

**Stress in Healthcare Professionals: Caring for the Carers**

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**Author Note**

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### Abstract

**Background:** Healthcare Professionals commonly experience elevated stress levels, and this issue has only further intensified by the ongoing COVID-19 pandemic. Mindfulness-based intervention have been shown to improve stress levels in diverse populations. **Objective:** The purpose of this project was to evaluate if an online, multicomponent MBI can reduce stress levels in healthcare professionals enrolled in a graduate health program. **Methods:** Recruitment was conducted at two different Southwestern institutions via email announcement from university's program directors. The brief, 12-day intervention involved (1) self-guided online educational modules, (2) one group course via the platform zoom, and (3) at home practice of guided meditation session. The Perceived Stress Scale-10 (PSS-10) was used to measure stress levels pre- and post-intervention. General feedback of experience was also inquired on Postsurvey. **Results:** Sample comprised of 17 health professionals enrolled in a graduate health program from two different Southwestern Institutions. Scores from PSS-10 in postsurvey ( $M=20.94$ ,  $SD=6.04$ ) were statistically significantly lower than scores in pre survey ( $M=24.24$ ,  $SD=5.78$ ),  $t(16) = 3.35$ ,  $p = .004$ . A large effect size was detected with findings ( $d = .81$ ). **Conclusions:** Mindfulness Based Interventions may be able to reduce stress levels in healthcare professionals. More literature should focus on mindfulness intervention tailored to the needs of healthcare professionals.

*Keywords: Healthcare professionals, Stress reduction, Mindfulness, Mindfulness Based Intervention*

### **Stress in Healthcare Professionals: Caring for the Carers**

Stress can be described as a series of physiological responses and adaptations that occur to cope with a perceived threat to one's mental, physical, emotional, and/or spiritual well-being (Seaward, 2002). Experiencing stress is a normal part of life. It can be good or bad. However, if left unaddressed, chronic, and unmanaged stress can be detrimental to the physical, mental, and emotional health of individuals (National Institute of Mental Health[NIMH], n.d.). In the U.S., healthcare professionals commonly experience elevated levels of stress. A mindfulness-based intervention (MBI) may be able to empower health professionals to effectively cope with psychological distress and ultimately, improve their overall mental health.

#### **Problem Statement**

There is a wide amount of evidence signifying elevated levels of stress is a common problem among healthcare workers in the U.S. Many studies have focused on physicians, nurses, and individuals training in these roles and burnout is commonly reported in several of these studies. Burnout is physical and emotional exhaustion caused by prolonged and excessive stress related to working conditions. In one study funded by Mayo Clinic and Stanford, nearly half of physicians reported experiencing burnout symptoms (West et al., 2018).

The recent COVID-19 pandemic has also inflicted a wide range of stressors onto all individuals across the globe (Center for Diseases[CDC], 2021). The World Health Organization (2020) issued a public statement reporting front line health workers are particularly vulnerable to negative mental health effects. Excessive, unmanaged stress is a risk factor for not only negative psychological effects such as burnout, but associated with mental illnesses such as anxiety and depression as well. Studies conducted across the world in countries such as China, Canada, and Italy, reveal elevated levels of psychological distress, depression, and anxiety, other negative

psychological effects in medical workers treating COVID-19 patients (WHO, 2020; Lai et al., 2020). A recent metanalysis also determined approximately 43% of nurses suffered from stress and 33% experienced depression and/or anxiety during the pandemic (Al Maqbali et al., 2021). The World Health Organization (2020) has emphasized access to mental well-being and social support services is crucial during this time.

### **Purpose and Rationale**

Health professionals commonly experience elevated levels of stress and this issue has only further intensified due to the COVID-19 Pandemic. Ineffective coping methods to manage stress is a major cause for negative psychological effects and other health problems. The purpose of this evidence-based practice (EBP) project is to explore the role of stress in health professionals and evaluate if a mindfulness intervention can reduce perceived stress levels. The following evaluation question inquires, in healthcare professionals, can a mindfulness-based intervention reduce stress levels post intervention?

### **Background and Significance**

#### **Stress**

Everyone copes differently to stress. Some cope better to challenging events and can recover more quickly than others (NIMH, n.d.). There are different types of stress including short term stress, chronic stress, eustress, and distress (American Institute of Stress[AIS], n.d.). Not all stress is harmful. Eustress occurs when individuals experience challenges which promote positive feelings such as marriage, a new baby, or a promotion. Additionally, stress can energize, motivate, and improve performance. In dangerous situations, stress signals the individual to prepare to face a threat or flee to safety. In response to acute stress, breathing quickens, muscles

tighten, heart rate and blood pressure increase, and the brain utilizes more oxygen to increase alertness, all functions aimed at survival (NIMH, n.d.).

Prolonged exposure to stress can lead to long term stress with harmful consequences (AIS, n.d.; NIMH, n.d.). If an individual is chronically stressed, the body never receives a clear signal to return to normal functioning. As a result, the body's internal balance or equilibrium is disrupted, which can lead to physical symptoms including headaches, digestive problems, low energy, and increases risk for health problems such hypertension, heart attack, or stroke, and mental illnesses such as depression or anxiety (NIMH, n.d.). Distress, or “bad stress” can involve short term or long-term stress and unlike eustress, is an unpleasant emotion, feeling, thought, condition, or behavior. (e.g., financial problems or divorce). Distress can be normal and is expected in certain situations such as when a loved one passes away. However, if improperly managed, distress can lead to physical and/or mental health problems as well (American Cancer Society, 2020).

### **Stress in Healthcare Professionals**

Healthcare professionals (also known as health professionals or hcps) perform a crucial role in improving access and quality of healthcare. The term describes any individuals that deliver a form of health care service and typically play a part in promoting health, and/or preventing and treating disease (WHO, n.d.). The workforce is comprised of variety of occupations including, but not limited to direct care practitioners such as physicians, nurses, pharmacists, as well as allied health professionals and paraprofessionals. According to the CDC (2017), The healthcare field is the fastest growing sector in the U.S. and employs over 18 million healthcare workers. Approximately 80% of the population are women (CDC, 2017).

Several studies reveal health professionals experience stressors which are commonly work-related issues. Organizational culture, lack of social support or team collaboration, excessive workload, high intensity responsibilities, work process inefficiencies are some factors fueling stress (Reith, 2018; Patel et al., 2018). HCPs are especially vulnerable to emotional distress because of their role in the current COVID-19 Pandemic. Factors playing a part may be, but not limited to higher risk of exposure to the virus, managing with resource shortages, working long hours, and having firsthand experience witnessing emotionally difficult situations such as the negative effects of disease in patients (Pfefferbaum & North, 2020).

### **Mindfulness**

Mindfulness is a mental state achieved by embracing two key concepts, awareness, and acceptance (Headspace, 2020). Mindfulness techniques can be incorporated into an individual's day in various ways, involving formal and informal approaches. A common mindfulness practice is mindfulness meditation, a mental training practice to help individuals slow down racing thoughts, let go of negativity, and calm both mind and body (Wong, 2020). A wide body of research demonstrates practicing mindfulness can improve mental health in various ways including reducing stress, depression, and anxiety (Mayo Clinic, 2020). Evidence has shown mindfulness practices improve stress by lowering the stress response and enhancing the ability to self-regulate attention and emotion (APA, 2019; Delagran & Evans, n.d.).

### **Internal Evidence**

For this EBP project, this graduate student partnered with a southwestern university as part of an interprofessional effort to provide mental health training for their healthcare professionals. Stakeholders received large interest for mindfulness training to be provided from various health professional programs directors. Graduate student also emailed a behavioral health

and wellness counselor from the project site for information about what mindfulness training is currently offered there. He stated as it relates to curriculum, he was uncertain if mindfulness is addressed and to what extent in the programs. He states in the past few years, he has presented mindfulness on a surface level, but not all individuals received the training. This graduate student interviewed individuals attending the institution as well. It was determined some have had prior formal training on mindfulness principles, but reported majority reported they do not practice mindfulness. This indicates, while some are introduced to mindfulness, they may not necessarily be utilizing the skills they have learned.

Healthcare professionals were also recruited from a second Southwestern university. Individuals were interviewed at this location as well that met preliminary eligibility criteria. Majority reported they have had not received any formal training on mindfulness. Everyone spoken to reported experiencing high levels of stress and would enjoy learning about mindfulness.

### **PICOT Question**

This inquiry has led to the clinically relevant PICOT question, in healthcare professionals, how can a mindfulness-based intervention compared to no intervention affect stress levels?

### **Evidence Synthesis**

#### **Search Strategy**

A detailed search was performed exploring the most current evidence to address PICOT. Three electronic databases were extensively searched including CINAHL, PubMed, and Scopus. Databases were searched utilizing a combination of two or more keywords related to PICOT. Keywords initially included: *Healthcare professionals, stress, mental health, mindfulness,*

*MBSR*, and *MBI*, but were expanded to *healthcare professionals in training, physicians, doctors,* and *nurses* to ensure no potential valuable literature was inadvertently overlooked. Exclusion criteria included unpublished works and articles published before five years. Inclusion criteria involved healthcare professionals, healthcare professionals in training, and interventions related to mindfulness.

Initial CINAHL search included the key terms *healthcare professional* and *mindfulness* with yield of 60 results. Terms were expanded to *healthcare professionals* or *nurses* or *healthcare providers*, and *mindfulness*, or *mbsr*, or *mindfulness-based stress reduction*, or *mindfulness intervention* to expand search to all articles relevant to PICOT. Inclusion criteria was then restricted to peer review articles, English language, adult population, and publication in the past five years to narrow results. The search concluded with 66 relevant results in CINAHL.

The initial search of *healthcare professional* and *mindfulness* yielded 1,533 results in PubMed. Limits were then set to exclusively allow articles with publication in the last 5 years, available in the English language. Books as well as articles with a population younger than adults were excluded from search. Ultimately, yielded 86 results in PubMed.

Key words *healthcare professionals* and *stress* were searched in Scopus with no exclusion or inclusion criteria which initially yielded 73,688 results (Appendix C). Limits were then set to peer reviewed journal articles, publication in the last 5 years, and the English language. Keywords: *mindfulness* or *MBSR* were added to narrow results related to addressing PICOT. Final search yielded 117 results.

Melnyk and Fineout-Overholt's (2017) rapid critical appraisal was used to determine the quality of the 11 articles utilized for this literature review. Inclusion and exclusion criteria, relevance to PICOT, and findings from rapid critical appraisal checklist were considered during



selection of studies. Preference was granted to articles with quantitative data, larger sample sizes, and higher level of evidence, when deciding between articles similar in content and met all other criteria. Ultimately, 11 articles were selected for inclusion in literature review (Appendix E). Those included evaluated the relationship between healthcare professionals and/ healthcare professional in training, stress, mental health, and assessed the most promising mindfulness-based interventions.

### **Synthesis of Evidence**

Majority of the studies were high-level evidence and included four systematic reviews, five randomized control trials, one longitudinal study from a randomized control trial, and one quasi- experimental study (Appendix A; Appendix B).

The evidence is slightly weakened since 4 articles did not discuss source (s) of funding, but no bias was identified in all 11 articles. One article investigated impact of mobile app “Calm” on stress levels and cautions potential conflict of interest. Dr. Huberty, a principal researcher of the study, is the current Director of Science at Calm. Although the article does clarify, she engaged in this role approximately one year after the design, collection of data, and analysis of results presented in the paper (Huberty et al., 2019). This study also focused on a population outside the PICOT. Given the limited research discovered on mindfulness training exclusively through an online modality, the article was accepted (Huberty at al., 2019). All other articles included diverse range of healthcare professionals and/or healthcare professions in training, enhancing applicability to project population. Sample size of all studies were sufficient. Stillwell et al. (2017) incorporated only 8 studies in their systematic review, but the size was appropriate given the strict inclusion criteria and specification of the measurement tool used. The

sample in all 7 interventional studies included majority of female participants, one factor limiting generalizability.

Significant heterogeneity was noted with intervention methods. It is challenging to define a standardized approach because interventions varied in training methods, content, and duration. Interventions were delivered either electronically, in person, or involved both modalities. Training methods were also offered as facilitator led, self-guided, and/or both. Additionally, interventions varied in length and frequency ranging from a few hours one day to 70 hours over the course of multiple weeks. Along with duration variability, content varied in topics or was fully disclosed. Furthermore, some studies required at home training and practice, while others only encouraged it, and the decision to account this time into intervention length differed as well.

Although intervention methods varied, commonalities were observed as well. Stress was a dependent variable measured in all studies, and the Perceived Stress Scale (PSS) was utilized to measure stress levels in 8 out of 11 articles. Furthermore, all 7 interventional studies demonstrated at least some type of improvement in stress levels that was significant despite methodological heterogeneity. It can be assumed education influenced these results. Variability and uncertainties in content, limits formation of conclusions as to which specific topics are the most valuable. At the bare minimum, teachings appeared to consist of a general overview of mindfulness principles and activities which promote mindfulness. Furthermore, all interventional studies involved practicing mindfulness techniques, specifically meditation and breathing work. Many articles also took on a multicomponent approach which commonly combined elements including structured education, practice of mindfulness techniques, and at home practice sessions (Appendix A; Appendix B).

## **Main Conclusions from Evidence**

The health professional role is associated with psychological distress and increases the person's risk for negative mental health effects and other health problems. The literature review reveals MBIs may be able to empower health care professionals to effectively cope with stress and ultimately, reduce their perceived levels of stress. A multicomponent intervention approach featuring a didactic factor, mindfulness practice sessions, and at home practice is supported by the evidence to reduce stress levels.

### **Evidence Based Practice Model**

*The Star Model of Knowledge Transformation* facilitated the implementation process of this evidence-based project (Stevens, 2012). The model highlights 5 steps (1) discovery (2) evidence summary (3) translation (4) integration and (5) evaluation, to transform knowledge into practice (Schaffer et al., 2013). The model emphasizes rigorous systematic review and understanding of the evidence (Schaffer et al., 2013), an important part of the process because there is a vast amount of research on mindfulness. Notably, the model also welcome use of qualitative evidence, which is included in two studies (Gilmartin et al., 2017; Stillwell et al., 2016).

During the discovery stage, the most current evidence relating to PICOT was sought out. In the translation stage, summary of evidence inspired development of a multicomponent intervention approach featuring (1) online self-guided education, (2) facilitator led group zoom course, and (3) at home practice. Graduate student earned a mindfulness life coach certification, to be adequately trained on topic prior to preparing and teaching course materials. An online PowerPoint presentation on mindfulness was created for self-guided learning. Due to COVID, planned in person meetings were modified to an online modality via zoom and a course outline

was prepared. The zoom session was to duplicate an in-person experience where key concepts from online modules were reinforced, two mindfulness exercises were decided upon to enhance mindfulness skills, followed by a Q&A. Integration, which describes implementation of practice change, occurred in March, and will be described further in later sections. Evaluation, the last stage describes monitor if intended outcomes were successful in terms of impact, quality, and satisfaction. Outcomes were evaluated and implications of findings were synthesized in the discussion section (Appendix C).

### **Theoretical Framework**

Lazarus and Folkman's (1984) *transactional theory of stress and coping* was selected to further guide this EBP project. Lazarus and Folkman's groundbreaking work is still widely used today to facilitate understanding of psychological stress, a complex phenomenon (Biggs et al., 2017). The two main concepts of the theory are cognitive appraisal and coping (Berjot & Gillet, 2011). According to Lazarus and Folkman, no event or situation is inherently stressful. An individual will subjectively evaluate if a situation is potentially a stressor through a process called cognitive appraisal. Cognitive appraisal has two stages: (1) Primary appraisal, determining if a situation is a threat and if so, (2) secondary appraisal, assessing if ability or resources are sufficiently available to effectively cope (Berjot & Gillet, 2011).

The authors then proposed two different types of coping responses when encountering stress, emotion focused, and problem focused. Problem focused coping involves determining strategies to reduce stress levels in practical ways by engaging in behaviors that tackle or remove the source of stress (Biggs et al, 2017). Emotional focused coping refers to behaviors and actions aimed at regulating the negative emotional response experienced by stress such as anxiety, sadness, and anger (Biggs, et al., 2017). Problem-focused coping methods are commonly viewed

in a positive light, with evidence revealing frequent use of this coping style reduces long-term strain levels (Greenway et al., 2015). Lazarus and Folkman theorized emotion focused coping is beneficial when a stressful situation cannot be changed (1984).

Lazarus and Folkman theory guided development of a stress reduction intervention based on mindfulness practices. Mindfulness techniques can be employed as healthy emotion focused coping methods and can improve problem solving coping abilities as well (Headspace, 2020). Training individuals to live more mindfully teaches individuals to not overly react to emotions or become overwhelmed by challenging events. As a result, mindfulness practices can decrease impulsivity while increasing the ability to regulate emotions (APA, n.d.; Headspace, 2020). Mindfulness has also been shown to improve concentration and mental clarity, essential features to problem focused coping (APA, n.d.; Delagran & Evans, n.d; Headspace, 2020). The theoretical framework compliments this project because it describes how individuals perceive stress and emphasizes healthy ways of coping which can be tied to various mindfulness principles and practice (Appendix D).

## **Methods**

### **Study Design**

An evidence-based project was completed using quantitative methods and a pre and post design. The study did not have a control group assigned.

### **Institutional Review Board**

Institutional Review Board (IRB) approval was granted at two large Southwestern Universities on December 18, 2021 at one facility and February 2<sup>nd</sup>, 2021 subsequently at the other facility. Modification of study was requested and approved prior to initiation of project on February 26, 2021 and March 2<sup>nd</sup>, 2021, respectively. Modification involved shortening at home

practice was shortened from three weeks to one week due to time constraints. Graduate student paid for mindfulness coaching certification out of pocket, but no other funding or other special costs associated with this project (Appendix G).

### **Sample and Setting**

All interactions were held remotely online using the video conferencing platform zoom and through email communication using university issued email addresses. Recruitment of subjects was conducted at two different Southwestern Universities via email announcement from university's program directors. Inclusion criteria requirements were adults 18 years old or older, enrolled in a graduate health profession program, can read, and understand the English language, and access to a computer which can operate all necessary online platforms. Exclusion criteria was routine practice of mindfulness activities such as yoga or meditation in the past three months and those unable to provide electronic consent.

The sample comprised of registered nurses enrolled in a Doctor of Nursing Practice program and individuals enrolled in a Doctor of Physical Therapy program. Participants were not compensated for participation in the project. Registered nurses were allotted up to 8 hours to count towards indirect nonclinical hours for participation in project after obtaining approval from university's program director. Indirect nonclinical hours involve time devoted to professional development activities in a non-clinical setting essential to achieve foundational competencies established by the American Association of Colleges of Nursing (AACN, 2021).

### **Project Description**

Interested subjects were advised to email graduate student and stakeholders in one email. Stakeholders enrolled subjects in one of two scheduled zoom sessions and emailed them access to presurvey and learning materials via Qualtrics link as well. Once Qualtrics link was emailed,

subjects had 3 days to complete two online tasks before their zoom session: (1) Presurvey and (2) Self-guided educational modules. The preintervention survey allowed subjects to consent electronically after reviewing study details, answer the PSS-10, and optional demographic questions. The PowerPoint presentation reviewed topics such as mindfulness principles, benefits to mindfulness, different activities, and additional resources to learn more about the if desired. Voice overs were added to each slide which expanded information provided on each slide. Subjects then attended an approximately 2-hour group online course via zoom with other subjects attending. The zoom course was taught by graduate student and overseen by one of the stakeholders. The stakeholder in the zoom session, also verified subjects' attendance during the zoom session. After the session, subjects were advised to practice guided meditation independently at least 3 times for 1 week, utilizing a 5-minute popular video on YouTube. The YouTube link as well as a mindfulness log were both provided on the Qualtrics link they were sent previously. A mindfulness log was provided for their own benefit, to keep track of days they completed a guided meditation session. The logs were not collected.

Seven days after their zoom course, subjects were emailed the website link to the post survey to complete within the next few days. The postsurvey included the PSS, inquired if they adhered to at home practice, and asked for general feedback regarding their experience. The intervention lasted approximately 12 days, from access to course materials via Qualtrics to postsurvey.

### **Data Collection and Human Subject Protection**

All responses from subjects were collected during Pre and Post survey utilizing password protected online survey software QuestionPro. All data is stored in a password protected computer in a secure location. The survey host's Respondent Anonymity Assurance feature was

utilized to protect patient identifiers and prevented investigators from tracing subjects' responses to individual subjects. Subjects created a unique patient identifier, unknown to investigators, to allow pre and post data to be connected.

### **Measurement Tool**

The Perceived Stress Scale-10 (PSS-10) was included in both pre and post survey to measure stress levels pre and post intervention. The perceived stress scale is the most popular psychological instrument for measuring perception of stress and has been utilized in diverse populations (Cohen, 1994). The ten-item questionnaire is used to assess the degree to which respondents subjectively appraise situations in their life as stressful (Cohen, et al., 1983). Questions are answered utilizing a 5-point rating scale (0 (*never*) to 4 (*very often*) to determine how uncontrollable, unpredictable, and overloaded, individuals viewed their lives during the last month. The final PSS score is positively correlated to the individual's stress level. For instance, the higher the score, indicates a high stress level.

Lee (2012) established the PSS-10 has suitable psychometric properties and is superior to PSS-14 and PSS-4. Upon inspection, Lee (2012) determined internal consistency reliability was empirically supported across 12 studies in which it was used (Cronbach  $\alpha > .70$ ). Retest reliability was also determined acceptable in one study after a 7-day interval ( $r = .74$ ) and a different study assessed at after 14-day interval ( $r = .77$ ). Thus, it is a dependable measurement tool to address if project outcomes were met 12 days post intervention. Responses to questions from PSS-10 were manually calculated to obtain an overall stress score and verified by a second individual before data analysis was performed.



## **Analysis Plan**

Data stored in QuestionPro was transferred onto Intellectus statistical software package for management and analysis (Intellectus Statistics, 2021). Aggregate descriptive statistics was used to describe the sample and outcome variables. Inferential statistics used to analyze the data, using a two- tailed test with the critical value set at  $p < .05$ . Postsurvey responses involving feedback of intervention were also reviewed.

## **Results**

### **Sample Enrollment and Demographics**

Seventeen subjects successfully completed intervention and were included for post data analysis. Out of the 17 subjects, majority were registered nurses enrolled in a Doctor of Nursing program ( $n=13$ , 76.47%) while the remaining were individuals enrolled in a Doctor of Physical Therapy program ( $n=4$ , 23.53%). The most frequently observed category of age was 25-29 ( $n = 7$ , 41.18%). Majority of the population identified as female ( $n = 15$ , 88.24%). Ten subjects identified as Caucasian or white (58.82%). Slightly over half the sample reported no prior mindfulness training in the past 2 years ( $n=9$ , 52.94%). Frequencies and percentages of baseline characteristics of the sample are also presented in Table 3 (Appendix E).

Of the 26 subjects that met inclusion criteria and were initially enrolled, 9 did not fulfill study requirements and their data was excluded from analysis. Two subjects dropped out after communicating they were unable to attend zoom session, 6 did not accurately complete at home practice instructions, and 1 subject did not complete the post survey.

### **Statistical and Clinical Significance**

After initial evaluation of PSS-10, healthcare professionals reported moderate levels of stress. The average stress level remained at moderate levels postintervention, but there was

statistical significance reduction in stress levels ( $n=17$ ). Two-tailed paired sample t-test was conducted to examine if there was a significant difference in stress levels pre and post intervention. The average stress level on presurvey was 24 points ( $M=24.24$ ,  $SD=5.78$ ) and ranged from 9 to 30. The average stress level was 20.94 ( $M=20.94$ ,  $SD=6.04$ ) and ranged from 6 to 29 postintervention, statistically significantly lower than baseline,  $t(16) = 3.35$ ,  $p = .004$ . It is also noteworthy to mention, the effect size for this analysis was found to exceed Cohen's (1988) convention for a large effect ( $d = .81$ ). This indicates the MBI has clinical significance in having a large impact on reducing stress.

### **Evaluation of Intervention**

Questions about quality of (1) overall intervention, (1) PowerPoint presentation, (3) zoom session, and (4) presenter's knowledge and guidance on topic were asked with a 5-point Likert scale ranging from very unsatisfied to very satisfied. All subjects answered the Likert scale ( $n=17$ ), see figure 3 for all responses in percentages (Appendix F). Regarding overall MBI quality, 47.06% reported very satisfied, 47.06% reported satisfied, and the remaining 5.88% stated they were neutral. Regarding PowerPoint presentation, 100% reported very satisfied or satisfied. For both the zoom course and presenter's knowledge and guidance, 82.36 % reported very satisfied or satisfied while the remaining 17.65% stated they were neutral.

All subjects selected yes on the following two questions: Are you planning to implement mindfulness principles, and would you recommend mindfulness to a friend? Over half of subjects provided additional comments ( $n=10$ ). Ten out of the 12 comments were positive. Some positive comments were "*I thought it was very insightful and made me really focus on my stresses. I enjoyed the course and the mindfulness videos*" and "*I attempted to practice mindfulness every day. I felt peace at the end of each session and had a bit more strength to fight on a get things*

*done.*” The other two comments were more constructive in nature. One subject wrote “*I week in my opinion was not enough to truly train oneself to be mindful and practice meditation.*”

## **Discussion**

### **Principle Findings**

The data provides several implications and valuable insight. For one, it reveals hcp experience moderate levels of stress, indicating there is room for improvement. Mindfulness-based interventions may be able to reduce stress levels in health professionals, consistent with the literature (De Vibe et al., 2018; Ghawadra et al., 2020; Gilmartin et al., 2017; Gutman et al., 2020; Ireland et al., 2017; McConville et al., 2017; Spinelli et al., 2019; Stillwell et al., 2017; Yang et al., 2018; Zollars et al., 2019). To our knowledge, this study appears to be one of the first to evaluate and successfully reduce perceived stress levels in healthcare professionals, with a 12-day intervention.

Additionally, 100% of subjects reported they plan to implement mindfulness principles in their lives, indicating positive attitudes towards mindfulness and an understanding of its value. Majority of subjects were satisfied with the overall intervention and provided positive comments about their experience. Although, it is important to note, from the 17 subjects who fully completed intervention, only 8 reported very satisfied with overall intervention. Ratings were relatively similar in the other categories evaluated, (see Appendix F), indicating there is room for improvement to enhance satisfaction. There is insufficient data to make concrete conclusions on how to best enhance satisfaction results.

### **Barriers**

#### ***Sample***

A small sample size with a homogenous population was major barrier to the study, and

limits generalizability of results. Majority of subjects were women (n=15), registered nurses, (n=13), and over half identified as Caucasian or white (n=10). It was originally intended more subjects would be part of study comprised of individuals from various graduate health professional programs. As mentioned before, there was large interest from program directors at project site. However, timing of project implementation was a hinderance and interfered with their busy schedules. Delays to project implementation also impacted holding a longer recruitment process. Furthermore, graduate student was acquaintances with some of the health professionals from one institution, indicating self-report bias is plausible (Althubaiti, 2016). Subjects were not coerced to provide favorable responses. However, a desire to provide favorable responses as “courtesy” to investigator is noted in research and more likely with qualitative data involving feedback of intervention quality (Hameed et al., 2018).

### ***Intervention Adherence***

Measures were not in place to verify adherence with self-guided online training and at home meditation practice. Some online interventions in the literature, involving a website or mobile based app, allowed researchers to monitor and confirm adherence (Huberty et al., 2019; Ghawadra et al., 2020; Zollars et al., 2019). Furthermore, it was originally planned subjects would receive the mindfulness presentation a week in advance, prior to attending the zoom course. Subjects were provided with course materials 3-4 days before zoom session due to delays. Thus, it is also unknown if subjects had adequate time to watch the mindfulness presentation beforehand. Adherence to at home practice was assessed through self-report inquiry in the post survey. However, the mindfulness logs that were provided to them, were not collected to verify adherence. One subject commented “*weekly mindfulness check-in to fill out would both provide more data and keep participants more responsible.*”

### ***Follow Up***

The EBP project lacked follow up, essential to evaluate continued adherence to formal mindfulness practices and long-term impact in stress levels. For studies in which follow up is assessed, lack of adherence to formal mindfulness practices is commonly noted (De Vibe et al., 2018; McConville et al., 2017). De Vibe et al (2018) notably evaluated six-year effects of a mindfulness-based intervention in a longitudinal study. It was determined despite low levels to formal mindfulness practices, subjects maintained improved healthy coping skills ( $p < .001$ ) with positive correlation to increase in mindfulness over 6-year period ( $r = .67, p < .001$ ). Studies which have evaluated direct correlation of stress and mindfulness, have identified similar findings, but with shorter follow ups (Huberty et al., 2019; McConville et al., 2017). McConville et al., (2017) determined significant decreases in stress post-intervention were maintained at three months follow-up involving 2 RCT's and 1 control trial (SMD =  $-0.22$ ; 95% CI:  $-0.61$  to  $0.17, p = .27$ ). The authors also noted amount of home practice decreased following intervention.

### ***Length of Intervention***

Another possible limitation is the length and dose of intervention. It can be disputed if participants received adequate training and practice. Jon Kabat-Zinn, a well-known mindfulness expert, developed the mindfulness-based stress-reduction program (MBSR) program consisting of an eight-week workshop (Gilmartin et al., 2017). Compared to the MBSR program, the intervention is introductory and brief. One participant suggested increasing duration of intervention. The project was initially planned as a four-week intervention but modified due to timing constraints. However, the length and duration of project appeared to be a strength which will be discussed more in later sections.

## **Strengths**

### ***Multicomponent Approach***

Although, multiple limitations were identified, there are notable strengths noted with this EBP project as well. A multicomponent approach is supported by the evidence and can enhance the quality of learning (Gutman et al., 2020; Stillwell et al., 2017). Although methodologies differed across literature, three interventional studies also incorporated a multifaceted approach involving both facilitator led and online self-guided education as well as practice of mindfulness techniques (Ghawadra et al., 2020; Gutman et al., 2020; Zollars et al., 2019). It is important to note all articles showed some type of improvement in stress levels post intervention. Gutman (2020) detected a statistically significant reduction with large effect size in 2 different instruments tools, PSS ( $Z=-4.291$ ,  $pd=-1.84$ ) and SSMS ( $Z=-3.330$ ,  $pd=-1.27$ ). Although it should be kept in mind, Ghawadra et al., (2020) only observed statistical significance in stress levels over time ( $p<.001$ ), but not between the control and experimental group ( $p=.155$ ). Additionally, Zollars et al., (2019) had a significant reduction in stress with a moderate effect size, but lacked a control group ( $p<0.001$ ,  $d = 0.6$ ).

### ***Length of Intervention***

It was discussed earlier, how a shorter MBI, can be perceived as a limitation, but there are benefits to this as well. Spinelli et al., (2019) noted longer interventional periods may contribute to higher attrition rates. Additionally, longer MBSR programs are also associated with more economical costs for reasons such as use of more resources, trained staff, and larger time commitment (Mcconville et al., 2017).

The intervention was shortened due to time constraints. The modification was originally undesired, but now provides us with new and valuable information. A combination of varied

methods including brief and long MBIs were included in literature review to determine which MBIs were of highest quality. It appears majority of MBIs, even when providing brief mindfulness training (described as 6 hours or less), delivered training throughout course of multiple weeks. For instance, Gilmartin et al., (2017) evaluated 6 brief mindfulness interventions (e.g.,  $\leq 4$  hours) offered to healthcare providers in. The brief MBI in the studies evaluated ranged from 4 weeks to 8 weeks. The length of intervention was consistent in smaller trials offering brief MBIs and ranged from 4 to 8 weeks (Gutman et al.,2020; Huberty et al.2019; Zollars et al., 2019). This project appears to be one of the first to evaluate perceived stress levels following mindfulness intervention provided in only 12 days. Although the MBI was slightly less than 2 weeks, there was statistical and clinical significance was obtain suggesting that one can implement the intervention in a shorter period of time and it would have an impact on reducing stress . Gutman et al., (2020) similarity noted significant improvement in stress levels with large effect when evaluating the subjects' weekly pre and post mindfulness activity log in their 8-week program. Follow-up testing would be important so that one can see the effect overtime and motivate study participants to continue using mindfulness techniques.

### **Online Modality**

The COVID-19 pandemic has forced many interactions originally face-to-face transition to online methods including this project. Originally considered another obstacle, it was discovered electronically delivered MBIs may be more practical and cost-effective approach for health professionals (McConville et al., 2017; Spinelli et al., 2019). A statistical significance with large effect size was still detected with a fully online MBI. Additionally, it was observed 100% of subjects reported satisfied with the PowerPoint presentation. The convenience of a self-guided online PowerPoint presentation may be a potential motivation for high rating in this

category. Similar findings have been detected with MBIs delivered through mobile apps. Huberty et al., (2019) evaluated impact of an online MBI entirely utilizing the mobile application “Calm.” on stress levels among undergraduate college students. Subjects in the randomized control trial were first asked to complete “7 Days of Calm,” an educational component and then meditate 10-minutes daily for 40 days with the help of the phone app. Decrease in perceived stress levels were observed post intervention with large effect size which remained significant at 3 months follow up ( $P < .001$ ; effect size=1.24).

### **Adaptability**

Shorter and online mindfulness-based interventions may be more feasible for healthcare professionals and easier for organizations to sustain. As a result, this DNP project can be easily adapted for diverse populations and organizations.

### **Sustainability and Recommendations for Practice**

The introductory and short-term mindfulness training program has provided subjects with new or increased knowledge about mindfulness. The hope is they will continue to implement mindfulness principles into their lives and recommend mindfulness to future patients, and other individuals to its benefits as well.

Currently, there are plans at the project site to utilize the online educational modules for future healthcare professionals. Stakeholders are currently developing their own research project and an unknown amount of healthcare professionals involved in their project, are expected to receive the online training. At the other institution, this graduate student has discussed with two faculty members to teach a similar zoom course and provide learning modules to their healthcare professionals as well. However, it is suggested, and ideal for all healthcare professionals from both institutions to receive a mandatory MBI course. All healthcare professionals can potentially



benefit from this intervention as observed from this DNP project. It is recommended to continue the project and allocating responsibilities to an individual(s) similar to this graduate student's role, within both universities. DNP projects are essential for evaluation of continued efforts and can help enhance reliability of results from this EBP project.

Based on the findings, it is recommended a MBI course is implemented in all graduate health professional programs including both institutions where recruitment was conducted. Further research is needed to develop a standardized mindfulness course. Nonetheless, project outcome was successful, and the mindfulness-based intervention reduced stress levels in health professionals. Consistent with the literature, varied range of presentation options have been effective. Similar to findings from Stillwell et al., (2017) this project supports mindfulness training can be adapted and incorporated into health professional training programs tailored based on the university's preferences, resources, and feasibility.

### **Recommendations for Future Research**

This project is one of the first studies to evaluate impact in stress levels involving a brief, 2-week, multicomponent, electronically delivered MBI for healthcare professionals. It is recommended future studies consider replicating this project with larger sample sizes, control groups, and long term follow up to help support findings from this project. For future projects, measures should also be established to ensure adherence to intervention requirements. For data purposes, a specific YouTube video was chosen for subjects to help guide their meditation sessions at home. The audio narration was selected based on its wide popularity and positive feedback on the website, but noncompliance was noted during intervention (n=6). Allowing subjects to select the mindfulness activity of their preference to practice at home, may also be beneficial in preventing increase in attrition rates.

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Appendix A

Table 1

Evaluation table

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>De Vibe, et al.</b> (2018) Six-year positive effects of a mindfulness-based intervention on mindfulness, coping and well-being in medical and psychology students.</p> <p><b>Funding:</b> Norwegian Medical Association, the Health Authority Region North, Norway, and the Norwegian Public Health Institute  <b>Bias:</b> Not reported  <b>Country:</b> Norway</p>	<p>Stated, Kabat-Zinn MBSR program</p>	<p><b>Design:</b> Longitudinal from RCT</p> <p><b>Purpose:</b> Evaluating six-year effects of a seven-week mindfulness-based course</p>	<p><b>N:</b> 288  <b>n:</b> 144  <b>n:</b> 144</p> <p><b>Sample:</b> Females, (CG) 76%, (EG) 82%. Mean age (CG) 23.8 y.o., (EG) 23.6 y.o., (CG) Medical students 61%, (EG) 60%, The rest in CG &amp; EG Psych students</p> <p><b>Inclusion Criteria:</b> medical and psychology students from specific university</p> <p><b>Exclusion Criteria:</b> n.s.</p>	<p><b>IV1:</b> MBSR (EG)  <b>IV2:</b> SS (CG)</p> <p><b>DV1:</b> FC Stress  <b>DV2:</b> FC mood  <b>DV3:</b> FC overall mental health and physical status  <b>DV4:</b> CB  <b>DV5:</b> CRRQ</p>	<p>FFMQ, WCCL</p>	<p>Independent sample T-test, latent growth curve models, Pearson correlation analysis</p>	<p><b>DV1:</b> predicted from increase in PFC intercept (<math>\beta = .24, p = .04</math>) and slope (<math>\beta = .52, p = .02</math>)</p> <p><b>DV2:</b> SS increase (<math>p &lt; .001</math>)</p> <p><b>DV3:</b> Sig. increased problem coping (<math>p &lt; .001</math>) &amp; decrease in avoidance coping AFC (<math>p = .02</math>)</p>	<p><b>LOE:</b> II</p> <p><b>Strengths:</b> long follow up effect, from RCT</p> <p><b>Weaknesses:</b> lack of active control, homogenous sample, possible response bias from elf-report instruments, no exclusion criteria</p> <p><b>Conclusion:</b> Mindfulness training can influence the promotion of well-being &amp; healthy coping methods even after several years</p> <p><b>Quality:</b> Provides valuable insight, but feasibility &amp;</p>

**Key:** AX – anxiety; CG- control group; CI– confidence interval; CSS- Cross sectional study; *d*- Cohen’s d; DASS- Depression, Anxiety, and Stress Scale; Dep.- depression DV- dependent variable; FFMQ; Five Facet Mindfulness Questionnaire, GRADE: Grading of Recommendations Assessment, Development and Evaluation; Grad- graduate; HCP- Healthcare professionals; IT; In Training; IV- independent variable; M- means; MA- meta-analyses; MAAS; Mindful Attention Awareness Scale; MBI; Mindfulness based intervention; MBSR- Mindfulness Based Stress Reduction; mn-month; PE- Psychoeducation; PRCT- Pilot randomized control trial; PROMIS- Patient-Reported Outcomes Measurement Information System; PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; N-number of studies (if SR) or participants in study; n- number of participants (if SR) or number of participants in subset and RCT– randomized control trial; S-stress; SD– standard deviation; SS-Statistically significant; y.o.; years old; Uni- University; WEMWBS; Warwick-Edinburgh Mental Well-Being Scale  $\alpha$ - Cronbach’s alpha value; &- and



Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
			<p><b>Attrition:</b> 17/288 0.06% post intervention, unknown reasons, 182/288 63% 6 year follow up, unknown</p>				<p>SS negative correlations between slopes of AFC &amp; DM (<math>r = -.72, p &lt; .001</math>) &amp; between slopes of AFC &amp; PFC (<math>r = -.42, p = .03</math>)</p> <p>Sig. positive correlation of DM and PFC (<math>r = .67, p &lt; .001</math>).</p>	applicability limited due to low quality of evidence
Citation	Framework	Design/Method	Sample/Setting	Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Ghawadra et al., (2020).</b> The effect of mindfulness-based training on stress, anxiety, depression and job satisfaction among ward nurses</p> <p><b>Funding:</b> UNCW School of Nursing</p>	Stated, Kabat-Zinn MBSR program	<p><b>Design:</b> RCT (pre- &amp; posttest, 2-mn follow up test)</p> <p><b>Purpose:</b> Evaluate effect of a 4-week mindfulness-based training intervention on</p>	<p><b>N:</b> 249 <b>n:</b> 123 (CG) <b>n:</b> 126 (EG)</p> <p><b>Setting:</b> In classroom sessions then online training</p> <p><b>Sample:</b> <i>No sig. difference Malaysian</i></p>	<p><b>IV1:</b> MBSR program</p> <p><b>IV2:</b> Yoga program</p> <p><b>DV1:</b> Stress <b>DV2:</b> Dep. <b>DV3:</b> Ax. <b>DV4:</b> Mindful</p>	DASS-21, JSS, MAAS	SPSS, generalized estimating equation (GEE), Chi-square test and independent t test, Cohen's <i>d</i>	<p>Not stat. sig. between groups for <b>DV1, DV2, DV4</b></p> <p><b>DV1:</b> Over time (<math>p &lt; .001</math>)</p>	<p><b>LOE:</b> II</p> <p><b>Strengths:</b> RCT design, detailed description of interventions, multiple instruments used, both in person &amp; online format used</p> <p><b>Weaknesses:</b> sample</p>

**Key:** AX – anxiety; CG- control group; CI– confidence interval; CSS- Cross sectional study; *d*- Cohen’s *d*; DASS- Depression, Anxiety, and Stress Scale; Dep.- depression DV- dependent variable; **FFMQ**; Five Facet Mindfulness Questionnaire, **GRADE**: Grading of Recommendations Assessment, Development and Evaluation; **Grad**- graduate; **HCP**- Healthcare professionals; **IT**; In Training; **IV**- independent variable; **M**- means; **MA**- meta-analyses; **MAAS**; Mindful Attention Awareness Scale; **MBI**; Mindfulness based intervention; **MBSR**- Mindfulness Based Stress Reduction; **mn**-month; **PE**- Psychoeducation; **PRCT**- Pilot randomized control trial; **PROMIS**- Patient-Reported Outcomes Measurement Information System; **PRISMA** – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; **N**-number of studies (if SR) or participants in study; **n**- number of participants (if SR) or number of participants in subset and **RCT**– randomized control trial; **S**-stress; **SD**– standard deviation; **SS**-Statistically significant; **y.o.**; years old; **Uni**- University; **WEMWBS**; Warwick-Edinburgh Mental Well-Being Scale **α**- Cronbach’s alpha value; **&**- and

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Bias:</b> None recognized  <b>Country:</b> Malaysia</p>		<p>improving stress, anxiety, depression, and job satisfaction among bedside nurses.</p>	<p>95% (CG), Malaysian 46.4% &amp; Malaysian 91% (EG), female 52 % (CG), 47.4% (EG), mean unstated &lt;25 y.o.,36% (CG), &lt;25 y.o. 41% (EG)</p> <p><b>Inclusion:</b> Bedside nurses working at specific Malaysian hospital, mild to moderate of dep, ax., and stress according to DASS-21</p> <p><b>Exclusion:</b> history of mental illnesses, severe levels of dep., ax. and stress according to DASS</p> <p><b>Attrition:</b> 10% 25/249 analyzed. Left for maternity</p>	<p><b>DV5:</b> Job satisfaction</p> <p><b>MBI:</b> 2-hr Mindfulness-Based training workshop, followed by 4 weeks of guided self-practice mindfulness-based training website</p>				<p>outside U.S., high attrition before online training,</p> <p><b>Conclusion:</b> Mindfulness-Based Training is effective in improving anxiety and job satisfaction among nurses</p> <p><b>Quality:</b> Slightly limited applicability to due to population in Malaysia. Feasible to apply concepts influenced from intervention to project</p>

**Key:** AX – anxiety; CG- control group; CI– confidence interval; CSS- Cross sectional study; *d*- Cohen’s d; DASS- Depression, Anxiety, and Stress Scale; Dep.- depression DV- dependent variable; FFMQ; Five Facet Mindfulness Questionnaire, GRADE: Grading of Recommendations Assessment, Development and Evaluation; Grad- graduate; HCP- Healthcare professionals; IT; In Training; IV- independent variable; M- means; MA- meta-analyses; MAAS; Mindful Attention Awareness Scale; MBI; Mindfulness based intervention; MBSR- Mindfulness Based Stress Reduction; mn-month; PE- Psychoeducation; PRCT- Pilot randomized control trial; PROMIS- Patient-Reported Outcomes Measurement Information System; PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; N-number of studies (if SR) or participants in study; n- number of participants (if SR) or number of participants in subset and RCT– randomized control trial; S-stress; SD– standard deviation; SS-Statistically significant; y.o.; years old; Uni- University; WEMWBS; Warwick-Edinburgh Mental Well-Being Scale  $\alpha$ - Cronbach’s alpha value; &- and

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
			leave, sick, or personal leave					
Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Gilmartin et al, (2017)</b> Brief mindfulness practices for healthcare providers</p> <p><b>Funding:</b> None <b>Bias:</b> None recognized <b>Country:</b> U.S.</p>	Stated, mindfulness	<p><b>Design:</b> SR of RCTs &amp; other designs with quantitative &amp; qualitative data</p> <p><b>Purpose:</b> Determine effects of brief mindfulness interventions (&lt;4 hours) on provider well-being and behavior</p>	<p>N: 14</p> <p><b>Search Strategy:</b> MEDLINE, CINAHL and PsychINFO, Cochrane/EBM Reviews, EMBASE, the PubMed Journals and Medical Subject Heading databases (Mesh)</p> <p><b>Inclusion Criteria:</b> Practicing nurses, physicians, student nurses, or medical trainees employed in a hospital setting, ≤ 4 hours MBI content</p>	<p><b>IV-</b> MBI</p> <p><b>DV1:</b> Stress <b>DV2:</b> AX <b>DV3:</b> Mindfulness</p>	Perceived Stress Scale, Maslach Burnout Inventory, Smith Anxiety Scale, Connor-Davidson Resilience Scale, and Mindfulness Attention Awareness Scale	PRISMA	<p><b>DV1:</b> 5/6 reported sig. improvement</p> <p><b>DV2:</b> 4/5 reported sig. improvement</p> <p><b>DV3:</b> 3/6 reported sig. improvement</p>	<p><b>LOE:</b> I</p> <p><b>Strengths:</b> Inclusion of RCTs, qualitative &amp; quantitative data, evaluated short interventions</p> <p><b>Weaknesses:</b> methodological heterogeneity, moderate quality evidence</p> <p><b>Conclusions:</b> Brief MBI can improve provider wellbeing in stress, anxiety, &amp; burnout</p> <p><b>Quality assessment</b> Applicable to population. Feasible is questionable due to methodical heterogeneity, but helps</p>

**Key:** AX – anxiety; CG- control group; CI– confidence interval; CSS- Cross sectional study; *d*- Cohen’s d; DASS- Depression, Anxiety, and Stress Scale; Dep.- depression DV- dependent variable; **FFMQ**; Five Facet Mindfulness Questionnaire, **GRADE**: Grading of Recommendations Assessment, Development and Evaluation; **Grad**- graduate; **HCP**- Healthcare professionals; **IT**; In Training; **IV**- independent variable; **M**- means; **MA**- meta-analyses; **MAAS**; Mindful Attention Awareness Scale; **MBI**; Mindfulness based intervention; **MBSR**- Mindfulness Based Stress Reduction; **mn**-month; **PE**- Psychoeducation; **PRCT**- Pilot randomized control trial; **PROMIS**- Patient-Reported Outcomes Measurement Information System; **PRISMA** – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; **N**-number of studies (if SR) or participants in study; **n**- number of participants (if SR) or number of participants in subset and **RCT**– randomized control trial; **S**-stress; **SD**– standard deviation; **SS**-Statistically significant; **y.o.**; years old; **Uni**- University; **WEMWBS**; Warwick-Edinburgh Mental Well-Being Scale **α**- Cronbach’s alpha value; **&**- and

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
			<p><b>Exclusion Criteria:</b> Psychiatrists &amp; others counseling roles, primary care, outpatient, long-term care, or office-based settings. dissertations, conference abstracts, &amp; non-peer-reviewed articles</p>					convenience with short intervention
Citation	Conceptual Framework	Design/Method	Sample/Method	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Gutman et al., (2020).</b> Effectiveness of a multimodal mindfulness program for student health care professionals</p> <p><b>Funding:</b> Not discussed <b>Bias:</b> None reported <b>Country:</b> U.S.</p>	Stated, mindfulness	<p><b>Design:</b> RCT (pretest &amp; posttest 2 mm) % Qualitative</p> <p><b>Purpose:</b> To Determine if a Multimodal Mindfulness Program can help reduce stress in Health Care</p>	<p><b>N:</b> 38 n: 18 (EG) n: 18 (CG)</p> <p><b>Setting:</b> Group classroom sessions &amp; outside mediation participation</p> <p><b>Sample:</b> mean age 24 y.o., Caucasian 58.3%</p>	<p><b>IV:</b> MBSR program</p> <p><b>DV1</b> Stress</p> <p><b>MBSR Program:</b> 8-week multicomponent MBSR program including didactic teaching of mindfulness &amp; stress management</p>	<p><b>RCT:</b> PSS, Student Stress Management Scale</p> <p><b>DQ:</b> Narrative data from activity logs &amp; open-ended qualitative questionnaire</p>	<p><b>RCT:</b> Mann Whitney <i>U</i>, Wilcoxon signed rank test, independent <i>t</i> test</p> <p><b>DQ:</b> Researchers analyzed &amp; synthesized data</p>	<p><b>DV1</b> Sig, difference PSS &amp; SSMS scores with large effect size post intervention</p> <p><b>PSS:</b> (<math>Z = -4.291, p &lt; .000, d = -1.84</math>)</p>	<p><b>LOE:</b> II</p> <p><b>Strengths:</b> Detailed description of intervention, RCT design, inclusion of qualitative data allows for holistic view, appropriate analysis on the qualitative &amp; quantitative side</p>

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		Professionals students	<p><b>Inclusion criteria:</b> First 40 to respond, occupational &amp; physical therapy students completing 1st year 2<sup>nd</sup> semester at CUIMC</p> <p><b>Exclusion Criteria:</b> Practiced meditation or received prior mindfulness training</p> <p><b>Attrition:</b> 5.3%, 2/38 withdrew 1<sup>st</sup> week</p>	practices, yoga, & pet therapy. 1 weekly 40 min in person course & 4 weekly 10 min guided meditation anytime		independently & then collaborated regarding theme development	<p><b>SSMS:</b> (Z = -3.330, p &lt; .001, d = -1.27)</p> <p><b>DQ:</b> Enhanced sleep, focus, energy, life balance, better understanding of self-compassion &amp; self-care, stress reduction</p>	<p><b>Weaknesses:</b> Small sample size, sample demographics not discussed, no follow up to assess continued compliance, funding not reported</p> <p><b>Conclusion:</b> Multicomponent mindfulness program can reduce stress in HCP students</p> <p><b>Quality Assessment:</b> Applicable to population slightly questionable due to sample demographics not given. Feasible to implement some techniques utilized in program.</p>
Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurements	Analysis	Findings	Decision for Use
Huberty et al., (2019). Efficacy of the Mindfulness Meditation Mobile App “Calm” to	Stated, mindfulness	<b>Design:</b> RCT (pretest, posttest, 2mm follow up test)	N: 109 n: 56 (EG) n: 53 (CG)	IV: Calm app DV1: Stress DV2: Mindfulness DV3: Self compassion	PSS, FFMQ, SCS-SF, PROMIS, YRBS	General linear models, linear mixed models, Bonferroni	No difference in baseline assessment. EG showed sig. reduction	LOE: II  <b>Strengths:</b> RCT design, multiple instruments to assess

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<p>Reduce Stress Among College students</p> <p><b>Funding:</b> Arizona State University  <b>Bias:</b> Author is director of Science, but began role 1 year after study design &amp; result analysis  <b>Country:</b> U.S.</p>		<p><b>Purpose:</b> Evaluate efficacy of 8-week intervention utilizing mobile app Calm, on stress, mindfulness, &amp; self-compassion in college students with elevated stress. Also explored intervention’s effect on health behaviors</p>	<p><b>Setting:</b> Distance format</p> <p><b>Sample Demographics:</b> No SS between groups. EG mean age 21.4 y.o., CG 21.9 y.o., EG female 87.8%, CG 91%, EG 61% Caucasian, CG 55%</p> <p><b>Inclusion Criteria:</b> Current undergrad student enrolled at ASU, &gt;18 y.o., scored &gt;14 on PSS, owned smartphone, read &amp; understand English</p> <p><b>Exclusion Criteria:</b> Practice mindfulness within past 6 mn, previously used</p>	<p><b>DV4</b> Health behaviors</p> <p><b>Calm:</b> A mindfulness mobile app which includes guided meditation. Participants asked to complete “7 Days of Calm,” after students instructed to complete 10-min. daily meditation using any desired guided meditation from app for 8 weeks.</p>		<p>posthoc tests, McNemar tests</p>	<p>in perceived stress vs. CG. (<math>\nabla=7.13</math>; <math>P&lt;.001</math>; effect size=1.24) post intervention phase. No difference in follow up (<math>P&gt;.05</math>)</p> <p><b>DV1:</b> SS reduction (<math>\nabla=-7.13</math>; <math>P&lt;.001</math>; effect size=1.24</p> <p><b>DV2:</b> SS improvement <math>\Delta=19.23</math>; <math>P&lt;.001</math>; effect size=1.11</p> <p><b>DV3:</b> SS improvement <math>\Delta=8.223</math>; <math>P&lt;.0001</math>; effect size=0.84</p>	<p>mental health, measuring app effect on health behaviors unique, detailed outline of intervention &amp; appropriate analysis shown, evaluated sustained change</p> <p><b>Weaknesses:</b> homogenous population, self-report instruments leading to potential response bias, stressors not evaluated</p> <p><b>Conclusion:</b> Implementing use of mobile app such as Calm can lead to moderate to large improvement in stress mindfulness &amp; self-compassion in stressed college students.</p> <p><b>Quality:</b> Applicability slightly limited as it pertains to undergrad college students.</p>

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			Calm or other mindfulness app  <b>Attrition:</b> 19%, 21/109, excluded participants didn't complete postsurvey (n=18), set up a Calm account, or meditate at all				<b>DV4:</b> SS sleep improvement, ( $P=.02$ ; effect size=0.79)	Feasible to utilize due to convenient & simplicity of intervention
Citation	Conceptual Framework	Design/Method	Sample/Method	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<b>Ireland et al., (2017).</b> A randomized controlled trial of mindfulness to reduce stress and burnout among intern medical practitioners  <b>Country:</b> Australia <b>Funding:</b> Not discussed <b>Bias:</b> None recognized	States, Mindfulness	<b>Design:</b> RCT  <b>Purpose:</b> Examine the efficacy of a mindfulness-based intervention to reduce stress and burnout among intern doctors working in a hospital emergency department	<b>N:</b> 44 <b>n:</b> 23 (EG) <b>n:</b> 21 (CG)  <b>Setting:</b> Hospital Breakroom <b>Sample:</b> Female 64%, mean age 26.88 y.o.  <b>Inclusion Criteria:</b> Physician residents from ED	<b>IV1:</b> MBI  <b>DV1:</b> Stress <b>DV3:</b> Burnout  <b>MBI:</b> 10-week program adapted from on validated MBSR program. One-hour weekly training.	PSS, CBI	Descriptive statistics, Multilevel analysis controlled for conditions	Both sig. post intervention over time & compared to CG  <b>DV1:</b> Sig (F 1/45.88, p 1/4 0.007, g2 1/4 0.28)  <b>DV2:</b> marginally sig. (F 1/42.88, p 1/4 0.072, g2 1/4 0.16)	<b>LOE:</b> II  <b>Strengths:</b> RCT design, short & convenient intervention, attrition  <b>Weaknesses:</b> Small Sample size, limited measurement tools, differences between sample demographic of CG & EG not discussed, funding not reported

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			<p><b>Exclusion Criteria:</b> No other criteria specified</p> <p><b>Attrition:</b> 44/44, 100%</p>					<p><b>Conclusion:</b> MBI may be effective in reducing stress and burnout among provider working within an emergency department.</p> <p><b>Quality:</b> Overall applicable &amp; feasible for population. Slightly limited since in Australia</p>
Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Yang et al.,</b> EFFECT OF MINDFULNESS-BASED STRESS REDUCTION THERAPY ON WORK STRESS AND MENTAL HEALTH OF PSYCHIATRIC NURSES</p> <p><b>Funding:</b> None <b>Bias:</b> None recognized</p>	Stated, MBSR	<p><b>Design:</b> RCT, Pre &amp; post test</p> <p><b>Purpose:</b> Determine feasibility and acceptability of modified Mindfulness-Based Stress Reduction (MBSR) training during surgical residency</p>	<p><b>N:</b> 100 <b>n:</b> 50 (EG) <b>n:</b> 50 (CG)</p> <p><b>Setting:</b> At hospital &amp;/or home</p> <p><b>Sample Demographic:</b> CG 64% female, EG 64%, altogether mean age, 29.5±7.1 y.o. mean age</p>	<p><b>IV:</b> MBSR</p> <p><b>DV:</b> Stress <b>DV2:</b> Anxiety <b>DV3:</b> Depression</p> <p><b>MBSR:</b> 3 phase intervention inspired by MBSR, education, meditation, and discussion.</p>	Symptom Checklist-90 (SCL-90) scale, Self-Rating Depression Scale, Self-Rating Anxiety Scale and Nursing Stress Scale.	independent samples t test, paired t-test, chi square test or Wilcoxon rank sum test	<p><b>DV1:</b> Sig. lower in EG group post intervention (P&lt;0.001)</p> <p><b>DV2:</b> SAS scores of the intervention group decrease significantly post intervention, (P&lt;0.001)</p>	<p><b>LOE:</b> II</p> <p><b>Strengths:</b> RCTs, low attrition, certain intervention details missing (duration, content)</p> <p><b>Weaknesses:</b> lack of follow up outcomes measured, certain intervention details missing (duration)</p>

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Country: China			<p><b>Inclusion Criteria:</b> Psych RN from 3 certain hospitals, 20-50 y.o., worked &gt;1 year</p> <p><b>Exclusion Criteria:</b> Serious cardiac other physical disease</p> <p><b>Attrition:</b> None, 5/100 = 5%</p>				<p><b>DV3:</b> SAS scores of the intervention group decrease significantly post intervention, (P&lt;0.001)</p>	<p><b>Conclusions:</b> MBSR can decrease stress, ax, and dep. &amp; improve overall mental health</p> <p><b>Quality assessment</b> Applicability slightly limited since population from china. Feasibility uncertain as intervention details missing</p>
Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
McConville et al., (2017). Mindfulness training for health profession students- the effect of mindfulness training on psychological well-being, learning and clinical performance of health professional students	Stated, mindfulness	<p><b>Design:</b> SR of RCTs &amp; NRCTs</p> <p><b>Purpose:</b> Assess the effectiveness of mindfulness training in medical and other health professional student population groups</p>	<p><b>N:</b> 19 <b>n:</b> 1815</p> <p><b>Search Strategy:</b> Cochrane Library, Medline, CINAHL, Embase, Psychinfo, &amp; ERIC</p> <p><b>Inclusion Criteria:</b> Peer reviewed, sample with undergrad or</p>	<p><b>IV-</b> MBSR program or shorter MBI</p> <p><b>DV1:</b> Stress <b>DV2:</b> AX <b>DV3:</b> Dep. <b>DV4:</b> Mindfulness <b>DV5:</b> Mood State</p>	DASS, FFMQ, MAAS, POMS, PSS, PSMS, STAI	PRISMA	<p>MBSR larger effect than mindful meditation alone</p> <p>Both longer &amp; shorter MBSR effective</p> <p><b>DV1:</b> all 11 studies Sig. effect post-intervention</p>	<p><b>LOE:</b> I</p> <p><b>Strengths:</b> Inclusion of RCTs, detailed description of interventions (content, group or single based, program length), assessed effect between intervention traits (MBSR vs. meditation alone, length)</p>

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Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Funding:</b> Not discussed  <b>Bias:</b> Not reported  <b>Country:</b> U.S.</p>			<p>post grad studying HCP field, MBIs</p> <p><b>Exclusion Criteria:</b> Samples with medical diagnosis, non-English, transcendental meditation or relaxation response, trials where MBI is clinical treatment tool for HCP-IT</p>				<p>(SMD ¼ 0.44; 95% CI: 0.57 to 0.31; p &lt; .01)</p> <p><b>DV2:</b> all 11-sig. effect (SMD= -0.44; 95% CI: -0.59 to -0.28. p &lt;.01) post intervention</p> <p><b>DV3:</b> 7 studies Showed questionable sig. effect?</p> <p><b>DV4:</b> 6 studies showed sig. effect post intervention (SMD= -0.24; 95% CI: -0.39 to -0.09; p &lt; .01)</p>	<p><b>Weaknesses:</b> lack of follow up outcomes measured, studies included with uncertainties and lower evidence. Many studies completed outside U.S., methodological heterogeneity,</p> <p><b>Conclusions:</b> MBSR can decrease stress, ax, and dep. &amp; improve mindfulness, mood, self-efficacy, &amp; empathy in health profession students.</p> <p><b>Quality assessment</b> Applicability to population and feasibility is questionable due to methodical heterogeneity and use of studies outside the U.S. limiting applicability.</p>

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							<p><b>DV5:</b> 4 studies showed sig. effect post intervention</p> <p>(SMD ¼ 0.36; 95% CI: 0.51 to 0.21; p o .01).</p>	
Citation	Conceptual Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Design for Use
<p><b>Spinelli et al., (2019)</b> Mindfulness training for healthcare professionals and trainees</p> <p><b>Funding:</b> None <b>Bias:</b> None recognized <b>Country:</b> U.S.</p>	Mindfulness	<p><b>Design:</b> MA &amp; SR on RCTs</p> <p><b>Purpose:</b> Effectiveness of mindfulness interventions on distress, well-being, physical health, &amp; performance in HCP and HCP in training</p>	<p><b>N:</b> 38 <b>n:</b> 2505</p> <p><b>Search Strategy:</b> PsycINFO, PubMed, Medline, and Proquest Dissertation and Theses</p> <p><b>Inclusion Criteria:</b> peer reviewed or dissertations, sample solely HCP &amp; HCP-IN, RCT design, primary intervention was</p>	<p><b>IV:</b> MBSR or any MBI</p> <p><b>DV1:</b> Overall</p> <p><b>DV2:</b> AX</p> <p><b>DV3:</b> Dep.</p> <p><b>DV4:</b> Stress</p> <p><b>DV5:</b> Psychological Distress</p> <p><b>DV6:</b> Burnout</p>	<p>Extensive amount of surveys used- see table on article</p> <p>PSS</p>	PRISMA, Comprehensive Meta-Analysis	<p><b>DV1:</b> small to moderate effect (Hedge's g = 0.35; 95% CI [0.27, 0.43])</p> <p><b>DV2:</b> Moderate effect Hedge's g = 0.47; 95% CI [0.27, 0.67]</p> <p><b>DV3:</b> (Hedge's g = 0.41; 95% CI [0.26, 0.57])</p>	<p><b>LOE:</b> I</p> <p><b>Strengths:</b> All RCT used, multiple indicators of psychological health measured, Population included various types of HCP's</p> <p><b>Weaknesses:</b> Heterogeneity of outcomes from inconsistency &amp; variation in intervention, Long term effects &amp; follow up lacking</p>

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			mindfulness or meditation, French or English publication  <b>Exclusion Criteria:</b> Qualitative studies), data insufficient for analysis, data included in other articles				<p><b>DV4:</b> moderate effect Hedge's <math>g = 0.52</math>; 95% CI [0.35, 0.69] At follow up- small to moderate effect Hedge's <math>g = 0.34</math>; 95% CI [0.11, 0.57]</p> <p><b>DV5:</b> Moderate Effect Hedge's <math>g = 0.46</math>; 95% CI [0.30, 0.62]</p> <p><b>DV6:</b> small effect Hedge's <math>g = 0.26</math>; 95% CI [0.11, 0.42].</p>	<p><b>Conclusion:</b> mindfulness-based interventions are effective in reducing distress and improving well-being in HCPs and HCP-ITs.</p> <p><b>Quality:</b> Applicability limited due to variation in &amp; inconsistency in intervention design, but feasible to take away important components for implementation</p>
Citation	Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use

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Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
<p><b>Stillwell, et al., (2017).</b> Interventions to Reduce Perceived Stress Among Graduate Student</p> <p><b>Funding:</b> Not reported <b>Bias:</b> Not reported <b>Country:</b> U.S.</p>	<p>Stated, stress management</p>	<p><b>Design:</b> SR with NRCTs and one unblinded RCT</p> <p><b>Purpose:</b> Identify evidence-based self-care interventions, which effectively reduced perceived stress in graduate students</p>	<p><b>N:</b> 8</p> <p><b>Search Strategy:</b> CINAHL, PsycINFO, MEDLINE</p> <p><b>Inclusion Criteria:</b> study participants are students in a graduate health program, peer reviewed, stress measured by PSS, IRB approved</p> <p><b>Exclusion Criteria:</b> Outside the U.S., not in English</p>	<p><b>IV1:</b> Stress reduction related intervention</p> <p><b>DV:</b> Perceived Stress</p>	<p>PSS</p>	<p>Critical appraisal by 2 authors, a wellness expert, &amp; expert EBP mentor using JBI, the 2 authors then met with a 3<sup>rd</sup> to synthesis key findings of interventions &amp; outcomes</p> <p>Thematic content analysis</p>	<p>All studies used some type of MBSR intervention such as yoga, meditation, breath work, &amp; mindfulness. All included didactic portion, experience component, and homework. All demonstrated reduction in perceived stress postintervention from small to large effect size. 2/8 studies were not statistically significant</p>	<p><b>LOE:</b> I</p> <p><b>Strengths:</b> provides analysis of most effective MBSR interventions, same measurement tool in all studies and within U.S., MBSR programs detailed well</p> <p><b>Weaknesses:</b> No RCTs, Qualitative data which is lower evidence, statistical data on studies not shown, funding not disclosed</p> <p><b>Conclusion:</b> Most effective self-care MBSR interventions include a didactic component, guided MBSR practice session, &amp; homework.</p> <p><b>Quality:</b> Applicable to population. Lower evidence data since its</p>

**Key:** **AX** – anxiety; **CG**- control group; **CI**– confidence interval; **CSS**- Cross sectional study; **d**- Cohen’s d; **DASS**- Depression, Anxiety, and Stress Scale; **Dep**- depression **DV**- dependent variable; **FFMQ**; Five Facet Mindfulness Questionnaire, **GRADE**: Grading of Recommendations Assessment, Development and Evaluation; **Grad**- graduate; **HCP**- Healthcare professionals; **IT**; In Training; **IV**- independent variable; **M**- means; **MA**- meta-analyses; **MAAS**; Mindful Attention Awareness Scale; **MBI**; Mindfulness based intervention; **MBSR**- Mindfulness Based Stress Reduction; **mn**-month; **PE**- Psychoeducation; **PRCT**- Pilot randomized control trial; **PROMIS**- Patient-Reported Outcomes Measurement Information System; **PRISMA** – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; **N**-number of studies (if SR) or participants in study; **n**- number of participants (if SR) or number of participants in subset and **RCT**– randomized control trial; **S**-stress; **SD**– standard deviation; **SS**-Statistically significant; **y.o.**; years old; **Uni**- University; **WEMWBS**; Warwick-Edinburgh Mental Well-Being Scale **α**- Cronbach’s alpha value; **&**- and

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
								qualitative but provides holistic view for the most effective MBSR strategy.
Citation	Framework	Design/Method	Sample/Setting	Major Variables & Definitions	Measurements	Analysis	Findings	Decision for Use
<p><b>Zollars et al.,</b> Effects of mindfulness meditation on mindfulness, mental well-being, and perceived stress. Currents in Pharmacy Teaching &amp; Learning.</p> <p><b>Funding:</b> Southern Illinois University  <b>Bias:</b> None recognized  <b>Country:</b> U.S.</p>	Stated, Mindfulness	<p><b>Design:</b> Quasi-experimental (pre &amp; posttest)</p> <p><b>Purpose:</b> Explore impact of mindfulness meditation using the Headspace app on mindfulness, mental well-being, and perceived stress in pharmacy students</p>	<p><b>N:</b> 92  <b>n:</b>64</p> <p><b>Setting:</b> 3 in person meetings for training &amp; survey completion, email, outside usage of app</p> <p><b>Sample:</b> Female 85.9%, 18-25 y.o. 79.7% &amp; rest &gt;25 y.o.</p> <p><b>Inclusion Criteria:</b> Pharmacy student enrolled in Southern Illinois University, has smartphone</p>	<p><b>IV1:</b> Mindfulness mediation using Headspace</p> <p><b>DV1:</b> Mindfulness, <b>DV2:</b> Mental well being <b>DV3:</b> Stress</p> <p><b>Headspace:</b> Mindfulness mobile app which include instruction courses, guided mediation tracks for PSS, Ax., etc. Students instructed to mediate atleast 10 min per day for 4 weeks using app. Instructions given by author during</p>	HPLP, FFMQ, WEMWBS, PSS	Descriptive statistics, paired t-tests, Bonferri corrected <i>p</i> -values, Pearson's correlations	<p>All scales were stat sig. post intervention</p> <p><b>DV1:</b> <i>d</i> 1.1, 0.6, 0.7, 0.6, 0.7, 0.7 <i>p</i>&lt;0.001</p> <p><b>DV2:</b> <i>d</i> 0.8 <i>p</i>&lt;0.001</p> <p><b>DV3:</b> <i>d</i> 0.6 <i>p</i>&lt;0.001</p>	<p><b>LOE:</b> III</p> <p><b>Strengths:</b> Convenient &amp; short intervention for participants, multiple measurements used as psychological health indicators,</p> <p><b>Weaknesses:</b> Not RCT design, lack of follow up from subjects, high attrition</p> <p><b>Conclusion:</b> Using headspace app can enhance mindfulness, mental well-being, &amp; decreased perceived stress in grad students</p> <p><b>Quality:</b> Applicable to population. Feasible to</p>

**Key:** **AX** – anxiety; **CG**- control group; **CI**– confidence interval; **CSS**- Cross sectional study; *d*- Cohen’s d; **DASS**- Depression, Anxiety, and Stress Scale; **Dep.**- depression **DV**- dependent variable; **FFMQ**; Five Facet Mindfulness Questionnaire, **GRADE**: Grading of Recommendations Assessment, Development and Evaluation; **Grad**- graduate; **HCP**- Healthcare professionals; **IT**; In Training; **IV**- independent variable; *M*- means; **MA**- meta-analyses; **MAAS**; Mindful Attention Awareness Scale; **MBI**; Mindfulness based intervention; **MBSR**- Mindfulness Based Stress Reduction; **mn**-month; **PE**- Psychoeducation; **PRCT**- Pilot randomized control trial; **PROMIS**- Patient-Reported Outcomes Measurement Information System; **PRISMA** – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; **N**-number of studies (if SR) or participants in study; **n**- number of participants (if SR) or number of participants in subset and **RCT**– randomized control trial; **S**-stress; **SD**– standard deviation; **SS**-Statistically significant; **y.o.**; years old; **Uni**- University; **WEMWBS**; Warwick-Edinburgh Mental Well-Being Scale **α**- Cronbach’s alpha value; **&**- and

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement	Analysis	Findings	Decision for Use
			<p><b>Exclusion Criteria:</b> Practiced daily mediation.</p> <p><b>Attrition:</b> 70% 28/92, 27 dropped out, one data eliminated for not adhering to study protocol</p>	training session before use				implement intervention due to convenience and but slightly questionable due to no real CG.

**Key:** **AX** – anxiety; **CG**- control group; **CI**– confidence interval; **CSS**- Cross sectional study; *d*- Cohen’s d; **DASS**- Depression, Anxiety, and Stress Scale; **Dep.**- depression **DV**- dependent variable; **FFMQ**; Five Facet Mindfulness Questionnaire, **GRADE**: Grading of Recommendations Assessment, Development and Evaluation; **Grad**- graduate; **HCP**- Healthcare professionals; **IT**; In Training; **IV**- independent variable; *M*- means; **MA**- meta-analyses; **MAAS**; Mindful Attention Awareness Scale; **MBI**; Mindfulness based intervention; **MBSR**- Mindfulness Based Stress Reduction; **mn**-month; **PE**- Psychoeducation; **PRCT**- Pilot randomized control trial; **PROMIS**- Patient-Reported Outcomes Measurement Information System; **PRISMA** – Preferred Reporting Items for Systematic Reviews and Meta-Analyses; **N**-number of studies (if SR) or participants in study; **n**- number of participants (if SR) or number of participants in subset and **RCT**– randomized control trial; **S**-stress; **SD**– standard deviation; **SS**-Statistically significant; **y.o.**; years old; **Uni**- University; **WEMWBS**; Warwick-Edinburgh Mental Well-Being Scale **α**- Cronbach’s alpha value; **&**- and

Appendix B

Table 2

Synthesis Table

	De Vibe	Ghawadra	Gilmartin	Gutman	Huberty	Ireland	McConville	Spinelli	Stillwell	Yang	Zollars
<b>Year</b>	2018	2020	2017	2020	2019	2017	2017	2019	2017	2018	2019
<b>Design/Level of Evidence</b>	LS of RCT/II	RCT/II	SR& DQ/I	RCT & DQ/II	RCT/II	RCT/II	SR of RCT & NRCT/ I	MA of RCTs/I	SR of NRCT's & 1 blinded RCT/ I	RCT/II	NRNCT/III
<b>Sample Size or Studies</b>	288	249	14	38	109	44	19	38	8	100	92
<b>Country</b>	Norway	Malaysia	U.S.	U.S.	U.S.	Australia	U.S.	U.S.	U.S.	China	U.S.
<b>Demographics</b>											
Population	Medical & Psych IT	Hospital nurses	Nurses, doctors, HCP-IT	OT/PT IT	Undergrad, n.s.	ED doctors	HCP-IT, varied	HCP & HCP-IT, varied	HCP-IT, varied	Psych Nurses	Pharmacy IT
Age (Mean y.o.)	24	n.s.		24	21.1	26.8				29.5	89.7% 18–25 y.o.
Female (%)	76	85		80	89.8	64				68	85.9
Caucasian (%)	n.s.	84% Malaysian		58.33	54.5	n.s.				n.s.	n.s.
<b>Study Characteristics</b>											
<b>Measurement Tools</b>	FFMQ, WCCL	DASS-21, JSS, MAAS	CD-RISC, MAAS, MBI, PSS, SAS,	PSS, SSMS	PSS, FFMQ, PROMIS, SCS-SF, YRBS	PSS, CBI	DASS, FFMQ, MAAS, POMS, PSS, PSMS, STAI	PSS; Extensive-see article.	PSS	NSS, SCL90, SDS, SAS	FFMQ, HPLP, PSS, WEMWBS,

**Key:** And-&; **BDI** - Beck’s Depression Inventory; **CBI**- Copenhagen Burnout Inventory; **CD-RISC** Connor-Davidson Resilience Scale; **CAMS-R**- Cognitive and Affective Mindfulness Scale–Revised; **DASS**; depression, anxiety and stress **DQ**– descriptive qualitative; **FFMQ**- Five Facet Mindfulness Questionnaire; **HCP**- Healthcare Professionals; **HAMA**- Hamilton Anxiety Rating Scale; **HPLP**-Health Promoting Lifestyle Profile; **IT**- In Training; **IV**- Independent Variable; **JSS**; Job Satisfaction Scale for Nurses; **MAAS**; Mindful Attention Awareness Scale; **MBI**; Maslach Burnout Inventory, **MINI**- Mini-International Neuropsychiatric Interview; **n.s.**- not specified; **NSS**- Nursing Stress scale; **OT/PT**- Occupational/Physical Therapy; **PHQ-9**- Patient health questionnaire-9; **PSS**-Perceived Stress Scale; **PSQ**- The perceived satisfaction questionnaire; **POMS**- Profile of Mood States; **PROMIS**- Patient-Reported Outcomes Measurement Information System; **PSMS**- Perceived Stress of Medical School; **SAS**; Smith Anxiety Scale, **SCS**- Self-compassion Scale; **SCL-90**- Symptom Checklist-90; **SDS**- Self-Rating Depression Scale, **SF-12**- Short-Form-12 Health Survey, Montgomery; **SLSI**- Student-Life Stress Inventory; **STAI**-State Trait Anxiety Inventory; **SSMS**- Student Stress Management Scale; **WCCL**-Ways of Coping Checklist; **WEMWBS**- Warwick-Edinburgh Mental Wellbeing Scale; **YRBS**- Youth Risk Behavior Survey; **ZBI**; Zarit Burden Interview; ↓ - decrease; ↑- increase; ≠ not statistically significant; \* statistically significant p-value ≤ 0.05; / Low LOE in SR; ~ Moderate LOE in SR; + High LOE in SR



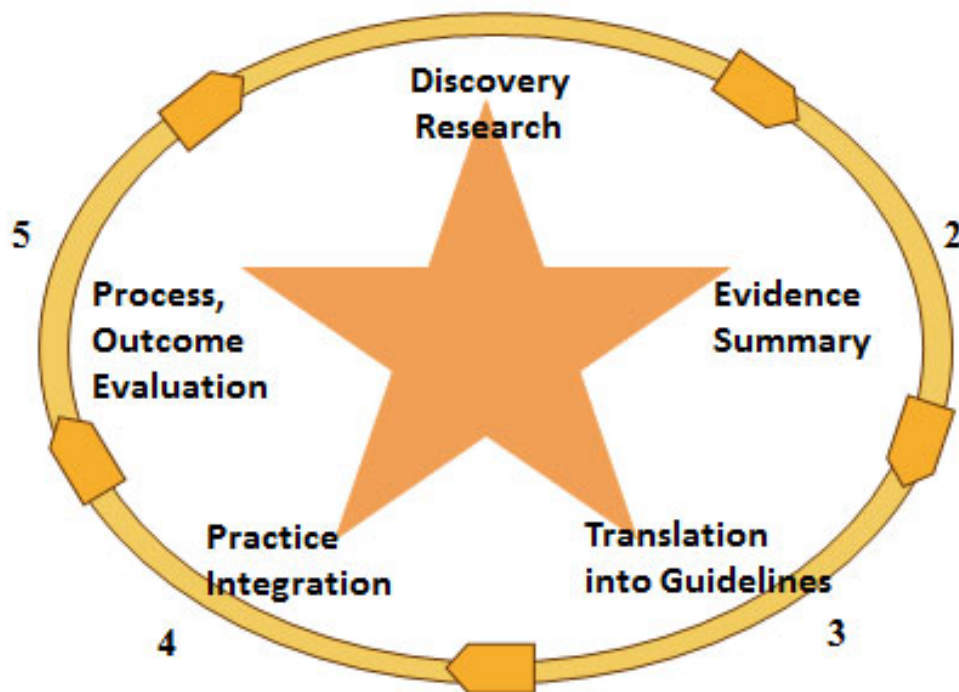
<b>Duration of Intervention</b>	15 hr then 1.5 hr optional class 2x yearly	2 hr then 4 weeks online self-pace	4 hours or less	200 min over 8 weeks	5 hr; Avg 38 min weekly over 8 weeks	10 hr over 10 weeks	Varied; 1.5-2.5 hours weekly for 4 to 10 weeks	2.5 to 70 h	120 to 1,800 min from 3 to 18 weeks	n.s. from Aug-Nov	4hr & 40 min Over 1 month
<b>Modality:</b>											
In person	x	x		x		x				x	x
Online		x		x	x					n.s.	x
<b>IV Elements:</b>											
Structured Education	x	x	x	x	x	x	x	x	x	x	x
Home practice	x	x	x	x	x		x	x	x	x	x
Meditation/Breathing	x	x	x	x	x	x	x	x	x	x	x
Mindful gym/yoga	x	x		x			x		x		
Depression		↓*(time) ≠(groups)					↓~	↓~	Type equation	↓*	
Anxiety		↓*	↓~				↓+	↓~		↓*	↓*
Stress	↓*	↓*(time) ≠(groups)	↓~	↓*	↓*	↓*	↓+	↓~	↓~	↓*	↓*
Mindfulness	↑*	↑*(time) ≠(groups)	↑~		↑*		↑+				
Other Dependent Variables Present	x			x	x	x	x	x			x

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Appendix C

Figure 1

*The Star Model of Transformation*

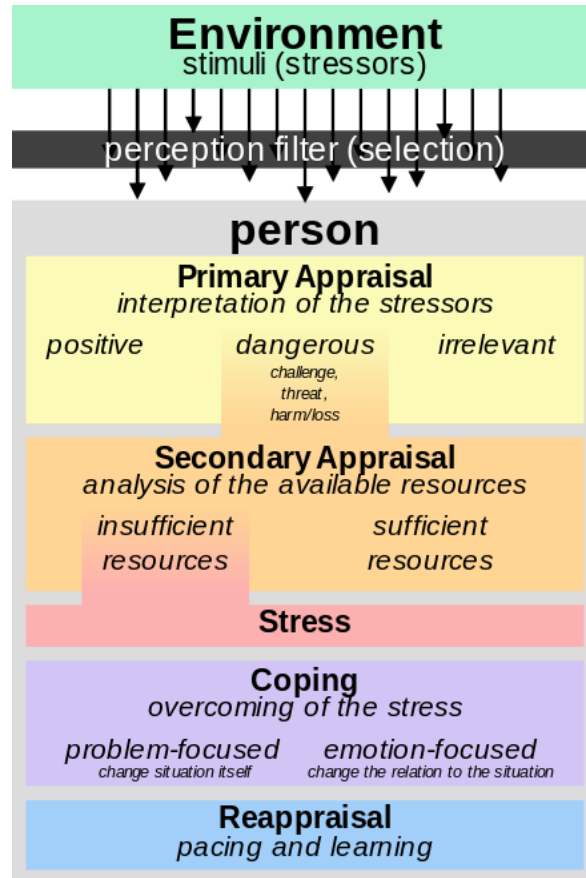


(Stevens, 2012)

Appendix D

Figure 2

*Stress and Coping Theory*



(Lazarus & Folkman, 1984)

## Appendix E

Table 3

<i>Sample Baseline Demographics</i>	<i>Frequency</i>	<i>Percentage</i>
Variable	<i>n</i>	%
<b>Race</b>		
White or Caucasian	10	58.82
Asian or Pacific Islander	2	11.76
Multiracial or Biracial	1	5.88
Hispanic or Latino	2	11.76
Native American or Alaskan Native	1	5.88
Asian or Pacific Islander	1	5.88
<b>Age</b>		
18-24	1	5.88
25-29	7	41.18
35-39	1	5.88
30-34	5	29.41
40-49	2	11.76
50-59	1	5.88
<b>Profession</b>		
DNP	13	76.47
PT	4	23.53
<b>Gender</b>		
Female	15	88.24
Male	2	11.76
<b>Previous Training to Mindfulness</b>		
Yes	8	47.06
No	9	52.94

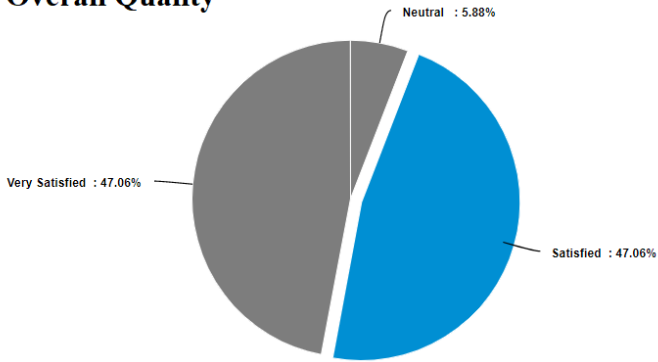
*Note.* Due to rounding errors, percentages may not equal 100%.

APPENDIX F

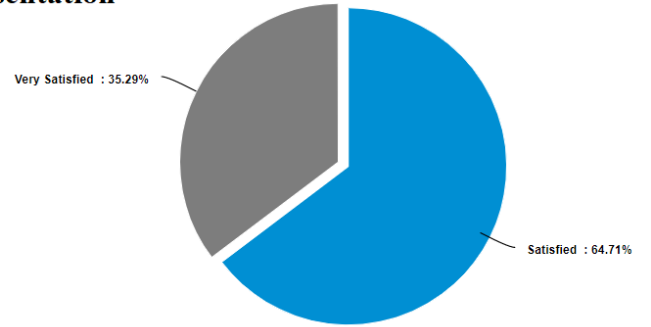
Figure 3

*Subject's Ratings of MBI Components in Percentages*

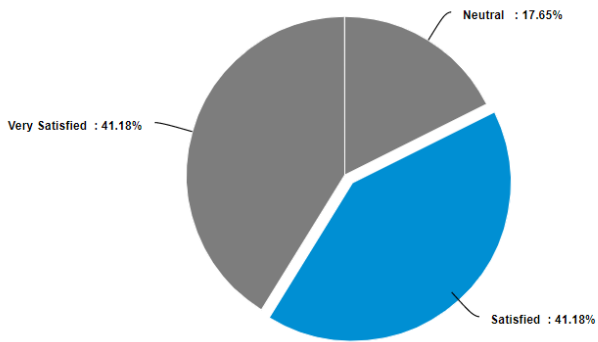
**Overall Quality**



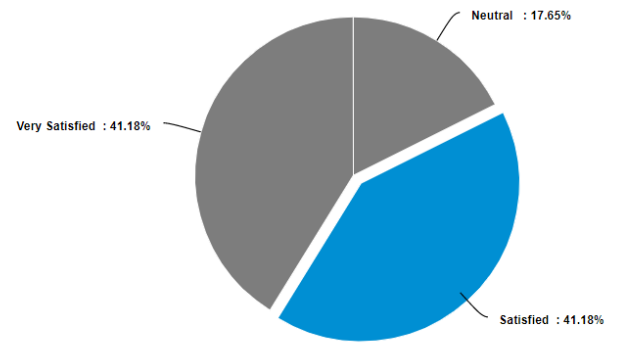
**Powerpoint Presentation**



**Zoom Course**



**Presenter's Knowledge and Guidance on Subject**



**APPENDIX G**

**Table 4**

*Budget Plan*

<b>Expenses</b>	<b>Activities</b>	<b>Cost</b>	<b>Total</b>
<b>Direct Costs</b>	Mindfulness Life Coach Certification & Mindfulness Blueprint from Qualified Experts	\$20.00	
	<b>Intervention materials:</b> Online educational modules, questionnaires, zoom course.	\$0.00	
<b>Indirect Costs</b>	Student's time developing and implementing project.	\$2,000	
	Mentor and stakeholders' time helping with DNP Project.	\$1,000	
<b>Funding</b>	No funding supported project.	\$0.00	
<b>Potential Cost Savings</b>	Reduction in stress levels can improve burnout, overall mental health, and patient safety outcomes which can have significant cost saving impact in the healthcare system.		
<b>TOTAL</b>			<b>\$3,200</b>