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Mental Health, Psychosocial Characteristics, and Well-Being among Healthcare Trainees

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Mental Health, Psychosocial Characteristics, and Well-Being among Healthcare Trainees

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Abstract

Mental Health, Psychosocial Characteristics, and
Well-Being among Healthcare Trainees
By Amanda Wallace

Background: Burnout is a critical concern among healthcare providers with detrimental effects on provider health, patient care, and economic consequences. However, medical residents and physician assistant (PA) students remain understudied. Using the "Coping Reservoir" conceptual model, this study examined the associations between mental health symptoms and psychosocial characteristics with well-being among healthcare trainees.

Methods: Fifty-nine participants completed a self-reported questionnaire consisting of personal demographic information and baseline levels of sleep disturbance, loneliness, depressive symptoms, anxiety, stress, mindfulness, and well-being. Analysis included descriptive statistics, Pearson's chi-squared tests, between-subjects independent samples t-tests, and between-subjects one-way ANOVAs examining differences between trainee and specialty types, and Pearson's R and Spearman's Rho correlations. Multivariate logistic regressions were performed to assess the association between demographics, mental health symptoms, and psychosocial characteristics with well-being.

Results: Slightly over half (n=32; 55.2%) of healthcare trainees were categorized as flourishing. Strong and statistically significant associations between personal characteristics, mental health symptoms, psychosocial characteristics, and well-being were present, including being a primary caregiver, exercise, number of days sick, and mindfulness. Loneliness (AOR=.76; 95% CI=.63, .91; p=.003) and stress (AOR=.67; 95% CI=.45, .99; p=.05) were associated with decreased odds of flourishing while each unit increase depressive symptoms was associated with more than 1.5 the odds of flourishing (AOR=1.53; 95% CI=1.01, 2.32; p=.05) when controlling for other variables. Trainee type was not significantly associated with well-being (p=.66). However, the presence of depressive symptoms was higher among residents (n=16, 37.2%) than PA students (n=2, 13.3%) while PA students had higher scores in the observation facet of mindfulness (mean=14.67; sd =2.29) compared to residents (mean=11.84; sd=3.14) (t=3.20, df=56, p=.002).

Conclusion: Healthcare training programs must create social support and personal time for healthcare trainees to focus on their well-being without repercussions. More research is needed to understand the role of depressive symptoms in multivariate analyses and longitudinal interventions reducing deleterious psychosocial characteristics and mental health symptoms. These approaches will inform best practices to improve well-being and positive psychology among healthcare trainees.

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Chapter 1: Introduction

Introduction and Literature Review

Occupational burnout is a psychological syndrome resulting from job-related chronic stressors manifesting in the three key dimensions of exhaustion, cynicism, and inefficacy (Maslach et al., 1996; Maslach & Leiter, 2016). In healthcare, research suggests many factors in the organizational environment contribute to burnout, such as excessive workloads, work-life conflicts, lack of control, decreased autonomy, clerical burdens, and increased use of technology and electronic health records (Dyrbye et al., 2012; Fred & Scheid, 2018; Martin, 2018; Shanafelt et al., 2012; Shanafelt, Dyrbye, Sinsky, et al., 2016; Sinsky et al., 2016; Wallace et al., 2009; West et al., 2018). Studies indicate the number of physicians experiencing burnout grew between 2011 and 2014 but returned to 2011 reported levels in 2017 (Shanafelt et al., 2015; Shanafelt et al., 2019). However, burnout remains highly prevalent among physicians: an estimated 50-80% of physicians report at least one burnout-associated symptom with differences among clinical specialties. The prevalence of burnout remains significantly higher compared to the general population (Shanafelt et al., 2012; Shanafelt et al., 2015).

The trend of burnout among medical students is also striking: while incoming medical students report less burnout than graduates pursuing other careers before beginning medical school, levels of depression, anxiety, and distress increase throughout their training to higher levels than the general working population even when matched for age (Brazeau et al., 2014; Dahlin et al., 2005; Dyrbye & Shanafelt, 2016; Dyrbye et al., 2006; Dyrbye et al., 2014; Hansell et al., 2019; Ishak et al., 2013). Over a quarter of medical students were found to have depression or depressive symptoms, while the

prevalence of suicidal ideation was over 10% (Rotenstein et al., 2016). After completing medical school, one-half to three-fourths of residents have reported at least one symptom of burnout with large variability by clinical specialty (Dyrbye et al., 2018; Levin et al., 2017; West et al., 2011) and over a quarter of medical residents reported symptoms of depression (Mata et al., 2015). The present stigma in the healthcare community surrounding these adverse psychological states remains a substantial concern and is cited as a reason for a lack of appropriate treatment (Clough et al., 2019; Kuhn & Flanagan, 2017; Williford et al., 2018) with one study finding only one-third of medical students reported seeking help when experiencing burnout (Dyrbye et al., 2015).

Physicians are not the only employees in the healthcare field who experience burnout. Physician assistants (PA) also report moderate and high levels of burnout, with approximately two-thirds of those surveyed reporting at least one symptom (Bell et al., 2002; Benson et al., 2016; Osborn et al., 2019). While estimates indicate PAs report higher levels of professional efficacy measured through job satisfaction when compared to physicians, a meta-analysis found job satisfaction was over-emphasized compared to and at the expense of other symptoms of burnout (Hoff et al., 2019). In the little research conducted on PA students, burnout is highly prevalent. In a recent study, almost 80% of respondents met at least one of the burnout dimensions (Johnson et al., 2020).

The effects of burnout for those working in the healthcare field are well-established. Burnout is associated with numerous negative effects on patient care, safety, quality of care, risk, satisfaction with medical care, and treatment adherence (Panagioti et al., 2018). Burnout is also linked with medical errors (Shanafelt et al., 2010; Tawfik et al., 2018; West et al., 2006), reduced hours (Shanafelt, Mungo, et al., 2016), suicidal

ideation (T. D. Shanafelt et al., 2011), motor vehicle accidents (West et al., 2012), job dissatisfaction, and early retirement by physicians (Dyrbye & Shanafelt, 2016). Regarding personal health and safety, burnout is a significant predictor of type 2 diabetes, hypercholesterolemia, coronary heart disease, musculoskeletal pain, headaches, gastrointestinal and respiratory problems, severe injuries, and mortality below the age of 45 (Salvagioni et al., 2017; Toker et al., 2012). Burnout is also consistently correlated with greater levels of sleep dysfunction, self-reported medical errors, and depression in the medical field (Brubaker & Beverly, 2020; Kalmbach et al., 2017; Kancherla et al., 2020; Metlaine et al., 2018; Stewart & Arora, 2019; Wolf & Rosenstock, 2017). Higher rates of divorce, depression, and substance (both drug and alcohol) abuse are also associated with burnout (Lacy & Chan, 2018). Depression, anxiety, and stress are also related with both medical errors affecting patient safety and burnout overall (Brubaker & Beverly, 2020; Brunsberg et al., 2019; Dyrbye et al., 2014; Grossi et al., 2003; Karaoglu et al., 2015; Metlaine et al., 2018; Wolf & Rosenstock, 2017).

The economic impact of burnout is also of critical concern. It is conservatively estimated $4.6 billion in costs annually are attributable to physician burnout due to increased turnover, decreased professional effort, and reduced hours worked (Han et al., 2019). Ultimately, this reduction in physician-health care activity has consequences: with the demand and need for healthcare growing through a rising aging population of increased life expectancy, there is a projected shortfall of healthcare providers by 20% if training enrollment numbers remain constant (Sargen et al., 2011). More recent estimates project a shortage of 45,000 to 90,000 physicians in the United States by 2025 (Shanafelt, Dyrbye, West, et al., 2016). Retaining physicians in the workforce practicing with full-

time and full effort is critical to combat the impending provider shortage and economic consequences of burnout.

Both the American Medical Association and Accreditation Council for Graduate Medical Education have issued statements emphasizing the importance of reducing burnout and fostering physician well-being (Accreditation Council for Graduate Medical Education, n.d.; American Medical Association, 2019). Because burnout may develop during medical school and residency, institutional training and education must incorporate sustainable approaches and programs to reduce its onset. Doing so at the earliest points in physician education and training can have profound long-term implications in their professional career and personal life. Research has shown burnout can be intervened and improved upon in ways which are clinically meaningful at different levels of influence. At the intrapersonal level of influence, interventions focusing on mindfulness and stress management were repeatedly and significantly effective in reducing provider cynicism in a systematic review and meta-analysis of the literature (West et al., 2016). Interventions focusing on improved coping skills are also associated with improved well-being (Raj, 2016).

At the interpersonal level of influence, loneliness is also related with burnout among medical residents (Karaoglu et al., 2015; Rogers et al., 2016; Shapiro et al., 2015). Positive workplace relationships and social support among colleagues can reduce burnout while improving job performance (Chiaburu & Harrison, 2008; Halbesleben, 2006). Nurse-physician relationships are also shown to affect patient health outcomes through mortality rates (Estabrooks et al., 2005), treatment adherence (Schmid & Svarstad, 2002), and patient safety (Latimer et al., 2009). As burnout stems from work-related stressors,

altering organizational level contributors can play a role in its prevention (Maslach & Leiter, 2016). In addition, stressor-burnout relationships can be moderated by buffering employees from the effects of excessive workloads (Viswesvaran et al., 1999).

Given the high prevalence of physician burnout, coupled with its negative consequences on provider well-being, patient health, and healthcare outcomes, informed interventions must be explored to not only reduce and prevent the development of burnout but also foster mental health and well-being. Medical residents and PA students self-report levels of burnout consistent with healthcare professionals alongside high amounts of stress, depression, anxiety, and sleep deprivation, yet little research exists understanding the associations among these mental health symptoms and psychosocial characteristics among healthcare trainees, especially PA students. Furthermore, understanding these associations with well-being can inform targeted programmatic interventions for these trainees.

Statement of Problem and Research Questions

The aim of this research was to examine the associations between mental health symptoms and psychosocial characteristics with well-being among healthcare trainees, specifically medical residents and PA students. Three different resident clinical specialties were enrolled in this study: surgery, obstetrics and gynecology (OB/GYN), and family medicine (FM). This study was designed to answer the following questions:

1. How are mental health symptom and psychosocial characteristic inputs associated with well-being?
2. Do mental health symptoms, psychosocial characteristics, and well-being significantly differ between PA students and medical residents?

Study Purpose

The purpose of this study was to conduct an exploratory analysis of well-being and associated demographic, mental health symptoms, and psychosocial characteristics among healthcare trainees, consisting of PA students and medical residents from a variety of specialties. A fuller understanding of well-being among this population and its relationship to demographic, mental health symptoms, and psychosocial characteristics may be used to identify how medical training impacts trainees' health and inform targeted burnout reduction interventions among healthcare trainees and providers. Therefore, the purpose of this study was to explore the associations between sleep disturbance, loneliness, depression, anxiety, stress, and mindfulness with well-being among healthcare trainees.

Study Significance

The literature surrounding the prevalence and effects of physician, resident, and medical student burnout is well-established. However, the research around well-being and how mental health symptoms and psychosocial characteristics are associated is less established. Furthermore, the research surrounding healthcare trainee and especially PA student burnout remains scarce even though previous studies identified a high prevalence of burnout among this profession (Benson et al., 2016; Osborn et al., 2019). In addition, examining the characteristics and demographics associated with mental health symptoms, psychosocial characteristics, and well-being can further inform burnout. This study seeks to fill these gaps by examining how the mental health symptoms and psychosocial characteristics are associated with well-being among medical resident and PA student healthcare trainees.

Conceptual Model

A conceptual model of medical student well-being, the "Coping Reservoir" (see Figure 1), posits positive and negative inputs in combination with the internal structure of the reservoir can lead to positive or negative outcomes (Dunn et al., 2008). The internal structure of the reservoir consists of students' unique qualities such as personal traits, temperament, and coping style. The outcomes of the reservoir may lead to either burnout or resilience, which are notably separate. Negative inputs include stress, internal conflict, and time and energy demands. Positive inputs are psychosocial support, social/healthy activities, mentorship, and intellectual stimulation. Inputs may individually or synergistically work together to deplete or fill the reservoir, affecting the outcome. This model demonstrates how medical students respond to stressors based on their resources and provides proposed areas for interventions to improve medical student well-being.

The "Coping Reservoir" model was used in multiple studies predominately surrounding interventions to decrease burnout among medical students with few investigating residents or similar populations. When examining stress among residents on their hematology and oncology rotation, the addition of personal stressors is correlated with higher distress scores when caring for the same patients (McFarland et al., 2015). This model also helped shaped findings where personal factors and traits are associated with depression among medical students (Silva et al., 2017). In addition to finding predictors of medical student burnout and resilience, research surrounding mindfulness and coping strategy interventions have cited this model when assessing medical student and resident well-being (de Vibe et al., 2013; Doolittle & Windish, 2015; Doolittle et al., 2013; Howell et al., 2019; Williams et al., 2020).

This study utilized the "Coping Reservoir" model to select mental health symptoms and psychosocial characteristics to understand their association with well-being and to model the interaction of these inputs. This research added a construct of loneliness to the model in lieu of psychosocial support. Research has repeatedly found associations between loneliness and burnout (Karaoglu et al., 2015; Rogers et al., 2016; Shapiro et al., 2015) as well as loneliness and inflammation (Cole et al., 2007; Cole, Levine, et al., 2015; Creswell et al., 2012). The addition of this construct informs a fuller understanding of correlates associated with burnout, resilience, and well-being among healthcare trainees. Constructs measured in this study are stress (depression, anxiety, and stress), time and energy demands (sleep disturbance), loneliness, healthy activities (mindfulness and exercise), and well-being as the dependent variable in place of a resilience outcome. This study is part of a larger research project examining healthcare trainees' changes in mental health symptoms, psychosocial characteristics, and well-being after a mindfulness intervention with the goal of reducing burnout, strengthening resilience, and improving well-being and health-relevant biomarkers such as brain function and proinflammatory gene expression.

Goals

In addition to answering the aim, questions, and purpose of this research, this study also sought to accomplish the following goals:

1. Contribute to the paucity of research surrounding burnout and well-being among PA students
2. Add to the literature of medical resident burnout and well-being to illustrate the importance of easily accessible and feasible interventions emphasizing skills to prevent burnout and foster well-being over the course of their career

Summary

Occupational burnout is a pressing issue facing those who work in healthcare, causing significant concerns for individual provider well-being, patient health outcomes, and substantial economic costs. Burnout can develop early on in a healthcare provider's career and yet this trainee population has received little attention in previous studies. The "Coping Reservoir" proposes positive and negative inputs consisting of mental health symptoms and psychosocial characteristics alongside personal characteristics can lead to burnout or resilience. This research examined the associations between selected mental health symptoms and psychosocial characteristics with well-being to explore this phenomenon in this understudied population as a basis for understanding future interventions and suggest directions for further research.

Chapter 2: Review of the Literature

Introduction

Burnout is a concern in the healthcare field yet more research is needed surrounding well-being in healthcare trainees. The "Coping Reservoir" conceptual model links mental health symptoms and psychosocial characteristics with occupational burnout and resilience to understand this problem. This chapter will provide a review of burnout, mental health symptoms, psychosocial characteristics, and well-being in the healthcare field to explain the importance of this research.

Burnout

Background

Burnout is a psychological syndrome resulting from work-related chronic stressors over an extended period. First described by Herbert Freudenberger (1974), burnout is the state of a person becoming effectively inoperative in their work role. Maslach et al. (1996) further developed upon this phenomenon and deduced a person's response to stress consists of three dimensions to indicate burnout. The first dimension is exhaustion consisting of fatigue and energy depletion from feeling overworked. The second dimension is cynicism and contains of detachment, depersonalization, and alienation toward others, such as treating people as objects. The third dimension is inefficacy and includes of low morale, incompetence, and reduced personal accomplishment. Each dimension is linked to a person's larger social context. Burnout does not only affect the individual, but also the others around them through interactions. It is also notably separate from related psychosocial conditions, such as job dissatisfaction, fatigue, stress, and depression. The Maslach Burnout Inventory (MBI) is a

22-item instrument created through qualitative research to first evaluate these three dimensions with burnout being assessed as some combination of them. While other measures later followed to assess some or all of the burnout dimensions, the MBI with modifications is the most widely used tool and remains the gold-standard in this field (Maslach & Leiter, 2016). Furthermore, burnout was added to the list of International Statistical Classification of Diseases (Z73.0) in the most recent update, indicating its acceptance as a condition worthy of identification, investigation, and treatment.

Burnout is highly prevalent among those who work in healthcare. Most research currently places the number of physicians experiencing burnout around 50% which is significantly higher than the general U.S. population (Shanafelt et al., 2012). A systematic review of the literature containing 182 studies estimated the prevalence of burnout is up to 80.5% of physicians while noting concern regarding the lack of consensus regarding its definition and measure across research (Rotenstein et al., 2018). Furthermore, the number of physicians experiencing burnout changed. Between 2011 and 2014, Shanafelt et al. found a 10% increase in the percentage of physicians reporting at least 1 symptom of burnout with significant differences in prevalence depending on the physician's clinical specialty. In comparison, the prevalence of burnout among the general working population of adults in the United States did not change over the same period where after adjusting for age, sex, relationship status, and the number of hours worked per week, physicians were at almost twice (1.97) the odds of experiencing burnout (Shanafelt et al., 2015). However, the prevalence of burnout decreased since 2014, returning to levels seen in 2011, with physicians experiencing 1.39 the odds of burnout compared to the general working population (Shanafelt et al., 2019).

Rates of high burnout are also seen among medical residents where prevalence estimates near 50% with variability by clinical specialty (Dyrbye & Shanafelt, 2016; Dyrbye et al., 2008; West et al., 2011). Before beginning medical school, future medical students report less burnout than age-matched graduates pursuing other careers but later report higher burnout rates as their medical training progresses. It is important to note depression rates decreased to baseline after academic breaks, indicating external stressors played a role in this development (Hansell et al., 2019). Medical residents also experienced increased odds of burnout when compared to medical students and early career physicians (Dyrbye et al., 2014)**.**

Multiple studies examined burnout among physician assistants (PA), finding they experience moderate levels (Benson et al., 2016; Coplan et al., 2018; Osborn et al., 2019). However, there is a paucity of research on PA students and the results are less clear. In the first study conducted on this population, PA students were found to have average degrees of burnout in exhaustion and cynicism but a higher degree in the inefficacy dimension (Orozco et al., 2016). On the other hand, a recent study found 79% of PA students reported burnout in the exhaustion dimension while 56% reported burnout in the cynicism dimension. Furthermore, burnout and stress reduction were the top two issues students requested to be included in their PA curriculum and 77.50% of the study's sample expressed interest in participating in programs designed to reduce burnout (Johnson et al., 2020).

Causes

Identifying casual factors of burnout remains uncertain as most research is derived from cross-sectional studies and self-report measures. Maslach and Leiter (2016)

identified six contributors to burnout: work overload, lack of control, insufficient recognition and reward, decreased community or ongoing relationships employees have with each other while on the job, lack of fairness, and conflicting values regarding job goals or expectations. Factors leading to burnout may affect more than one of these contributors. For example, clerical burden work requirements, such as using computerized physician order entry, electronic medical records, and patient portals, were cited as both contributing to additional physician workload and not meaningfully furthering the physician's work in addition to being associated with burnout (Shanafelt, Dyrbye, Sinsky, et al., 2016).

Multiple demographic factors are associated with physician burnout. Physicians who were younger, had children, and certain areas of specialization were independently associated with increased burnout. In addition, billing-based compensation was also associated with burnout. The number of hours worked also had a dose-dependent relationship with burnout where surgeons who worked fewer than 60 hours per week had 20% less prevalence of burnout compared to surgeons who worked more than 80 hours per week (Shanafelt, Balch, et al., 2009). Furthermore, 36% of the surgeons surveyed felt they achieved work-life balance (Shanafelt, Balch, et al., 2009) with physicians who worked more hours also reported more instances of work-life conflict (Dyrbye, West, et al., 2011). Women also reported higher rates of work-life conflict and burnout compared to men even though there was no significant difference in either the number of hours worked each week or nights on call (Dyrbye, Shanafelt, et al., 2011). Among academic faculty, time spent working on meaningful activities was the strongest predictor of burnout, where those who spent less than 20% of time on perceived meaningful work

were more likely to be burned out. Furthermore, each additional hour worked was significantly associated with a 2% increase in the odds of experiencing burnout (Shanafelt, West, et al., 2009). Medical residents who had educational debt over $200,000 also reported lower levels of quality of life and work-life balance satisfaction compared to those who did not have educational debt (West et al., 2011). International medical residents were also less likely to report burnout (West et al., 2011).

Consequences

The effects of burnout have significant ramifications for patient care. A meta-analysis found negative outcomes in patient safety, quality of care, risk, satisfaction with medical care due to professionalism, and treatment adherence were associated with provider burnout, especially among residents and early career physicians (Panagioti et al., 2018). Increased numbers of medical errors are consistently associated with provider burnout with dose-dependent relationships (Shanafelt et al., 2010; Tawfik et al., 2018; West et al., 2006; West et al., 2009). Longer patient post-discharge recovery times and overall patient satisfaction are also related with physician burnout (Halbesleben & Rathert, 2008) while provider characteristics are linked with patient adherence to medical treatment (DiMatteo et al., 1993). Medication errors (Fahrenkopf et al., 2008) and suboptimal care practices (Shanafelt et al., 2002) are also consequences of burnout. Burnout also reduces provider professionalism, commitment to their careers, and attention to detail (West & Shanafelt, 2007). Physicians are also more likely to report engaging in unprofessional behaviors and reduced professionalism with burnout (Dyrbye et al., 2010).

Burnout is also associated with many detrimental outcomes regarding the provider's own health. Conditions linked with burnout include type 2 diabetes, hypercholesterolemia, coronary heart disease, musculoskeletal pain, headaches, gastrointestinal and respiratory problems, severe injuries, and mortality below the age of 45 (Salvagioni et al., 2017; Toker et al., 2012). Even after adjusting for fatigue, burnout was also related with increased motor vehicle accidents (West et al., 2012). Divorce, depression, and drug and alcohol abuse are also correlated with burnout (Lacy & Chan, 2018). For surgeons who were burned out, they were 25% more likely to abuse alcohol (Oreskovich et al., 2012). Among non-clinical populations, burnout is found to be "contagious" (Bakker et al., 2005) and can lead to aggression in workplace (Gascon et al., 2013). Suicidal ideation is twice as common among burned out surgeons (T. D. Shanafelt et al., 2011; van der Heijden et al., 2008). However, suicidal ideation is not static: while burnout was found to be independently associated with suicidal ideation during medical school, recovery from burnout was associated with decreased suicidal ideation, indicating it is linked with physician stressors (Dyrbye et al., 2008).

The economic impacts of provider burnout are also a cause for concern. Increases in medical malpractice suits are associated with physician burnout, depression, and suicide (Balch et al., 2011). Burnout has dose-response linear relationships with job dissatisfaction (Shanafelt, Balch, et al., 2009) and decreased productivity (Dewa et al., 2014). With each 1-point increase in burnout or 1-point decrease in professional satisfaction, the physician was 30% to 50% more likely to reduce their work effort (Shanafelt, Mungo, et al., 2016). With job dissatisfaction, physicians are significantly more likely to retire early (Dyrbye & Shanafelt, 2016) and turnover (T. Shanafelt et al.,

2011; Shanafelt et al., 2014). Based on current growth, there is a projected 20% shortfall of healthcare providers (Sargen et al., 2011) by the year 2025 if program enrollment numbers remain constant. Furthermore, the monetary losses to the healthcare organization and costs to replace a physician, which includes hiring, training, and productivity resources, is often more than the physician's salary (Fibuch & Ahmed, 2015). It is estimated there are $4.6 billion in costs annually due to physician turnover and decreased hours resulting from healthcare business practices, such as recruitment, interviewing, onboarding, and decreased revenue (Han et al., 2019). It is also conjectured provider burnout is a significant but underdiscussed component when addressing healthcare reform in the United States (Dyrbye & Shanafelt, 2011). Ultimately, the outlined consequences resulting from physician burnout are reflected in costs to provider health, patient care, and healthcare system viability.

Mental Health Symptoms, Psychosocial Characteristics, and Well-Being

Sleep

Sleep quality includes a variety of factors, such as number of hours, frequency of disturbances, and presence of circadian disorders. It is consistently correlated with burnout in the medical field but is often overlooked as its effects are difficult to quantify (Kancherla et al., 2020). Models indicate lack of sleep is associated with depletion of energy as well as increased stress (Stewart & Arora, 2019). Sleep quality is independently associated with self-perceived medical errors, but the relationship loses significance after adjusting for burnout or depression, signifying their roles as mediators in this relationship (West et al., 2009). Additional research found similar results where short sleep duration was suggested to explain the relationship between sleep disturbance and burnout as well as being an independent risk factor for depression and self-reported

medical errors among first-year residents (Kalmbach et al., 2017). One study found poor sleep quality correlated with the burnout dimension of exhaustion (Brubaker & Beverly, 2020) while another found those who slept less than 7 hours per night were significantly associated with both lower efficacy and higher exhaustion scores compared to those who reported sleeping between 7 to 9 hours per night. In addition, those who reported sleeping less than 5 hours per night were significantly associated with burnout in all three dimensions suggesting additional symptoms of burnout appear as sleep quantity decreased (Wolf & Rosenstock, 2017).

Loneliness

Loneliness is also associated with burnout among medical residents (Karaoglu et al., 2015) in both the exhaustion and depersonalization dimensions (Shapiro et al., 2015). Similarly, increased social support is linked with reduced burnout (Rogers et al., 2016). Positive workplace relationships and social support among colleagues were found to simultaneously reduce burnout and improve job performance (Chiaburu & Harrison, 2008; Halbesleben, 2006).

Social isolation was a risk factor for the upregulation of proinflammatory gene expression and mortality (Cacioppo et al., 2015; Cole, Capitanio, et al., 2015). Among those who reported high levels of social isolation, they were found to have increased genome-wide proinflammatory transcriptional activity (Cole, Capitanio, et al., 2015; Cole et al., 2007). When exposed to an external inflammatory stressor compared to a placebo group, those with high levels of social disconnectedness demonstrated a higher inflammation (Moieni et al., 2015). Similar constructs, such as chronic burden and discrimination, were also significantly associated with increased inflammation (Brown et

al., 2020). Similarly, those who reported prosocial behavior were found to have reduced inflammation (Nelson-Coffey et al., 2017). This research indicates social isolation and connectedness have meaningful impacts on individual health and are worthy of further research to understand applications among populations.

Depression

Burnout and depression share substantial overlap with arguments the difference between these two is unclear (Bianchi et al., 2015). A meta-analysis from 54 studies estimated 28.8% of medical residents had depressive symptoms (Mata et al., 2015). A similar prevalence was found among medical students where 27.2% reported depression or symptoms of depression and 11.1% reported suicidal ideation (Rotenstein et al., 2016). Both medical students and residents were significantly more likely to report depressive symptoms compared to members of the general population who completed four-year degrees controlled for age (Dyrbye et al., 2014). Depression is an independent predictor of burnout (Wolf & Rosenstock, 2017) and residents who were screened with depression committed 3 times the rate of harmful medical errors (Brunsberg et al., 2019). Depression is also linked with increased inflammatory biomarkers including proinflammatory cytokines (Miller et al., 2009).

Anxiety

Anxiety shares a similar positive correlation with depression in relation to both burnout among clinicians and the number of patient safety medical errors (Karaoglu et al., 2015). Research found among oncologists reporting burnout, almost 20% also suffered from anxiety (Paiva et al., 2018). Increased levels of cytokines were also present among those who suffer from anxiety-related disorders (Felger, 2018).

Stress

Increased levels of stress were associated with all three dimensions of burnout among medical students (Brubaker & Beverly, 2020). Stress is also associated with elevated cytokines (Cole, 2010) and inflammation in both humans and mice (Powell et al., 2013). While stress appears to have a causal relationship with burnout, there is good news: interventions focusing on stress management were found to lessen inflammation when examined in cancer patients (Antoni et al., 2016).

Mindfulness

Mindfulness and stress management techniques were found to be more effective in combating burnout compared to other interventions (West et al., 2016). Mindfulness-based interventions have repeatedly demonstrated positive impacts in improving physician well-being and performance. Reduced burnout was observed when participants adopted mindfulness and stress management techniques (Martin, 2018). In one study on pharmacy students who participated in 10 minutes of daily meditation over four weeks, mindfulness, well-being, and stress outcomes significantly improved and over three fourths of participants indicated they were somewhat likely or extremely likely to continue practicing mindful mediation (Zollars et al., 2019). Systematic reviews of the literature also found mind-body interventions and mindfulness meditation were consistently associated with the downregulation of proinflammatory activity and counteract the effects of chronic stress on the human immune system (Buric et al., 2017). The effects of social stressors on inflammatory activity were found to mediated by the individual's perception or sensitivity to the threat, thus leaving opportunities for interventions to mitigate these health effects (Black et al., 2019).

Well-Being

Well-being is a critical component in the dialogue surrounding physician burnout. Well-being contains two distinguished yet overlapping categories: hedonic well-being and eudaimonic well-being Hedonic well-being, also known as emotional or subjective well-being, is related to everyday happiness. Eudaimonic well-being, consisting of both social and psychological facets of well-being, focuses on fulfillment, actualization, purpose, and meaning in life. Research found a significant high genetic correlation ($r=0.78$) between hedonic and eudaimonic well-being but a moderate correlation ($r=0.53$) when observed, indicating the presence of external factors influence well-being (Baselmans & Bartels, 2018). Factors such as autonomy, competence, control, confidence, opportunities to learn, positive feedback, goal attainment, positive relationships, social connectedness, and having personal time through work-life balance were associated with greater resident well-being (Raj, 2016). Among veterinarians, participating in work they found meaningful was associated with increased eudaimonic well-being (Wallace, 2019). Coping skill interventions designed to reduce burnout were also linked with improved well-being (Raj, 2016).

The associations between well-being and inflammation have also been examined in the recent decade (Fredrickson et al., 2015). Those with high levels of hedonic well-being were associated with the upregulation of inflammation while those with high levels of eudaimonic well-being were associated with the downregulation despite both types of happiness being associated with total well-being (Fredrickson et al., 2013). A later study found that hedonic well-being was not consistently independently associated with inflammation while eudaimonic well-being was associated with positive effects in

inflammation. When adjusting for both measures, associations were still less consistent than measures for eudaimonic well-being alone (Fredrickson et al., 2015). Similar results of an inverse relationship between eudaimonic well-being and inflammation were found among Japanese men working at an information technology firm (Kitayama et al., 2016) and among online videogame players (Snodgrass et al., 2019). People who participated in eudaimonic prosocial behavior by performing acts of kindness for others experienced decreased inflammation compared to those who did not perform acts of kindness or only performed acts of kindness for themselves (Nelson-Coffey et al., 2017). Similar results of increased eudaimonic well-being and decreased inflammatory gene expression were found among older volunteers in a school mentoring program (Seeman et al., 2020). Proinflammatory gene activity among those with high levels of loneliness was mitigated when high eudaimonic well-being was also reported, while high eudaimonic well-being alone was associated with decreased inflammation. Increased eudaimonic well-being is proposed to create resilience in populations facing chronic social stressors and adversity (Cole, Levine, et al., 2015). Overall, well-being is associated with health relevant biomarkers, signifying its importance in burnout research.

Summary

This review of the literature demonstrated the importance and harmful consequences of burnout as well as its established associations with sleep, loneliness, depression, anxiety, stress, mindfulness, and well-being. Using the "Coping Reservoir" conceptual model as guidance in conjunction with this foundation on how mental health symptoms and psychosocial characteristics are intricately related to burnout highlights the importance of understanding how to facilitate well-being among healthcare trainees.

Chapter 3: Methods

Introduction

The problem addressed by this research was to examine the associations between mental health symptoms and psychosocial characteristics with well-being among healthcare trainees under the guidance of the "Coping Reservoir" conceptual model. Four different groups of healthcare trainees were used in this study: medical residents from three different specialties (surgery, OB/GYN, and FM) and PA students. The associations were explored among healthcare trainees and further examined by both trainee and specialty type. This study was designed to answer the following questions:

1. How are mental health symptom and psychosocial characteristic inputs associated with well-being?
2. Do mental health symptoms, psychosocial characteristics, and well-being significantly differ between PA students and medical residents?

Human Subjects Approval

This study was part of a larger parent study examining the impact of an app-delivered mindfulness intervention for healthcare trainee well-being (NCT03452670). The primary outcome of the parent study was incivility, with the following secondary outcomes: changes in depression, anxiety, brain function and structure, and inflammatory gene expression. Here, a cross-sectional design was used to examine the associations among mental health symptoms and psychosocial characteristics with well-being prior to randomization. The study was approved by the Emory Institutional Review Board (IRB) (see Appendix A). All participants were recruited at Emory University and informed of the study's purpose, assessment procedures, confidentiality, compensation, potential risks

and benefits, and voluntary nature of participation including the right to stop participating at any time without penalty. Participants were then asked to sign a consent form without which they would not be able to participate. Informed consent was ascertained in accordance with Emory IRB standards. All information collected from the participants was associated with an ID number to protect their privacy and kept in secured computer files. The Principal Investigator and study team members were CITI-certified.

Participant Recruitment and Sampling

The Contemplative Well-being Apps for the Workplace study was conducted from March 2018 to April 2020. Participants were recruited across three cohorts and screened for eligibility. Inclusion criteria consisted of current Emory University medical residents in the surgery, OB/GYN, or FM programs as well as current Emory University PA students. All participants were over the age of 18 and written informed consent was required for participation. As the parent study included neuroimaging for the first cohort, exclusion criteria were factors contraindicated by the Society of Magnetic Resonance Imaging (ferrous metal in any part of body, such as pacemakers, cochlear implants, surgical clips or metal fragments, serious medical conditions, and claustrophobia). There were no exclusion criteria for cohorts 2 or 3. No one who was screened met any exclusion criteria. A convenience sampling method was used to recruit healthcare trainees. This approach was appropriate for this study because the researcher could initiate contact with medical residents and PA students through in-person presentations from an easily accessible population. Fifty-nine medical residents and PA students agreed to participate in the study. In cohort 1, Emory surgery residents (n=11) and PA students (n=15) were recruited in March 2018. In cohort 2, Emory OB/GYN residents (n=12)

were recruited in November 2019. In cohort 3, Emory FM residents (n=21) were recruited in November 2019 (see Figure 2). Participants in cohort 1 were compensated $100. Participants in Cohort 2 were compensated $20. Participants in cohort 3 were not compensated as their burden was minimal.

Measures

Demographics

Participants completed a self-administered Qualtrics, an online survey tool, at baseline. Self-reported information included sex, relationship status, number of children, race, ethnicity, number of days sick in the previous 30 days, number of times exercised in the previous 30 days, and previous meditation experience. Birth dates were gathered from the study participant registry, manually entered, and used to compute the participants' age at the time of study participation. Demographic data were cleaned by transforming sex into numerical categories, converting alphabetic responses into numeric values for number of children of each participant then altering to a yes/no format to identify if the participant was a primary caregiver of children, and condensing relationship status into 3 categories: (1) single, (2) in a relationship, and (3) married.

Sleep Disturbance

Sleep disturbance was assessed using the Patient-Reported Outcomes Measurement Information System (PROMIS) Sleep Disturbance short form (Yu et al., 2011), an 8-item scale with answer options ranging from (1) not at all, never, or very poor to (5) very much, always, or very good. The survey asked the participant to indicate how often each item described them over the past 7 days. Sample items include "My sleep was restless" and "I had trouble staying asleep" (see Appendix B.1). Four items were reverse coded prior to computing the total scale score by summing the responses to

all 8 items. Scores could range from 8 to 40, with higher scores indicating more severe levels of sleep disturbance. To categorize levels of sleep disturbance, scores were converted into T-scores ranging from 28.9 to 76.5. T-scores less than 55 indicate none to slight levels, scores between 55.0-59.9 indicate mild levels, scores between 60.0-69.9 indicate moderate levels, and scores over 70 indicate severe levels of sleep disturbance. Cronbach alpha reliability for this scale was .87 suggesting high internal consistency of scale items.

Loneliness

Loneliness was assessed using the revised UCLA Loneliness Scale (Russell et al., 1980), a 20-item scale with answer options ranging from (1) never to (4) often. The survey asked the participant to indicate how often each item described them. Sample items include “My social relationships arc superficial” and “My interests and ideas are not shared by those around me” (see Appendix B.2). Ten items were reverse coded prior to computing the total scale score by summing the responses to all 20 items. Scores could range from 20 to 80, with higher scores indicating higher perceived levels of loneliness. Cronbach alpha reliability for this scale was .92 suggesting excellent internal consistency of scale items.

Depression, Anxiety, Stress

Depression, anxiety, and stress were each assessed using the Depression, Anxiety, and Stress Scale (DASS21) short form (Lovibond et al., 1995), a 21-item scale with answer options ranging from (0) did not apply to me at all to (3) applied to me very much, or most of the time. The survey asked the participant to indicate how often each

item described them over the past 7 days (see Appendix B.3). The scale has three subsections: depression, anxiety, and stress.

The depression scale included items “I couldn't seem to experience any positive feeling at all” and “I found it difficult to work up the initiative to do things.” The depression scale score was computed by summing the responses to 7 of the DASS21 items. Scores could range from 0 to 21, with higher scores indicating increased levels of depression. Cronbach alpha reliability for the depression scale was .85 suggesting high internal consistency of scale items. To categorize levels of depression, scores of 0-4 indicate normal levels, scores of 5-6 indicate mild levels, scores of 7-10 indicate moderate levels, scores of 11-13 indicate severe levels, and scores greater than 14 indicate extremely severe levels.

The anxiety scale included items “I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)” and “I experienced trembling (eg, in the hands).” The anxiety scale score was computed by summing the responses to 7 of the DASS21 items. Scores could range from 0 to 21, with higher scores indicating increased levels of anxiety. Cronbach alpha reliability for the anxiety scale was .58 suggesting internal consistency of scale items is minimal. To categorize levels of anxiety, scores of 0-3 indicate normal levels, scores of 4-5 indicate mild levels, scores of 6-7 indicate moderate levels, scores of 8-9 indicate severe levels, and scores greater than 10 indicate extremely severe levels.

The stress scale included items “I was intolerant of anything that kept me from getting on with what I was doing” and “I tended to over-react to situations.” The stress scale score was computed by summing the responses to 7 of the DASS21 items. Scores

could range from 0 to 21, with higher scores indicating increased stress levels. Cronbach alpha reliability for the stress scale was .75 suggesting moderate internal consistency of scale items. To categorize levels of stress, scores of 0-7 indicate normal levels, scores of 8-9 indicate mild levels, scores of 10-12 indicate moderate levels, scores of 13-16 indicate severe levels, and scores greater than 17 indicate extremely severe levels.

Mindfulness

Mindfulness was assessed using the Five Facet Mindfulness Questionnaire short form (FFMQ-SF) (Bohlmeijer et al., 2011), a 24-item scale with answer options ranging from (1) never or very rarely true to (5) very often or always true. The survey asked the participant to indicate how often they experienced or felt each item over the past month (see Appendix B.5). Twelve items were reverse coded prior to computing the total scale score by summing the responses to all 24 items. Scores could range from 24 to 120, with higher scores indicating increased levels of mindfulness. Cronbach alpha reliability was .89 suggesting high internal consistency of scale items. The scale has five subscales: observation, describing, acting with awareness, non-judgment, and non-reaction.

The observation subscale included items “I pay attention to physical experiences, such as the wind in my hair or sun on my face” and “Generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.” The observation subscale score was computed by summing the responses to 4 of the MHC-SF items. Scores could range from 4 to 20, with higher scores indicating increased levels of the observation facet of mindfulness. Cronbach alpha reliability for the observation subscale was .82 suggesting high internal consistency of subscale items.

The describing subscale included items “I’m good at finding the words to describe my feelings” and “I can easily put my beliefs, opinions, and expectations into words.” The describing subscale score was computed by summing the responses to 5 of the MHC-SF items. Scores could range from 5 to 25, with higher scores indicating increased levels of the description facet of mindfulness. Cronbach alpha reliability for the describing subscale was .87 suggesting high internal consistency of subscale items.

The acting with awareness subscale included items “I find it difficult to stay focused on what’s happening in the present moment” and “it seems I am “running on automatic” without much awareness of what I’m doing.” The acting with awareness subscale score was computed by summing the responses to 5 of the MHC-SF items. Scores could range from 5 to 25, with higher scores indicating increased levels of the acting with awareness facet of mindfulness. Cronbach alpha reliability for the describing subscale was .86 suggesting high internal consistency of subscale items.

The non-judgement subscale included items “I tell myself that I shouldn’t be feeling the way I’m feeling” and “I disapprove of myself when I have illogical ideas.” The non-judgement subscale score was computed by summing the responses to 5 of the MHC-SF items. Scores could range from 5 to 25, with higher scores indicating increased levels of the non-judgement facet of mindfulness. Cronbach alpha reliability for the non-judgement subscale was .82 suggesting high internal consistency of subscale items.

The non-reaction subscale included items “I watch my feelings without getting carried away by them” and “When I have distressing thoughts or images, I feel calm soon after.” The non-reaction subscale score was computed by summing the responses to 5 of the MHC-SF items. Scores could range from 5 to 25, with higher scores indicating

increased levels of non-reaction facet of mindfulness. Cronbach alpha reliability for the non-reaction subscale was .79 suggesting moderate internal consistency of subscale items.

Well-Being

Well-being was assessed using the Adult Mental Health Continuum short form (MHC-SF) (Keyes et al., 2008) a 14-item scale with answer options ranging from (0) never to (5) every day. The survey asked the participant to indicate how often they experienced or felt each item over the past month (see Appendix B.4). The scale has two subsections: hedonic well-being and eudaimonic well-being. Hedonic well-being consists of one scale, emotional well-being. Eudaimonic well-being consists of two scales: social well-being and psychological well-being.

The emotional well-being scale included items “interested in life” and “satisfied with life.” The emotional well-being scale score was computed by summing the responses to 3 of the MHC-SF items. Scores could range from 0 to 15, with higher scores indicating increased levels of emotional well-being. Cronbach alpha reliability for the emotional well-being scale was .87 suggesting high internal consistency of scale items.

The social well-being scale included items “that you had something important to contribute to society” and “that you belonged to a community (like a social group, or your neighborhood).” The social well-being scale score was computed by summing the responses to 5 of the MHC-SF items. Scores could range from 0 to 25, with higher scores indicating increased levels of social well-being. Cronbach alpha reliability for the social well-being scale was .82 suggesting high internal consistency of scale items.

The psychological well-being scale included items “good at managing the

responsibilities of your daily life" and "that you had experiences that challenged you to grow and become a better person." The psychological well-being scale score was computed by summing the responses to 6 of the MHC-SF items. Scores could range from 0 to 30, with higher scores indicating increased levels of psychological well-being. Cronbach alpha reliability for the stress scale was .87 suggesting high internal consistency of scale items.

Participants' mental health was categorized as flourishing, languishing, or moderate. Flourishing was determined if participants reported at least 1 item of hedonic well-being and at least 6 items of eudaimonic well-being as (4) almost every day or (5) every day. Languishing mental health was determined if participants reported at least 1 item of hedonic well-being and at least 6 items of eudaimonic well-being as (0) never or (1) once or twice. Participants who did not meet either of these criteria were categorized as moderate mental health.

Data Collection Procedures

This study was a longitudinal, randomized, wait-list controlled trial. However, this paper reported results from the baseline cross-sectional data collected from participants prior to randomization. Upon providing informed consent in accordance with the Emory IRB standards, 59 Emory medical residents (n=44; 74.6%) and PA students (n=15; 25.4%) were assessed for baseline levels of depressive symptoms, anxiety, stress, mindfulness, sleep disturbance, loneliness, and well-being through a series of self-report questionnaires administered through Qualtrics. As part of the larger parent study, a subset of the participants underwent (1) structural and functional MRI scanning of the whole brain and brain stem, (2) electrocardiogram testing to index high frequency heart rate variability, and (3) blood collection.

Data Analysis Description

All analyses were conducted with Statistical Package for the Social Sciences software (SPSS), version 27.0 (IBM, Armonk, New York). Statistical significance was evaluated at the 0.05 level. First, descriptive statistical analyses were conducted to characterize the baseline sample of healthcare trainees. Missing data was accounted for using Expectation Maximization. To examine bivariate associations between participant characteristics, mental health symptoms, psychosocial characteristics, and well-being, Pearson's R and Spearman's Rho correlations were used based upon the level of data.

Multivariate logistic regression analyses were used to explore the associations among participant characteristics, mental health symptoms, psychosocial characteristics, and well-being for statistically significant inputs to answer the research questions of this study. Analyses were also conducted among medical resident clinical specialties, between all medical residents and PA students, and across the total sample to examine if differences in participant characteristics, mental health symptoms, psychosocial characteristics, and well-being were statistically significant to assist with answering the second research question.

Treatment of Data

Survey data was download from Qualtrics into Microsoft Excel version 16.0 then imported into SPSS. Initial data analyses were conducted in the following steps:

1. All scales were reviewed, and appropriate items were reverse coded based upon instructions for using each scale.
2. Expectation maximization (EM) was completed to account for missing data using other items within each scale or subscale as the predictor variables. Two

participants were excluded from some subscales as none of the items were completed. As a result, EM was used only for the FFMQ-SF acting with awareness subscale where Little's MCAR test was not significant (p= .621), indicating data was missing at random.

3. All scales, subscales, reliability analyses, and categorizations were calculated.
4. Initial univariate statistics were conducted (1) among all participants in the sample, (2) between trainee types, and (3) across trainee specialties for all demographic, mental health symptom, psychosocial characteristic, and well-being measures.
5. Presence of outliers was assessed among initial univariate statistics for all participants. One outlier was found in each of the depression, emotional well-being, psychological well-being, mindfulness non-judgement, and mindfulness observation scales. No outliers were removed as there was no evidence to suggest they were incorrectly entered nor not reflective of this sample.
6. Skewness was assessed. The depression scale had skewness value < 2. All other scales and subscales had skewness values > 1. As all skewness values < 3.29, these values are found to be adequate (Tabachnick & Fidell, 2013).
7. Kurtosis was assessed. The depression scale had kurtosis value of approximately 3 and the emotional well-being subscale had a kurtosis value < 2. All other scales and subscales had kurtosis values > 1. As all kurtosis values < 3.29, these values are found to be adequate (Tabachnick & Fidell, 2013).
8. Multicollinearity was assessed as part of regression analyses and all VIFs were < 3, indicating no critical levels of multicollinearity were present.

Preliminary Analyses

First, univariate tests were conducted on all demographic, mental health symptoms, psychosocial characteristics, and well-being measures to understand and characterize the sample. Next, when appropriate, bivariate between-subjects independent samples t-tests and Pearson's chi-squared tests of independence were performed between PA students (n=15) and residents (n=44). Additionally, when appropriate, between-subjects one-way ANOVAs and Pearson's chi-squared tests of independence were performed among each specialty (N=59; n=15 PA students, n=11 surgery residents, n=12 OB/GYN residents, n=21 FM residents) on the demographic, mental health symptoms, psychosocial characteristics, and well-being measures to determine if there were significant differences between the trainee specialties in this study.

Last, data were removed or consolidated for analyses due to size limitations when categorized. One person (1.7%) who identified as nonbinary was removed from analyses from sex analyses and 1 person (1.7%) who responded 'unknown' to "are you Hispanic or Latino?" was removed from ethnicity analyses. Categorizations for sleep disturbance, depression, anxiety, stress, and well-being were consolidated due to the small number of study participants in each category. For sleep disturbance, the mild, moderate, and severe categorizations were combined to indicate sleep disturbance symptoms present compared with the normal categorization. For the depression, anxiety, and stress measures, the mild, moderate, severe, and extremely severe categorizations were combined to indicate symptoms present to compare with the normal categorization. The languishing and moderate well-being categorizations were combined to indicate non-flourishing to compare with the flourishing categorization.

Analyses by Research Question

Research Question 1

Sequential multivariate logistic regression was used to examine how mental health symptom and psychosocial characteristic inputs were associated with well-being. First, bivariate logistic regression analyses were conducted to identify statistically significant demographics and inputs with flourishing. Next, statistically significant demographic characteristics were included in step 1, health behaviors in step 2, and mental health symptom and psychosocial characteristic inputs in step 3 of the logistic regression model. The adjusted odds ratio and p-value were calculated for the association between each input and the dependent variable of flourishing. The Nagelkerke R^2 value was calculated and compared between each step to evaluate goodness of fit of the regression model.

Research Question 2

Sequential multivariate logistic regression was used to examine if mental health symptoms, psychosocial characteristics, and well-being significantly differ between PA students and medical residents. First, bivariate logistic regression analyses were conducted to identify statistically significant demographics and inputs with flourishing. Next, statistically significant demographic characteristics and trainee type regardless of statistical significance were included in step 1, health behaviors in step 2, and mental health symptom and psychosocial characteristic inputs in step 3 of the logistic regression model. The adjusted odds ratio and p-value were assessed between trainee type and the dependent variable of flourishing. The Nagelkerke R^2 value was calculated and compared between each step to evaluate goodness of fit of the regression model.

Chapter 4: Results

Introduction

The aim of this research was to conduct an exploratory analysis between mental health symptoms and psychosocial characteristics with well-being among healthcare trainees. The questions in this study examined (1) the associations among mental health symptom and psychosocial characteristic inputs with well-being among healthcare trainees and (2) the presence of statistically significant differences among mental health symptoms, psychosocial characteristics, and well-being between PA students and medical residents. The "Coping Reservoir" conceptual model theorizes positive and negative inputs in combination with personal characteristics can lead to different outcomes. Statistical analyses were performed to explore the positive and negative inputs of mental health symptoms and psychosocial characteristics with well-being.

This chapter is divided into four sections. First, personal demographic characteristics from the total sample were described, analyzed, and compared by trainee and specialty types to examine associations and differences among the population. Next, mental health symptoms, psychosocial characteristics, and well-being from the sample were described, analyzed, and compared by trainee and specialty types to further examine associations and differences. If a statistically significant association was found, additional analyses were conducted with stratification. Thirdly, bivariate analyses regarding mental health symptoms, psychosocial characteristics, and well-being were conducted to understand their associations with participant characteristics and relationships with each other. Finally, two multivariate logistic regression models were created to analyze well-being for participant characteristics, mental health symptoms, and psychosocial

characteristics to answer the research questions. Overall, this section addresses the research aim surrounding mental health symptoms and psychosocial characteristics with well-being. The analysis examined throughout if statistically significant differences in these inputs exist between medical residents and PA students.

Participant Characteristics

A total of 59 healthcare trainees participated with a mean age of 29.8 (sd = 3.04) years (see Table 1). Thirteen (22.0%) participants identified as male, 45 (76.3%) identified as female, and 1 (1.7%) identified as nonbinary. A minority of participants reported being single (n=16; 27.2%) with 24 (40.7%) participants reported being in a relationship and 19 (32.2%) reported being married. Most participants identified as white (n=37; 62.7%), 8 (13.6%) identified as African American/black, 9 (15.3%) identified as Asian, and 5 (8.5%) identified as other. Most identified as not Hispanic or Latino (n=54; 93.1%) while 3 (5.2%) identified as Hispanic or Latino and 1 (1.7%) reported unknown. Most participants (n=51; 86.4%) did not report being a primary caregiver. Over the previous month from survey administration, participants estimated an average of 1.05 (sd=1.64) sick days. Fifteen (25.4%) participants reported not exercising at all, 7 (11.9%) reported exercising occasionally, 13 (22.0%) reported exercising once per week, 22 (37.3%) reported exercising 2-4 times per week, and 2 (3.4%) reported exercising daily. Most participants (n=35; 59.3%) reported having previous experience with meditation.

To examine differences between PA students (n=15, 25.4%) and residents (n=44, 74.6%), independent samples t-tests and Pearson's chi-squared tests of independence were performed. There were no statistically significant differences among the personal demographic characteristics between trainee types. A series of one-way ANOVAs and

Pearson's chi-squared tests of independence were conducted among each of the specialty types (N=59; n=15 PA students, n=11 surgery residents, n=12 OB/GYN residents, n=21 FM residents) where there were also no statistically significant differences present in personal demographic information.

Mental Health Symptoms, Psychosocial Characteristics, and Well-Being

The mean sleep disturbance score was 20.74 (sd= 5.70) (see Table 2): 41 (70.7%) participants were categorized with none to slight disturbance, 14 (24.1%) as mild, 3 (5.2%) as moderate, and 0 (0%) as severe for a total of 17 (29.3%) participants indicating sleep disturbance symptoms. The mean loneliness score was 35.77 (sd = 9.81). The mean depression score was 3.43 (sd = 3.21): 40 (69.0%) participants were categorized as normal, 9 (15.5%) were categorized as mild, 8 (13.8%) were categorized as moderate, 0 (0%) were categorized as severe, and 1 (1.7%) was categorized as extremely severe for a total of 18 (31.0%) participants indicating symptoms of depression. The mean anxiety score was 3.17 (sd = 3.29): 32 (55.2%) participants were categorized as normal, 16 (27.6%) were categorized as mild, 8 (13.8%) were categorized as moderate, 2 (3.4%) were categorized as severe, and 0 (0%) were categorized as extremely severe for a total of 26 (44.8%) participants indicating symptoms of anxiety. The mean stress score was 6.33 (sd =3.34): 40 (69.0%) participants were categorized as normal, 8 (13.8%) as mild, 7 (12.1%) as moderate, 3 (5.2%) as severe, and 0 (0%) as extremely severe for a total of 18 participants (31.0%) indicating symptoms of stress. The mean emotional well-being score was 11.36 (sd = 2.48). The mean social well-being score was 14.48 (sd = 4.87). The mean psychological well-being score was 22.50 (sd = 4.95). One (1.7%) participant was categorized as languishing and 25 (43.1%) as moderate for a total of 26 (44.8%)

participants non-flourishing compared to 32 (55.2%) participants who were categorized as flourishing. The mean mindfulness score was 77.07 (sd = 10.82). The mean mindfulness observation score was 12.57 (sd = 3.18). The mean mindfulness describe score was 17.78 (sd = 3.18). The mean mindfulness act with awareness score was 15.67 (sd = 3.34). The mean mindfulness non-judgement score was 16.29 (sd = 3.36). The mean mindfulness non-reaction score was 14.76 (sd = 2.98).

A series of independent t-tests were performed between PA students (n=15, 25.9%) and residents (n=43, 74.1%). Depressive symptoms were significantly higher among residents (mean=3.86; sd =3.54) than PA students (mean=2.20; sd = 1.57) (t=-2.46, df=52.59, p=.017). Among residents, 37.2% (n=16) were categorized with depressive symptoms present compared to 13.3% (n=2) of PA students. In addition, the mindfulness observation score was significantly higher among PA students (mean=14.67; sd =2.29) than residents (mean=11.84; sd=3.14) (t=3.20, df=56, p=.002). A series of one-way ANOVAs were also performed among each of the specialties. A statistically significant difference was observed in mean mindfulness observation scores (F(3,54)=4.19, p=.01). Tukey post hoc tests suggests the mean mindfulness observation score for PA students (mean=14.67; sd=2.29) was significantly higher than the mean mindfulness observation score for OB/GYN residents (mean=10.75; sd=3.67; p=.006). There were no differences between PA student and surgery residents (p=.21) nor FM residents (p=.08). Furthermore, no differences were observed between OB/GYN and surgery residents (p=.56) or FM residents (p=.54). Surgery and FM residents also did not differ in mean mindfulness observation scores (p=1.00). No significant differences were observed by trainee type or among each of the specialties for any other scores.

Pearson's chi-squared tests of independence were performed among trainee and specialty types for all the mental health symptoms, psychosocial characteristics, and well-being categorizations. No significant associations were found between the sleep (p=.29), depression (p=.09), anxiety (p=.17), stress (p=.09), and mental health (p=.66) categorizations between trainee type (see Table 2). Additionally, no significant associations were found between the sleep (p=.36), depression, (p=.22), anxiety (p=.22), stress (p=.37), and mental health (p=.40) categorizations with specialty type

Bivariate Analyses Regarding Participant Characteristics and Mental Health Symptoms, Psychosocial Characteristics, and Well-Being

Correlation tests were performed to examine the associations between participant characteristics and mental health symptoms, psychosocial characteristics, and well-being. Pearson correlation tests were performed for continuous participant characteristics and Spearman's Rho correlation tests was performed for non-parametric data (see Table 3). Results suggest sex was associated with lower mindfulness non-reaction (r=-.29, p=.03) score. Relationship status was significantly associated with higher levels of stress (r=.31, p=.02) and lower levels of mindfulness observation (r=-.27, p=.04). Being a primary caregiver was significantly associated with higher loneliness (r=.26, p=.05) and depression (r=.42, p=.001) as well as lower levels of mindful acting with awareness (r=-.37, p=.004). Ethnicity was significantly associated with the mindfulness describe score (r=.31, p=.02). Number of days sick in the previous 30 days was significantly associated with higher loneliness (r=.28, p=.04) and anxiety (r=.34, p=.008) as well as with lower levels of mindful acting with awareness (r=-.26, p=.05). Number of times exercised in the previous 30 days was significantly associated with lower levels of loneliness (r=-.37,

p=.005), depression (r=-.44, p=.001), and stress (r=-.29, p=.03) as well as higher levels of emotional well-being (r=.46, p<.001), social well-being (r=.29, p<.03), psychological well-being (r=.32, p=.02), overall mindfulness (r=.28, p=.03), and mindful observation (r=.26, p=.05). Previous meditation experience was associated with higher mindful non-reaction (r=.26, p=.05). Overall, higher levels of positive mental health symptoms and psychosocial characteristics were positively and significantly associated with other positive inputs and well-being while negatively associated with the negative inputs.

Pearson correlation tests were performed to examine the associations between the mental health symptoms, psychosocial characteristics, and well-being among healthcare trainees (see Table 4). Higher levels of sleep disturbance were associated with increasing anxiety (r=.39, p=.003). Higher levels of loneliness were positively associated with the negative inputs of depression (r=.57, p<.001), anxiety, (r=.46, p<.001), and stress (r=.27, p=.04) as well as negatively associated with the positive inputs of emotional well-being (r=-.59, p<.001), social well-being (r=-.52, p<.001), psychological well-being (r=-.58, p<.001), overall mindfulness (r=-.42, p=.001), mindful acting with awareness (r=-.47, p<.001), and mindful non-reaction (r=-.38, p=.003). Higher levels of depression were also positively associated with the negative inputs of anxiety (r=.33, p=.01) and stress (r=.56, p<.001) as well as the positive inputs of emotional well-being (r=-.68, p<.001), social well-being (r=-.38, p=.003), psychological well-being (r=-.52, p<.001), overall mindfulness (r=-.51, p<.001), mindful acting with awareness (r=-.35, p=.007), mindful non-judgement (r=-.35, p=.007), and mindful non-reaction (r=-.51, p<.001). Anxiety was also positively associated with stress (r=.39, p=.003) and inversely correlated with social well-being (r=-.31, p=.02), psychological well-being (r=-.35, p=.007), overall

mindfulness (r=-.33, p=.01), mindful describing (r=-.24, p=.07), and mindful non-reaction (r=-.47, p<.001). Stress was also negatively associated with emotional well-being (r=-.42, p=.001), social well-being (r=-.44, p=.001), psychological well-being (r=-.56, p<.001), mindfulness (r=-.60, p<.001), mindful observation (r=-.26, p=.05), mindful describing (r=-.58, p<.001), mindful non-judgement (r=-.41, r=.002), and mindful non-reaction (r=-.55, p<.001).

The positive inputs were all positive correlated with each other with most at statistically significant levels. Emotional well-being was significantly associated with social well-being (r=.50, p<.001), psychological well-being (r=.66, p<.001), overall mindfulness (r=.41, p<.001), mindful describe (r=.37, p=.004), mindful acting with awareness (r=.38, p<.003), and mindful non-reaction (r=.26, p=.05). Social well-being was positively associated with psychological well-being (r=.59, p<.001), overall mindfulness (r=.44, p<.001), mindful describe (r=.45, p<.001), mindful acting with awareness (r=.32, p=.02), and mindful non-reaction (r=.38, p=.003). Psychological well-being was also positively associated with overall mindfulness (r=.51, r<.001), mindful describe (r=.53, p<.001), mindful non-judgement (r=.36, p=.006), and mindful non-reaction (r=.49, p<.001). Overall mindfulness was significantly associated with all its subscales (see Table 4 continued). All the mindful subscales were significantly associated with one another with exception of acting with awareness and non-judgement (p=0.35). Overall, the correlation results suggest statistically significant associations among the inputs. Positive inputs were positively associated with each other and negatively associated with the negative inputs. Furthermore, negative inputs were positively associated with the other negative inputs.

Results from Multivariate Logistic Regression of Participant Characteristics, Mental Health Symptoms, and Psychosocial Characteristics with Well-Being

The aim of this research was to examine the associations between mental health symptoms and psychosocial characteristics with well-being among healthcare trainees. To answer the two research questions, two multivariate logistic regression models were created. Preliminary analyses for model variable selection consisted of bivariate logistic regression for all participant characteristics, mental health symptoms, and psychosocial characteristics as the independent variable with the dependent variable of well-being, which was categorized as non-flourishing (0) compared to flourishing (1). Criteria for variable selection in the models started with a statistically significant association where $p<.05$. Analyses suggested being a primary caregiver ($p=.03$), number of days sick in the previous 30 days ($p=.04$), loneliness ($p<.001$), depression ($p=.02$), anxiety ($p=.02$), stress ($p=.01$), and mindfulness ($p=.003$) were independently and significantly associated with flourishing. Therefore, all 7 variables were included in subsequent logistic regression models using the Enter method with three blocks. In addition, number of days exercised in the previous 30 days ($p=.05$) was also included in the models due to its significant and strong correlations with many of the mental health symptom and psychosocial characteristic inputs as well as well-being in the bivariate analyses (see Table 4). Age ($p=.69$), gender ($p=.08$), relationship status ($p>.05$ for all categories), race ($p>.05$ for all categories), ethnicity ($p=.64$), previous meditation experience ($p=.90$), trainee specialty ($p>.05$ for all categories), and sleep ($p=.32$) were excluded. While trainee type ($p=.66$) was also not significant in bivariate analyses, it was included in the second model to examine the second research question.

Research Question 1

To examine the first research question exploring how mental health symptom and psychosocial characteristic inputs were associated with well-being among healthcare trainees, one model with three steps was created (see Table 5). In the first step, multivariate logistic regression results suggested primary caregivers were significantly less likely to be flourishing compared to those who were not primary caregivers (OR=.09; 95% CI=.01, .77; p=.03). The Nagelkerke R^2 was .16 in block one. In the second step, primary caregiver (p=.19), number of days sick in the previous 30 days (p=.13), and number of days exercised in the previous 30 days (p=.19) did not significantly predict flourishing when controlling for the other variables in the model. The Nagelkerke R^2 increased from .16 in block one to .24 in block two. In the third step, the mental health symptoms and psychosocial characteristics were added. Each unit increase in loneliness (AOR=.76; 95% CI=.63, .91; p=.003) and stress (AOR=.67; 95% CI=.45, .99; p=.05) was associated with decreased odds of flourishing. When controlling for all variables in the model, each unit increase in the depression scale was associated with more than 1.5 the odds of flourishing (AOR=1.53; 95% CI=1.01, 2.32; p=.05), indicating a positive and significant association between increasing symptoms of depression and well-being. However, being a primary caregiver (p=.09), number of days sick in the previous 30 days (p=.68), number of days exercised in the previous 30 days (p=.59), anxiety (p=.46), and mindfulness (p=.72) did not significantly predict flourishing when controlling for the other variables. The Nagelkerke R^2 increased from .24 in block two to .64 in block three. The Hosmer-Lemeshow test for the third step was not significant (X^2=8.69; df=8; p=.37) indicating goodness of fit for this model. The VIF for each variable was less than 2.

Research Question 2

To examine the second research question if mental health symptoms, psychosocial characteristics, and well-being significantly differ between PA students and medical residents, one model with three steps was created with the same inputs as the first model with the addition of trainee type (see Table 6). In the first step, multivariate logistic regression results suggested primary caregivers were significantly less likely to be flourishing compared to those who are not primary caregivers (AOR=.09; 95% CI=.01, .78; p=.03). Trainee type did not significantly predict flourishing (p=.90). The Nagelkerke R^2 was .16 in block one. In the second step, trainee type (p=.76), primary caregiver (p=.18), number of days sick in the previous 30 days (p=.13), and number of days exercised in the previous 30 days (p=.18) did not significantly predict flourishing when controlling for the other variables. The Nagelkerke R^2 increased from .16 in block one to .24 in block two. In the third step, each unit increase in loneliness (AOR=.75; 95% CI=.62, .91; p=.004) and stress (AOR=.67; 95% CI=.45, .99; p=.04) was associated with decreased odds of flourishing. However, when controlling for all variables in the model with the addition of trainee type, the depression scale no longer had a significant association with flourishing (AOR=1.52; 95% CI=1.00, 2.32; p=.05). Trainee type (p=.57), being a primary caregiver (p=.09), number of days sick in the previous 30 days (p=.64), number of days exercised in the previous 30 days (p=.64), anxiety (p=.40), and mindfulness (p=.75) also did not significantly predict flourishing when controlling for the other variables. The Nagelkerke R^2 increased from .24 in block two to .64 in block three. The Hosmer-Lemeshow test for the third step was not significant (X^2=8.51; df=8; p=.39) indicating goodness of fit for this model. The VIF for each variable was less than 2.

Summary

To examine associations between mental health symptoms and psychosocial characteristics with well-being among healthcare trainees, 59 participants were assessed for baseline demographic characteristics, sleep disturbance, loneliness, depression, anxiety, stress, mindfulness, and well-being. Results suggest many of these inputs were significantly associated with personal characteristics as well as other inputs. For the first research question examining the associations among mental health symptom and psychosocial characteristic inputs associated with well-being among healthcare trainees, the first logistic regression found loneliness, depression, and stress remained independently significant predictors when controlling for other variables found significant in bivariate analyses. While participants with decreasing loneliness and stress were less likely to be flourishing, participants with increasing depressive symptoms were more likely to be flourishing when controlling for other variables. For the second research question examining the presence of statistically significant differences among mental health symptoms, psychosocial characteristics, and well-being between PA students and medical residents, the second logistic regression found trainee type was not significantly associated with well-being when controlling for all variables in the model.

Chapter 5: Discussion

Introduction

Given the prevalence of burnout among healthcare providers, understanding associations between mental health symptoms and psychosocial characteristics with well-being especially among trainees in the earliest stages of their career is of the utmost importance to inform targeted interventions to prevent, reduce, and reverse burnout. Furthermore, well-being among healthcare trainees remains understudied, and there is little understanding of the specific inputs associated with flourishing. Therefore, this research examined (1) the associations among mental health symptom and psychosocial characteristic inputs associated with well-being among healthcare trainees and (2) the presence of statistically significant differences among mental health symptoms, psychosocial characteristics, and well-being between PA students and medical residents. The "Coping Reservoir" model was used to select inputs in conjunction with personal demographics and to understand their associations with well-being.

The Contemplative Well-being Apps for the Workplace study was conducted from March 2018 to April 2020 and consisted of four different groups of healthcare trainees: medical residents from three different specialties (surgery, OB/GYN, and FM) and PA students. Input selection consisted of sleep disturbance, loneliness, depression, anxiety, stress, and mindfulness, and well-being for resilience. Analyses from baseline survey results consisted descriptive statistics to characterize this population and bivariate exploration of demographics, mental health symptoms, psychosocial characteristics, and well-being including trainee and specialty type comparisons. Finally, two logistic regression models were created from statistically significant participant characteristics,

mental health symptoms, and psychosocial characteristics to understand (1) associations with well-being when controlling for these inputs and (2) examine if there is a statistically significant difference between trainee types when included in the model.

Discussion

The aim of this research included two overarching questions. The results of these analyses suggest (1) inputs of loneliness, depression, and stress were statistically significant predictors of well-being even after controlling for other demographics and inputs and (2) trainee type was not significantly associated with well-being; however, the presence of depressive symptoms was significantly higher in residents and the observation facet of mindfulness was significantly higher in PA students.

In the 58 students with completed mental health continuum questionnaire data to categorize well-being, slightly over half (n=32; 55.2%) were categorized as flourishing compared to non-flourishing (n=26; 44.8%). There was not a statistically significant difference between trainee (p=.66) nor specialty (p=.40) type. Few studies have examined flourishing in medical residents (Kelly-Hedrick et al., 2020) despite calls to promote it (Slavin et al., 2011) and none have been conducted among PA students.

The results from the first multivariate logistic regression examining the associations among mental health symptom and psychosocial characteristic inputs with well-being suggested loneliness and stress remained negative predictors of flourishing when included in the model whereas anxiety was no longer significant. Levels of depression, anxiety, and stress were lower than or consistent with baseline levels in previous studies among residents (Goldhagen et al., 2015; Nutting et al., 2020). The mean loneliness score was also lower than previous baseline results among advance practice

providers (Thimmapuram et al., 2021) yet remained a significant predictor of well-being. Interestingly, the increasing presence of depressive symptoms was found to be a significant positive predictor of flourishing when controlling for other inputs even though there was a significant negative association in bivariate analyses. This finding is contrary to previous research examining depressive symptoms and flourishing during residency (Lebares et al., 2021) and among gynecologic oncology members (Vetter et al., 2018). There is significant stigma and potentially harmful professional repercussions for reporting depressive symptoms in healthcare (Clough et al., 2019; Dyrbye et al., 2015; Kuhn & Flanagan, 2017; Williford et al., 2018) and it may be that there are differences in reporting when confidentially self-reporting. With these divergent findings from previous studies in the multivariate analyses, more research is needed to understand how depressive symptoms is associated with well-being when controlling for the other inputs and especially with similar negative inputs such as loneliness and stress.

A particularly interesting finding was the association between being a primary caregiver and flourishing. In the first step of the logistic regression model, being a primary caregiver was significantly associated with decreased odds of flourishing; however, the association was no longer significant when controlling for other inputs. This association indicates other mental health symptoms and psychosocial characteristics at least partially explain why primary caregivers were less likely to be flourishing. While these findings highlight the need for healthcare trainee programs to specifically target loneliness and stress, the need for training programs to provide built-in time and social support to facilitate the practice of positive behaviors to flourish should not be overlooked as being a primary caregiver was significantly associated with increasing

loneliness and depression. Previous research has noted the difficulties parents in residency programs encounter during pregnancy and after childbirth (Rangel et al., 2018; Stack et al., 2019). While a recent study did not find a significant association between having at least one child and flourishing, it did find significantly lower levels of flourishing among pet owners. Both animals and children are an additional responsibility and the time requirements during residency likely further contribute to non-flourishing even with the other positive benefits (Kelly-Hedrick et al., 2020).

Other health behaviors were also important influences in healthcare trainee well-being. Number of times exercised was associated negatively with loneliness, depression, and stress and positively with mindfulness and well-being. Research surrounding fitness interventions as a method to reduce burnout among healthcare professionals and trainees is emerging and promising (Nutting et al., 2020; Seward et al., 2020). Number of sick days was also associated with increasing loneliness and anxiety, which is consistent with sick leave in nurses (Booker et al., 2020). While a causal relationship cannot be inferred from these findings, mental health symptoms and psychosocial characteristics are interrelated with physical health and all are important factors in understanding well-being. Mindfulness was significantly associated with all inputs included in the multivariate models and well-being in bivariate analyses. Mindfulness programs for healthcare trainees are linked with improvements in stress management (de Vibe et al., 2013), well-being (Williams et al., 2020), and resilience (Malpass et al., 2019).

The second multivariate logistic regression model included trainee type, consisting of PA students and medical residents, and found it was not a significant predictor of well-being. However, other statistically significant differences among mental

health symptoms and psychosocial characteristics between PA students and medical residents were uncovered. Significantly more residents (n=16, 37.2%) than PA students (n=2, 13.3%) were categorized with depressive symptoms present. These results were around 10% higher than previous studies examining depressive symptoms in residents (Mata et al., 2015; Rotenstein et al., 2016). While depression remains under researched among PA students, one study found at least 8% positively screened for depression (Cocke et al., 2019) and another finding almost 80% reported burnout in the exhaustion dimension with a similar amount expressing interest to participate in a program to reduce burnout and improve their well-being (Johnson et al., 2020).

In addition, PA students had significantly higher levels of the observation facet of mindfulness compared to residents, where specifically OB/GYN residents had the lowest scores among all trainee and specialty types. While mindfulness self-report measures may reflect different levels of experience and meta-awareness can impact the quality of the results (Davidson & Kaszniak, 2015), this finding suggests future research is needed in the mental health of PA students given that they remain understudied and how those lessons could be applied to other healthcare trainee populations.

When examining the "Coping Reservoir" inputs with each another, the positive inputs were positively associated with other positive inputs and negatively associated with negative inputs overall. Furthermore, the negative inputs were also positively associated with other negative inputs. These associations were consistent with previous research using "Coping Reservoir" approaches. In recent studies, significant associations with positive inputs and well-being have been identified (Huber et al., 2020; Williams et al., 2020) as well as with negative inputs and decreased well-being (Kachel et al., 2020)

among medical students and physicians. The presence of these mental health symptoms, psychosocial characteristics, and well-being with their strong associations reinforce the need for interventions and trainee structural changes to reduce the prevalence of the negative inputs as well as increase the opportunity for positive inputs to promote healthcare trainee flourishing.

Strengths and Limitations

This study has multiple strengths. One strength of this research was its focus on well-being, adding credence to the growing field of positive psychology (Seligman & Csikszentmihalyi, 2000). Too little research has been conducted on primary prevention and positive approaches to promote mental health and well-being despite its importance. Instead, most of the existing research on mental health symptoms and psychosocial characteristics focuses on the onset, reduction, and reversal of burnout. Another strength of this study was its racially and ethnically diverse sample, although participants were mostly women. Limitations of this research included a small sample, and a power analysis was not completed before commencing. These measures were also self-reported and thus prone to error as well as stigma even with assured confidentiality. Therefore, these findings may not be a true representation of the overall healthcare trainee population. As these results were collected from a cross-sectional baseline survey, they should not be interpreted as causative. In addition, loneliness shares overlap with social well-being which may partially attribute to its significant relationship with flourishing.

Implications

This study found loneliness, stress, and depression were associated with healthcare trainee flourishing. Other participant characteristics, mental health symptoms,

and psychosocial characteristics were no longer significant when controlling for these inputs. As a result, this study has several implications for future explorations and recommendations. More research is needed to understand the role of depressive symptoms as part healthcare trainee well-being. Depressive symptoms must be examined in conjunction with other correlated mental health symptoms and psychosocial characteristics beyond bivariate analyses given its positive and significant association with flourishing in multivariate logistic regression. Next steps in research should focus on longitudinal interventions targeted to reduce loneliness, stress, and depression inputs and examine changes in healthcare trainee well-being. These studies can inform best practices in healthcare trainee programs.

Regarding practice, healthcare training programs and organizations must create social support and space for healthcare trainees to focus on their well-being without repercussions. Given many healthcare trainees are time limited, these findings would support organizations increasing personal time and time off from work to facilitate flourishing. Furthermore, providing support to primary caregivers may be linked to practicing more positive health behaviors. While little research is available surrounding specific programs with demonstrated positive effects on flourishing, the importance of incorporating positive psychology into healthcare trainee programs has been repeatedly declared (Kelly-Hedrick et al., 2020; Lebares et al., 2021; Seligman & Csikszentmihalyi, 2000; Skakum et al., 2015; Slavin et al., 2011). The need to study lifestyle and behavioral approaches strengthening the positive aspects of mental health and well-being in healthcare trainee programs will only benefit everyone in the healthcare ecosystem, including providers, patients, and the field overall in the United States.

Within the healthcare field, calls to reduce burnout and foster well-being for providers have intensified. Understanding which mental health symptoms and psychosocial characteristics are significantly associated with well-being is an essential part of the paradigm when examining burnout in future healthcare providers to effectively design and improve healthcare trainee programs. Ignoring these associations as way to meaningfully foster well-being among healthcare trainees only further contributes to the prevalence of burnout. As emphasized in the "Coping Reservoir," well-being and resilience are not merely the absence of burnout. This insight in the earlier stages of training can inform the necessity, urgency, and priority of interventions to strengthen resilience and allow future healthcare providers to flourish.

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TABLES

Table 1

Participant Characteristics

	Total Sample	**All Residents**	**PA Students**	**Test Statistic (Degrees of Freedom), P-Value**
Age	27.8 (sd =3.03)	30.13 (sd = 2.85)	28.74 (sd = 3.42)	T(df=57)=-1.55, p=.13
Sex	59 (100%)	44 (74.6%)	15 (25.4%)	X^2(df=1)=.07, p=.80
Female	45 (76.3%)	33 (55.9%)	12 (20.3%)	
Male	13 (22.0%)	10 (16.9%)	3 (5.1%)*	
Nonbinary**	1 (1.7%)	1 (1.7%)	0 (0.0%)	
Relationship Status	59 (100%)	44 (74.6%)	15 (25.4%)	X^2(df=2)=1.39, p=.50
Single	16 (27.1%)	11 (18.6%)	5 (8.5%)*	
Relationship	24 (40.7%)	17 (28.8%)	7 (11.9%)	
Married	19 (32.2%)	16 (27.1%)	3 (5.1%)*	
Primary Caregiver	8 (13.6%)	7 (11.9%)	1 (1.7%)*	X^2(df=1)=.82, p=.37
Race	59 (100%)	44 (74.6%)	15 (25.4%)	X^2(df=3)=3.42, p=.33
White	37 (62.7%)	25 (42.4%)	12 (20.3%)	
African American/ Black	8 (13.6%)	7 (11.9%)	1 (1.7%)*	
Asian	9 (15.3%)	7 (11.9%)	2 (3.4%)*	
Other	5 (8.5%)	5 (8.5%)*	0 (0.0%)*	
Hispanic or Latino	58 (100%)	43 (74.1%)	15 (25.9%)	X^2(df=1)=.08, p=.78
Yes	3 (5.2%)	2 (3.4%)*	1 (1.7%)*	
No	54 (93.1%)	40 (67.8%)	14 (23.7%)	
Unknown**	1 (1.7%)	1 (1.7%)	0 (0.0%)	
# of Days Sick in Previous 30 Days	1.06 (sd =1.64)	1.14 (sd = 1.83)	.80 (sd = .94)	T(df=47.49)=-.92, p=.36
# of Times Exercised in Previous 30 Days	6.61 (sd = 6.73)	5.73 (sd = 6.41)	9.20 (sd = 7.20)	T(df=57)= 1.76, p=.084
Previous Meditation Experience	35 (59.3%)	7 (11.9%)	28 (47.5%)	X^2(df=1)=1.34, p=.25

*This cell had an expected count of less than 5

**Removed for analysis due to insufficient sample size

Table 2

Participant Mental Health Symptoms, Psychosocial Characteristics, and Well-Being

	Total Sample	**All Residents**	**PA Students**	**Test Statistic (Degrees of Freedom), P-Value**
Sleep Disturbance	20.74 (sd = 5.70)	20.07 (sd = 5.36)	22.67 (sd = 6.38)	T(df=56)=1.54, p=.13
Sleep Categories	58 (100.0%)	43 (74.1%)	15 (25.9%)	X^2(df=1)=1.12, p=.29
None to Slight	41 (70.7%)	32 (55.2%)	9 (15.5%)	
Sleep Disturbance Present	17 (29.3%)	11 (19.0%)	6 (10.3%)*	
Mild	14 (24.1%)	10 (17.2%)	4 (6.9%)	
Moderate	3 (5.2%)	1 (1.7%)	2 (3.4%)	
Severe	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Loneliness	35.77 (sd = 9.81)	36.44 (sd = 9.57)	33.87 (sd = 10.57)	T(df=56)=-.87, p=.39
Depression	3.43 (sd = 3.21)	3.86 (sd =3.54)	2.20 (sd = 1.57)	T(df=52.59)=-2.46, p=.02
Depression Categories	58 (100.0%)	43 (74.1%)	15 (25.9%)	X^2(df=1)=2.96, p=.09
Normal	40 (69.0%)	27 (46.6%)	13 (22.4%)	
Depression Symptoms Present	18 (31.0%)	16 (27.6%)	2 (3.4%)*	
Mild	9 (15.5%)	7 (12.1%)	2 (3.4%)	
Moderate	8 (13.8%)	8 (13.8%)	0 (0.0%)	
Severe	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Extremely Severe	1 (1.7%)	1 (1.7%)	0 (0.0%)	
Anxiety	3.17 (sd = 3.29)	2.91 (sd = 2.29)	3.93 (sd = 2.60)	T(df=56)=1.44, p=.15
Anxiety Categories	58 (100.0%)	43 (74.1%)	15 (25.9%)	X^2(df=1)=1.88, p=.17
Normal	32 (55.2%)	26 (44.8%)	6 (10.3%)	
Anxiety Symptoms Present	26 (44.8%)	17 (29.3%)	9 (15.5%)	
Mild	16 (27.6%)	12 (20.7%)	4 (6.9%)	
Moderate	8 (13.8%)	4 (6.9%)	4 (6.9%)	
Severe	2 (3.4%)	1 (1.7%)	1 (1.7%)	
Extremely Severe	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Stress	6.33 (sd =3.34)	6.58 (sd =3.58)	5.60 (sd =2.47)	T(df=56)=-.98, p=.33
Stress Categories	58 (100.0%)	43 (74.1%)	15 (25.9%)	X^2(df=1)=2.96, p=.09
Normal	40 (69.0%)	27 (46.6%)	13 (22.4%)	

Stress Symptoms Present	18 (31.0%)	16 (27.6%)	2 (3.4%)*	
Mild	8 (13.8%)	7 (12.1%)	1 (1.7%)	
Moderate	7 (12.1%)	6 (10.3%)	1 (1.7%)	
Severe	3 (5.2%)	3 (5.2%)	0 (0.0%)	
Extremely Severe	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Emotional Well-Being	11.36 (sd = 2.48)	11.05 (sd = 2.65)	12.27 (sd =1.71)	T(df=1)=1.66, p=.10
Social Well-Being	14.48 (sd = 4.87)	14.77 (sd = 5.03)	13.67 (sd = 4.42)	T(df=56)=-.75, p=.46
Psychological Well-Being	22.50 (sd = 4.95)	22.35 (sd = 5.35)	22.93 (sd =3.69)	T(df=56)=.39, p=.70
Mental Health	58 (100.0%)	43 (74.1%)	15 (25.9%)	X^2(df=1)=.19, p=.66
Flourishing	32 (55.2%)	23 (39.7%)	9 (15.5%)	
Non-Flourishing	26 (44.8%)	20 (34.4%)	6 (10.3%)	
Moderate	25 (43.1%)	19 (32.8%)	6 (10.3%)	
Languishing	1 (1.7%)	1 (1.7%)	0 (0.0%)	
Mindfulness	77.07 (sd = 10.82)	76.42 (sd =10.58)	78.93 (sd = 11.65)	T(df=56)=.77, p=.44
Observation	12.57 (sd = 3.18)	11.84 (sd = 3.14)	14.67 (sd =2.29)	T(df=56)= 3.20, p=.002
Describe	17.78 (sd = 3.18)	18.00 (sd = 3.05)	17.13 (sd =3.58)	T(df=56)=-.91, p=.37
Act with Awareness	15.67 (sd = 3.34)	15.58 (sd =3.51)	15.93 (sd =2.87)	T(df=56)=.35, p=.72
Non-judgement	16.29 (sd = 3.36)	16.23 (sd = 2.81)	16.47 (sd = 4.70)	T(p=17.61)=.18, p=.86
Non-reaction	14.76 (sd = 2.98)	14.77 (sd = 3.07)	14.73 (sd = 2.81)	T(df=56)=-.04, p=.97

*This cell had an expected count of less than 5

Table 3

Bivariate Analyses Regarding Participant Characteristics and Mental Health Symptoms, Psychosocial Characteristics, and Well-Being

	Sleep Disturbance r (p-value)	**Loneliness** r (p-value)	**Depression** r (p-value)	**Anxiety** r (p-value)	**Stress** r (p-value)	**Emotional Well-Being** r (p-value)	**Social Well-Being** r (p-value)	**Psychological Well-Being** r (p-value)
Age	.06 (.64)	-.04 (.79)	.21 (.12)	-.03 (.83)	.03 (.80)	-.25 (.06)	.01 (.94)	.06 (.64)
Sex	.006 (.96)	-.11 (.41)	.08 (.54)	.09 (.53)	.12 (.39)	-.05 (.71)	.08 (.54)	.01 (.97)
Relationship Status	-.02 (.87)	-.13 (.32)	.20 (.14)	-.09 (.49)	.31 (.02)	-.06 (.63)	-.03 (.82)	.006 (.97)
Primary Caregiver	.21 (.10)	.26 (.05)	.42 (.001)	.21 (.11)	.18 (.18)	-.15 (.26)	-.17 (.21)	-.20 (.12)
Race	.12 (.39)	.20 (.14)	.18 (.17)	.18 (.19)	.11 (.41)	-.25 (.06)	-.09 (.51)	-.25 (.06)
Hispanic or Latino	.17 (.23)	-.07 (.63)	-.17 (.20)	-.20 (.14)	-.13 (.36)	.03 (.84)	-.01 (.94)	-.002 (.99)
Specialty	-.20 (.12)	.11 (.43)	.13 (.35)	-.13 (.32)	.09 (.51)	-.11 (.40)	.08 (.54)	-.12 (.38)
# of Days Sick in Previous 30 Days	.25 (.06)	.28 (.04)	.11 (.43)	.34 (.008)	.24 (.07)	-.08 (.54)	-.11 (.43)	-.17 (.21)
# of Times Exercised in Previous 30 Days	-.07 (.59)	-.37 (.005)	-.44 (.001)	-.21 (.11)	-.29 (.03)	.46 (<.001)	.29 (.03)	.32 (.02)
Previous Meditation Experience	-.01 (.94)	-.17 (.20)	-.22 (.10)	-.25 (.06)	-.09 (.49)	.14 (.31)	.19 (.16)	.12 (.35)

Table 3 continued

Bivariate Analyses Regarding Participant Characteristics and Mental Health Symptoms, Psychosocial Characteristics, and Well-Being

	Mindfulness r (p-value)	**Observation** r (p-value)	**Describe** r (p-value)	**Act with Awareness** r (p-value)	**Non-judgement** r (p-value)	**Non-reaction** r (p-value)
Age	.22 (.10)	.12 (.36)	.26 (.05)	.24 (.07)	.11 (.43)	.003 (.98)
Sex	-.20 (.13)	-.18 (.17)	-.10 (.45)	-.09 (.52)	-.05 (.73)	-.29 (.03)
Relationship Status	-.22 (.10)	-.27 (.04)	-.04 (.77)	-.12 (.36)	-.01 (.97)	-.26 (.05)
Primary Caregiver	-.22 (.10)	-.07 (.61)	-.06 (.67)	-.37 (.004)	-.06 (.67)	-.12 (.39)
Race	-.06 (.66)	-.03 (.82)	-.04 (.75)	-.21 (.11)	.13 (.34)	-.02 (.86)
Hispanic or Latino	.16 (.24)	.23 (.09)	.31 (.02)	.12 (.37)	-.06 (.65)	.02 (.91)
Specialty	-.11 (.42)	-.29 (.03)	-.03 (.85)	-.008 (.95)	-.05 (.72)	-.07 (.60)
# of Days Sick in Previous 30 Days	-.17 (.21)	.03 (.83)	-.004 (.98)	-.26 (.05)	-.13 (.33)	-.19 (.15)
# of Times Exercised in Previous 30 Days	.28 (.03)	.26 (.05)	.22 (.09)	.13 (.35)	.22 (.10)	.11 (.43)
Previous Meditation Experience	.18 (.18)	.09 (.52)	-.02 (.88)	.08 (.54)	.11 (.41)	.26 (.05)

Table 4

Mental Health Symptoms, Psychosocial Characteristics, and Well-Being Correlation Matrix

	Sleep Disturbance r (p-value)	**Loneliness** r (p-value)	**Depression** r (p-value)	**Anxiety** r (p-value)	**Stress** r (p-value)	**Emotional Well-Being** r (p-value)	**Social Well-Being** r (p-value)	**Psychological Well-Being** r (p-value)
Sleep Disturbance	-	.22 (.10)	.01 (.95)	.39 (.003)	.02 (.91)	.01 (.96)	-.04 (.76)	-.12 (.36)
Loneliness		-	.57 (<.001)	.46 (<.001)	.27 (.04)	-.59 (<.001)	-.52 (<.001)	-.58 (<.001)
Depression			-	.33 (.01)	.56 (<.001)	-.68 (<.001)	-.38 (.003)	-.52 (<.001)
Anxiety				-	.39 (.003)	-.16 (.24)	-.31 (.02)	-.35 (.007)
Stress					-	-.42 (.001)	-.44 (.001)	-.56 (<.001)
Emotional Well-Being						-	.50 (<.001)	.66 (<.001)
Social Well-Being							-	.59 (<.001)
Psychological Well-Being								-
Mindfulness Observation								
Describe								
Act with Awareness								
Non-judgement								
Non-reaction								

Table 4 continued

Mental Health Symptoms, Psychosocial Characteristics, and Well-Being Correlation Matrix

	Mindfulness r (p-value)	**Observation** r (p-value)	**Describe** r (p-value)	**Act with Awareness** r (p-value)	**Non-judgement** r (p-value)	**Non-reaction** r (p-value)
Sleep Disturbance	-.02 (.89)	-.07 (.59)	-.05 (.74)	.02 (.87)	.12 (.38)	-.09 (.53)
Loneliness	-.42 (.001)	-.18 (.19)	-.23 (.08)	-.47 (<.001)	-.15 (.25)	-.38 (.003)
Depression	-.51 (<.001)	-.25 (.06)	-.24 (.07)	-.35 (.007)	-.35 (.007)	-.51 (<.001)
Anxiety	-.33 (.01)	-.21 (.12)	-.24 (.07)	-.12 (.35)	-.05 (.72)	-.47 (<.001)
Stress	-.60 (<.001)	-.26 (.05)	-.58 (<.001)	-.24 (.07)	-.41 (.002)	-.55 (<.001)
Emotional Well-Being	.41 (.001)	.15 (.28)	.37 (.004)	.38 (.003)	.22 (.09)	.26 (.05)
Social Well-Being	.44 (.001)	.20 (.14)	.45 (<.001)	.32 (.02)	.12 (.36)	.38 (.003)
Psychological Well-Being	.51 (<.001)	.18 (.17)	.53 (<.001)	.18 (.19)	.36 (.006)	.49 (<.001)
Mindfulness	-	0.72 (<.001)	0.67 (<.001)	0.60 (<.001)	0.67 (<.001)	0.71 (<.001)
Observation		-	0.28 (0.03)	0.31 (0.02)	0.41 (0.001)	0.43 (0.001)
Describe			-	0.27 (0.04)	0.42 (0.001)	0.33 (0.01)
Act with Awareness				-	0.13 (0.35)	0.29 (0.03)
Non-judgement					-	0.33 (0.01)
Non-reaction						-

Table 5

Results from Multivariate Logistic Regression of Participant Characteristics, Mental Health Symptoms, and Psychosocial Characteristics with Well-Being

	Step 1		**Step 2**		**Step 3**	
	AOR (95% CI)	P-value	AOR (95% CI)	P-value	AOR (95% CI)	P-value
Primary Caregiver (Yes = 1)	.09 (.01-.77)	.03	.21 (.02-2.14)	.19	.10 (.01-1.43)	.09
# of Days Sick in Previous 30 Days			.73 (.48-1.10)	.13	.87 (.46-1.66)	.68
# of Times Exercised in Previous 30 Days			1.08 (.96-1.19)	.19	.95 (.79-1.15)	.59
Loneliness					.76 (.63-.91)	.003
Depression					1.53 (1.01-2.32)	.05
Anxiety					1.16 (.78-1.72)	.46
Stress					.67 (.45-.99)	.05
Mindfulness					1.02 (.92-1.12)	.72
Nagelkerke R^2	**.16**		**.24**		**.64**	

Table 6

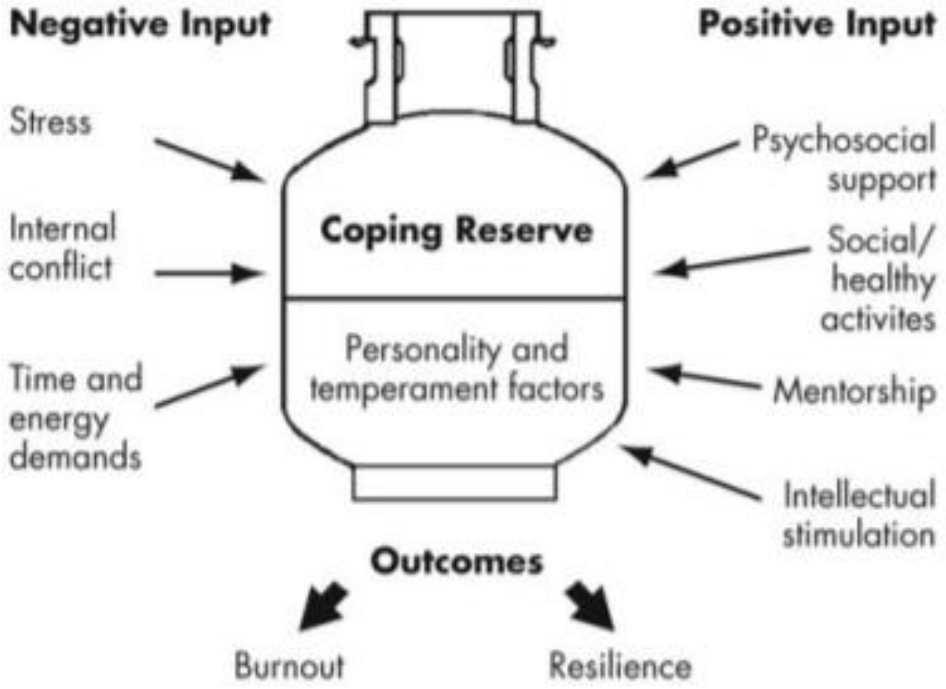
Results from Multivariate Logistic Regression of Participant Characteristics, Mental Health Symptoms, and Psychosocial Characteristics with Well-Being with Trainee Type

	Step 1		**Step 2**		**Step 3**	
	AOR (95% CI)	P-value	AOR (95% CI)	P-value	AOR (95% CI)	P-value
Trainee Type (PA Student = 1)	1.08 (.31-3.78)	.90	.81 (.21-3.08)	.76	.58 (.09-3.74)	.57
Primary Caregiver (Yes = 1)	.09 (.01-.78)	.03	.20 (.02-2.13)	.18	.10 (.01-1.38)	.09
# of Days Sick in Previous 30 Days			.73 (.48-1.10)	.13	.86 (.45-1.64)	.64
# of Times Exercised in Previous 30 Days			1.08 (.97-1.21)	.18	.96 (.79-1.16)	.64
Loneliness					.75 (.62-.91)	.004
Depression					1.52 (1.00-2.32)	.05
Anxiety					1.19 (.80-1.78)	.40
Stress					.67 (.45-.99)	.04
Mindfulness					1.02 (.92-1.12)	.75
Nagelkerke R^2	**.16**		**.24**		**.64**	

FIGURES

Figure 1

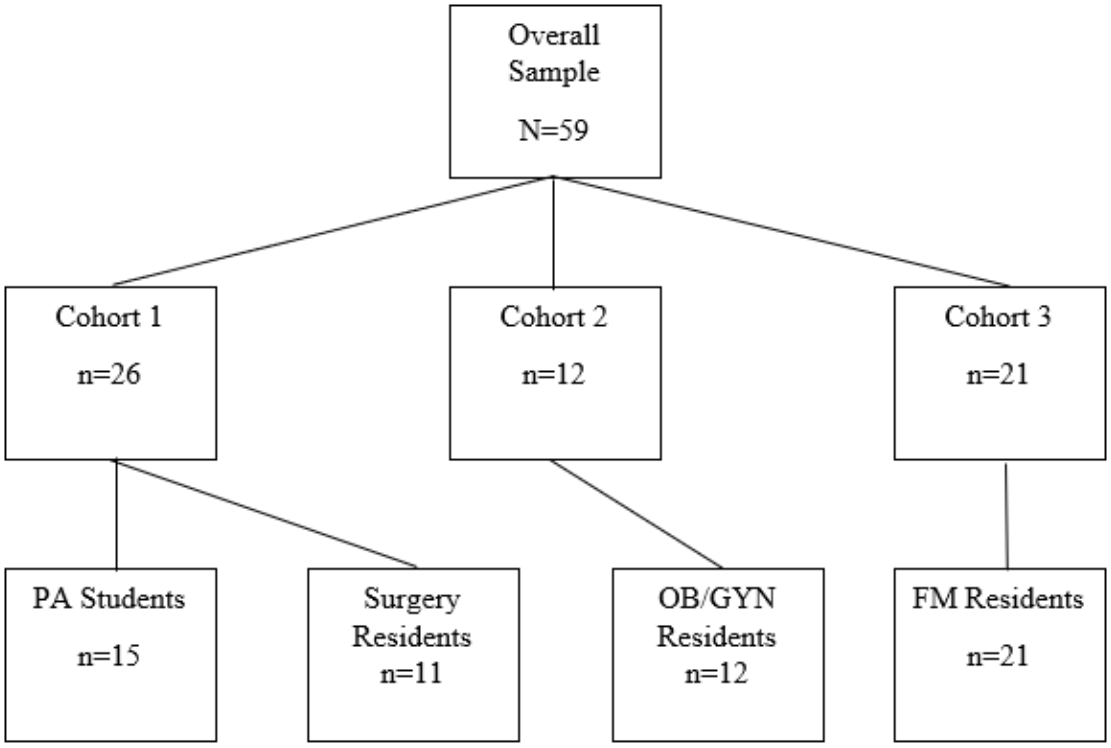
A Conceptual Model of Medical Student Well-Being: The "Coping Reservoir"



(Dunn et al., 2008)

Figure 2

Study Sample, Stratified by Participant Cohort and Specialty



APPENDICES

Appendix A

Emory IRB Approval

IRB CONTINUINING REVIEW APPROVAL

April 28, 2020

Jennifer Mascaro, PhD

jmascar@emory.edu

Title:	Contemplative Well-being Apps for the Workplace
Principal Investigator:	Jennifer Mascaro, PhD
IRB ID:	CR001-IRB00088349
Funding:	Name: Internal - University, Funding Source ID: Emory University Research Committee
IND, IDE or HDE:	None
Documents Reviewed:	• 88349YogaConsentV3.pdf, Category: Consent Form; • Amend_6_Consent_Clean, Category: Consent Form; • Empathic_Accuracy_Recording_Consent, Category: Consent Form; • Empathic_Accuracy_Release_of_Use_Consent, Category: Consent Form; • Meditation_IRB_amend_19_Clean.pdf, Category: IRB Protocol; • Stimuli_Reviewer_Consent.pdf, Category: Consent Form; • WorkplaceMed_BiomarkerConsent, Category: Consent Form;

Dear Jennifer Mascaro:

Thank you for submitting a renewal application for this protocol. The Emory IRB approved it by the expedited process on 4/28/2020, per 45 CFR 46.110, the Federal Register expeditable category F[7], and/or 21 CFR 56.110.

This reapproval is effective from 4/28/2020 through 4/27/2021. Thereafter, continuation of human subjects research activities requires the submission of another renewal application, which must be reviewed and approved by the IRB prior to the expiration date noted above

Please note carefully the following items with respect to this approval:

- 88349YogaConsentV3.pdf
- Amend_6_Consent_Clean
- Empathic_Accuracy_Recording_Consent
- Empathic_Accuracy_Release_of_Use_Consent

- Meditation_IRB_amend_19_Clean.pdf
- Stimuli_Reviewer_Consent.pdf
- WorkplaceMed_BiomarkerConsent

In conducting this protocol, you are required to follow the requirements listed in the Emory Policies and Procedures, which can be found at our IRB website.

Sincerely,

Brook Cabrera
IRB Analyst Assistant

Your stamped consent form is available under the "Documents" tab.

Now that your submission has been approved, please take a few moments to complete the Emory IRB Satisfaction Survey. We will use your responses to improve our service to the Emory research community. We appreciate your feedback!

Appendix B: Survey Forms

B.1

PROMIS Sleep Disturbance Short Form

						Clinician Use
In the past SEVEN (7) DAYS....						
	Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**	
1. My sleep was restless.	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5	
2. I was satisfied with my sleep.	❑ 5	❑ 4	❑ 3	❑ 2	❑ 1	
3. My sleep was refreshing.	❑ 5	❑ 4	❑ 3	❑ 2	❑ 1	
4. I had difficulty falling asleep.	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5	
In the past SEVEN (7) DAYS....						
	Never	**Rarely**	**Sometimes**	**Often**	**Always**	
5. I had trouble staying asleep.	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5	
6. I had trouble sleeping.	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5	
7. I got enough sleep.	❑ 5	❑ 4	❑ 3	❑ 2	❑ 1	
In the past SEVEN (7) DAYS....						
	Very Poor	**Poor**	**Fair**	**Good**	**Very good**	
8. My sleep quality was...	❑ 5	❑ 4	❑ 3	❑ 2	❑ 1	
Total/Partial Raw Score:						
Prorated Total Raw Score:						
T-Score:						

B.2

Revised UCLA Loneliness Scale

Scale:
INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you.

Statement	Never	Rarely	Sometimes	Often
1. I feel in tune with the people around me	1	2	3	4
2. I lack companionship	1	2	3	4
3. There is no one I can turn to	1	2	3	4
4. I do not feel alone	1	2	3	4
5. I feel part of a group of friends	1	2	3	4
6. I have a lot in common with the people around me	1	2	3	4
7. I am no longer close to anyone	1	2	3	4
8. My interests and ideas are not shared by those around me	1	2	3	4
9. I am an outgoing person	1	2	3	4
10. There arc people I feel close to	1	2	3	4
11. I feel left out	1	2	3	4
12. My social relationships arc superficial	1	2	3	4
13. No one really knows me well	1	2	3	4
14. I feel isolated from others	1	2	3	4
15. I can find companionship when I want it	1	2	3	4
16. There are people who really understand me	1	2	3	4
17. I am unhappy being so withdrawn	1	2	3	4
18. People are around me but not with me	1	2	3	4
19. There are people I can talk to	1	2	3	4
20. There are people I can turn to	1	2	3	4

B.3

DASS21 Short Form

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

B.4

Mental Health Continuum Short Form

Below is a collection of statements about your everyday experience. Using the 1–5 scale below, please indicate, in the box to the right of each statement, how frequently or infrequently you have had each experience in the last month (or other agreed time period). Please answer according to what really reflects your experience rather than what you think your experience should be.

never or very rarely true 1	***not often true 2***	***sometimes true sometimes not true 3***	***often true 4***	***very often or always true 5***

1	I'm good at finding the words to describe my feelings	*DS*	
2	I can easily put my beliefs, opinions, and expectations into words	*DS*	
3	I watch my feelings without getting carried away by them	*NR*	
4	I tell myself that I shouldn't be feeling the way I'm feeling	*/NJ*	
5	it's hard for me to find the words to describe what I'm thinking	*/DS*	
6	I pay attention to physical experiences, such as the wind in my hair or sun on my face	*OB*	
7	I make judgments about whether my thoughts are good or bad.	*/NJ*	
8	I find it difficult to stay focused on what's happening in the present moment	*/AA*	
9	when I have distressing thoughts or images, I don't let myself be carried away by them	*NR*	
10	generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing	*OB*	
11	when I feel something in my body, it's hard for me to find the right words to describe it	*/DS*	
12	it seems I am "running on automatic" without much awareness of what I'm doing	*/AA*	
13	when I have distressing thoughts or images, I feel calm soon after	*NR*	
14	I tell myself I shouldn't be thinking the way I'm thinking	*/NJ*	
15	I notice the smells and aromas of things	*OB*	
16	even when I'm feeling terribly upset, I can find a way to put it into words	*DS*	
17	I rush through activities without being really attentive to them	*/AA*	
18	usually when I have distressing thoughts or images I can just notice them without reacting	*NR*	
19	I think some of my emotions are bad or inappropriate and I shouldn't feel them	*/NJ*	
20	I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow	*OB*	
21	when I have distressing thoughts or images, I just notice them and let them go	*NR*	
22	I do jobs or tasks automatically without being aware of what I'm doing	*/AA*	
23	I find myself doing things without paying attention	*/AA*	
24	I disapprove of myself when I have illogical ideas	*/NJ*	

B.5

Five Facet Mindfulness Questionnaire Short Form

Please answer the following questions are about how you have been feeling during the past month. Place a check mark in the box that best represents how often you have experienced or felt the following:

During the past month, how often did you feel …	NEVER	ONCE OR TWICE	ABOUT ONCE A WEEK	ABOUT 2 OR 3 TIMES A WEEK	ALMOST EVERY DAY	EVERY DAY
1. happy						
2. interested in life						
3. satisfied with life						
4. that you had something important to contribute to society						
5. that you belonged to a community (like a social group, or your neighborhood)						
SEE BELOW 6. that our society is a good place, or is becoming a better place, for all people						
7. that people are basically good						
8. that the way our society works makes sense to you						
9. that you liked most parts of your personality						
10. good at managing the responsibilities of your daily life						
11. that you had warm and trusting relationships with others						
12. that you had experiences that challenged you to grow and become a better person						
13. confident to think or express your own ideas and opinions						
14. that your life has a sense of direction or meaning to it						

Note: The original wording for item 6 was "that our society is becoming a better place for people like you." This item does not work in all cultural contexts. However, when validating the MHC-SF, test both versions of item 6 to see which one works best in your context.