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Caring for Ourselves Before We Care for Others: A Mindfulness-Based Intervention for Acute Care Nursing Staff

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Caring for Ourselves Before We Care for Others:
A Mindfulness-Based Intervention for Acute Care Nursing Staff

Submitted in Partial Fulfillment of the Requirements for the Degree of
Doctor of Nursing Practice at the University of Kentucky

By

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Lexington, Kentucky

2022

Abstract

Background: Acute care nursing staff have recently faced increasing rates of anxiety, stress, emotional exhaustion, and burnout. Nursing burnout is directly linked to patient outcomes, nurse retention, and the resilience of our nurses. Therefore, it is in the best interest of hospital organizations to focus efforts on the well-being of the nursing workforce. A recent innovative technology to prevent burnout teaches mindfulness through the utilization of smartphone applications. There is limited evidence regarding the implementation and impact of brief mindfulness interventions on intra-professional acute care providers.

Methods: A pretest-posttest design with a midpoint evaluation was utilized in this pilot study. Data analysis was completed using descriptive and inferential statistics via SPSS. The Copenhagen Burnout Inventory, Cognitive and Affective Mindfulness Scale-Revised, Perceived Stress Scale and Brief Resilience Scale were used to measure the impact of the intervention on participants.

Results: Thirty-one intra-professional acute care nursing staff participated in the pre-intervention and eight completed the entire study. In the repeated measures analysis, there were no statistically significant changes in scores on the Brief Resilience Scale across the three timeframes ($F = 0.64$, $p = .49$). For perceived stress, there were statistically significant decreases over time ($F = 10.6$, $p = .002$). There were also statistically significant increases in mindfulness scores across time ($F = 4.8$, $p = .039$). Finally, for personal burnout, there were statistically significant decreases over time ($F = 11.8$, $p = .007$), with higher scores representing lower burnout.

Conclusions: Mindfulness-based smartphone applications may promote the health and well-being of nursing staff in an acute care setting. If nursing providers can foster practices to promote resilience, they will be better equipped to manage the increasing demands within our healthcare environments. As our healthcare systems continue to evolve in response to pandemics and become more complex, combatting burnout among acute care nursing providers is a top priority as we move toward the future.

Acknowledgements

I would like to thank Dr. Melander, my faculty advisor for her dedication to me and all of her students. Her time and hard work are very much appreciated! I would like to thank Dr. Walmsley and Dr. Okoli who have been fundamental to my success in the DNP program. Both of these mentors have been so influential in my work to improve the mental health and well-being of the nursing workforce. I would like to thank Dr. Norton who helped shape my project and who has continued to impact my personal career by highlighting the importance of interprofessional collaboration. I would especially like to thank Dean Heath who has always supported my professional journey. Dean Heath continues to wholeheartedly support the mental health needs of the nursing profession, and for that, we are forever grateful! The start of my graduate career would not have been possible without Dr. Hardin-Pierce. I am thankful for her guidance and support during the first two years of my DNP program of study. Finally, Dr. Wiggins was instrumental in completing the statistical analysis for this project and I very much appreciate her time and support.

This research was supported by Sigma Theta Tau International, and specifically, the Delta Psi Chapter at The University of Kentucky College of Nursing.

Dedication

To my parents, Kenneth and Kim Brouwer, and Grandparents, Wilma and Russ Brouwer, who have always supported my journey, both personally and professionally.

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Background and Significance

Burnout is increasing at an alarming rate among all healthcare professionals, but especially in nursing (Reith, 2018). Burnout can be defined as the physical, emotional, and mental enervation caused by stressful work environments (Hassanzade Dalooe et al., 2020). In a sample of 1688 nurses from the National Academies of Medicine, 54% of the sample reported experiencing burnout with 28% experiencing high levels of burnout (Kelly et al., 2020). Burnout has been directly linked to mental health problems (including anxiety and post-traumatic stress disorder), medication errors, poor patient outcomes, and higher rates of turnover in the acute care setting (Moss et al., 2016; Pastores et al., 2019). Furthermore, increased burnout among nurses is associated with an increased intention to leave the profession (Van der Heijden et al., 2019). The U.S. Bureau of Labor and Statistics estimates that there is a need for approximately 11 million additional nurses, given the current nursing shortage (Haddad & Toney-Butler, 2020). The addition of stressful work environments compounded with the shortage of nurses in the U.S. has made the situation even more critical. Especially with the current COVID-19 pandemic, the healthcare system cannot afford to lose providers due to stress and burnout. Therefore, it is important to understand ways to mitigate the impact of burnout on healthcare providers, especially in the acute care setting and improve the resilience of the nursing workforce.

Burnout among healthcare workers has been recognized for many years, but there is a scarcity of research on how to combat the problem in nursing. Resilience, or the ability of an individual to “bounce back” in the face of adversity, stress or trauma, is an important factor in understanding burnout (APA, 2004). Resilience may help individuals cope with many of the negative attributes of burnout. Resilience is a skill that can be fostered through practicing self-care and promoting personal well-being (Bender & Ingram, 2018). However, nurses may neglect

taking care of their own well-being (Ross et al., 2017). Furthermore, without first taking care of themselves, providers may be less equipped to properly care for their patients (Hofmeyer et al., 2020).

Several strategies can improve the well-being of healthcare workers. These include Mindfulness-Based Stress Reduction (MBSR), Cognitive Behavioral Therapy (CBT), and mindfulness (Fadaei et al., 2020; Ghawadra et al., 2019; Pender, 1987; Penque, 2019). Meditation, and specifically practices of mindfulness, focus on teaching patience, openness, and acceptance with a unique appreciation for the present moment (Gilmartin et al., 2017). Practices of mindfulness have been shown to improve levels of anxiety and depression among working nurses (Ghawadra et al., 2019). Recent innovative technology teaches mindfulness using smartphone applications. Some examples of these applications include Headspace, Insight Timer and Calm. This specific intervention delivery method is unique given the minimal amount of time required to practice mindfulness through the use of a smartphone application. The time required to practice an intervention is especially important since health care providers are quite limited on time during the workday. Therefore, the use of mindfulness techniques should be considered as a feasible way to improve the mental health and resilience of our healthcare providers, specifically for nursing.

Purpose & Objectives

Given that there are limited studies utilizing mindfulness-based smartphone applications to combat burnout among nursing staff, the purpose of this study was to determine if a brief mindfulness-based smartphone application (five-minutes/day via Headspace or Insight Timer) could be used to address burnout among nursing staff in an acute care setting. Before the study, participants were sent a pre-recorded session introducing mindfulness and mindfulness-based smartphone applications to educate individuals and to improve compliance. A pre-post quasi-

experimental design, with a midpoint evaluation, was used to determine the impact of the brief mindfulness-based intervention. Abbreviated versions of the Copenhagen Burnout Inventory (CBI), Cognitive and Affective Mindfulness Scale-Revised (CAMS-R), Perceived Stress Scale (PSS-4), and the Brief Resilience Scale (BRS) were used to assess outcomes in this study. Specifically, the aims of this study were to:

1. Determine the impact of a brief mindfulness-based smartphone application on reducing burnout and stress among acute care nursing staff.
2. Assess the impact of a brief mindfulness-based smartphone application on improving resilience and mindfulness among acute care nursing staff.

Theoretical Framework

The two theoretical frameworks that guided the study were the Mindfulness to Meaning Theory and Pender's Health Promotion Model. The Mindfulness to Meaning Theory (Garland et al., 2015) is a relatively new theory that describes the impact of mindfulness training on psychological well-being. According to this theory, the utilization of mindfulness may promote mental well-being in the face of stress and trauma. Furthermore, when individuals can detach themselves from stressful situations (by practicing mindfulness), they are able to see alternative information that they may have overlooked previously. Individuals will then be able to reframe their thoughts, which will help reduce their overall distress and increase positive emotions (Garland et al., 2015). Mindfulness practices have been shown to improve positive emotions in every-day life by developing an awareness and acceptance of the present moment (Lindsay et al., 2018). Additionally, an increase in positive emotion may help to overcome and alleviate burnout (Sexton & Adair, 2019). An intervention that may increase these positive psychological states may be useful to fields, such as nursing, which are facing increasing rates of stress and burnout.

In addition, Pender's Health Promotional Model (Pender, 1987) is a theoretical framework that focuses on factors that determine if individuals will participate in health promoting activities. Pender (1987) defined health as a positive state of well-being; not just being free from disease. Factors that influence whether individuals will take part in an intervention that improves their health and well-being include intrinsic factors (personal factors, perceived barriers, or self-efficacy), extrinsic factors (situational or interpersonal influences), and health promoting behaviors (Pender, 1987). This model also makes clear that individuals are more likely to engage in health promoting behaviors if they believe they will benefit from the behavior (Pender, 1987). For this project, the introductory educational session prior to the intervention was important in showing participants how this specific health promoting behavior could improve their mental health and well-being. Additionally, the utilization of a mindfulness-based intervention is one way to support well-being through health promoting behaviors. Mindfulness is a behavior that can be learned, and mindfulness may help promote self-care. According to Pender (1987), self-care is a core principal in creating holistic health and well-being. Therefore, an intervention that focuses on mindfulness meditation for individuals, especially those in high-stress environments, may be beneficial in improving the overall mental health and well-being of participants.

Review of the Literature

PICOT Question and Search Methods

In an acute care setting, how will the use of a brief mindfulness intervention via a smartphone application impact burnout, stress, resilience and mindfulness in nursing staff after a one-month period? PubMed was utilized for a search of the existing literature to answer this question. The main title search included "burnout in nursing." The other search terms included "mindfulness or resilience." The main inclusion criterion was acute care nursing studies (clinical

trials, randomized control trials (RCT), systematic reviews and meta-analyses). The exclusion criteria for the search were studies that did not measure burnout or its related components (stress, anxiety and depression, resilience, or mindfulness) and those that were not published within the past five years. The application of these criteria yielded 41 articles.

Synthesis of the Literature

Mindfulness may play an important role in acute care nursing settings. In areas such as oncology and critical care (emergency medicine and Intensive Care (ICU) settings), nursing providers are at an increased risk for burnout (Duarte & Pinto-Gouveia, 2017; Kerlin et al., 2020). Importantly, high levels of burnout syndrome are commonplace among nurse practitioners working as intensivists in the ICU (Pastores et al., 2019). In a non-randomized experimental study of 48 oncology nurses, researchers found that the abbreviated MBSR intervention group showed marked decreases in burnout and stress (Duarte & Pinto-Gouveia, 2016). Furthermore, participants in the mindfulness intervention showed an increase in mindfulness, satisfaction with life, and self-compassion (Duarte & Pinto-Gouveia, 2016). In a RCT of 110 nurses in a general hospital, the MBSR intervention group showed decreases in stress and negative affect, and an increase in resilience and positive affect (Lin et al., 2018). Similarly, researchers have found that an eight-week MBSR program significantly reduced perceived stress and increased mindfulness among critical care nursing staff (Anderson, 2020). While MBSR interventions have positive implications on the overall well-being of nurses, they may also provide benefits to their patients. Daigle et al. (2018), showed that a mindfulness intervention significantly improved provider distress, treatment satisfaction, and reduced medical errors among acute care nurses. Additionally, utilization of mindfulness interventions may help to improve overall patient safety (Daigle et al., 2018). These types of mindfulness interventions not only impact providers, but affect the patients as well. Given

these positive implications, a mindfulness-based intervention could be beneficial for acute care nursing settings.

Current State, Desired State, Gaps in Practice

Although MBSR and other forms of mindfulness practices are useful, mindfulness-based smartphone applications may outperform these alternative therapies. In a sample of pediatric acute care nurses, researchers found that a meditation smartphone application was superior to traditional mindfulness exercises (in-person MBSR program) in reducing burnout (Morrison Wylde et al., 2017). Furthermore, a major concern with the utilization of MBSR and CBT programs is the amount of time required to complete the intervention (Gilmartin et al., 2017). CBT and MBSR usually require at least two hours per week for a duration of four to eight weeks. A brief intervention, such as Headspace or Insight Timer (a mindfulness-based smartphone application), can take as little as five minutes a day. There are few studies on brief mindfulness interventions (e.g., five-minutes a day for 30 days) for nursing staff (Van der Riet et al., 2018). Therefore, smartphone-based mindfulness applications may further enhance a nurse's ability to improve their mindfulness and resilience, potentially resulting in decreasing levels of stress and burnout.

Justification

This pilot study was designed to provide insight regarding the impact of brief mindfulness interventions on the well-being of intra-professional acute care nursing staff. Given that nurses often have limitations on time, this brief application may be beneficial to acute care nursing providers.

Methods

Design

This pilot project utilized a pre-post quasi-experimental design, with a midpoint evaluation.

Due to the limited sample size, a second cohort was added to this study. The first cohort consisted of nursing staff from a cardiac progressive/acute care unit. The second cohort consisted of nursing staff from a cardiac ICU and two other cardiac progressive/acute care units. For 30 consecutive days, participants were asked to spend five minutes per day using the mindfulness-based smartphone application while at work or at home. At each testing point, participants completed an online survey via Qualtrics that included the CBI, CAMS-R, PSS-4 and the BRS. Demographic variables were collected prior to initiating the study and included age, sex, race, previous meditation experience, number of years in nursing practice, relationship status, children in the home, and current job title (Table 1). Qualitative data collected post-intervention included perceived barriers and facilitators of the five-minute meditation, average time spent meditating each day, total time spent meditating during the study, and total number of days spent meditating (these data were collected by participants from the Apple Health application or the Headspace/Insight Timer application).

Setting

This pilot project took place on the cardiovascular service-line at the University of Kentucky (UK) Chandler Medical Center. UK Healthcare is a level 1 trauma center with approximately 945 beds. A well-known nursing mission of UK Healthcare is to provide quality patient care through clinical excellence. One way this can be attained is through advancements in professional nursing practice. A key component in providing quality patient care involves having a healthy workforce that is resilient to the many stressors confronted in the healthcare arena. Meditation, specifically practices of mindfulness, can create more resilient providers, leading to a stronger and healthier workforce. In turn, a healthy workforce will likely positively impact patient outcomes. The idea of caring for providers is also crucial in successfully attaining UK Healthcare's

2025 strategic plan. In order to have providers “committed to creating a healthier Kentucky,” the organization needs its staff to be committed to caring for themselves. Practicing mindfulness is one skill that can be used to teach providers how to properly care for their own well-being so that they are better prepared to care for their patients.

Specific stakeholders for this project included my committee members, the managers on my unit, and the leadership at UK Healthcare (Chief Nursing Executives, Chief Nursing Officers, etc.). Leadership has endorsed this project because of the positive impact it could have on provider burnout as well as its implications on nursing turnover. In addition, participants in this project may also be considered stakeholders because their mental health and well-being may be improved by participating in this intervention. Site-specific facilitators included: a quiet room designated only for employees and positive buy-in for the study from the managers.

Sample

A convenient sample was obtained from the cardiovascular service-line at UK Healthcare (ICU/Progressive/Acute). Nurses, nursing care technicians, nurse managers and advanced practice providers were eligible for inclusion in the study.

Procedures

Participants were informed that their responses would not be shared and would remain anonymous. Institutional Review Board (IRB) approval was obtained through the University of Kentucky IRB and the UK Healthcare Nursing Research Council. Prior to providing informed consent and beginning the pre-survey, study subjects were sent a brief pre-recorded online seminar via a YouTube link. The seminar covered information on the importance of meditation and how it relates to their practice. Data from previous research on meditation were shared with potential participants to demonstrate the importance of their participation in this study. Educating study

subjects on how mindfulness can benefit their patients and their own well-being was employed to increase study compliance. An example of a meditation practice was demonstrated during this pre-recorded seminar. Study subjects were informed that they could drop out or choose not to participate at any time. Participants agreeing to take part in the study then filled out the consent form and pre-survey. The surveys were taken via Qualtrics. Although participants were invited to participate via email, their responses were de-identified within the Qualtrics software to maintain confidentiality.

At the end of the pre-survey, participants were prompted to download the free version of Headspace or Insight Timer. Those who downloaded Headspace used the “Basics” module, which has 10 meditations in each course. Once they reached the 10th session in the 1st course, they would restart with day one, then complete the same course two more times. Participants who downloaded Insight Timer chose between two five-minute guided meditations: “5 Minute Presence” by Felix New or “5 Minute Grounding Awareness” by Natalie Bondine. To increase compliance, daily notifications from Headspace/Insight Timer were sent to participants via the application. Participants were emailed the midpoint evaluation survey at the 15-day mark, and the post-survey at 30 days. After completion of the final survey, they could follow a link to another anonymous Qualtrics survey for a chance to win a \$50 gift card.

A formal timeline of the study is shown below:

07/01/2021	Submission for approval to University of Kentucky IRB
08/01/2021	Receive IRB approval
11/24/2021	Study begins; 1 st cohort
12/31/2021	Study ends; 1 st cohort

01/01/2022	Initiation of 2 nd Cohort
02/08/2022	Completion of 2 nd cohort
03/22/2022	Data analysis and manuscript complete; DNP presentation

Measures

Demographics

The Qualtrics survey asked respondents to self-report their age, years of nursing experience, sex, race, previous meditation experience, job title, unit, relationship status, and whether they had children living in the home.

Scales

The BRS is a five-question assessment tool that measures the resilience of participants (Appendix A). This questionnaire utilizes a Likert scale with values ranging from 1-5 (Strongly Disagree to Strongly Agree). Responses are summed and the total is divided by the number of questions answered. Total scores can range from 6-30, with higher scores representing greater resilience.

The CAMS-R is a 10-item scale that measures trait and/or dispositional mindfulness (Appendix B). A summary score was calculated. The fifth item is reverse scored. Each question uses a Likert scale with potential ranges from 1-4 (Rarely/Not at all to Almost always). Total scores can range from 13-36, with a higher value representing greater mindfulness qualities.

The PSS-4 is a brief scale that measures the stress of participants (Appendix C). This assessment tool utilizes a Likert scale of 0 to 4 per item (Never to Very Often). A summary score was calculated ranging from 0-16, with higher scores reflecting increased stress levels.

The CBI is a 19-item tool that measures personal, work-related, and client-related burnout (Appendix D). Each subscale is calculated as the mean score of the items within, with potential

ranges of 1 (Always/To a very high degree) to 5 (Never/To a very low degree); with higher scores reflecting lower degrees of burnout. It is important to note that the last four items on the work-related CBI were reverse scored.

Each of these scales were utilized for the pre-post and midpoint survey, via Qualtrics. All scales have been validated and are reliable (Feldman et al., 2006; Fung, 2020; Karam et al., 2012; Riley et al., 2018).

Data Analysis

Thirty-three individuals responded initially, of those 31 fully completed the pre-survey. However, only 16 individuals completed the midpoint evaluation, and eight completed the entire study. Participants entered a code prior to each survey to allow for linking the surveys over time, while maintaining participant anonymity. Descriptive statistics (mean and standard deviation or frequency distribution) were used to summarize participant characteristics. Repeated measures analysis of variance was used to assess changes over time for the outcomes measured (CBI, CAMS, etc.). Both groups in the study (Headspace and Insight Timer) were combined in the data analysis. All participants who fully completed the study were from the same unit, except for one participant. All analysis was completed using SPSS, version 28 with an alpha of .05.

Results

Sample Description

The average age of participants was 33 (SD = 8.1; see Table 1) and ranged from 22-49 years. Most of the sample was female (83.9 %) and Caucasian (96.8%). Over three-quarters of participants were in long-term committed relationships (77.4%), and most did not have children in the home (61.3%). More than half of the sample (61.3%) had less than five years of nursing

experience. Nearly three-quarters of participants had no previous meditation experience (71%). The majority were nurses (87.1%) followed by nursing care technicians (6.5%), and advanced practice providers (6.5%). Most of the nursing staff worked on cardiac progressive/acute floors (83.9%) while the rest worked in the cardiac ICU (16.1%).

Resilience

In the repeated measures analysis, there were no significant changes in scores from the BRS across the three timeframes ($F = 0.64, p = .49$, see Table 2).

Perceived Stress

For the PSS-4, there were statistically significant changes over time ($F = 10.6, p = .002$). There was a statistically significant decrease in stress from baseline ($M = 8.11, SE = 0.42$) to the midpoint ($M = 6.33, SE = 0.60, p = .009$) and follow-up evaluation ($M = 5.11, SE = 0.61, p = .002$). Scores for stress did not significantly differ from midpoint to follow-up assessments.

Mindfulness

There was a statistically significant change in mindfulness scores across time ($F = 4.76, p = .039$). Scores significantly increased from baseline ($M = 26.13, SE = 0.48$) to follow-up ($M = 30.75, SE = 1.60, p = .039$). Mindfulness scores did not differ between baseline to midpoint or midpoint to follow-up assessments.

Burnout

For personal burnout, there were statistically significant changes over time ($F = 11.8, p = .007$), with higher scores representing lower burnout. There was a statistically significant decrease in personal burnout from baseline ($M = 2.43, SE = 0.18$) to both midpoint ($M = 3.15, SE = 0.19, p < .001$) and follow-up ($M = 3.46, SE = 0.27, p = .004$). Scores did not differ from midpoint to follow-up. There were no statistically significant changes among individual scores across the three

timeframes for work ($F = 2.69, p = .126$) or client burnout ($F = 3.83, p = .067$).

Qualitative Data

On average, participants reported practicing the intervention 18 days, with a range of 4-28 days. Additionally, participants reported their total time practicing meditation, which ranged from 20 minutes to 360 minutes for the entire study period, with an average of 149 minutes.

Discussion

The purpose of this study was to determine the impact of a brief mindfulness-based smartphone application on burnout, stress, resilience and mindfulness in acute care nursing staff. Individuals who participated in the intervention had significantly decreased levels of reported personal burnout and stress compared to pre-intervention levels. Additionally, those who participated in the intervention reported increased levels of mindfulness from pre- to post-intervention. Previous research has demonstrated that brief mindfulness interventions can positively impact perceived stress, mindfulness, and well-being (Champion et al., 2019; Wen et al., 2017; Yang et al., 2018). While there were no significant changes in resilience throughout this study, previous findings have shown that the Headspace application has improved perceived stress and resilience in the general population (Champion et al., 2019).

Time was the most cited barrier for not practicing the meditation intervention each day. Participants felt that even five minutes/day was a lot of time to dedicate to their mental health and well-being. This suggests that retention of subjects may be a problem in studies with longer interventions. Specific education involving potential participants may be important in retaining individuals throughout future studies. Previous research has shown that educational interventions improve an individual's understanding of key concepts (Cusack et al., 2016). If participants know and understand the importance of such an intervention, they may be more likely to continue with

the intervention. These findings have important implications for future studies on the impact of mindfulness-based stress reduction techniques for nursing staff.

Limitations

There are clear limitations to this study. First, the COVID-19 pandemic continues to place a strain on the healthcare workforce. Even with a monetary incentive, participants were unwilling to add anything “extra” to their daily schedules, even if it could positively impact their mental health and well-being. As noted by response rates and the qualitative data, adherence to the practice of mindfulness was a clear barrier for individuals in the study. This can also be seen by the initial pre-survey numbers of 31 participants compared to the post-survey results with only eight participants. Other studies have mentioned adherence as a problem, especially for mindfulness practices, such as MBSR, which require an even greater time commitment (Gilmartin et al., 2017). The limited sample size (in both number and homogeneity) also makes it difficult to generalize the results of this project to other populations. The limited diversity in this study was related to the homogeneity of the nursing profession, being predominantly female.

Trusting that participants meditated each day and were adhering to the intervention is another clear limitation of this study. The application sent a daily notification as a way to improve compliance. Receiving a daily notification was noted to be a facilitator of the intervention in the post-survey data.

Another limitation of this study was the use of two different mindfulness-based smartphone applications: Headspace and Insight Timer. The free version of the Headspace application unexpectedly timed out two weeks into the first cohort. A free voucher was obtained through Headspace for those in the first cohort to continue using the application for the remainder of the first study period. Therefore, participants in the second cohort had to use Insight Timer instead.

This change in protocol was considered acceptable given that Insight Timer is still a mindfulness-based smartphone application, and participants could choose from two five-minute meditations.

Having different nursing units in this study also may have been a limitation. This is really a site-specific barrier because different units may have differing patient acuities. However, this was necessary in an attempt to increase the total sample size. It is important to note that all but one of the participants who fully completed the study were from the same unit.

Implications For Future Nursing Research

Although this study had a small sample size, we can conclude that a brief mindfulness-based smartphone intervention may have a positive impact on burnout, mindfulness and stress among nursing staff in an acute care setting. Significant changes in burnout, mindfulness, and stress scores were observed in this study. This pilot project had too few participants to be generalizable. It would be important for future studies to assess the impact of a brief mindfulness-based smartphone intervention on a larger sample of nursing staff. Additionally, other healthcare professionals, especially those in critical care settings, are at an increased risk for burnout (Kerlin et al., 2020). Therefore, future studies could assess the impact of brief mindfulness-based smartphone interventions on other healthcare professionals experiencing increasing rates of burnout and stress. Importantly, the intervention clearly needs to be brief, as time was a major barrier noted by participants.

There is a clear need for interventions to reduce stress and burnout among those in the nursing workforce. For nursing staff to begin to integrate mindfulness into their daily lives, healthcare organizations must emphasize the importance of strategies to maintain well-being by providing time, resources and benefits for participants that take part in practices such as mindfulness. Leadership within healthcare organizations must highlight the importance of the

well-being of their employees to decrease rates of nursing stress and burnout.

Future research should include specific measurements from participants such as cortisol stress levels and blood pressure. These are more specific parameters from participants that could provide evidence-based insight on the impact of brief mindfulness-based interventions on nursing staff. Additionally, researchers may want to consider increasing the sample size by sampling from other units across the hospital. The incentive to participate in this study was important in retaining the participants. Therefore, having a monetary incentive would be crucial for any future research. Additionally, to increase buy-in, more rigorous education to the participants prior to the intervention may increase study compliance.

It is a well-known fact that activities can take roughly 66 days, approximately two months, for habit formation. This could explain the difficulty of retaining participants in the study. However, a longer intervention may prove more difficult given the time-constraints of healthcare workers. An alternative form of meditation may be more beneficial for some participants than others, depending on their preference. This is important as individuals have different learning styles. However, previous research has already demonstrated that mindfulness-based interventions through a smartphone application may be more effective than traditional mindfulness-based activities (Morrison Wylde et al., 2017).

Given that our sample was small, it is hard to infer the specific amount of time needed for a mindfulness-based intervention to be “effective.” Seeing that participants would likely not meditate every day; it would be important to recommend that participants attempt to meditate every day. Total time meditating during the study ranged from 20 to 360 minutes, so this varied widely across the sample. Future research may examine the specific impact of different times (5 minutes vs 10 minutes, etc.) on the well-being of nursing staff. This may provide direction on a

specific amount of time needed for individuals to reap the benefits of practicing a mindfulness-based intervention. Finally, future research with larger sample sizes should focus on demographic variables that may impact the well-being of the nursing workforce. Nursing staff with more experience may need different or additional strategies to improve their well-being if they experience increased levels of stress and burnout.

Conclusion

Understanding the impact of brief mindfulness-based interventions for acute care nursing staff remains an important topic, especially given the COVID-19 pandemic. The findings of this study suggest that a brief mindfulness-based intervention may be effective in reducing burnout and perceived stress, while increasing levels of mindfulness. Addressing strategies that nursing staff can utilize to adhere to these types of interventions will be important in future studies. Decreasing the rates of stress and burnout among nursing staff will enhance the well-being of the nursing workforce, which may improve patient outcomes.

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Tables

Table 1: Descriptive summary of demographic variables (N = 31)

Variable	<i>Mean (SD); range or n (%)</i>
Age	33 (8.1); 22-49
Gender	
Male	5 (16.1%)
Female	26 (83.9%)
Years of Nursing Experience	
<1	5 (16.1%)
1-5	14 (45.2%)
6-10	6 (19.4)
>/11	6 (19.4%)
Race	
Caucasian	30 (96.8%)
African American	1 (3.2%)
Previous Meditation Experience	
Yes	9 (29%)
No	22 (71%)
Job Title	
RN	27 (87.1%)
Nursing Care Tech	2 (6.5%)
Advanced Practice Provider	2 (6.5%)
Home Floor/Unit	
8-100	20 (64.5%)
8-200	5 (16.1%)
6N/6W	6 (19.4%)
Long-term Committed Relationship	
Yes	24 (77.4%)
No	7 (22.6%)
Children in the Home	
Yes	12 (37.8%)
No	19 (61.3%)

Table 2. Repeated measures analysis of outcomes over time

Outcome	Potential Range	Baseline Mean (SE)	Midpoint Mean (SE)	Follow-up Mean (SE)	<i>F</i> (p)
Brief resilience scale	1-5	2.89 (0.12)	3.00 (0.04)	3.00 (0.048)	0.64 (.49)
Perceived stress	0-16	8.11 (0.42) ^a	6.33 (0.60) ^b	5.11 (0.61) ^b	10.56(.002)
CAMS	10-40	26.13 (0.48) ^a	28.38 (0.98)	30.75 (1.60) ^b	4.76 (.039)
Burnout [^]	1-5				
Personal		2.43 (0.18) ^a	3.15 (0.19) ^b	3.46 (0.27) ^b	11.80 (.007)
Work		2.59 (0.13)	2.75 (0.12)	3.02 (0.27)	2.69 (.126)
Client		3.41 (0.14)	3.50 (0.17)	3.85 (0.24)	3.83 (.67)

*Significance was denoted at $p < .05$

Note: Mean values with different letters significantly differ in post-hoc analysis

[^] Response options range from 1) 'Almost always' to 5) 'Never'

Appendices

Appendix A

Brief Resilience Scale (BRS)

Please respond to each item by marking <u>one box per row</u>		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
BR S1	I tend to bounce back quickly after hard times	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
BR S2	I have a hard time making it through stressful events.	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
BR S3	It does not take me long to recover from a stressful event.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
BR S4	It is hard for me to snap back when something bad happens.	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
BR S5	I usually come through difficult times with little trouble.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
BR S6	I tend to take a long time to get over set-backs in my life.	<input type="checkbox"/> 5	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1

Scoring: Add the responses varying from 1-5 for all six items giving a range from 6-30. Divide the total sum by the total number of questions answered.

My score: _____ item average / 6

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International journal of behavioral medicine*, 15(3), 194-200.

Appendix B

Cognitive and Affective Mindfulness Scale-Revised (CAMS-R)

Please respond to each item by marking <u>one box per row</u>		Rarely/Not at All	Sometimes	Often	Almost Always
CAMS-R1	It is easy for me to concentrate on what I am doing.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R3	I can tolerate emotional pain.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R4	I can accept things I cannot change.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R5	I can usually describe how I feel at the moment in considerable detail.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R6	I am easily distracted. (R)	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1
CAMS-R8	It's easy for me to keep track of my thoughts and feelings.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R9	I try to notice my thoughts without judging them.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R10	I am able to accept the thoughts and feelings I have.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R11	I am able to focus on the present moment.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
CAMS-R12	I am able to pay close attention to one thing for a long period of time.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Scoring: Note that 6 is reversed (R) scored. Sum of all values reflects greater mindful qualities.

Your total score: _____

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, 29(3), 177-190.
Note that the original scale was 12 items, but the original items 2 and 7 were deleted because they were viewed as being less useful than the remaining 10

Appendix C

PSS-4

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate your response by placing an “X” over the square representing HOW OFTEN you felt or thought a certain way.

	Never 0	Almost Never 1	Sometimes 2	Fairly Often 3	Very Often 4
1. In the last month, how often have you felt that you were unable to control the important things in your life?	<input type="checkbox"/>				
2. In the last month, how often have you felt confident about your ability to handle your personal problems?	<input type="checkbox"/>				
3. In the last month, how often have you felt that things were going your way?	<input type="checkbox"/>				
4. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	<input type="checkbox"/>				

Scoring for the Perceived Stress Scale 4:

Questions 1 and 4

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

Questions 2 and 3

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

Lowest score: 0
Highest score: 16

Higher scores are correlated to more stress.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396.

Appendix D

Copenhagen Burnout Inventory (English version) used in the PUMA study

NB: The questions of the CBI are *not* being printed in the questionnaire in the same order as shown here. In fact, the questions are mixed with questions on other topics. This is recommended in order to avoid stereotyped response patterns.

Part one: **Personal burnout**

Definition: Personal burnout is a state of prolonged physical and psychological exhaustion.

Questions:

1. How often do you feel tired?
2. How often are you physically exhausted?
3. How often are you emotionally exhausted?
4. How often do you think: "I can't take it anymore"?
5. How often do you feel worn out?
6. How often do you feel weak and susceptible to illness?

Response categories: Always, Often, Sometimes, Seldom, Never/almost never.

Scoring: Always: 100. Often: 75. Sometimes: 50. Seldom: 25. Never/almost never: 0.
Total score on the scale is the average of the scores on the items.

If less than three questions have been answered, the respondent is classified as a non-responder.

Part two: **Work-related burnout**

Definition: Work-related burnout is a state of prolonged physical and psychological exhaustion, which is perceived as related to the person's work.

Questions:

1. Is your work emotionally exhausting?
2. Do you feel burnt out because of your work?
3. Does your work frustrate you?

4. Do you feel worn out at the end of the working day?
5. Are you exhausted in the morning at the thought of another day at work?
6. Do you feel that every working hour is tiring for you?
7. Do you have enough energy for family and friends during leisure time?

Response categories:

Three first questions: To a very high degree, To a high degree, Somewhat, To a low degree, To a very low degree.

Last four questions: Always, Often, Sometimes, Seldom, Never/almost never. Reversed score for last question.

Scoring as for the first scale. If less than four questions have been answered, the respondent is classified as a non-responder.

Part three: Client-related burnout

Definition: Client-related burnout is a state of prolonged physical and psychological exhaustion, which is perceived as related to the person's work with clients*.

***Clients, patients, social service recipients, elderly citizens, or inmates.**

Questions:

1. Do you find it hard to work with clients?
2. Do you find it frustrating to work with clients?
3. Does it drain your energy to work with clients?
4. Do you feel that you give more than you get back when you work with clients?
5. Are you tired of working with clients?
6. Do you sometimes wonder how long you will be able to continue working with clients?

Response categories:

The four first questions: To a very high degree, To a high degree, Somewhat, To a low degree, To a very low degree.

The two last questions: Always, Often, Sometimes, Seldom, Never/almost never.

Scoring as for the first two scales. If less than three questions have been answered, the respondent is classified as a non-responder.