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EFFECTS OF A SMARTPHONE APP-BASED YOGA ON EMERGENCY ROOM NURSE
BURNOUT

DNP Scholarly Project Paper

submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF NURSING PRACTICE

in Nursing Science

by

Robyn Lopez

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Doctor of Nursing Practice, Family Nurse Practitioner in Nursing Science

ABSTRACT OF THE DNP SCHOLARLY PROJECT PAPER

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Doctor of Nursing Practice, Family Nurse Practitioner in Nursing Science

University of California, Irvine, 2022

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Registered nurses make up approximately 30% of healthcare workers, yet there is still a critical shortage in this profession. The nursing shortage is a notorious phenomenon and accounts for devastation in healthcare, including sentinel events, lost costs, and poor health outcomes for patients and nurses. Yet, despite this, shortages continue to grow with no relief in sight. One of the identified factors of the nursing shortage is occupational burnout, defined “as a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed” and is characterized along three dimensions: 1) feelings of energy depletion or exhaustion, 2) increased mental distance from one’s job/ feelings of negativism or cynicism related to one's job and 3) reduced professional efficacy (WHO, 2019). Emergency Room (ER) nurses are particularly vulnerable to burnout, with nurses frequently calling off, changing positions, or leaving the profession altogether. ER nurses experience chaotic, unpredictable environments, frequent traumatic events such as unexpected deaths, injured children, and workplace violence more than any other specialty of nursing (Adriaenssens et al., 2012). ERs are frequently overcrowded and understaffed, leaving ER nursing stretched to their max. This toll often leads to mental health issues, substance use, and even suicide (Pietrantonio et al., 2008). In

the last few decades, studies have examined how to help healthcare workers, including nurses, deal with occupational burnout, what contributing factors play a role and how to reduce turnover rates.

Since feelings of stress and anxiety contribute to burnout, recent studies have also examined ways to mitigate these factors, including mindful-based practices and more specifically yoga. Yoga has proven to be a promising intervention to reduce burnout in the nursing population in emerging research. In this project, yoga was used as a modality specifically for the ER nurse population using a Smartphone application called DownDog®. Ten participants from various ERs; ranging in age, gender, and shift, engaged in 4 weeks of yoga, twice per week via the Smartphone app DownDog®. The project was to determine if after the 4 weeks, participant's feelings of stress, anxiety, and burnout were decreased using pre- and post-data from the Perceived Stress Scale (PSS), General Anxiety -7 scale (GAD-7), and Maslach's Burnout Index (MBI). The scales were provided via Qualtrics along with a short, post-semi-structured qualitative questionnaire. With a 60% compliance rate, quantitative measures showed improvement in anxiety levels, occupational exhaustion, depersonalization/loss of empathy, lack of personal accomplishment, and overall, burnout. In the qualitative portion, only one participant did not find the yoga intervention effective, while five considered it moderately beneficial, and three found it very beneficial. The intervention was found to be either somewhat or significantly useful for all participants. In the semi-structured survey, 7 out of 9 participants said they would continue yoga, while only one said they liked the yoga but would prefer an in-person class. In conclusion, the participants reported decreased feelings of anxiety and burnout after the 4-week intervention and the more classes taken by the participants, the more benefit was attained. Although limited to a small sample size and self-reported attendance, the feasibility of DownDog® along with the benefits of practicing yoga showed to have positive results and is a promising solution to ER nurse burnout.

CHAPTER I: INTRODUCTION

The Effects of Yoga on Emergency Room Nurse Burnout

Registered nurses are the most common occupation in healthcare and account for 30% of overall hospital employment in the United States (Bureau of Labor Statistics, 2020). Yet, there is a critical shortage of nurses (Haddad et al., 2020). Due to a lack of educators, excessive turnover, and unequal labor distribution, the nursing industry continues to experience shortages (Haddad et al., 2020). There are several reasons for the nursing shortage and issues to be concerned about (Haddad et al., 2020). The deficit is likely, at least in part, due to occupational burnout (BO) (Haddad et al., 2020). More than 40% of hospital staff nurses report considerable job-related BO, and more than one-fifth of hospital staff nurses intend to leave their jobs within a year, in part related to BO (Aiken, 2001). The Emergency Room (ER) nurses are a particularly vulnerable population at risk for BO due to the high-stress level associated with those positions (Adriaenssens, 2014). Yoga is an evidence-based modality that helps decrease stress (Christopher et al., 2006) and could be a valuable tool to implement with ER nurses to reduce stress and related BO. The project aims to evaluate whether participation in a 4-week Smartphone application-based yoga intervention can reduce BO in ER nurses.

Background

Burnout

Herbert Freudenberger first created the term burnout (BO) in 1974 to describe severe stress in helping professions (Freudenberger, 1974). The World Health Organization now defines BO (WHO, 2019) “as a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed” and is characterized along three dimensions: 1) feelings of energy depletion or exhaustion, 2) increased mental distance from one’s job/ feelings of negativism or cynicism related to one's job and 3) reduced professional efficacy (WHO, 2019). The three-dimensional model of BO is significant because it positions the individual's stress

experience in a social framework and includes the perception of both self and others (Maslach et al., 2016). Exhaustion's first dimension was characterized as energy depletion, debilitation, and fatigue (Maslach et al., 2016). The second, depersonalization, has also been referred to as irritability and disengagement (Maslach, 2016). The third dimension, inefficiency, describes low morale, low productivity, and an inability to cope (Maslach et al., 2016). Symptoms of BO can often overlap with depression and include fatigue, loss of interest, and avoidance (Maslach, 2016). BO has been linked to various adverse reactions and work withdrawal, including job dissatisfaction, poor organizational commitment, absenteeism, intention to leave the job, and turnover (Maslach, 2016). Given these characteristics, BO may be a critical factor in nurse attrition and must be addressed to combat the global nursing shortage (Maslach, 2015).

BO is increasingly becoming concerning for healthcare workers, primarily nurses (Abellanoza et al., 2018). Factors contributing to nursing stress leading to BO include responsibilities that exceed resources and expectations to provide immediate, safe, and compassionate care while juggling stressors such as changeable shifts, long working hours, and a noisy work environment (Khamis et al., 2015). The need to address this issue to mitigate further nursing shortages is critical. One suggestion is to provide self-care resources to ER nurses through the implementation of an Evidence-Based Practice (EBP) solution known to reduce BO in nurses, yoga (Patronis et al., 2021)

In a national survey conducted in April 2019, 15.6% of nurses reported a feeling of BO, with a higher prevalence among ER nurses (Ross et al., 2020). One study demonstrated that ER nurses are at exceptionally high risk for BO due to the workload, often unstable patients, overcrowding, unpredictability, and traumatic events such as unexpected critical injury and death (Zhang et al., 2020). Moreover, ER nurses work long, grueling hours, sometimes as long as 14 hours per shift, with short and infrequent breaks (Hunsaker et al., 2015). ER nurses are regularly exposed to distressing occurrences, and many reported significant traumatic events such as a

frequent witnessing of a child or adolescent death or significant injury occurring (Adriaenssens et al., 2012). Research suggests the high level of trauma exposure and stress are essential factors in the prevalence of BO in ER nurses (Adriaenssens et al., 2012).

Stress is defined as any intrinsic or extrinsic stimulus that causes a biological response in the body (Yaribeygi, 2017). Prolonged and repeated exposure to such traumatic events can tax the stress response system, leading to physical and mental health problems over time (Pietrantonio et al., 2008). According to Ardayfio et al. (2018), chronic stress can lead to anxiety. The study revealed chronic exposure to the stress hormone cortisol was linked to anxiety and other mood disorders (Ardayfio et al., 2018).

Anxiety disorders are the most common type of mental illness (Bystritsky et al., 2013). Anxiety can often lead to lower productivity, high morbidity and mortality rates, and substance abuse (Bystritsky et al., 2013). The most common anxiety disorders include generalized anxiety disorder, panic disorder, and social anxiety and are characterized by excessive worry, insomnia, and feeling out of control (Bandelow et al., 2017). Anxiety can perpetuate other illnesses and severely impact one's quality of life (Bystritsky et al., 2013).

Repeated exposure to stress can lead to anxiety, a critical factor in developing BO. A study revealed ER nurses frequently suffer from mental health ailments, including anxiety, addiction, depression, posttraumatic stress disorder (PTSD), and even suicide (Adriaenssens et al., 2012). A recent cross-sectional study with 216 participants found that the percentage of nurses who attempted suicide at least once in their lives was 9.41% (Santos et al., 2020). This contrasts with the 4% of the general public, ages 18 and over, reported by the Substance Abuse Mental Health Services Administration (SAMHSA) in 2016 (Piscopo et al., 2016). The negative psychological toll of stress is a significant contributor to nurse BO, which is associated with increased turnover rates and career attrition in ER nurses (Adriaenssens, 2012).

Yoga

Yoga is a 3000-year-old tradition used in ancient cultures for various health benefits and is classified by the National Institutes of Health as a form of complementary and alternative medicine (CAM) (Woodward, 2011). Although yoga is an ancient practice, current scientific evidence of its benefits is still emerging. Yoga's lack of scientific attention is likely since it is a diverse and complex intervention that includes poses, breathing methods, relaxation, and meditation, making it difficult to pin down the exact components of this practice that affect an individual's wellness (Bilderbeck et al., 2013). Nonetheless, there has been increasing evidence in the study of yoga in recent years (Bilderbeck et al., 2013). Emerging evidence shows yoga improves overall wellbeing and mood (Shapiro et al., 2008), decreases feelings of stress (Granath et al., 2006), and enhances life satisfaction (Hartfield et al., 2011) along with reducing feelings of anger and impulsivity (Nagendra et al., 2008). In a 2008 meta-analysis reviewing yoga interventions, *asana* (movement or poses) was the primary intervention modality (Ross et al., 2008). In another study, it was suggested yoga increases mindfulness (i.e., awareness of the present moment) and *pranayama* (breathing exercises), which can lower the stress response (Hoffman et al., 2016).

Yoga encourages relaxation by purposefully controlling the body with breath and movement, switching the function of the sympathetic nervous system (SNS) to our parasympathetic nervous system (PNS) (Granath et al., 2006). When the PNS is activated, blood pressure and heart rate decrease, causing vasodilation and allowing circulation to our digestive system, supporting relaxation and homeostasis (Granath et al., 2006). Moreover, the *asanas* are poses that incorporate deep stretching and strengthening while massaging the lymphatic system and bringing circulation to organs, and rejuvenating the nervous system (Aorora et al., 2008). The deep breathing and strength training of yoga has also been shown to decrease the SNS reaction and allow the individuals to respond to stressful situations by regaining balance and positivity (Ross et al., 2010). While the exact mechanism of action is unknown, some yoga poses are

thought to produce a shift toward PNS dominance, possibly by direct vagal stimulation (Shapiro et al., 2008).

Additionally, evidence has pointed to the hypothalamic-pituitary-adrenal (HPA) axis (Hartfield et al., 2011). When exposed to stress, the HPA and the SNS response results in the release of cortisol and catecholamines; this leads to a state of hypervigilance (Sterling, 2004). Over time, this repeated physiological response can lead to dysregulation in homeostasis or balance within the body (Sterling, 2004). Yoga has been shown to immediately affect the HPA response, resulting in downregulation of the stress response (Ross et al., 2008).

One of the benefits of yoga is its ability to reduce stress and anxiety, resulting in increased overall wellbeing (Ross et al., 2008). A recent study on the benefits of Kundalini Yoga (a yoga style that incorporates postures, breathing methods, meditation, cultivation of mind-body awareness, and deep relaxation) found those participating in yoga had reductions in PTSD, sleeplessness, perceived stress compared to a control group (Jindani, 2015). Moreover, a recent study comparing cognitive behavior therapy (CBT) and yoga on patients diagnosed with a generalized anxiety disorder (GAD) found that yoga showed promise for reducing symptoms of anxiety (Simon, 2021). Additionally, the sustained practice has led to crucial consequences such as a shift in perspective, increased self-awareness, and more energy to live life fully and with genuine pleasure (Desikachar et al., (2005).

Yoga has also been studied as a potential intervention to address BO in high-stress healthcare-related occupations such as mental health providers, nurses, and doctors (Cocchiara et al., 2019). The goal of yoga as an intervention is to provide participants with enhanced self-awareness tools that facilitate awareness of the simple unconscious, daily activities, and functions that have a cumulative contribution to their wellbeing (DelleValle et al., 2020). This, in turn, has led to the examination of the effects of yoga on BO in healthcare workers. A recent systematic review exploring yoga to mitigate stress in healthcare workers found yoga to be beneficial in preventing and managing physical and mental health problems (Cocchiara et al., 2019). The

review also highlighted the relative simplicity and low cost of implementing a yoga program for healthcare workers in a healthcare occupational setting. It is recommended healthcare management acknowledge the benefits of yoga in their employees (Cocchiara et al., 2019).

More specifically, mental healthcare students experienced increased feelings of wellbeing, decreased stress, and BO after participating in a yoga-based intervention. A program including mindfulness practices and yoga was implemented into their curriculum (Christopher et al., 2006). A pilot study incorporating a yoga-based program into a counseling faculty training program found that faculty reported improvements in overall wellbeing, calm, and happiness; blood pressure was reduced, and feelings of BO decreased (Thomley et al., 2012).

With technology advances and access to remote resources increasing, new literature on the feasibility and efficacy of a virtual yoga intervention is rising (Uebelacker et al., 2018). As evidence emerges, the delivery and style of yoga are still somewhat undefined in the research. In a study exploring the feasibility and acceptability of an online yoga modality on adults with mood disorders participants stated they were "pretty likely" or "very likely" to engage in another online yoga program (Uebelacker et al., 2018). After finishing the course, a statistically significant decrease in the negative effect on their mood (Uebelacker et al., 2018). Likewise, ten studies from a recent meta-analysis showed an online yoga modality was a feasible and efficient option for implementing yoga in populations ranging from breast cancer patients to adolescents and mothers of stillborn infants (Brosnan et al., 2021).

Problem Statement

In 2006, the World Health Organization (WHO) reported the projected nursing shortage in years to come will directly interfere with the wellbeing of nurses (Mudallal et al., 2017). This is due to increased impossible demands to meet growing healthcare needs along with the health of the international population at large (Mudallal et al., 2017). Indeed, a cross-sectional study exploring job satisfaction among 50,000 registered nurses in the US found that 80% reported job dissatisfaction emanating from BO (Shah et al., 2021). A 2020 survey of 1688 direct patient care

nurses found BO was a significant factor in turnover and job change (Kelly et al., 2020). This is a critical problem for the healthcare system as, more broadly, the average cost to an organization for losing one nurse ranges from \$11,000 to \$90,000 (Halter et al., 2017). With turnover rates increasing exponentially, this could lead to a fiscal crisis for healthcare systems and a diminished capacity to provide patient care (Halter et al., 2017).

A 2017 meta-analysis focusing on the three key components of BO (emotional exhaustion, depersonalization, and personal accomplishment) indicated that ER nurses' primary source of BO was the experience of work-related stress leading to ongoing anxiety that eventually resulted in BO (Urquiza et al., 2017). More specifically, ER nurses suffered worry and stress linked with high emotional exhaustion (Urquiza et al., 2017). Likewise, substandard working conditions, workplace violence, understaffing, and lateral violence led to increased depersonalization (Urquiza et al., 2017). In turn, personal issues that occurred - likely a result of their emotional exhaustion and depersonalization - were associated with feelings of low personal accomplishment (Urquiza et al., 2017). The notion that stress and anxiety play essential roles in BO was further confirmed in a recent study showing that chronic stress leads to anxiety contributing to BO (Oosterholt et al., 2018). Further research highlighted the important link between anxiety and BO, suggesting that since anxiety can be less challenging to diagnose, early diagnosis and treatment may help prevent BO over time (Govêia et al., 2018). With this, a possible solution to decrease BO in the ER nursing population is to implement a known modality that reduces stress and anxiety.

As BO continues to affect nursing shortages, deleterious impacts on our population's health are at risk. With the growing body of evidence of the positive effects of yoga on BO and related outcomes (e.g., stress and anxiety) coupled with the feasibility and efficacy of virtual access, yoga via a smartphone app could be an effective and low-cost modality to reduce burnout in ER nurses.

PICO

Can participation in app-based yoga intervention reduce the self-report of occupational burnout and related symptoms (i.e., perceived stress and anxiety) in ER nurses?

CHAPTER II: Body of Evidence

Review of the Literature

Search strategy

To conduct the literature search, the following databases were used, PubMed and Google Scholar. Boolean operators included "Nursing" OR nurs* OR "Nurses" AND Burnout, Psychological"[Mesh] OR "Compassion Fatigue" OR compassion fatigue OR burnout OR burnout AND "Yoga" OR yoga OR yogic OR Hatha. Initial screening found a total of $n=443$ potential articles. After removing 123 articles identified as duplicates, 320 unique articles remained. Screening of the articles by title yielded $n=162$. After reviewing the abstracts, $n=31$ was excluded based on the study population (e.g., prisoners, students, children, etc.). Unavailability of complete texts, redundancy, and additional duplications; $n=40$ met eligibility and were screened further. The remaining articles were excluded for reasons (1) missing the search term "nurses" (for example, several articles' participants were non-healthcare workers); (2) "not yoga specific" (for example, several studies included meditation; but they were not specific to yoga). This left $n=9$ articles that focused on yoga as an intervention to reduce employee BO. The non-nursing employee populations studies included healthcare workers, teachers, first responders, and nursing faculty. Of note, those articles included some yoga interventions presented as a component of a larger mindfulness class (e.g., mediation and yoga). See Appendix A.

Appraisal of Evidence

Because out of the $n=9$ articles related to the effects of yoga on occupational, BO only included four articles directly relating to nursing; the evidence was appraised as primary, nurse specific ($N=4$), and secondary, non-nursing occupations ($N=5$). See Appendix B.

Primary Evidence

The primary evidence showed promising results of the effects of yoga on nursing BO, but overall, the evidence is thin and still emerging. Fang et al. (2015) was a randomized control trial (RCT) exploring yoga's effects on Chinese nurses. The study used a convenience sampling method and assessed sleep quality and work stress (Fang et al., 2015). Alexander et al. (2015), a pilot RCT. All articles were on nurses as part of the inclusion criteria (nursing). However, the specialty and/or area of nurse varied. Alexander et al. (2015) examined the effects of yoga on occupational health nurses, whereas Meharabi et al. (2012) focused on Intensive Care Nurses (ICU) nurses. In Patronis et al. (2021) and Fang et al. (2015), any specialty nurse within the hospital was eligible to participate.

Fang et al. (2015) used a workout area designated for employees at a hospital in China. Alexander et al. (2015), Patronis et al. (2021), and Meharabi et al. (2012) used a room within the healthcare setting. Patronis et al. (2021) allowed an online class to be taken via a web-based program in addition to the in-person courses. All four articles used yoga as the intervention, and the styles varied slightly. Alexander et al. (2015) and Patronis et al. (2021) used relaxation and breathing techniques as part of their program. In contrast, Meharabi et al. (2012) used Hatha yoga, and Fang et al. (2015) did not specify the style of yoga used in the intervention. Fang et al. (2015) spanned ten months, having the nurses participating in an unspecified number of classes, whereas the other three, Alexander et al. (2015) and Patronis et al. (2021), and Meharabi et al. (2012), held their studies for an 8-week period.

All (N=4) studies included in the primary literature showed promising and positive outcomes concerning the impact on yoga and nurse burnout. However, secondary outcomes related to BO were also assessed. Fang et al. (2015) concluded yoga could improve sleep quality and decrease stress. Alexander et al. (2015) reported promising, positive results of yoga decreasing feelings of BO in nurses. Still, they noted that more research is warranted due to the small number of existing studies and the sample sizes and recommended a longitudinal design (Alexander et al., 2011). Patronis et al. (2021) reported feasibility and success, stating a brief

session of a mindful movement program, primarily yoga, is realistic and could reduce BO.

Meharabi et al. (2012) concluded eight weeks of yoga exercises and relaxation techniques could improve feelings of wellbeing.

Secondary Evidence

The secondary literature is essential and purposeful because it provides broader evidence on the effects of yoga on occupational BO, besides the fact that the professions are non-nursing. The style of yoga, setting, and intervention differed slightly, but all studies' outcomes were similar, with positive and promising results on the effects of yoga on occupational BO.

Kavermaci et al. (2021) examined the effect of yoga on job satisfaction in nursing faculty in Eastern Turkey. Trent et al. (2019) explored improvements in occupational wellbeing utilizing a pragmatic controlled trial that placed participants in a yoga-based immersion program. In contrast, Hilcove et al. (2021) use a single-blinded RCT to explore the effects of yoga on various healthcare professionals. And Ofei-Dodoo et al. (2020) conducted a pilot study of a mindfulness program including yoga to examine the impact of self-care and compassion on healthcare professionals.

Kavermaci et al. (2021) studied nursing faculty, while Trent et al. (2019) focused on front-line workers and included police, mental health workers, teachers, and nurses. Hillgrove et al. (2021) studied any professional involved in direct patient care in a healthcare setting, including social workers, assistants, physicians, and nurses. Ofei-Dodoo et al. (2020) focused on healthcare workers in a hospital setting. Trent et al. (2019) held the intervention at the Krapula Center for Yoga and Health in Massachusetts. In contrast, Hilcove et al. (2021) and Ofei-Dodoo et al. (2020) held yoga classes in an empty room in the employment hospital. The Kavermaci et al. (2021) study was conducted in a vacant room in a nursing institute in Eastern Turkey.

A five-day immersion yoga retreat with participants was conducted by Trent et al. (2019). Hilcove et al. (2021) delivered classes twice weekly with a mix of Hatha and Raja-style yoga. The lead author also the instructor made a DVD for participants to take home and practice if they

missed a class. A combination of Vinyasa and Yin Yang yoga was held weekly in Ofei-Dodoo et al. (2020), with a combination of mindfulness-based activities such as meditation and self-reflection. Lastly, Kavermaci et al. (2021) conducted classes twice a week, including breathing exercises, sitting, and lying, followed by 10 minutes of deep relaxation.

Trent et al. (2019) conducted the intervention over five days in an immersion-style setting. Participants practiced 5 hours per day, and results showed improvement in occupational BO two months after the study (Trent et al., 2019). Hillgrove et al.'s (2021) intervention period was six weeks, whereas Ofei-Dodoo et al. (2020) and Kavermaci et al. (2021) both conducted eight-week interventions.

All (N=6) articles reviewed showed a positive relationship between participation in a yoga intervention and reduced feelings of BO in employee BO. Kavermaci et al. (2021), who studied academic nurses, found yoga positively affected job dissatisfaction and BO. The authors suggested places of employment might be able to provide "yoga halls," where, at any given time, employees could take a break to do yoga and reduce stress. Like other studies, the authors recommended more extensive and longitudinal studies to bolster the strength of their inferences (Kavermaci et al., 2021). Trent et al. (2019) concluded the program implemented was successful, but more research is needed to confirm this. Hilcove et al. (2021) showed statistical significance in the positive outcomes of yoga on BO, and Ofei-Dodoo et al. (2020) concluded that mindful-based yoga could improve BO in healthcare.

Comprehensive Synthesis of Evidence

Although the literature shows that yoga may be beneficial for reducing BO in occupational settings, including nursing, there are gaps in knowledge about how this can be applied in the ER nursing population specifically. Moreover, whether a virtual implementation is practical and feasible for ER nurses. Most of the literature presents "in-person" yoga classes utilizing different yoga techniques, making it difficult to pinpoint what variation of yoga may be most beneficial to BO. However, in a recent metanalysis looking at ten articles conducted on

virtual Hatha yoga programs, yoga showed positive outcomes on other populations (i.e., breast cancer patients, mothers giving birth to stillborn infants, cardiac patients, and adolescents) (Brosnan et al., 2021).

Adherence

Measurements of adherence, compliance, and consistency also varied from study to study. For example, Fang et al. (2015) used a mandatory sign-in sheet, whereas Hilcove et al. (2021) encouraged participants to keep a log of each time they practiced; the others did not present any adherence metrics or attendance.

Class Structure

Class structure and environment also differed. For example, Hilcove et al. (2021) and Patronis et al. (2021) provided options for make-up classes, while the other studies did not offer this option. While in Patronis et al. (2021), yoga was practiced at work before a shift, the place of implementation in Trent et al. (2019) was an immersion program at a retreat away from home and work. These different implementation environments may have significantly contributed to altering the studies' outcomes.

Yoga Style and Instruction

The style of yoga implemented also varied in the studies. Alexander et al. (2015) focused on restorative, a gentle style with incorporated breathing techniques. Mehrabi et al. (2012) on Hatha, Hillcove et al. (2021) a mixture of Raja, a traditional/ Eastern style of yoga, and Hatha, a more traditional/Western-style (Ofei et al. (2020), a mix of Vinyasa, a sequence of poses or “breath to movement” and Yin (relaxing) Yang (physically challenging) and Fang et al. (2015), Alexander et al. (2015), Kavermaci et al. (2021) didn’t specify. In three of the studies, Alexander et al. (2015), Hilcove et al. (2021), and Mehrabi et al. (2012), the instruction was given by the lead investigator, and the others had trained yoga instructors teaching the class.

The literature used a combination of qualitative and quantitative research methods; some research used a control group, and others evaluated post-intervention scores to pre-intervention

scores. In Fang et al. (2015), the conclusion focused on yoga improving sleep, thus reducing stress. In Alexander et al. (2015), different elements of BO, including higher self-care and less emotional exhaustion, were measured, and all outcomes showed improvement after the 8-week intervention. Hillcove et al. (2021) concluded that yoga increases the sense of wellbeing and alleviates stressful feelings towards the nurse's place of employment. Comparison groups varied. Trent et al. (2019), Fang et al. (2015), and Hilcove et al. (2020) included used a control group, as did Alexander et al. (2015). Mehrabi et al. (2012), Kavermaci et al. (2021), Ofei et al. (2020) and Patronis et al. (2021) used pre-data as the control.

Summary of Evidence

While evidence suggests yoga is an effective intervention to reduce burnout and related symptoms in healthcare workers, studies with ER nurses have been limited. Furthermore, few studies have explored yoga delivered via a smartphone app, although there is emerging evidence supporting virtual yoga as an intervention for stress (Wadhen et al., 2021). Therefore, the following were identified as existing gaps 1) yoga has not been used as an intervention for ER nurses specifically 2) yoga is yet to be fully recognized as a solution for BO and stress reduction in ER nurses 3) there is limited evidence in the use of virtual yoga as the intervention modality. It is recommended that applying an existing yoga program or application via a smartphone that can be verified would strengthen the existing literature.

Evidence-Based Recommendation for the Project

With technology emerging, virtual yoga programs are a feasible, effective modality to apply the benefits of yoga (Uebelacker et al., 2018). The app Down Dog ® was chosen for implementation based on positive reviews from multiple sources, including Business Insider Magazine, Yelp, and Apple App. Additionally, the app offered donations for the participants of this project and a 'healthcare worker' discount during the COVID-19 pandemic, which displayed support for the cause. The project will address the three gaps mentioned above. The measurement tools will provide information on the perceptions of stress, anxiety, and BO in the ER nursing

population. Next, ER nurses will exclusively be our study population. This project will also use the same yoga class from one application, Down Dog®, which since pre-recorded, ensures zero variance in the class. Participants will also be asked to submit proof of the class taken to ensure consistency and track deviation.

CHAPTER III: PROJECT FRAMEWORK

Conceptual Model

The Coping Reserve Tank model was created by Dunn et al. (2008) and promoted resilience which led to decreased BO in medical school students. The concept posits that sound mental health is essential for developing and preserving empathy, compassion, and commitment in the medical occupation (Dunn et al., 2008). The “tank” or “reserve” of the model “houses” the coping supply of the student along with their personality and temperament factors. The “tank” then receives negative and positive output, which results in one of two outcomes: resilience or BO (Dunn et al., 2008). In other words, a variety of positive, "filling or replenishing the reservoir" and negative "draining the reservoir" inputs, together with the reservoir's structure, can lead to beneficial effects (such as relaxation and improved mental health) or adverse effects (such as BO) (Dunn et al., 2008). The Coping reserve tank theorizes that if the provider can mitigate the negative input with replenishing factors such as social support, mentorship, and intellectual stimulation, the outcome is more likely to be resilience than BO (Dunn et al. 2008).

Implementation of self-care practices such as mediation, mindfulness, and yoga could potentially achieve this.

The link between stress and BO is becoming more widely recognized in the nursing community. Because ER nurses are particularly susceptible to BO. They must be provided with the self-care resources to reduce their stress and anxiety and the skills to maintain these reservoirs over time. In this way, their growth as professionals capable of caring for themselves and others can accelerate, rather than the stress related to ER nursing spiraling into BO and nursing attrition. Based on this concept, nurses also require sound mental health, highlighting the importance of

preservation and resilience. Yoga may be a feasible and effective way of replenishing coping to avoid BO. See Appendix C.

Logic Model

The Conceptual Model of Mindful Yoga was designed to reduce stress in school-aged children by implementing mindful yoga (Mandelson, 2010). This model was then used to explain how mindful yoga can help a student learn and utilize skills taught in a school setting (Dariotis, 2016). The model proposed that repeated toxic stress exposure harms stress responses, negatively affecting cognitive functioning and emotional regulation capacities and, as a result, increasing the probability of unfavorable emotional and behavioral outcomes. (Mandelson, 2010).

Mendelson (2010) hypothesized yoga could improve the regulation of stress and emotion through the practice of being aware in the moment, breathing exercises to decrease the body's stress response, and attention training (Mendelson et al., 20210). Both studies showed promising results in this model and had success with their outcomes; the application of yoga as a self-regulation tool reduced the stress response (Mendelson, 2010). The model further includes a direct relationship connecting mindful yoga and outcomes to form other results that changes in self-regulation may not mediate.

Although school-age students and ER nurses are quite different, the concept of creating a modality (yoga) to promote stress reduction is what will guide this project using this model. Chronic stress exposure, the independent variable, will be mitigated by yoga, the intervention which in turn decreases feelings of BO in the ER nurse population. Yoga will allow for adjustment of emotional and physical regulation, increase ER nurses' ability to manage, and decrease job-related stress resulting in less BO. See Appendix D.

CHAPTER IV: METHODS

Project Purpose

The purpose of this project was to evaluate the potential benefit of an app-based yoga intervention for ER nurses to reduce BO and related symptoms (i.e., perceived stress, BO). This,

in turn, would have the potential to provide a feasible and effective solution to BO in the ER nursing population.

Project Goals

Short-term goals included assessing adherence to the program over the four weeks, while intermediate goals were if participation in the app-based yoga intervention was associated with decreased self-reported BO, perceived stress, and anxiety after four weeks of yoga. Long-term goals included participants developing a yoga practice and continuing after the project was completed, potential dissemination on a broad level, and an overall decrease of BO in ER nurses.

Project Description

Project Type/Design

The project was a practice-based, qualitative, and quantitative DNP Project, measuring stress, anxiety, and BO via pre and post data with yoga via DownDog® as the intervention. Since this project was not an actual research study but rather a DNP scholarly project, the focus was on applying an existing evidence-based practice (EBP), yoga and applying it to an identified problem affecting healthcare delivery, ER nursing BO.

Project Timeline

The proposal of this study was presented on December 6, 2021, to Dr. Dana Rose Garfin and Dr. Susanne Phillips. Once approved, the implementation portion of the project began in January of 2022. Participants continued to be recruited until the sample size of at least 15 was achieved in late February 2022. The yoga intervention took place in March 2022. Data was collected from completed surveys and a brief structured interview in April 2022. Analysis of the data was collected, interpreted, evaluated by May 1, 2022. See Appendix E.

Project Setting

The participants were allowed to choose a quiet, uninterrupted space, to practice yoga. We assumed most participants would practice at home, however, we let participants know it was acceptable to practice elsewhere, such as in a park, an empty room in a community center, etc.

They were aware they were welcome to use a mat, props such as blocks, or straps, but was unnecessary and was not provided to them by the investigators. They used the Down Dog® Smartphone application as the yoga intervention.

Project Population

Participants were recruited using a convenience sample obtained by email and word of mouth. Although power analysis derived from (Alexander et al., 2015) recommended $N=40$ nurses, the samples in the primary evidence reviewed ranged from 20 to 130. Based on the feasibility of recruitment and the project timeline, my initial goal to obtain a sample of $N=20$ for this project.

Arrangements were made with two ER Managers to deliver an email to all ER nursing staff. I also reached out to the advertising representative for ENA to promote the project by allowing me to recruit via organization emails to nursing staff and members, but to no avail. After nurses were recruited, eligibility was determined via a short inclusion/exclusion criteria form via email. Inclusion criteria include being over the age of 18, the willingness to complete the 4-week program, not currently practicing yoga, no current injuries, and at least two years of ER experience and currently working as a nurse. Exclusion criteria include serious illness or orthopedic injury.

Stakeholders/Barriers

All but 3 of the participants worked at Huntington Memorial Hospital, making this hospital the main stakeholder. Two nurses worked at Methodist Hospital and one at USC County. The smartphone application Down Dog® was a supportive resource, donating a free subscription to participants beyond the length of the study, therefore, is also considered a main stakeholder. Additionally, from a business aspect as they have recently launched a yoga program specifically for organizations to partner as an employee benefit, which this project supports.

Barriers included recruitment without large incentives for ER nurses who are typically busy and may have seen this project as extra work or time-consuming. Additionally, adherence

and attrition proved to be barriers along with cooperation in completing the classes. However, it is likely the donation from Down Dog® helped overcome some of these barriers.

Description of Intervention

Based on the success of the Brosnan et al. (2021) meta-analysis of the feasibility and delivery of virtual Hatha yoga, the intervention initially consisted of a Hatha yoga practice for 4-weeks. Participants were asked to practice the Hatha yoga twice per week for 30 minutes. The yoga classes were administered via the smartphone application Down Dog®. In the Down Dog® app, there were several different types of yoga; for this study, initially, Hatha Yoga, Beginner 1 was suggested. This class I included breath-to-movement and gentle stretching and follows a sequence of poses or salutations such as Sun Salutation A and B. See Appendix I. After more than one participant suggested choosing any class from the app, the Hatha requirement was eliminated, and any class style was deemed acceptable if the time remained 30 minutes. A 3-minute time of rest called Savasana or "dead corpse" pose, which is meant to restore and relax by focusing on your breath and promoting a meditative state.

The nurses were asked to take the yoga classes in a quiet environment at whatever time of day they prefer. Attendance was initially planned to be verified by the historical record in the application; participants were asked to take a screenshot of the history and use the feature "share" to send confirmation of their class participation immediately after they complete each class. During the study, however, only one participant sent the screenshot, so instead, a self-report of how many classes they took was included in the post survey.

Measures/Instruments

The Maslach Burnout Inventory

There are multiple measurement tools to determine BO, the most widely used being the *Maslach Burnout Inventory* (MBI) (Poghosyan et al., 2009). Creators, Maslach and Jackson, developed three subscales based on the three key dimensions of BO (Maslach et al., 2016). There they examined the outcomes of the three subscales and found positive psychometric qualities.

They then determined convergence by correlating the three scores, which further validated the accuracy of the MBI (Poghosyan et al., 2009). Each item is assessed using a Likert-type response option evaluating the occurrence of symptoms ranging from 1=*never* to 7=*every day*. Subscale scores for the three dimensions of BO are calculated separately, then converted into a total score. Subscales include Overall score for occupational exhaustion, depersonalization / loss of empathy and personal accomplishment assessment. Conceptually they are measuring three different dimensions, the subscales provide more depth, and the total scale is the composite. (Mukherjee, 2020) The MBI was chosen as the tool to measure BO. See Appendix G.

The Perceived Stress Scale

The Perceived Stress Scale (PSS) was chosen to measure stress. The PSS is psychometrically reliable and the most widely used measurement tool for assessing perceived stress (Hyun Lee, 2012), or the degree to which external demands exceed one's perceived ability to cope (Nielsen, 2016). The PSS evaluates the frequency that an individual perceives life as unpredictable, uncontrollable, and overloading in the past month. It has six negative and four positive items, with answer choices ranging from 0=*never* to 4=*very often*. The total score of PSS is calculated by reverse scoring the positive questions and then summing all things, with a higher score indicating higher perceived stress (Huang, 2020). See Appendix H.

The GAD-7

For the anxiety measure, The Generalized Anxiety Disorder scale (GAD-7) was chosen. The GAD-7 is a widely used diagnostic self-report measure for anxiety disorder screening, diagnosis, and severity evaluation (Jordon et al., 2017). In a study examining the validity of the GAD-7, results showed reliability, criteria, construct, factorial, and procedural validity of the seven-item anxiety scale (GAD-7) (Spitzer et al., 2006). The scale proved a sensitivity of 89% and specificity of 90% and concluded in clinical practice and research; that the GAD-7 is a viable and efficient tool for screening for GAD and measuring its severity (Spitzer et al., 2006). The scale will ask the participants to provide a score of 0=*never* to 3=*nearly every day* in response to

seven questions. The questions range from 'feeling nervous, anxious, or on edge?' to 'trouble relaxing?' and 'being so restless it is hard to sit still. The scale has been proven valid for self-administration (Spitzer et al., 2006). See Appendix L.

Descriptive Variables Questionnaire

A descriptive variables section will be included in the post survey where participants will be asked the following information. Time of practice (morning, evening or varied) was the intervention beneficial (no, somewhat, or very) and was it feasible (no, somewhat, or very).

Post- Interview

Included in the post data survey will also contain a short survey with the questions 1) Do you plan to continue yoga? 2) Why or why not? and a box for comments and free text.

Data Collection Procedures

Emails were sent to the managers of 2 large urban hospitals, Huntington Hospital in Pasadena, CA, and UCI Health in Orange, CA. In addition, the advertising department of the ENA was contacted, however I did not receive a reply after one additional follow up. The emails sent to the two managers described the project in detail and requested permission to contact the entire ER nursing department of each to recruit participants. The emails highlighted the importance of mental health and suggested a meeting to further discuss. See Appendix I.

Additionally, an email was sent to Down Dog® through the 'contact us' feature in the app. The email included details of the project and an interest in discussing a discount for participants to subscribe. A representative for Down Dog replied they are willing to donate free memberships to all participants until July 2022. See Appendix J

Additional accommodations for availability were made per each participant's needs. All correspondence took place over email, including information on the questionnaires, the MBI, GAD-7, and PSS. The emails also provided instructions on downloading the Down Dog® application and inputting the code UCIRVINE to access their free six-month subscription. Participants then were recommended to select the gentle Hatha option at a Beginner 1 level for 30

minutes, with a 3-minute Savasana's. They were asked to take two classes per week at their convenience for four weeks totaling eight classes each.

Participants were asked to complete the pre-measures, the MBI, GAD-7, and the PSS at least one week before beginning the classes, then again on week 5. The MBI, GAD-7, and PSS were administered before the intervention (week 0) and shortly after completion (week 5). Data was initially filled out by pen and paper and collected and entered manually but was eventually changed to a Qualtrics survey and collected in that manner pre- and post-intervention.

Data Analysis Plan

Frequencies and percentages were examined using SAS v9.4 as the sample size was not large enough for formal statistical analysis. Covariates including age, sex and shift were included but not analyzed as there was not enough data provided by the participants. The self-report of yoga classes was looked at independently then compared to each's pre and post data scores.

The data was then used as information to answer questions related to this project. Three questions expected to be answered were 1) Did the participants experience decreased feelings of anxiety? 2) Did they experience decreased feelings of stress? 3) Did they experience decreased feelings of burnout? In addition, how many yoga classes were completed and what were the participants thoughts based on the short post qualitative survey. The information was derived from the data collected from the MBI, GAD-7, the PSS and the qualitative open-ended survey provided post intervention.

Ethical Considerations

This is a non-research project, as new knowledge is not being created. Rather an existing Evidence based Practice (yoga) is being used as an intervention for an existing clinical problem (ER nurse BO). For these reasons, the official University of California, Irvine, Institutional Review Board (IRB) non-human subject IRB form will be used and filed online using Quali@. Subjects were engaged in physical activity; although gentle and low-exertional, participants were

still screened to eliminate any prior orthopedic injuries, health issues, and previous yoga experience through email.

All information collected from participants and will not include any patient identifiers. The risks and benefits of the project was explained via email during the screening and participant confidentiality was assured by coding the participants using unique identification numbers. The list of participants and their identifying numbers will be kept locked in a place only accessible to the DNP student. All electronic files containing identifiable information will be password protected to prevent access by unauthorized users, and only the DNP student will have access to the password.

Implications

Implications for this project were to decrease feelings of BO in the ER nursing population. Additionally, an increase in feelings of wellbeing and decreased stress and anxiety in the population's everyday lives. This project was intended to introduce yoga as a tool, which participants could use to improve their overall wellbeing even after the 4 weeks intervention. Further implications were long-term health, physically and mentally, stress and anxiety reduction. It was also intended to initiate engagement of yoga within the participants, creating a pleasurable experience in which they would resume after the project ended and continue to reap the benefits of a yoga practice. Next, reducing healthcare costs and improving patient care due to decreased BO were also implied in this project. The healthcare industry is at significant risk for an even more severe nursing shortage, the very profession that makes up most of the healthcare system. This project was intended to provide the healthcare industry a feasible solution to one of the factors, BO, contributing to this problem. If applied to this population, healthcare organizations have the potential to decrease the amount of turnover and absenteeism, resulting in ER nurses staying within the profession, thus contributing to mitigating the nursing shortage.

Formative and Evaluation Plan

Formative evaluations were ongoing via email. Changes and accommodations took place when needed during all phases of the project. In addition, the post-intervention survey asking a series of open-ended questions was provided to participants. The delivery method for the survey was via Qualtrics included questions such as 1) Do you plan to continue doing yoga? Why or why not? 2) Please provide any additional feedback (positive or negative), in which a box was provided for free text. All pre and post data was collected and evaluated and summarized.

Sustainability Plan

This project was entirely virtual and allowed participants to participate in the intervention as their schedule allowed. The yoga in this intervention did not require equipment other than a mat, if preferred and the smartphone application Down Dog®. The ease, flexibility, and low cost of yoga are ideal for implementation for feasibility and affordability. Additionally, yoga is typically seen as a modality or tool for stress management, and once learned, nurses can implement it themselves virtually, anywhere at any time.

Dissemination Plan

Dissemination plans include an oral presentation to an audience of UCI nursing students and professors on May 19, 2022. Potential additional dissemination plans include presentations at ENA conferences, submission to the American Nursing Association, ENA, Journal of Emergency Medicine, Holistic Journal of Nursing, Yoga Journal, CAM Journal, and American Holistic Nurses Association for publication. This entire paper will also be sent to DownDog® and can be used as advertisement however they like. Partnering with DownDog® and meeting with healthcare organizations individually to discuss the app's employee benefit membership may also be a beneficial and feasible plan to create awareness and propagation.

Budget Plan

Because formal research was not conducted, there was no monetary resources for this project. The recruitment was conducted through word of mouth with assistance from Emergency

Department managers and participants were incentivized by complementary yoga access from the DownDog® until July of 2022.

CHAPTER V: RESULTS

Data Analysis

Fifteen participants agreed to participate in the project. The demographics for this population consisted of two males, one non-binary gender, and eight females. 7 participants worked days, three worked midshaft and five worked nights.

Collection of Data

Initially, the method for data collection, pre and post, was by “pen and paper” method, meaning the primary measures (MBI, the PSS and the GAD-7) were sent out as PDF attachments. Participants were asked to complete the scales electronically via PDF, or by printing them off, filling them in, then scanning, then sending back. A total of eight participants completed the pre-intervention survey via “paper and pencil” format over 3 weeks. I speculated the effort required to complete the scales might be contributing to the delay and low completion rate of the remaining seven participants. Thus, a potentially more convenient method of completing the scales was implemented: a Qualtrics electronic survey was created and sent to participants. Within a week, seven more surveys were completed via Qualtrics; thus, all fifteen (100%) participants completed the pre-data metrics.

Of the eight participants who completed the pre-data survey via “paper and pencil” format, four completed the post-intervention survey via Qualtrics, and four did not complete the post-intervention survey. Of the seven participants who completed the pre-intervention survey via Qualtrics, six completed the post-intervention survey via Qualtrics. Thus, participation for the pre-intervention study was 100% (N = 15); complete data from both pre-and post-intervention surveys was available for 67% (N = 10) of participants.

Missing Data

Due to a formatting issue in the pre-intervention paper and pencil survey, (N=6) participants did not complete the first question of MBI, an item of the occupational exhaustion subscale. Thus, a mean from the available data was used for these participants, which creates less bias than listwise deletion (Kang, 2013).

Quantitative Findings

Pre-Intervention Survey Results

See table 1.

Before the yoga intervention stress and anxiety scores varied among participants, with stress scores higher overall than anxiety, 75% reporting moderate stress. Scores from the MBI were more consistent among participants with 100% participants reporting a low degree of personal accomplishment and the highest subscales, occupational exhaustion, and depersonalization/loss of empathy, within the high range for 80%.

Post-Intervention Survey Results

See Table 1.

After the yoga intervention, ten out of the fifteen participants completed the PSS, the GAD-7, and the MBI (60% retention) from pre-intervention participants. Of these, for the PSS scores did not change, there may have been variance on what participants answered each question, but the percentages for the scores stayed the same. On the GAD-7 the participant's anxiety scores improved slightly and MBI scored improved in all subscales.

Table 1. Descriptive Statistics Perceived Stress Scale (PSS), Generalized Anxiety Disorder Scale (GAD-7), and Maslach Burnout Inventory (MBI) between Pre- and Post-Yoga Intervention

Variable	Pre-Intervention N (%)	Post-Intervention N (%)
PSS		
Low	1 (12.5)	1 (12.5)
Moderate	6 (75.0)	6 (75.0)
High	1 (12.5)	1 (12.5)
GAD-7		
Minimal	2 (25.0)	3 (37.5)

Mild	3 (37.5)	2 (25.0)
Moderate	1 (12.5)	3 (37.5)
Severe	2 (25.0)	0 (0.0)
MBI: Occupational Exhaustion		
Low	3 (37.5)	3 (37.5)
Moderate	2 (25.0)	4 (50.0)
High	3 (37.5)	1 (12.5)
MBI: Depersonalization/Loss of Empathy		
Low	0 (0.0)	2 (25.0)
Moderate	1 (12.5)	2 (25.0)
High	7 (87.5)	4 (50.0)
MBI: Lack of Personal Accomplishment		
Low	0 (0.0)	0 (0.0)
Moderate	0 (0.0)	1 (12.5)
High	8 (100.0)	7 (87.5)
Overall Burnout		
Low	5 (62.5)	7 (87.5)
Moderate	0 (0.0)	0 (0.0)
High	3 (37.5)	1 (12.5)

Intervention-Specific Post-Survey Analyses

See Table 2. Of the ten participants who completed the post-intervention survey, one participant did not complete any yoga sessions, that participants stress score increased while anxiety BO remained the same. On the other hand, the participants who engaged in at least 1 yoga session had improvement in MBI scores and either improvement or no change in anxiety and stress. Even more significant, the participants who took between 6-10 classes had the most improvement overall in anxiety and BO scores.

Table 2. Descriptive data of improvement in data scores related to amount of Yoga

Yoga sessions	Participants	PSS scores	GAD-7 scores	MBI scores
0	1	Increased	No change	No change
1-5	3	No change	No change	Improvement
6-10	4	Decreased	Improvement	Improvement
>10	2	Decreased	Improvement	Improvement

Additional Descriptive Data

Of the nine participants who completed at least one yoga session, most completed the sessions in the morning (N = 4), one completed the sessions in the evening, and four completed

the sessions at variable times. Only one participant did not find the yoga intervention beneficial, whereas five found it somewhat beneficial, and three found it very beneficial. All participants found the intervention somewhat (N = 4) or very (N = 5) beneficial. Although one participant found it not at all feasible to continue their yoga practice, most (N = 6) found it somewhat feasible, and two found it very feasible.

Qualitative Findings

See Table 3 for results of responses to the open-ended responses.

Table 3. Responses to Open-Ended Questions from Post-Intervention Survey

Do you plan to continue doing yoga? Why or why not?
“Maybe. Depending on children. It’s been difficult to complete.”
“No. In person was better than alone with an app. Hits different.”
“Yes.”
“Yes, because it helped my body and mind relax.”
“Yes, the difficulty and calmness it provided enabled a space for conscious relaxation and deep self-reflection.”
“Yes. It’s very good for the body, mind, and soul.”
“Yes. Just by setting time aside for myself was beneficial. Doing yoga in the morning helped me settle my mind and get my body moving and start the day out better.”
“No time.”
Please provide any additional feedback (positive or negative) in the space below.
“I think anyone would benefit from yoga, even my children were eased by its simplicity.”
“Not enough time in the day.”
“Very cute app!”
“I guess sometimes it helps.”

Summative Evaluation

The recruitment process involved a convenience snowball method that used word of mouth via an email sent to two large Emergency Departments. A total of 20 participants displayed interest, and on January 11, 2022, to those 20, another email was sent with broad details of the project. From there, 15 participants agreed to participate, and a detailed email was sent out with specific instructions, the PDF attachments of the scales and dates of the project. Only 3 participants replied to the first email, so an additional “gentle reminder” was sent on January 24th. An additional two participants responded at that time.

On January 27, the pencil paper method of data collection mentioned above was replaced with a Qualtrics survey. Although 8 participants completed the pre-data via “pen and paper”, it took almost 3 weeks. With the “pen and paper” method the raw data was input by hand and a coding number had not been assigned to the participants. However, after the Qualtrics survey was created, participants received a coding number for data collection purposes. When the post survey was sent out to all the participants, those 8 who completed the pen and paper method initially (and did not have a number assigned to them) reached out to me inquiring about “a number the survey is asking me about.” I then sent an email to those 8 participants with their coding number to complete the post survey. After this, post-data collection was seamless due to the survey and the simplicity of the pre- and post-data being the same scales used throughout the project.

The initial low and slow recruitment process was likely related to participants being asked to complete the scales in “pen and paper” format. This may have been due to participants not being familiar with filling in PDF electronically or found that printing them, completing them, then scanning them back was too cumbersome and time consuming. Once this realization was made, the Qualtrics survey, more convenient and efficient was sent out. However, by March 7, I had received all the participants' pre-data, and the 4-week project began on March 11th, 2022, until March 25th, 2022. After the four weeks (March 29, 2022), the post-survey, also via Qualtrics, including the quantitative and qualitative portions were sent to participants.

Discussion

Overview

The project results support the urgency for an effective modality to reduce ER nursing BO and suggests yoga delivered via a Smartphone app is a promising solution. The ER nurse population is particularly vulnerable to BO and have a higher incidence of exhaustion, depersonalization, and BO than other nursing specialties (Urquiza et al., 2017). This becomes a viscous cycle in that, engagement in any additional responsibility outside of work may seem

daunting, making it a challenge to even introduce an effective solution. However, if ER nurses can become engaged with a solution such as yoga delivered by a Smartphone app; perceive it as beneficial and gratifying, there is potential to mitigate these challenges. Moreover, convenience and feasibility play an instrumental role in successfully implementing a solution to address BO in this population.

Strengths

Some of the project's strengths included the application DownDog® used for the yoga intervention, in general the classes coming exclusively from the app DownDog® provided a contained selection in which classes could be chosen helped with too much variance. No issues were reported with respect to the ease, feasibility, or quality of the DownDog® app method. Additionally, initial barriers to the project were overcome with flexibility and resourcefulness, which allowed the project to be implemented and completed in an organized, as predicted timeframe and manner. Lastly, with very limited resources, no monetary budget to create incentives for recruitment and a virtual implementation method donated by a quality product, the project was completed in its entirety with positive findings and promising results that yoga delivered a Smartphone app has potential to mitigate ER nurse BO. The project had a 100% retention rate initially with all 15 participants completing the pre-data scales and a 60% rate (10 out of the 15) after completion of the intervention. Of the 60%, 9 of the 10 (90%) completed the intervention in its entirety leading to a high compliance rate in a population notorious for noncompliance (Kim, 2021).

Limitations

The small sample size, convenience sampling, and switching the data collection method from pen and paper to Qualtrics were key limitations. The switch in mode of questionnaire administration may have caused confusion and/or frustration. Additionally, there was low compliance with respect to taking screenshots of the completed classes. Only a total of three screenshots of the classes intended for verification were sent in for confirmation of the class

taken. It is unclear whether the classes simply were not completed, the participants forgot to send verification, or instructions of how to send the screenshot were misunderstood. One participant noted in an email during week one she would prefer a different style of yoga, so she asked if she could take another class. Another participant asked if they could also choose another with a more challenging flow. Thus, I eliminated the prechosen class and the screenshot requirement and instead allowed participants to choose any yoga class on DownDog® and answer in the post survey a self-report of how many classes were completed. Although all classes were 30 minutes with a 3-minute Savasana, the strategy of allowing participants to choose different classes may have increased compliance at the expense of internal validity.

Implications

Based on the literature previously synthesized in this paper, yoga is a promising intervention for nursing BO in several other specialties other than ER nurses (Thomley et al., 2012). Implications were derived from the need to mitigate nursing BO, especially in the ER population (Adriaenssens, 2011)

Results revealed that participants who did yoga had improved feelings of anxiety and BO and because of the subscales of the MBI, highlighted what area of BO the participants struggle with pre and improved after yoga; exhaustion, and lack of empathy. Prior literature suggests stress and anxiety are linked with BO (Govêia et al., 2018) however this project found stress scores remained the same post intervention and anxiety improved slightly while BO improved significantly. This is a notable finding and warrants further examination; perhaps ER nurses have different sources of stress that can be mitigated with modalities other than yoga to decrease BO.

Implications also included assessing what elements of occupational BO affected this population in which findings from the data suggested exhaustion and lack of empathy as most notably improved subscales from the MBI scale. Further investigation to why this population struggles with these two factors may be beneficial in coming up with alternative ways to decrease BO. Post-intervention qualitative data found exhaustion, child obligations, and time constraints as

challenges to participate in yoga. These self-reported barriers may be good information for stakeholders to know when implementing ways to decrease BO. For example, maybe childcare could be offered to nurses so they can take a yoga class or replace a 12-hour working shift with a paid yoga workshop. Knowing one of the most significant factors related to BO was exhaustion, it makes sense ER nurses are not inclined to go above and beyond to commit to more responsibility in their free time.

Continuity of practice was promising, with 75% participants reporting they would do yoga again, with only one stating “maybe, but would instead do it in person.” This finding suggests feasibility and practicality plays a role in implementation for stakeholders. Perhaps healthcare employers could provide Smartphone apps to their employees to encourage self-care that could reduce BO. Moreover, the participants who practiced yoga at least once had improved MBI scores and either reduced or no change to anxiety and stress whereas the participant who did not complete any classes had no change to their MBI or anxiety score and an increase in their stress score. On balance, this project found that participants found yoga beneficial and reported that they would continue their practice, making it a potential promising option to decrease BO in ER nurses.

Conclusion

Overall, like prior research, this project showed ER nurses suffer from occupational BO. Knowing BO has a direct impact on nursing shortages supports the urgency to find solutions to this dire problem. Results from the data in this project revealed decreased anxiety levels, occupational exhaustion, depersonalization, loss of empathy, and overall, BO after completing a 4-week Smartphone app-based yoga intervention. Additionally, the project showed participating in at least one class during the 4-week intervention was more beneficial than none. And as the more classes a participant took, the more their MBI and GAD-7 scores improved. This implies yoga has a direct effect on decreasing feelings of BO and anxiety. Although this sample was small and more research is needed, results of this project suggest yoga delivered via a

Smartphone App, specifically DownDog®, was shown to be a beneficial and feasible method to decrease BO in the ER nursing population.

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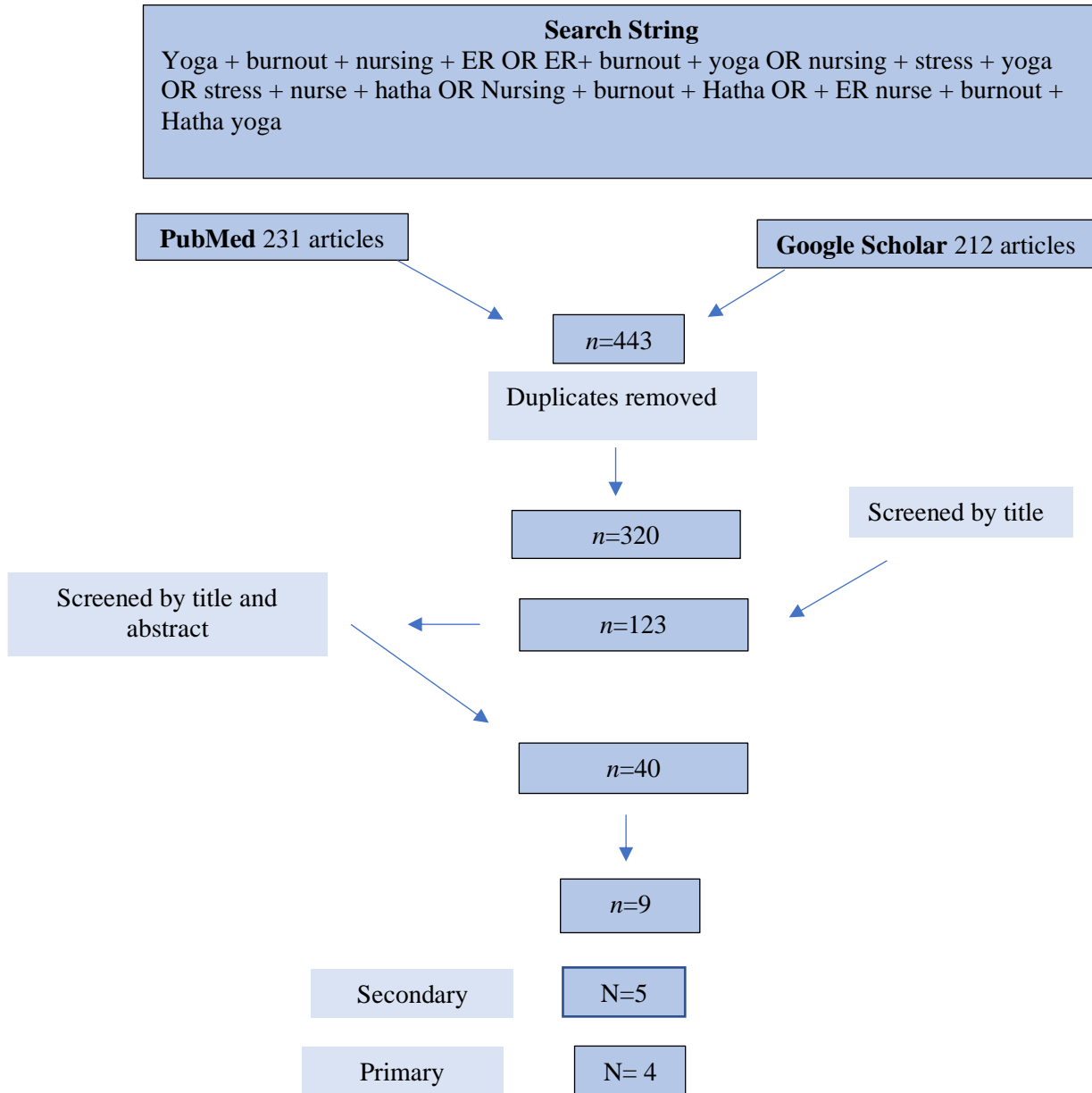
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Appendix A

Literature Search Diagram



Appendix B

Table of Evidence

Primary

Article	Title/Author Type/year	Population	Intervention	Timeline	Tools	Setting	Outcome
1	Fang et al., 2015 A Regular Yoga Intervention for staff nurse sleep quality and work stress RCT 2015	120 Female Nurses	Yoga under the supervision of a yoga coach	Ten months	PSQI QMW S	Chinese Hospital Workout area	Yoga can improve the quality of sleep and reduce stress
2	Alexander et al., 2015 Yoga for Self-care and burnout prevention Among Nurses Pilot RCT 2015	49 Occupational health nurses	Mindfulness training program including breathing and yoga poses led by the yoga teacher.	Eight weeks	FMI MBI	Community-based Health network rooms	Promising, had positive outcomes but need more studies
3	Patronis et al., 2021 Favorable outcomes from an in-person and online feasibility Mindful Moment The pilot study, RCT	20 nurses at Midwest hospital	The mindfulness program included yoga, self-reflection, and meditation 20 minutes prior to a shift.	Eight weeks	MBI	Hospital room and through a web site WIX created by the author	Strategies lowered BO and stress
4	Meharabi et al., T, 2012 The effect of yoga on coping strategies among ICU nurses	36 ICU nurses	Hatha yoga poses Held by the researcher under yoga teacher supervision	Twice a week for eight weeks	CS-R	Alzara hospital in Iran	Eight weeks of yoga can make a significant change in work-related stress.

Secondary

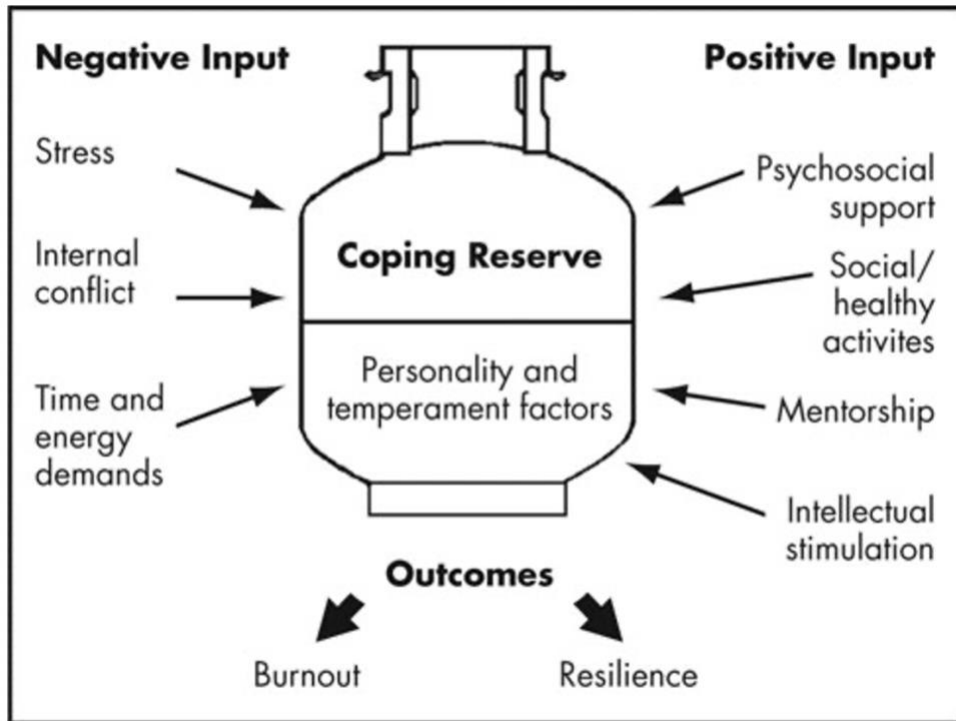
5	Kavermaci et al., 2021 Determining the effect of yoga on job satisfaction and burnout in nurse academia RCT	33 Nursing instructors Pre and post with control	Yoga classes held twice a week for eight weeks	twice a week for eight weeks	MBI MSQ	Nursing Institute in Eastern Turkey	High significance in the non-control group, fewer feelings of stress, and increased feelings of job satisfaction
6	Trent et al., 2019 Improvements in Psychological and Occupational Wellbeing in a Pragmatic Controlled	N=61 N=60 waitlist control group Front line	5-day immersion program with 5 hours of yoga per day	Five days	PSS RS PANAS FFMQ PES SCS	Krapula center for yoga and health in Stockbridge, MA	Improvements in psychological and occupational wellbeing improved immediately after

	Trial of a Yoga-Based Program for Professionals	Teachers, mental health workers, police			SWLS MBI		and two months after the program.
7	Hilcove et al., 2021 Holistic Nursing in Practice: Mindfulness-Based Yoga as an Intervention to Manage Stress and Burnout Single blinded RCT	N=41 MB N=39 control Social workers, nurses, assistants (Direct pt care)	Combo of Hatha and Raja Mindfulness routine is then given a DVD to take home	Six weeks	Biomarkers PSS Vitality Scale MBI	Inside an empty room at Southwestern hospital In participants homes	The MB yoga intervention had a statistically significant effect on the health and wellbeing of nurses and HCPs
8	Ofei-Dodoo et al., 2020 Impact of a mindfulness-based, workplace group yoga intervention on burnout, self-care, and compassion in health care professionals Pilot Study	43 health care professionals	Combo of Vinyasa and yin yang group mindfulness-based yoga activities	Eight weeks 1-hour weekly sessions	MBI DASS-21 RS-14	In a dim-lit empty hospital room by RYT	Participants had improvements after the 8-week intervention.
9	DellaValle, et al., 2020 Effectiveness of Workplace Yoga Interventions to Reduce Perceived Stress in Employees: A Systematic Review and Meta-Analysis	Six studies University employees, government, public nursing home, telephone, insurance carriers	Yoga interventions at the worksite Six studies analysis; 266 participants 221 - control group	N/A	Prisma Springerlink, MEDLINE, PubMed, CINAHL, Web of Science, Scopus, Cochrane CENTRAL	N/A	Further studies are needed to improve the validity of these results and to specify more characteristics of the Yoga intervention, such as style, volume, and frequency.

Appendix C

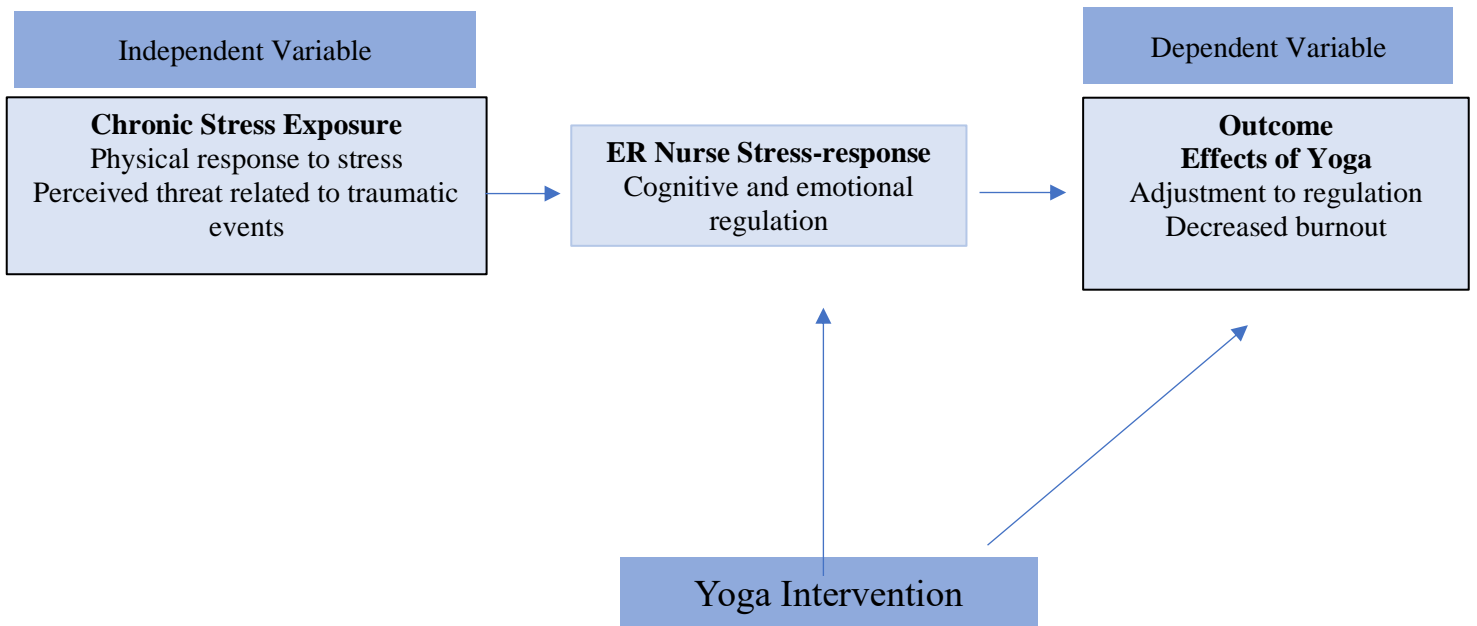
Coping Reserve Tank: Conceptual Framework

(Dunn et al., 2008)



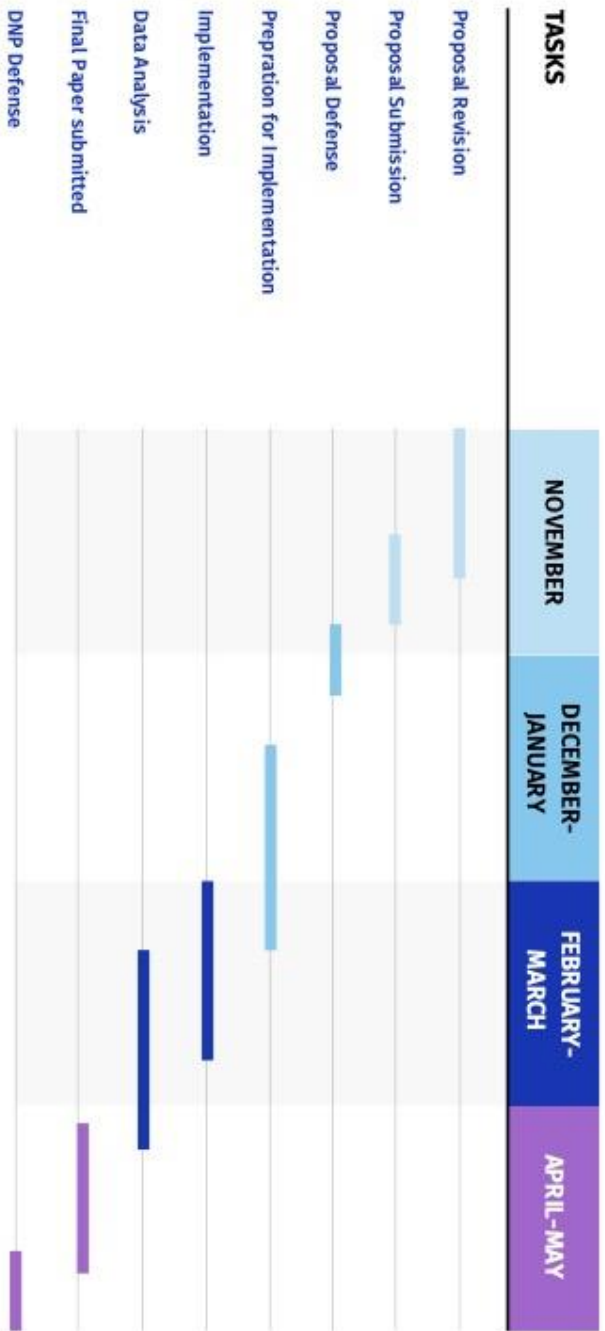
Appendix D
Logic Model

(Mendelson et al., 2010)



Robyn Lopez
Yoga on the Effects of Emergency
Room Nurse Burnout

GANTT CHART



Appendix E
Gantt Chart

Appendix F

Emails to Emergency Department Managers

ER Manager Huntington Memorial Hospital

Hi Karen,

I hope this email finds you well, it has been a while! I miss my HMH family so much!

I am reaching out because I am currently pursuing my DNP at UCI and am conducting a small study on the effects of yoga on ER nurse burnout.

The study would take place sometime this fall, most likely between January and April and will take place outside of the workplace. I will ask nurses to complete two short surveys before and after a 4-week Yoga program delivered via a free smart phone application, Down Dog, which will be complimentary until summer 2022 for participants. The classes, intended to be taken at home, are gentle and mindfulness based. The primary constructs of interests are burnout and perceived stress.

I know mental health is currently a huge priority for most healthcare organizations and emerging literature supports yoga for nursing burnout. I am excited to explore this intervention as a possible way to help support nurses and decrease burnout.

With your permission, I would like to send out an email to the department to recruit some nurses for participation. My chair, Dr. Dana Rose Garfin, is an expert in mindfulness and community-based interventions; we would be happy to set up a Zoom to discuss further.

I look forward to hearing from you and thank you in advance for considering.

Best regards,

Robyn Lopez (formerly Cords)

Appendix F

Email to Uci Er Manager

Hi Ms. Mary Olivas and Ms. Colette Baeza,

I hope this email finds you well; I am reaching out because I am currently pursuing my DNP at UCI and am conducting a small study on the effects of yoga on ER nurse burnout.

The study would take place sometime this winter, most likely between January and April and will take place outside of the workplace. I will ask nurses to complete two short surveys before and after a 4-week Yoga program delivered via a free smart phone application, Down Dog, which will be complementary to all participants until Summer 2022. The classes, intended to be taken at home, are gentle and mindfulness based. The primary constructs of interests are burnout and perceived stress.

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I look forward to hearing from you and thank you in advance for considering.

Best regards,

Robyn Lopez

Appendix G

Email to Down Dog®

October 7, 2021

Good morning,

I am reaching out to introduce myself; I am a senior Doctoral student conducting a small study on the effects of yoga on Emergency Department nursing burnout or occupational stress in a large urban LA area hospital. I am planning on using the Down Dog application as my intervention and by means of delivering yoga to my sample of ER nurses.

I know there is an offer for healthcare workers to sign up for the app until January 2022. I am wondering if that can be extended or if I can be put in touch with someone that is willing to meet to discuss a discount or introductory period to your new workplace yoga subscription for the study. The study spans 8 weeks and will be completed with data collection and interpretation by June 2022.

Please feel free to reach out with any thoughts or considerations. I hope to speak with you soon. Thank you.

Warm regards,

Robyn Lopez, RN, BSN, DNP Student

October 9, 2021

Hey Robyn,

We'd love to help! I just added a code to the app: **ucirvine**

Anyone who enters that code in the menu (on our web app or our android app) will get an extra 6 months of membership credited to their account, starting the day they enter the code. Note that this won't work for people who have already purchased memberships.

The code will be live starting this Monday morning.

Keep us posted on the publication schedule and keep up the good work!

Sam

—

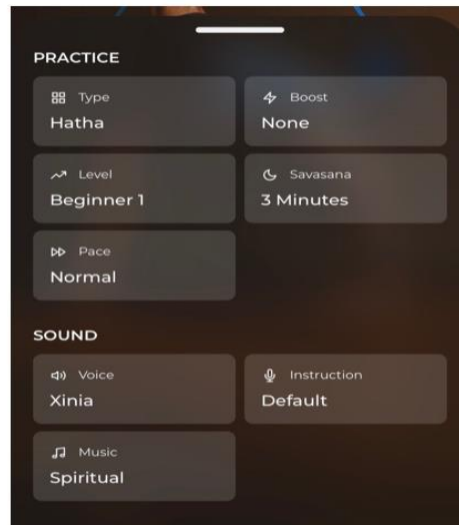
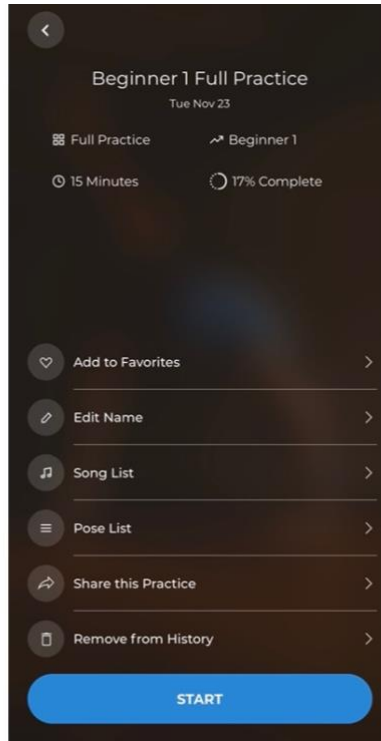
Use Down Dog on your laptop or desktop or Chromecast at www.downdogapp.com

Follow us on [Instagram](#)

Join our [Facebook Community](#)

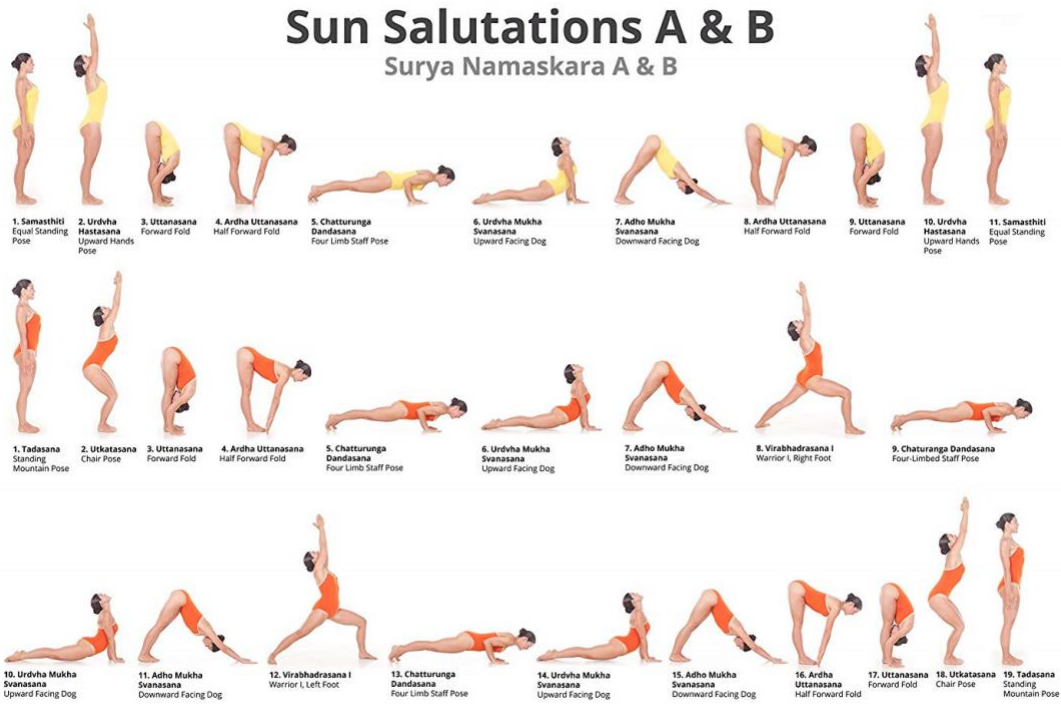
Appendix H

Down Dog® Screen Shots



Appendix I

Sun Salutations A & B



Appendix J

Perceived Stress Scale

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

Name _____ Date _____

_____ Age _____ Gender (Circle): M F Other _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly.
2. In the last month, how often have you felt that you were unable
3. to control the important things in your life?
4. In the last month, how often have you felt nervous and “stressed”?
5. In the last month, how often have you felt confident about your ability
6. to handle your personal problems?
7. In the last month, how often have you felt that things
8. were going your way?
9. In the last month, how often have you found that you could not cope
10. with all the things that you had to do?
11. In the last month, how often have you been able to control irritations in your life?
12. In the last month, how often have you felt that you were on top of things?
13. In the last month, how often have you been angered
14. because of things that were outside of your control?
15. In the last month, how often have you felt difficulties?
16. were piling up so high that you could not overcome them?

Appendix K

The Maslach Burnout Inventory

The Maslach Burnout Inventory

How do you perceive your work? Are you exhausted? How capable are you of shaping your relationship to others? To what degree are you personally fulfilled?

Indicate how frequently the following statements apply to you and add the points indicated on top of the respective box:

0 = Never

1 = At least a few times a year 2 = At least once a month

3 = Several times a month

4 = Once a week

5 = Several times a week

6 = Every day

	Never						Every day
	↓						↓
	↓						
01 – I feel emotionally exhausted because of my work	0	1	2	3	4	5	6
02 – I feel worn out at the end of a working day							
03 – I feel tired as soon as I get up in the morning and see a new working day stretched out in front of me							
04 – I can easily understand the actions of my colleagues/supervisors							
05 – I get the feeling that I treat some clients/colleagues impersonally, as if they were objects							
06 – Working with people the whole day is stressful for me							
07 – I deal with other people’s problems successfully							
08 – I feel burned out because of my work							
09 – I feel that I influence other people positively through my work							
10 – I have become more callous to people since I have started doing this job							
11 – I’m afraid that my work makes me emotionally harder							
12 – I feel full of energy							
13 – I feel frustrated by my work							
14 – I get the feeling that I work too hard							

15 – I’m not really interested in what is going on with many of my colleagues									
16 – Being in direct contact with people at work is too stressful									
17 – I find it easy to build a relaxed atmosphere in my working environment									
18 – I feel stimulated when I been working closely with my colleagues									
19 – I have achieved many rewarding objectives in my work									
20 – I feel as if I’m at my wits’ end									
21 – In my work I am very relaxed when dealing with emotional problems									
22 – I have the feeling that my colleagues blame me for some of their problems									

Overall score for occupational exhaustion (EE)

Add together the answers to questions 01. 02. 03. 06. 08. 13. 14. 16. 20

Overall score for depersonalization / loss of empathy (DP)

Add together the answers to questions 05. 10. 11. 15. 22

Overall score personal accomplishment assessment (PA)

Add together the answers to questions 04. 07. 09. 12. 17. 18. 19. 21.

Occupational exhaustion	EE < 17	EE 18 - 29	EE > 30
	Low degree	Moderate degree	High degree
Depersonalization	DP < 5	DP 6 - 11	DP > 12
	Low degree	Moderate degree	High degree
Personal accomplishment assessment	PA < 33	PA 34 - 39	PA > 40
	Low degree	Moderate degree	High degree

EE	Occupational exhaustion (burnout) is typically connected to a relationship with work that is perceived as difficult, tiring, stressful... Maslach sees this as different from depression, as it is likely that the symptoms of burnout would be reduced during holidays.
DP	Depersonalization or loss of empathy is characterized by a loss of regard for others (clients, colleagues...), and by keeping a greater emotional distance, which is expressed through cynical, derogatory remarks, and even callousness.
PA	The personal accomplishment assessment is a feeling that acts as a “safety valve” and contributes to bringing about a balance if occupational exhaustion and depersonalization occur. It ensures fulfilment in the workplace and a positive view of professional achievements.

Appendix L

General Anxiety Disorder (GAD-7)

1. Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all sure	Several days	Over half the days	Nearly every day
Feeling nervous, anxious, or on edge	0	1	2	3
Not being able to stop or control worrying	0	1	2	3
Worrying too much about different things	0	1	2	3
Trouble relaxing	0	1	2	3
Being so restless that it's hard to sit still	0	1	2	3
Becoming easily annoyed or Irritable	0	1	2	3
Feeling afraid as if something awful might happen	0	1	2	3
<i>Add the score for each column</i>				
TOTAL SCORE <i>(add your column scores)</i>				
	Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
2. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?	0	1	2	3

GAD-7 developed by Dr. Robert L. Spitzer, Dr. K. Kroenke. et.al.

Appendix M

IRB Form

Researcher

Robyn Lopez

Training

Social/Behavioral Investigators - Basic Course	03/02/20 - 03/01/25	Research and HIPAA Privacy Protections	06/26/21 - 06/25/26
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To promote the objectivity of the research, all researchers are required to disclose their related disclosable financial interests, per the [IRB COI Policy](#). If you have any questions about the COI process in general, contact the [COI team](#).

Each member of the study team for this protocol must be asked the following question to comply:

"Do you, your spouse/registered domestic partner, and dependent children have any disclosable financial interests* (i) that would reasonably appear to be affected by this research study; or (ii) in entities whose financial interests would reasonably appear to be affected by this research study?"

Degree

Position/Title

Department

IR-8111 - SUE & BILL GROSS SCHOOL OF NURSING (Lead Unit)

Affiliation

Researcher Role

Lead Researcher

Permissions

Full Access

Duties

Specify relevant training and experience for the referenced duties/responsibilities:

Appendix N

Summative Evaluation Survey

Post Intervention Survey

Variable Name	Question	Responses
PSS_CAT	PSS Composite Categorized by Scale Cutoffs	1 = Low Stress 2 = Moderate Stress 3 = High Stress
GAD_CAT	GAD-7 Composite Categorized by Scale Cutoffs	1 = Minimal Anxiety 2 = Mild Anxiety 3 = Moderate Anxiety 4 = Severe Anxiety
MBI_EE_CAT	MBI Occupational Exhaustion Composite Categorized by Scale Cutoffs	1 = Low Degree of Occupational Exhaustion 2 = Moderate Degree of Occupational Exhaustion 3 = High Degree of Occupational Exhaustion
MBI_DP_CAT	MBI Depersonalization/Lack of Empathy Composite Categorized by Scale Cutoffs	1 = Low Degree of Depersonalization/Lack of Empathy 2 = Moderate Degree of Depersonalization/Lack of Empathy 3 = High Degree of Depersonalization/Lack of Empathy
MBI_PA_CAT	MBI Personal Accomplishment Composite Categorized by Scale Cutoffs	1 = Low Lack of Personal Accomplishment 2 = Moderate Lack of Personal Accomplishment 3 = High Lack of Personal Accomplishment
BURNOUT	Overall Burnout Score	0 = One or Fewer of Burnout Subscales in High Risk Range 1 = Both Occupational Exhaustion and Depersonalization/Lack of Empathy in High Risk Range 2 = All Three Burnout Subscales in High Risk Range
POST1	If you completed any yoga sessions, how many did you complete?	Free Response
NUMSESH	Categorized Number of Yoga Sessions	0 = None 1 = 1-5 2 = 6-10 3 = 11+

POST2	If you completed any yoga sessions, during what time of day did you complete them?	1 = Morning 2 = Afternoon 3 = Evening 4 = Variable
POST3	If you completed any yoga sessions, please indicate how much you felt that they were beneficial to your well-being.	1 = Not Beneficial At All 2 = Somewhat Beneficial 3 = Extremely Beneficial
POST4	If you completed any yoga sessions, please indicate enjoyable you found the sessions to be overall.	1 = Not Enjoyable At All 2 = Somewhat Enjoyable 3 = Extremely Enjoyable
POST5	How feasible would it be for you to continue doing yoga?	1 = Not Feasible At All 2 = Somewhat Feasible 3 = Very Feasible
POST6	Do you plan to continue doing yoga? Why or why not?	Free Response
POST7	Please provide any additional feedback (positive or negative) in the space below.	Free Response