

Lesley University

DigitalCommons@Lesley

---

Mindfulness Studies Theses

Graduate School of Arts and Social Sciences  
(GSASS)

---

Spring 5-22-2021

## The Impact of Mindfulness on Healthcare Provider Burnout During COVID-19

Natasha Johnson  
njohns32@lesley.edu

Follow this and additional works at: [https://digitalcommons.lesley.edu/mindfulness\\_theses](https://digitalcommons.lesley.edu/mindfulness_theses)



Part of the [Social and Behavioral Sciences Commons](#)

---

### Recommended Citation

Johnson, Natasha, "The Impact of Mindfulness on Healthcare Provider Burnout During COVID-19" (2021). *Mindfulness Studies Theses*. 48.  
[https://digitalcommons.lesley.edu/mindfulness\\_theses/48](https://digitalcommons.lesley.edu/mindfulness_theses/48)

This Thesis is brought to you for free and open access by the Graduate School of Arts and Social Sciences (GSASS) at DigitalCommons@Lesley. It has been accepted for inclusion in Mindfulness Studies Theses by an authorized administrator of DigitalCommons@Lesley. For more information, please contact [digitalcommons@lesley.edu](mailto:digitalcommons@lesley.edu), [cvrattos@lesley.edu](mailto:cvrattos@lesley.edu).

**The Impact of Mindfulness on Healthcare Provider Burnout During COVID-19**

Natasha Johnson

Department of Mindfulness Studies, Lesley University

Thesis

Dr. Melissa Jean

Dr. Nancy Waring

May 2021

### **Abstract**

Healthcare providers are subject to unique stress as part of their job in a helping profession and regularly suffer the effects of burnout and secondary traumatic stress. Mindfulness-based interventions have been demonstrated to be effective in reducing burnout and addressing the impacts of secondary traumatic stress, however the current COVID-19 pandemic poses a new, more debilitating type of stress to healthcare providers. This paper seeks to examine the existing evidence on the effects of mindfulness in reducing burnout and secondary traumatic stress, incorporate new evidence on the unique stress of COVID-19, and determine if mindfulness interventions remain effective. It also seeks to evaluate the most recommended forms of mindfulness practice and evaluate the science behind their effectiveness.

Findings of this paper include the significant effects of COVID-19 on healthcare workers, both physically and emotionally, and the resulting increase in anxiety, depression, and insomnia that stems from the traumatic nature of healthcare providers' work during COVID-19. Further effects of COVID-19 are found to be due to the increased isolation due to COVID-19 precautions and the pre-existing literature on the effects of isolation. This paper also suggests that mindfulness can help healthcare providers retain their effectiveness and resilience during the COVID-19 pandemic and that these benefits are maximized by focusing mindfulness efforts in four areas: nutrition, movement, meditation, and rest, each of which reflects principles of the Buddhist roots of mindfulness as well as emerging neuroscience. It is my hope that this body of work will continue to benefit those who have so tirelessly sacrificed their physical and emotional well-being for those of others during this global pandemic.

**Table of Contents**

Abstract.....ii

Introduction.....1

Mindfulness: Roots and Research.....2

Burnout and Secondary Traumatic Stress in Healthcare Providers.....11

Impact of COVID-19 Pandemic.....22

Mindfulness Interventions.....31

    Mindful Nutrition.....31

        Nutritional Psychiatry.....33

    Mindful Movement.....36

    Mindful Meditation.....39

        Creating Resilience.....41

    Mindful Rest.....43

Discussion.....46

Limitations.....48

Future Research.....49

Conclusion.....50

References.....51

### **The Impact of Mindfulness on Healthcare Provider Burnout During COVID-19**

Stress is a natural and expected part of daily life, and coping strategies to deal with stress vary widely along the spectrum from healthy and beneficial to destructive and maladaptive. Learned and innate coping skills are part of how we cope with daily stress and can offer insight into our natural resilience, how we have historically dealt with stress, and if our learned strategies are effective. While everyone is subject to daily stress, some professions, such as helping professions, have more stress than the average occupation and therefore professionals in those fields need additional strategies to cope with this increased stress.

Prior studies have demonstrated that healthcare providers, which I will define here as physicians, nurses, first responders, and mental health providers, often experience levels of extreme stress due to the empathic nature of their work. Many people who work in these roles in helping professions serve those who are experiencing a moment of physical or emotional crisis or who are seeking care to cope with chronic issues and/or prolonged levels of trauma. Additionally, these providers, even if they are not mental health providers, are quite often expected to respond to some level of emotional need from their patients, thus further increasing their own distress and setting the stage for burnout and secondary traumatic stress among physicians, nurses, and first responders.

Even mental health providers, who are trained to navigate coping with the emotional needs of others, often find increased personal distress due to the overwhelming nature and volume of their work. Mindfulness has been studied as a way to reduce stress, foster resiliency, and provide coping skills for healthcare providers to maintain and enhance their well-being.

The current COVID-19 pandemic has resulted in prolonged stress on healthcare providers as they seek to cope with the increased stress in their daily role providing empathic care to

others. New research has documented that COVID-19 has increased the rate of burnout and secondary traumatic stress for these providers as well as increased their exposure to conditions that may result in anxiety, depression, and post-traumatic stress disorder.

This work seeks to examine the research on burnout and compassion fatigue within the healthcare profession, discuss the impact of mindfulness in improving coping skills for healthcare professionals, and explore relevant research on increased burnout and compassion fatigue due to the COVID-19 pandemic. This paper aims to discover whether mindfulness interventions have the potential to provide benefit to healthcare workers experiencing the increased stress and trauma of the COVID-19 pandemic. In addition to this, this paper will seek to explore the forms of mindfulness that might be most effective, the basis of their effectiveness, how easily they might be integrated into the lives of already stressed healthcare providers, and if there are any contraindications to engaging in mindfulness practice to reduce stress caused by COVID-19.

This paper posits that mindfulness is an effective strategy to reduce the increased level of burnout and compassion fatigue experienced by healthcare providers during the prolonged stress of the COVID-19 pandemic, and, that there are four main areas, nutrition, movement, meditation, and rest, in which mindfulness can be integrated as best practices to improve coping during COVID-19 with special attention to avoiding contraindications.

### **Mindfulness: Roots and Research**

What is mindfulness and how might we define it in a way that honors its historical roots while also acknowledging its modern-day evolution? In recent years, mindfulness has become a term that has saturated mainstream media, morphed its way into apps on our smartphones, and been touted by celebrities, like Oprah, as the pathway to a better life. Nonetheless, the vagueness

of the term mindfulness often leaves one to wonder how one might lead a mindful life without apps and celebrity gurus to lead the way. Additionally, many people ask if there is any evidence that mindfulness works and if so, how can this effectiveness be explained? Furthermore, those seeking to practice mindfulness are left to wonder how to integrate it into daily life in a sustainable way that feels authentic rather than just another trend that will shortly be in the past.

Jon Kabat-Zinn (1994) is often considered the “father” of mindfulness and has been made popular by his widely used definition of mindfulness which he states as “paying attention in a particular way: on purpose, in the present moment, and non-judgmentally” (p. 4). While not the only way to define mindfulness, his definition provides a good place to begin the exploration of three of the core principles of mindfulness: present moment awareness, focused attention, and an attitude of non-judgment.

In his book *Full Catastrophe Living*, Kabat-Zinn (1990) further explored these three core principles and broke them down even further into seven attitudinal foundations of mindfulness that he believes are key in its practice. Kabat-Zinn states that these foundations are embodied by the elements of non-judging, patience, beginner’s mind, trust, non-striving, acceptance, and letting go. By embodying each of these foundational attitudes, keeping them in mind and action on a daily basis, one can create a more mindful life that reflects the true definition of mindfulness.

Kabat-Zinn (1990) began with *non-judgement* as an embodied practice of taking an unbiased stance of the present moment of one’s experience. It involves simply noticing any judgement that the mind presents, acknowledging that the mind has presented a judging stance, and not attempting to attach or dismiss this judgement. This practice is often best described by acknowledging thoughts are just the workings of the brain and the brain’s unending task to create

thoughts as part of its operation. This can often be challenging for beginners who cling to the process of thinking as part of the experience of making meaning in life.

The principle of *patience* can be helpful with non-judgement and seeks to acknowledge a sense of releasing these preconceived thoughts and expectations, allowing oneself to be open to each moment as it comes (Kabat-Zinn, 1990). It can be frustrating to realize how much we think and react to our thoughts. Patience speaks to the ability to be gentle with one's thoughts and feelings in order to be more curious about our thoughts and actions and more compassionate about our reactions.

Adopting a *beginner's mind* can be helpful in developing compassion towards oneself and others and is reflected in practice by attempting to "see" events as one would if it was the first time they had encountered them (Kabat-Zinn, 1990). From this stance of newness, one can observe the human tendency to perceive and react to things in the same way we have before without stopping to be aware of these automatic reactions. With patience and non-judgement, a beginner's mind can be cultivated and nurtured in order to create more authentic actions and reactions to life's events.

*Trust* speaks to the need to recognize our feelings as a natural expression of our own internal intelligence and wisdom (Kabat-Zinn, 1990). If we do not trust our own feelings and reactions, then our actions are inherently based in some level of mistrust, even if it is only mistrust of the self. The process of trust also reflects the need to tap into our interoceptive awareness and tune in to what body and mind are telling us without clinging to a particular outcome.

*Non-Striving* centers on developing acceptance for the time and place that you inhabit in the present moment. (Kabat-Zinn, 1990). So often life has a forward momentum that seeks to



push us from one moment to the next so that in some way we are constantly living in a future moment. Non-striving allows the space to slow down and be in this moment, acknowledging that there are moments ahead without actively moving towards them in thought or action.

*Acceptance* is a natural manifestation of non-striving and is just that, accepting the here and now without overly identifying with it or clinging to an outcome (Kabat-Zinn, 1990). By accepting that this moment is this moment and the next is the next, we offer ourselves room to experience the moment we are in and therefore begin to experience moment-to-moment awareness. Acceptance can facilitate experiencing an emotion without reacting to it and therefore can help to process that emotion within the context of our present experience.

Finally, *letting go* embodies the impermanence of life and reframes events to allow them to be as they are in the present (Kabat-Zinn, 1990). It is reflective of our tendency to be attached to pleasant experiences and averse to unpleasantness to craft our sense of self and the world around us. By truly letting go and embracing the impermanence of both the pleasant and unpleasant we can reduce suffering created by the events that change around us.

Embracing these foundations in daily life brings us naturally to a place of more embodied mindfulness practice and speaks to the natural curiosity and awareness needed to engage in creating a more mindful life. It also speaks to the effort involved in the pursuit of mindfulness and the innate capacity for humans to retrain both cognitive and behavioral processes in service of creating an improved sense of well-being.

The definitions put forth by Kabat-Zinn (1990) and others speak to how mindfulness practice can unfold in the more secular nature of our lives yet how it cannot, and should not, be divorced or severed from its very important and distinct Buddhist roots. To explore the Buddhist

roots of mindfulness is an academic study unto itself; however, it is valuable to address some of the core historical principles in order to better understand the foundation of mindfulness itself.

Buddhism as a religion is attributed to the teachings of the Buddha, sometimes known as Gotama, and while the Buddha was as an actual person that lived somewhere between 500-400 BCE, the word Buddha also has meaning of its own: “The word *buddha* is not a name but a title; its meaning is ‘one who has woken up’” (Gethin, 1998, p. 8). In his book *The Foundations of Buddhism*, Gethin (1998) discussed the foundational elements of Buddhism, the life of Buddha, the man, and the path that led Buddha towards the creation of Buddhism.

The story of the Buddha’s life, while not key to practicing mindfulness, provides a deeper understanding of the principles that mindfulness embodies. Gethin (1998) enlightened us with his recounting of the creation of the man we know today as Buddha:

The earliest Buddhist sources state that the future Buddha was born Siddhārtha Gautama (Pali Siddhattha Gotama), the son of a local chieftain—a *rājan*—in Kapilavastu (Pali Kapilavatthu) on what is now the Indian–Nepalese border. He was thus a member of a relatively privileged and wealthy family and enjoyed a comfortable upbringing. ... At some point he became disillusioned with his comfortable and privileged life; he became troubled by a sense of the suffering that, in the form of sickness, old age, and death, sooner or later awaited him and everyone else. In the face of this, the pleasures he enjoyed seemed empty and of little value. So, he left home and adopted the life of a wandering ascetic, a *śramaṇa*, to embark on a religious and spiritual quest. He took instruction from various teachers; he practiced extreme austerities as was the custom of some ascetics. Still, he was not satisfied. Finally, seated in meditation beneath an *aśvattha* tree on the banks of the Nairāñjanā in what is now the north Indian state of

Bihar, he had an experience which affected him profoundly, convincing him that he had come to the end of his quest. ... the Buddhist tradition (apparently bearing witness to the Buddha's own understanding of his experience) calls it *bodhi* or 'awakening' and characterizes it as involving the deepest understanding of the nature of suffering, its cause, its cessation, and the way leading to its cessation. The Buddha devoted the rest of his life to teaching this 'way to the cessation of suffering' to groups of wanderers and ordinary householders. In the course of his wanderings across the plains that flank the banks of the Ganges he gathered a considerable following and by the time of his death at about the age of 80 he had established a well-organized mendicant community which attracted considerable support from the wider population. (pp. 14–15)

Suffering, or *dukkha* as it is referred to in Buddhist texts, is at the core of the Buddha's practice and gives birth to the principles that are the foundation of Buddhism and mindfulness. The Buddha designed a pathway to encompass the inevitability of suffering within the context of practical ways that help practitioners to facilitate joy, curiosity, meaning, enlightenment and awakening in the creation of their lives. This pathway begins with his teachings on the Four Noble Truths: The truth of suffering, the cause of suffering, the end of suffering and the truth of the path leading to the end of suffering.

In essence, Buddha states that suffering will always exist, suffering has a cause and an end, and it also has a cause that leads to its end. With our modern-day lens, it seems rather simplistic to think this way; however, within the context of this paper, the Four Noble Truths are of primary importance in regard to suffering during the COVID-19 pandemic and within the context of the general burnout and secondary traumatic stress felt by healthcare providers prior to the pandemic. Suffering is in many ways what we now refer to as chronic stress.

It is no wonder, with suffering and ending suffering as their focus, that these texts and teachings have survived throughout the ages and have made their way into our contemporary times. It is also then not surprising that our modern-day world has sought to study these teachings and practices with its most effective and validated tool, science.

Science is the tool by which the world validates its hunches, clarifies its own relevance in society and fosters ideas for new growth. The field of contemplative neuroscience utilizes tools of scientific study, such as high-powered imaging machines, functional magnetic resonance imaging, to understand the impact of meditation on the brain. It draws on its sister field of neuroscience to relate how changes in the brain relate to other theories of brain structure and neuroplasticity. Contemplative neuroscience attempts to validate real world experiences related to meditation and other contemplative pursuits and translate them into concrete scientific fact.

The field of neuroscience has long studied the process and action of neuroplasticity, or changes in the brain, due to functional activities (Goleman & Davidson (2017)). Sometimes these studies have included studying the neuroplasticity that results from activities such as music, sports, and other disciplines that require a high degree of skill and focus. Recently, research has turned its attention to studying the effects of meditation and how the practice of mediation might also result in neuroplastic changes that can improve the quality of our cognition and ultimately our lives.

One key discovery in the field of contemplative neuroscience has been the emergence of the brain's default mode network (DMN) and its role during meditation. In research conducted by Ricard et al. (2014), neuroimaging helped to illuminate what happens to the brain during meditation. They studied the practice of focused attention (FA) meditation where the practitioner focuses on the in-out cycles of the breath as a way to train the mind and discovered that once the

mind begins to wander away from focusing on the breath, areas in the brain that are associated with the DMN (such as the posterior cingulate cortex, the medial prefrontal cortex and the precuneus) become active. Once the meditator becomes aware that their mind has wandered, the brain shifts from the DMN to activating the salience network (SN), which shifts activity to the anterior insula and anterior cingulate cortex and then further prompts the inferior parietal lobe and dorsolateral prefrontal cortex to reorient awareness. This cycle of shifting awareness from DMN to SN continues each time the mind wanders.

In real life, or “off the cushion” as it is sometimes referred to, this cycle accounts for the ebb and flow of our attentional focus throughout our day. While the DMN certainly has a place in our daily lives and function, by training the mind to be more in the present moment while meditating, i.e., more in the attentional network, we learn to strengthen our focus and shift away from excess rumination. Research from Goleman & Davidson (2017) states that

the brain's default mode activates when we are doing nothing that demands mental effort, just letting our mind wander; we hash over thoughts and feelings (often unpleasant) that focus on ourselves, constructing the narrative we experience as our quote self and quote. The default mode circuit quiets during mindfulness and lovingkindness meditation. (p. 163)

Goleman & Davidson (2017) went on to explain that

this quieting of the self-circuitry begins as a state effect, seen during or immediately after meditation, but with long term practitioners it becomes an enduring trait, along with lessened activity in the default mode itself. The resulting decrease in stickiness means that the self-focused thoughts and feelings that arise in the mind have much less “grab” and decreasing ability to hijack attention. (p. 164)

Thus, it is possible to develop the ability to train the mind to be more calm, quiet, and in the moment and less lost in constant thoughts or worries about the self or things pertaining to the self. The key to this training seems to be developing the capacity to focus attention in the moment.

In their work with Mindfulness Based Stress Reduction (MBSR), Goodman & Schorling (2012) provided alternative ways of how to practically engage in mindfulness and in their study had participants engage in “four types of formal mindfulness practices, including the body scan, mindful movement, walking meditation and sitting meditation” (p. 121). All these practices engage in present moment awareness by helping participants focus their attention on the senses, bodily sensations, the environment around them, and the mental environment created by thought. These practices also helped the participants to work on bridging the sensations of the body and mind. In his book *Aware*, Dan Siegel (2018) further suggested that these activities fall into the category of what he called *monitoring*, a term he uses to define how we move to a more expanded conscious state of awareness.

The task of engaging in a body scan or walking meditation calls to the forefront the current state of one’s mind and thoughts in the present moment. However, Siegel (2018) proposed that this is only half of the equation of mindfulness and stated that “once you can stabilize the monitoring function of the mind, you can learn to *modify* towards integration” (p. 27), which he depicted as the full embodiment of mindfulness. The experience of integration suggests that we are linking the complex processes of monitoring the mind, body, thoughts while also being in the present moment. In short, it is the adaptable and flexible ability to not get lost in the now or in the later but to hold both with equanimity while clinging to neither.

The result of engaging in meditation is that over time we are more able to attend to our present moment experience, become less absorbed in excess thoughts and ruminations about ourselves thus strengthening our ability to engage with fuller attention in real-time so as to reduce or avoid triggered reactions to present events based on past experiences. While the neuroscience of mindfulness may be separated by centuries from its Buddhist roots, it seems that it clearly speaks directly to the Buddha's Four Noble Truths and his desire to address the role of suffering in daily life by illuminating the processes of the mind but also the way these processes can change.

If we are to attend to our inevitable suffering, and the suffering of others, it seems that Buddha has provided the path forward so that we may find our way to more joy, peace, and connection with those that we love. In the context of this work, this path seems essential as the current COVID-19 pandemic has brought incalculable suffering to millions worldwide. This suffering is expressed in the global sense of loss: loss of friends and loved ones, loss of employment and financial stability, loss of connection to others as a result of isolation, and loss of sense of self. However, this loss is often compounded when one is regularly witness to the catastrophic loss experienced by others during this global pandemic; this is the plight and stress of healthcare providers during COVID-19.

### **Burnout and Secondary Traumatic Stress in Healthcare Providers**

Healthcare providers (HCPs) are subject to a unique type of stress due to their role helping patients with both physical and emotional problems. Oftentimes, they encounter patients at their most vulnerable and distressing moments, and over time this repeated exposure to patients' distress, combined with the daily pressures of working in the high-stress, fast-paced field of healthcare, can lead to clinical levels of distress.

HCPs face two main types of stress that regularly impact patient-facing medical and mental health care providers: burnout and secondary traumatic stress (STS), also sometimes called compassion fatigue. Burnout is the lesser of these two and can often be mitigated by adapting strong healthy coping skills and engaging in regular respite. According to the Institute for Quality and Efficiency in Health Care (2020), “the term ‘burnout’ was coined in the 1970s by the American psychologist Herbert Freudenberger [who] used it to describe the consequences of severe stress and high ideals in ‘helping’ professions” (para. 2). Since this time, the definition and diagnosis of burnout has expanded to include a more clinically appropriate and finite set of symptoms.

Many times, the first symptoms of the more severe STS manifest through the emergence of symptoms of burnout. While burnout in any profession is possible, research done by Ortiz-Fune et al. (2020) stated that it is a “significant problem for those in medical and mental health professions who have continuous contact with human suffering” (p. 85). Again, it is noted that it is the element of human suffering that they directly link to the incidence of both burnout and secondary traumatic stress.

Today, burnout has a more detailed definition as encompassing three distinct dimensions: “emotional exhaustion (EE; being emotionally overextended and depleted), depersonalization (D; feeling negative, callous, and excessively detached from clients and customers), and lack of personal accomplishment (PA; feeling incompetent and lacking experiences of success and achievement)” (Ortiz-Fune et al., 2020, p. 85). All these dimensions originate not only from the repeated contact with human suffering but also from HCPs’ empathic mission to eliminate it. It is this deeply intertwined and dual effort of engaging in the trauma of others in order to help them and thereby traumatizing the provider that paves the way for burnout.



Research by Bridgeman et al. (2018) suggested that these dimensions are sequential, beginning with emotional exhaustion and progressing through to feelings of lack of achievement. Bridgeman et al. (2018) also suggested that burnout is, in some ways, a natural part of the process when in the profession of caring for other humans and that it can be evidenced across all stages of a provider's career. If so, it might be that burnout can be considered a consequence of the job itself although it should never be accepted simply due to this fact. While burnout may be natural, it does not provide a reason to normalize and accept its effects.

Nonetheless, the fact that burnout may be a normative process in the healthcare field also offers another opportunity: an opportunity to recognize where a provider might be on the burnout scale and seek interventions to engage in habits to reduce burnout. This recognition begins not just with the HCP but also the institution of healthcare itself.

It is not simply the job that plays a role in fostering burnout, but also the culture of the workplace itself. Further research by Cavanagh et al. (2020) cited that there may be an institutional component of burnout and suggested that it may be “primarily triggered by work-related and organizational characteristics, with some predisposing personal characteristics” (p. 659). Thus, burnout may not only be characterized as part of the job but also might also be considered the natural by-product of engaging in institutional roles and responsibilities.

Consistent with the research on burnout indicating a high level of institutional involvement in creating conditions that foster burnout, research shows that actions within an organization can also mitigate it:

Burnout among HCPs could be reduced by actions from healthcare institutions and other governmental and non-governmental stakeholders aimed at potentially modifiable factors. These could include providing additional training and mental health resources,

strengthening organizational support for HCPs' physical and emotional needs.

(Morgantini et al., 2020, p. 7)

These findings suggest that the lower levels of burnout can be addressed by interventions from the healthcare institutions themselves and that this may be most effective in healthcare workers not directly exposed to trauma from COVID-19 or experiencing secondary traumatic stress.

Institutional support does not seem to be sufficient for those who have direct exposure to COVID-19 patients or have a "high empathy" role within the system, such as mental health providers, and likely suffer the effects of STS that goes beyond the level of burnout.

Regardless of its origin, burnout should be considered as the natural cumulative effects of working as a healthcare provider caring for patients and should be attended to just as any other professional responsibility. Knowledge around the effects of engaging in the work of HCPs offers the opportunity for employers to retain employees by fostering employee resilience. Burnout can often be mitigated by time away from the work environment, feeling supported by co-workers and management, having effective and readily available coping skills, and engaging in regular self-care. Left to fester, burnout can lead to greater physical and emotional distress.

Beyond burnout, providers may experience a more detrimental level of provider distress called secondary traumatic stress (STS). STS differs from burnout in the severity of its impact on providers and the depth at which providers are able to engage with their patients. STS appears to be

triggered by the continual use of empathy and emotional energy, previous exposure to trauma, prolonged exposure to secondary trauma (a consequence of being witness to the trauma of others and being in a position of having to care for those who are suffering,

rather than being the primary subject of the trauma themselves), and the work environment. (Cavanagh et al., 2020, p. 658)

STS might be considered a disorder of both length and intensity as it can manifest after many years of repeated secondary trauma or as the result of high intensity secondary trauma over a shorter period. As secondary traumatic stress involves the vicarious nature of trauma, it is essential to understand some of the dynamics involved in the experience of a primary trauma.

Trauma is often viewed as an emotional response to a disturbing or distressing event. It can take the shape of many different types of interactions ranging from interactions between two individuals to a more global event that affects many people at once, such as war or other global political events. Renowned trauma expert Judith Herman (1992) describes trauma as

an affliction of the powerless. At the moment of trauma, the victim is rendered helpless by an overwhelming force. When the force is that of nature, we speak of disasters. When the force is that of other human beings, we speak of atrocities. Traumatic events overwhelm the ordinary systems of care that give people a sense of control, connection and meaning. (p. 33)

It is this sense of loss of control, loss of power, and being overwhelmed that can lead to trauma creating a maladaptive response.

In addition to overwhelming our sense of control and meaning, trauma affects us physically too. The typical stress survival response of fight, flight, or freeze is activated when we feel that we are in danger. Typically, when this system is activated, we make a choice to get ready to fight danger, flee from it, or freeze in order to avoid it. According to Emerson and Hopper (2011), this response is directed by the autonomic nervous system and the endocrine system which help our body to release hormones that aid in our survival; the autonomic nervous

system activates one of its two branches, the sympathetic nervous system, to signal release of adrenaline and norepinephrine by our adrenal glands, increasing respiration, heart rate, and blood pressure (p. 19). These chemicals help our body to get ready to do whatever it needs to do to avoid danger, whether that is to fight, flee or freeze. Emerson and Hopper (2011) detailed the adrenal response via the hypothalamus-pituitary-adrenaline (HPA) axis, stating “that it is initiated when the hypothalamus secretes corticotropin-releasing hormone (CRH), a hormone that prepares the body for action under conditions of a threat” (p. 19). The domino effect of CRH release is the release of adrenocorticotrophic hormone (ACTH) by the pituitary gland that in turn causes the cascade of other hormones, such as cortisol, into the bloodstream that attempt to help the body respond to stress.

This stress response is helpful when acute danger is present and has helped humans survive when their lives are threatened. A commonly utilized example of how the fight, flight, freeze response works is to imagine seeing a tiger running towards you and needing to escape. This example characterizes the acute, short-lived nature of this type of stressful situation and hopefully, in this day and age, this scenario is encountered less than in Neanderthal times, although one’s angry boss walking towards them might be a modern equivalent.

Trauma, although it elicits the same fight, flight, freeze response, differs in both the helplessness of the victim and resulting hyperarousal of the system in response to non-threatening stressors that are perceived as threatening. In short, trauma is characterized not only by not being able to engage in a flight or fight response but also by the strength of the outside force that prevents one from doing so thereby leaving its mark on both body and mind. Thus, depending on severity and/or repeated exposure, the experience of trauma can be overwhelming

enough to cause future symptoms of its telltale past including anxiety, depression, intrusive thoughts, numbing, hyper-arousal, and hyper-vigilance.

According to Herman (1992), hyperarousal is often the first symptom to emerge as it alerts to the possibility of incoming danger and results in “the traumatized person startl[ing] easily, react[ing] irritably to small provocations and sleep[ing] poorly” (p. 35). This speaks to the unexpected need to protect oneself and the alteration in the perception of a personal sense of safety. When trauma is severe, a sense of safety in the world can completely erode, and basic trustworthiness is challenged. “Traumatized people feel utterly abandoned, utterly alone, cast out of the human and divine systems of care and protection that sustain life” (Herman, 1992, p. 52). Trauma often leaves its survivors to be tossed around in a world full of sights, sounds and potential threats without the reliable tools necessary to protect themselves; the world becomes a series of cues of danger and trying to maintain safety.

While trauma has a distinct impact on survivors, by its very nature it also impacts those that they come in contact with, including friends, family, and providers, who become witness to their trauma through its retelling or through direct care. Trauma survivors might also struggle with shame in sharing their story, fearing that they will be blamed or ignored. Thus, it becomes vital to share as a way to heal and validate the survivor. Sometimes this re-telling can first occur if the survivor seeks care in a hospital or clinic to attend to any physical injuries, and it is here where HCPs can play the role of both witness and caregiver.

The role of witness holds true for healthcare providers as they attempt to provide containment, empathy, and compassion for their patient’s experience within the daily norms of their caregiving job, whether that is as a hands-on direct provider of physical care such as a doctor or nurse or as the direct provider of psychological care such as a social worker,

psychologist, or psychiatrist. This can result in providers experiencing symptoms similar to those of direct/primary trauma, such as depression, anxiety, hypervigilance, hyperarousal, and other sensorimotor symptoms (Ogden et al., 2006, p. 4).

It is the witness to repeated disaster that these providers face while they attempt to advance through their own diminished capacity to care for patients that is the hallmark of burnout and beginning of the more severe effects of secondary traumatic stress. Additionally, the experience of both burnout and STS will also likely activate any primary traumas that the provider themselves has experienced and further increase the sense of helplessness and lack of safety for both provider and patient.

Undoubtedly, those providers experiencing any level of burnout or secondary traumatic stress struggle with the toll that it takes on their personal and professional lives and seek to find ways of coping and reducing their daily stress so that they can better fulfill their professional role and enjoy their personal lives. Mindfulness has been studied (Cavanaugh et al. (2020), Decker et al. (2015)) for the role it can play in helping providers reduce burnout and the possible impact on secondary traumatic stress.

As previously discussed, mindfulness is most often identified by the definition provided by Kabat-Zinn (1990) as “paying attention in a particular way; on purpose, in the present moment, and non-judgmentally” (p. 14). While this definition might seem diffuse, by its very nature it encourages practitioners to bring greater attention to thoughts, feelings, body sensations, and automatic reactions in a wide variety of day-to-day situations. Mindfulness itself is a lens with which to view the world rather than a prescribed set of actions or tasks.

Research by Goodman & Schorling (2012) suggested that mindfulness can play a role in mitigating the effects of burnout and found that after an 8-week MBSR course all those who

received the intervention had decreased scores across all three dimensions of emotional exhaustion, depersonalization, and personal achievement (p. 123). In addition, their study was conducted with a range of HCPs including physicians, nurses, and social workers thereby validating this work within this specific population. Furthermore, their study found no differences in results between groups thus supporting the effectiveness across all groups of healthcare providers.

Goodman & Shorling (2012) bolstered their findings by using widely validated tools, such as the Maslach Burnout Inventory (MBI), in order to substantiate their results within the field. Their work speaks to the effectiveness of mindfulness within the healthcare field with HCPs who are suffering from burnout but lack to tools to effectively cope. This suggests that providers can use the tools of mindfulness to develop better coping habits thereby reducing burnout and engaging more effectively in their work and in their own personal lives.

Unfortunately, their work does not address the roots of secondary traumatic stress that stems from repeated exposure or the effectiveness of mindfulness in treating the more debilitating and ingrained effects of STS.

While mindfulness may play a positive role in preventing or blunting burnout, the question remains of whether or not it can have an impact on the more detrimental effects of secondary traumatic stress. A study by Decker et al. (2015) conducted on compassion fatigue in social workers may provide insight into this question. In their study, Decker et al. (2015) found

There was a moderate, positive correlation between compassion satisfaction and mindfulness,  $r=.46$ ,  $n=92$ ,  $p<.00$  with high levels of compassion satisfaction associated with higher levels of mindfulness. There was a strong, negative relationship between

compassion fatigue and mindfulness,  $r=-.53$ ,  $n=91$ ,  $p < .00$  with high levels of compassion fatigue associated with lower levels of mindfulness. (p. 36)

This indicates that a mindfulness practice may also be helpful in combating compassion fatigue and the effects of secondary traumatic stress.

Decker et al. (2015) also shed light on another interesting, and converse, experience of engaging in caregiving work: compassion satisfaction. They define compassion satisfaction as the opposite of compassion fatigue and conceive of it as the enjoyment of “filling up” of one’s resources rather than the draining of resources as a result of compassion fatigue. Here too, mindfulness plays a role and has been demonstrated to be correlated with higher levels of mindfulness. This work is suggestive that mindfulness not only helps to stop the drain of emotional resources but also helps the provider to fill their personal and professional reserves.

This might suggest that mindfulness is a natural fit for treating anyone who is struggling to cope with other mental health disorders, and in fact mindfulness has been developed into clinical mental health treatments, becoming the foundation of modalities such as Cognitive Behavioral Therapy (CBT) and Acceptance and Commitment Therapy (ACT). Both of these modalities are frequently used due to their widely accepted evidenced-based approach.

In their research on burnout and psychological flexibility, Ortiz-Fune et al. (2020) stated that

Contextual-behavioral interventions focusing on psychological flexibility—the primary target of Acceptance and Commitment Therapy (ACT; Hayes et al., 2009)—have promise for reducing burnout. Psychological flexibility (PF) refers to one’s ability to mindfully stay in contact with the present moment and act according to one’s values,



even when one is experiencing unpleasant thoughts, emotions, and bodily sensations. (p. 86)

The value in this approach for healthcare providers seems to be the ability for the provider to learn that by using the lens of ACT and mindfulness, the threat that seems overwhelming and continual becomes a more acute, manageable situation in which the provider regains a sense of autonomy and control.

Similarly, CBT is rooted in identifying maladaptive thinking and behavior and using mindfulness to change these patterns. The American Psychological Association (APA; 2017) states that

CBT is based on several core principles, including:

1. Psychological problems are based, in part, on faulty or unhelpful ways of thinking.
2. Psychological problems are based, in part, on learned patterns of unhelpful behavior.
3. People suffering from psychological problems can learn better ways of coping with them, thereby relieving their symptoms and becoming more effective in their lives.

(para. 3)

and details that treatment with CBT is comprised of engaging in mindful strategies to learn to “recognize one's distortions in thinking that are creating problems, and then to reevaluate them in light of reality ... Gaining a better understanding of the behavior and motivation of others” (APA, 2017, para. 4).

Both of these clinical treatments have been well documented to be effective in treating symptoms of anxiety, depression, and post-traumatic stress disorder, all of which are seen in the conditions of burnout and secondary traumatic stress. However, while there seems to be research on the impact of mindfulness on both burnout, secondary traumatic stress, and established

clinical treatments for both based in mindfulness practices, the vast majority of this research exists prior to the significant impact of COVID-19 which has created a global physical and mental health pandemic along with economic crisis.

While there is some preliminary research into the effect that COVID-19 has had on both the general population and HCPs, questions remain as to the true impact of COVID-19 on healthcare providers, their ability to cope, and if mindfulness may be effective in mitigating this severe increase in distress during and after this traumatic time.

### **Impact of COVID-19 Pandemic**

According to the Centers for Disease Control (CDC; 2020), COVID-19, also called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a highly contagious respiratory virus from the family called coronaviruses. Due to the rapidly spreading nature of COVID-19, there have been widespread public health measures put in place worldwide including social distancing, mask mandates, and public “lockdowns” requiring people to stay at home for an extended length of time. In its early days, COVID-19 very unexpectedly interrupted almost every facet of our daily lives.

The economic impact of COVID-19 has been widespread as restaurants, retail, and other businesses have had to close, either temporarily or permanently, or significantly limit the number of customers they serve. The byproduct of these measures has resulted in creating economic instability and significantly increased unemployment. The Congressional Research Service (CRS) cited that “The unemployment rate peaked at an unprecedented level, not seen since data collection started in 1948, in April 2020 (14.8%) before declining to a still elevated level in December (6.7%)” (Falk et al., 2021, Summary section). Furthermore, they stated that unemployment rates were higher for part-time workers, women, and minorities, and those

without a college degree. The hospitality sector was the hardest hit with an unemployment rate of over 30% according to CRS.

COVID-19 has generated an economic, physical, and psychological impact within the United States, and worldwide, that runs across a spectrum from people who are minimally affected to those suffering from catastrophic consequences. Suffering seems to be the hallmark of the COVID-19 pandemic, and healthcare providers seem poised to suffer some of the most detrimental vicarious psychological and physical effects due to their direct involvement in the healthcare system.

The overwhelming nature of the COVID-19 pandemic creates both physical and emotional effects as providers try to keep caring for their patients who might be sick with the virus, coping with another chronic illness that puts them in a high-risk category, or coping with the psychological toll of COVID-19 precautions, all while providers try to cope with the significant impact on their own personal lives and provide care within the fast-paced and overburdened healthcare setting. It seems evident that healthcare workers may have an increased risk of impacts from COVID-19 as a result of both the incidence of acquiring the virus themselves from patients during their daily work and coping with the impact of being a healthcare provider during a global pandemic. The nature of their role puts them at risk for both occupational and personal risk in a way that no other role group is tasked.

Research from Akat and Karatas (2020) supports that “healthcare staff can be regarded as the most psychologically affected occupational group in the COVID-19 pandemic” (p. 2), and the authors explained that this is likely because “they try to provide one-to-one assistance to patients exposed to the virus from this epidemic, see the deaths caused by the virus almost every day, and are more likely to be infected by virus” (p. 2).

These psychological effects in direct care providers are further confirmed in research by Magill et al. (2020) who stated that “health care workers who directly cared for patients with COVID-19 had higher rates of depression, insomnia, and distress” (p. 1260). These data are not surprising, as these providers are exposed to the direct trauma and impact of disease, distress, and death due to COVID-19 on a daily basis and then, with minimal time for rest, are pushed back to the front lines to do it all again the next day.

Even in healthcare providers who do not have direct contact with patients with COVID-19, distress is significantly elevated due to the increased stress in the environment and within their own patient population from COVID-19. Research from Morgantini et al. (2020) indicates that a study of 190 healthcare providers in Wuhan China demonstrated that “individuals working in their usual ward reported a higher frequency of burnout and fear of being infected” (p. 2). Simply working in a hospital, often the epicenter of COVID-19 efforts, appears to increase stress of providers providing care to other patient populations.

The rapid rise of COVID-19 and COVID-19-related deaths has clearly overwhelmed hospitals and other healthcare institutions to the detriment of a variety of healthcare workers directly or indirectly due to the increased exposure from the healthcare environment. While the effects of COVID-19 in the workplace seem more easily evident, the effects do not cease when providers complete their workday and return home to their families. In addition to the distress that HCPs feel when they are working, caring for patients, or otherwise engaged in their job, COVID-19 is a global pandemic and therefore is also likely to impact their personal and home life as well.

Some direct care providers might have elected to stay in hotels or other accommodations in order to reduce the risk of bringing COVID-19 home to their families, and while this seems

like an ethical choice, it also further increases isolation and decreases social support for these providers. Even those who do not work directly with COVID-19 patients but still work in healthcare settings have been mandated to work from home and conduct their patient-facing work remotely. These providers may face a loss of peer support and the benefit from working in a social environment. Furthermore, many of these providers, such as mental health providers, are still providing care to patients who may be coping with chronic disease or mental health issues and have heightened fear around COVID-19.

Isolation due to the recommended social interactions limitations may also play a role in increasing stress and decreasing well-being as HCPs lose the supportive environment of the workplace and their co-workers leading to loneliness. In research conducted by Bu et al. (2020), they cited that loneliness during the pandemic is “associated with higher levels of inflammation and impaired immune regulation (Cole et al., 2007; Hackett et al., 2012; Walker et al., 2019), which are in turn associated with chronic stress, depression and cardiovascular risk factors” (p. 2). Thus, loneliness as the result of the pandemic precautions may possibly increase the risk for contracting COVID-19 by decreasing protective health markers that are normally mitigated by social interactions and support.

Loneliness, independent of pandemic conditions, has been shown to be detrimental to both mental and physical health. Research has shown that “loneliness is a major public health concern as research has shown associations with heightened risk of mental illness, including depression, generalized anxiety, and suicidal ideation” and that it increases detrimental health behaviors “such as smoking, drinking, and over-eating” (Bu et al., 2020, p. 1).

Limited contact with family, friends, and even colleagues due to COVID-19 precautions, resulting in loneliness, increases distress during an already stressful time, further compounding

the psychological effects of the pandemic for providers. Bu et al. (2020) reported further concerning findings that state that research conducted in Spain suggests that “women are at a higher risk of experiencing loneliness during the pandemic, as are younger adults, and that higher contacts with relatives might be protective” (p. 2).

While limited to Bu et al.’s (2020) research, these facts are cause for concern since the United States Census reports that women comprise 76% of the healthcare workforce (Day & Christnacht, 2019). At times, these same women may also be in the role of caregiver to both parents and children, both of whom can further drain the physical and emotional resources that they have to give to others. It is also worth noting that loneliness, while correlated with isolation, can also be experienced when surrounded by friends and family if meaningful and satisfactory connection is not maintained. In what seems like the perfect storm, those impacted most by these types of roles—women—may inflict generational trauma upon the populations that are the most vulnerable in society—the elderly and children—by putting their own mental and physical health at risk as caregivers and healthcare providers. In the end, healthcare providers, regardless of gender, who are in dual roles of family caregivers and professional caregivers may suffer the traumatic and detrimental effects of the pandemic.

In a recent study by Khan et al. (2020) reviewing the effects of prior pandemics and incidents of post-traumatic stress disorder (PTSD), they stated that “in multiple studies post-traumatic stress disorder, exhaustion and depression has [*sic*] been shown in health care workers due to disease outbreaks that have overwhelmed health care systems” (p. S585). Even more detrimental than the current psychological effects of COVID-19 are the long-lasting effects shown in prior pandemics. Paredes et al. (2021) explored the role of psychological health in prior pandemics and disasters and found that “previous research on significant outbreaks (e.g.,

pandemics, natural disasters, terrorist attacks) has demonstrated that the psychological effects remain years after the incident” (p. 2). This lends credibility to the assertion that COVID-19 is itself a trauma and that effects may last for years to come.

Further supporting the view that COVID-19 is indeed a type of trauma is the fact that the pandemic, separate from the actual virus itself, results in necessary precautions and high levels of emergency care which for HCPs assaults the sense of personal, professional, and community safety. The very nature of the pandemic floods the sensory systems with overwhelming cues of danger and disconnects us from the social connections that typically provide support during challenging times. According to the American Psychiatric Association (2020), PTSD is “a psychiatric disorder that may occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist act, war/combat, or rape or who have been threatened with death, sexual violence or serious injury” (para. 1).

Typically, symptoms associated with PTSD fall into four categories: intrusion, avoidance, changes to mood/thought process, and changes in arousal and may be accompanied by other physical symptoms and range in severity. Research previously discussed has already reported that HCPs suffer from anxiety, depression, the effects of isolation and insomnia as a result of COVID-19. For those who have witnessed repeated death as part of their work, they may experience, or will experience in the future, flashbacks, or other intrusive thoughts as they seek to process what they have witnessed. Exhausted, isolated, and depleted, healthcare providers might seem to be at the mercy of COVID-19 and the negative health and behavioral effects that it extracts, yet again early research on the impact of mindfulness shows promise on ways to mitigate these effects. New research shows that development of external support from healthcare institutions may mitigate distress and help with burnout, but it is the development of

internal resilience that provides relief for compassion fatigue. Thus, the role of resilience is at the forefront of developing strategies to address secondary traumatic stress.

Research on resilience can be found in the work of Paredes et al. (2021) in their study on mental well-being during COVID-19. Paredes et al. (2021) found that “individuals with higher levels of resilience were less susceptible to the harmful effects of the perceived threat of COVID-19 on subjective mental well-being through the activation of future anxiety” (p. 4). This finding suggests that resilience can be developed beyond a state of being and into a trait of being and that it is this trait resilience that can be most effective in coping with the impacts of COVID-19. Paredes et al. (2021) go on to state that “individuals with higher levels of resilience reported lower levels of future anxiety and, in turn, lower effects on subjective mental well-being, experiencing greater success in coping with the emotional distress provoked by the pandemic” (p. 4).

While this study was not conducted with healthcare providers, it speaks to the role of resilience in creating mental well-being and offers a link to creating resilience through mindfulness. Additionally, results from Paredes et al. (2021) addressed individuals with and without pre-existing mental health disorders and define well-being as the ability to “cope with the traditional stress of life” (p. 1). It might be inferred that healthcare providers, despite being vulnerable to burnout and STS, who felt that they were coping well would reflect the benefits of this study as they would likely be equivalent with the general population surveyed.

Developing both state and trait resilience appears to be important, allowing providers to engage in moment-to-moment mindfulness (state) and attitudinal mindfulness (trait) in order to reap the mental health benefits. This is supported by the work of Paredes et al. (2021) who stated that



the literature has identified different strategies to strengthen individual resilience. For instance, there is evidence that mindfulness as a trait—the disposition to pay attention to the present moment—, positively links with resilience (Garland et al., 2011; Zarotti et al., 2020). This mindfulness trait can be increased through mindfulness-based interventions [state], leading to mental health benefits. (p. 4)

Thus, even healthcare providers who pre-pandemic had a sense of well-being might already have developed good trait resilience regardless of mindfulness intervention, but they likely would benefit from mindfulness interventions given the increased stress and their predisposition to resilient behavior patterns.

Other research has demonstrated effectiveness impacting secondary traumatic stress prior to the COVID-19 pandemic and suggests that resilience, as a trait achieved through the practice of mindfulness, may be effective in creating a state of resilience that reduces the increased compassion fatigue that some providers face. One key factor in creating resilience appears to be the ability to engage in self-regulation. In his work on trauma sensitive mindfulness, David Treleaven (2018) discussed the role of self-regulation and the “ability for us to monitor and control our own behavior, emotions, or thoughts” (p. 31) as key in treating trauma which has often disrupted this regulatory process.

Treleaven (2018) stated that “mindfulness has been proposed to support self-regulation in three particular ways: the regulation of attention, body awareness, and emotional regulation” (p. 31). It appears that this trimodal approach addresses the impacts of trauma on the body, mind, and emotions while engaging the patient as an active participant, thereby creating a sense of greater control. This sense of control can be a key element for those with a trauma history or who may have been exposed to trauma as the result of COVID-19. Providing a concrete pathway or

framework allows mindfulness participants to grasp the levels on which they have been affected while simultaneously providing a containing experience. However, trauma is often an experience of duality, the experience of the present moment and the reaction to these events with past emotional responses, and Treleaven addressed this with his theory of dual awareness.

One of the elements of engaging in trauma-sensitive mindfulness is the strengthening of what Treleaven (2018) called *dual awareness*, a bifurcation of two parts of the self: the experiencing self and observing self. He stated that “mindfulness strengthens the observing self, and by extension, one’s capacity for dual awareness. With practice survivors can learn to witness their experience without becoming identified with it” (Treleaven, 2018, p. 38). The practice of dual awareness within the trimodal approach provides a safe container for mindfulness practitioners to experience the present moment and monitor for past reactions and triggers that may arise within the self-regulatory process, and it allows the participant to observe adverse thoughts, feelings, and sensations without re-experiencing them.

Research presented here lends credibility to the assertion that mindfulness can be effective in even the most traumatic and stressful situations and that it offers benefit during the COVID-19 crisis. Nonetheless, questions remain about the how the average person might integrate mindfulness into their daily life and if there are certain types of mindfulness that may be effective and the reasons why these may be appropriate interventions.

### **Mindfulness Interventions**

Research reviewed suggests there are three primary categories where mindfulness practices seem to provide benefit: nutrition/eating, movement, and contemplative/meditation practices. There is additional research, although not as robust, that sleep hygiene can also be part of a mindfulness practice and help to ameliorate stress. Throughout the literature reviewed, it is

noted that these practices appear to be separated into two reasons for effectiveness: increased interoceptive awareness and the physiological effect of the practice. This paper will seek to explore each of these aspects within the three primary categories of mindfulness previously outlined.

To begin, it may be helpful to define interoceptive awareness as it is not a widely used term outside of certain fields of study. Interoceptive awareness can generally be defined as a person's ability to sense the internal state of the body, such as the cardiovascular, respiratory, and digestive systems, with an increased awareness of how they are functioning. Detecting these interoceptive changes may lead to increased awareness around our cognitive perceptions, exteroceptive (outside) cues, and related emotional states. For example, in a stressful situation such as a job interview, one might notice that their breath rate has increased, that the inhale is longer than the exhale, that there is a tightness in the chest and stomach, and that the strange environment that you are in is hectic, busy, and not very friendly. From this stance, one's awareness of their breath might lead to altering their breathing pattern; one may reassess the outside situation and see that it is very similar to their own work environment so that it does not feel so strange or may correlate the tightness in their stomach with hunger rather than fear. Interoception is, in and of itself, a practice of mindfulness and can be the gateway to making more mindful choices in our daily lives. From these mindful choices springs the physiological effects of mindfulness practice that are often evident in the current research. One burgeoning area of research centers around mindful eating and the new branch of psychiatry called nutritional psychiatry.

### **Mindful Nutrition**

Healthy nutrition is one approach to cultivating physical and psychological well-being and offers a unique opportunity to practice mindfulness in a required activity of daily life. Food is needed for survival and making better food choices may provide positive benefits to both our body and mind. If “you are what you eat,” perhaps taking time to consider not only what but how we eat can benefit us greatly.

Mindful eating is often defined as the awareness of the process of eating, yet this definition seems too simplistic in its attempt to capture the multi-faceted experience of how and why humans eat. Perhaps a better definition is provided by Román and Urbán (2019) in their statement that mindful eating is the

recognition of internal and external cues of hunger and satiety that have an impact on food choices and portion sizes; focusing attention and awareness on the process of eating including the taste, smell, texture, and sight of the meal; slowing the rate of eating; encouraging a non-judgmental acceptance of food, its environment, and one's physical and emotional reactions to them; minimizing distractions while eating; and being aware of the consequences of mindless eating. (p. 2111)

This definition by Román and Urbán more aptly captures the sensory, emotional, environmental, yet still physical task of our daily consumption.

There is no doubt that we use food for many purposes other than nutrition; we use food to celebrate important moments in our lives and holidays, to create pleasure and create shared experiences with others, and to cope with stress and difficult emotions. Culturally, we have appropriated a name for the latter: stress eating. Research by Hsu and Forestell (2021) highlights these differences between eating for hunger or eating for pleasure. They stated that “although maintaining a balance between physical needs for food and the psychological value of food is

tricky, this process often occurs without interoceptive awareness, which can lead to overeating” (Hsu & Forestell, 2021, p. 1). It is this area where mindful eating may be of the most immediate and observable benefit. The process of slowing down and increasing awareness while eating not only gives the digestive system a chance to catch up and register satiety but also provides the opportunity to increase interoceptive awareness while also engaging the senses to truly enjoy your meal.

Research by Denkova et al. (2019) reinforces that mindfulness increases interoceptive awareness and self-regulation and therefore can play a role in preventing overeating, and additional research by Román and Urbán (2019) supports this link between self-regulation and mindfulness being “inversely [associated] with uncontrolled eating and emotional eating” (p. 2118). Román and Urbán (2019) further stated that “mindful eating interventions were shown to be effective in treating emotional eating, with medium to large effect sizes” (p. 2111). Not only does the increased self-regulation from increased interoceptive awareness enhance the sensory experience of eating, but it seems that it also allows one to be emotionally and physically present for the meal, thereby redirecting the emotional need use food as a coping tool.

As adults, we are the sole responsible party for the nutritional choices we make. It is only in the phases of infancy and childhood that we rely on someone else to make our nutritional choices. Making more mindful choices by developing greater awareness around how we nourish ourselves seems to increase interoceptive skills, provide the benefits of reduced stress, and provide benefits of healthier nutritional choices. Mindful choices around healthier foods not only impact our body, but new research in the field of nutritional psychiatry states that it can also impact our mood and improve our mental health.

### *Nutritional Psychiatry*

Beyond the capacity for mindfulness to increase introspection around nutritional intake, the field of nutritional psychology posits that diet plays an integral role in mental health. It uses “findings from research, combined with innovative education, to increase awareness of the psychological, behavioral, cognitive, perceptual, interoceptive, and psychosocial aspects of diet and nutrient intake related to mental health” (Center for Nutritional Psychology, 2020, Building Conceptualization section). Using this lens, it would appear that the practice of mindfulness is not only about the process of eating and the potential for increased awareness around food choices, but it is also the choice of particular foods that may provide positive benefit for our mental health thereby providing an additional layer of resilience during times of added stress.

One good place to start is our gut; our gut is the place where food begins its transformation to deliver nutrients to our cells and organs:

Within the human gastrointestinal microbiota exists a complex ecosystem of approximately 300 to 500 bacterial species, comprising nearly 2 million genes (the microbiome). Indeed, the number of bacteria within the gut is approximately 10 times that of all of the cells in the human body, and the collective bacterial genome is vastly greater than the human genome. (Quigley, 2013, p. 561)

While it is often overlooked beyond its capacity to break down what we eat, the world of the gut appears to play an integral role in many different functions.

Research by Marx et al. (2017) highlights the role and importance of the microbiome and its contribution to our mood by stating that there is

compelling evidence, predominantly from animal studies, indicates the gut microbiota can affect mental health-related behaviors via multiple pathways. The gastrointestinal microbiota has been implicated in several neurobiological pathways related to mental

illness, including the modulation of BDNF, serotonin neurotransmission, immune function, and the hypothalamic-pituitary-adrenal axis-mediated stress response. (p. 429)

This research makes it evident that the role of gut health impacts many other aspects of our health and that the gut is more than just a simple system that breaks down nutrients. Naidoo (2019) indicated that roughly “90% of serotonin receptors are located in the gut” (p. 11A). Serotonin is widely known to be one of the key neurotransmitters that influences our mood and is often the key target in anti-depressant drugs. Naidoo suggested that food may be just as impactful as medications in regulating mood and also result in fewer side effects.

The gut–brain axis, driven by the vagus nerve (VN), appears to play a key role not only in how we process stress but also how the food choices we make can contribute to increasing or decreasing our stress and mood. Gerritsen and Band (2018) stated that the “VN afferents reach the medulla from the heart, airways, liver and gastrointestinal track. It monitors cardiorespiratory, endocrinal and immune parameters” and that “VN afferents on the adrenal glands relay information on the release of stress hormones, such as epinephrine and the glucocorticoids” (p. 6). The vagus nerve, the longest cranial nerve in the body, acts as the link between the nerves in our brain and the nerve in our gut and mediates our central nervous system.

Two other physiological processes—oxidative stress and neurogenesis—also appear to be impacted by our nutritional choices and linked to mental health. “Oxidative and nitrosative stress are implicated in several chronic diseases and appear to be relevant to mental illness” (Marx et al., 2017, 428). Marx et al. (2017) aligned increased oxidative stress with increased depression and lower levels of antioxidants. They stated that “given the abundance of antioxidant

compounds present in foods such as fruit and vegetables, this is a pathway that could be modulated through dietary means” (Marx et al., 2017, p. 428).

Similarly, neurogenesis, the process by which new neurons are formed in the brain, also appears to have preliminary evidence of the food–mood connection with better food choices, such as fruits, vegetables, fish, and whole grains, improving the growth and sustainability of hippocampal neurons, the area responsible for emotion, memory, and learning. Brain derived neurotrophic factor (BDNF), known as “Miracle-Gro” for the brain, plays a role in hippocampal neurogenesis and may be impacted by improved diet. Marx et al. (2017) noted that “there is presently limited clinical investigation of the effect of diet on this pathway; however, preliminary evidence supports the role of diet in improving BDNF levels” (p. 428). Thus, it may be possible that it is not only that “you are what you eat,” but that if you eat better, you may be smarter, more emotionally balanced, and more cognitively flexible.

It seems plausible given the research presented that our choice of diet can create marked impact on multiple chemical reactions in our body that play a role in mediating our physical health, mental health, and stress levels. In times of stress, such as COVID-19, it might be suggested that the practice of mindful nutrition, both in the practice of eating and in the food choices we make, would both provide benefit in interoceptive awareness and improve the protective factors against stress, anxiety, depression, and immune dysfunction.

### **Mindful Movement**

Moving is part of living, and regardless of physical ability, most of us move in some way each day. Exercise has long been touted as a way to “blow off steam” or “keep in shape” or “keep us sane,” but movement encompasses more than just exercise. While research has previously demonstrated the benefits of regular movement and exercise as a way to boost mood



and reduce stress, the term mindful movement has typically been associated with traditional Buddhist practices like yoga, qi gong, or tai chi and is regarded as the moving equivalent of sitting meditation or yet another gateway into an “inquiry into self” (Emerson & Hopper, 2011, p. 26). Yet, mindful movement can encompass a wide range of contemplative activities that include walking, stretching, or dance.

Yoga is the most recognizable of the mindful movement practices, and in the United States it has become widely popularized. Despite differences in style, the link between mindfulness and yoga often is characterized by its focus on breath and awareness of bodily sensations. Research done by West et al. (2017) revealed that “body-based intervention[s] like hatha yoga may be most fruitful due to the emphasis on present moment awareness along with a direct focus on using the body to build interoceptive awareness” (p. 175). Yet building awareness is not solely limited to practices like yoga and can be developed by other body-based interventions. Greater interoceptive awareness and improved interoceptive accuracy can build the tools needed to assess stress in daily life and cope more effectively with exteroceptive stressors.

However, there are other benefits of mindful movement that include boosting mood and increasing cognitive function in the brain. Research by Ratey (2008) found that when we move or exercise, “particularly if [it] requires complex motor movement, we’re also exercising areas of the brain involved in the full suite of cognitive functions” (p. 41). Ratey (2008) stated that it “provides distraction. ... reduces muscle tension. ... builds brain resources. ... teaches a different outcome. ... re-routes your circuits. ... [and] improves resilience” (pp. 107–108). Ratey’s research speaks to the neuroplastic benefit of mindfulness to disrupt our conditioned patterns and help the brain engage in a more flexible thought process.

In addition to improving cognitive function, any sustained movement-based activity or exercise increases several neurotransmitters in the brain that are responsible for improving mood and well-being, such as serotonin and dopamine, effects that might prove beneficial during the stress of the COVID-19 pandemic.

Ratey (2008) discussed the specific impact of movement on anxiety and the fact that anxiety naturally activates the hypothalamic pituitary adrenal (HPA) axis. Typically, this happens as a natural response to an external stressor, such as being chased by a tiger or faced with a threat, but Ratey hypothesized that regular movement-based activity primes the body to learn that the physiological signals of anxiety, such as increased heart rate and respiration, do not always correlate to imminent threat. Engaging in regular movement-based activity allows us to more accurately assess threats in real time and rely on our interoceptive awareness to determine if the threat is real or simply a maladaptive reaction that has been stored from a past experience.

Ratey (2008) also stated that “moving the body also triggers the release of gammaamino-butyric acid (GABA), which is the brain’s major inhibitory neurotransmitter (and the primary target for most of our antianxiety medications)” (p. 92), thus providing a natural chemical response to reduce anxiety. Movement-based activities help the body to cope more naturally with stressors and to dispel any of the physical energy that inhabits the body during times of anxiety.

Regular mindful movement activities provides an opportunity to consistently increase the chemicals in the brain that protect us from stress, depression, and anxiety. These effects would appear to be critical for healthcare providers during the increased stress of COVID-19. While isolation due to lockdown has certainly curtailed many of our normal day-to-day activities, recent research from Ding et al. (2020) showed that “despite challenges to an active lifestyle, the COVID-19 lockdown may have led to increases in ... physical activity” (p. 1183). This

phenomenon is likely due to the attempt to engage some form of in acceptable activity outside the house and need for even limited socially distant human contact. If this holds true, then it would appear that mood should be reported to be increased as opposed to pre-pandemic times.

Further research from Brand et al. (2020) showed that “those who exercised almost every day during this pandemic had the best mood” and that conversely “those who reduced their exercise frequency during the pandemic reported worse mood” (p. 1), thus compounding the findings from Ding et al. (2020).

These results offer a valuable addition to the suite of tools to reduce distress in healthcare providers by virtue of the ability for exercise to improve cognitive function, reduce stress, increase neurotransmitters that improve mood, and utilize breathwork in a different way in order to activate the parasympathetic nervous system (PNS) and engage the relaxation response. Additionally, and similarly to mindful eating, mindful movement in any form can be easily integrated into the hectic lives of busy healthcare providers in as little as 15-30 minutes per day.

### **Mindful Meditation**

Returning to the definition of mindfulness provided by Kabat-Zinn (1990) as “paying attention in a particular way; on purpose, in the present moment, and non-judgmentally” (p. 4) highlights two of the main tenants of mindfulness: present moment awareness and non-judgement. In thinking about present moment awareness as a relationship both within ourselves and with the outside world, it might be helpful to contextualize it as the process of moving away from the automatic thoughts and behaviors that over time we have been conditioned into and moving towards a more regulated evaluation of what is happening with our body, mind, and senses.

Contemplative practices, such as seated meditation, provide an opportunity to engage in the process of watching our thought patterns while also providing the opportunity to distance ourselves from them. It also offers a dedicated opportunity to increase our interoceptive awareness and present moment awareness by focusing on breathwork and the sensations of breath as it moves through the body.

One gateway to engaging in present moment awareness seems to be found in the process of monitoring one's breath. Breath awareness practices have been found to stabilize attention and also to engage in a deep neurobiological response that can either send us into a state of arousal or calm our nerves (Siegel, 2018). "The act of controlling the breath has a parallel brain response of calming our instincts for fear and danger" (Ratey & Manning, 2014, p. 224). Breathwork also has the added benefit of being available at any point in the day and can be used during both stressful and less stressful moments.

Research by Ratey & Manning (2014) suggests that breath is directly connected to the vagus nerve that, as previously discussed, runs from the medulla oblongata, the part of our brain responsible for controlling our heart, lungs, and digestive tract, all the way to the colon and that it plays a key role in regulating our autonomic nervous system—divided into the sympathetic nervous system (SNS) and parasympathetic nervous system (PNS)—also known to control the "fight, flight, or freeze" response (p. 223). Breathwork literally connects us to our automatic responses that begin in the brain and resonate throughout our body.

Additional research from Gerritsen and Band (2018) shed light on the importance of these two functions of the autonomic nervous system:

The SNS is responsible for the fight/flight mode of organisms. It raises heart rate, blood pressure and indirectly respiration rate. It dampens currently irrelevant homeostatic

processes but stimulates immediate availability of energy. The PNS acts as an opposing force. It is the rest/digest system of the organism. It lowers heart rate, respiration rate and increases digestion. The VN is the main effector and effector of the PNS. (p. 6)

They went on to state that “Slow breathing techniques with long exhalation will signal a state of relaxation by VN, resulting in more VN activity and further relaxation” (Gerritsen & Band, 2018, p. 7). This suggests that the breath work common in mindfulness practice not only helps practitioners to slow down enough to redirect and focus their awareness on the present moment, but it also can have a profound effect in regulating our body’s response to stress, thus confirming that it is not only a psychological perception of relaxation but a physical shift towards downregulating the stress response.

In thinking about the stress experienced by healthcare professionals during the COVID-19 pandemic, it would seem possible that stress is the result of an activated SNS, as is common in most stress responses, and that the practice of mindfulness directly combats the SNS response associated with the stress created by the pandemic by activating the PNS. Furthermore, the research presented is suggestive that resilience is created by repeatedly dampening the SNS response and activating the PNS response, thus allowing for greater present moment awareness and increased cognitive function in stressful situations. Regular practice of mindfulness would seem to not only “teach” the PNS to engage but also help to develop trait resilience.

### ***Creating Resilience***

Developing resilience provides some protective factors against stress and these findings that are confirmed in research by Denkova et al. (2019) who sought to measure if resilience is trainable in high stress environments, like those experienced by firefighters. Their study focused on four themes related to resilience: concentration (executive function), body awareness, open

monitoring (present moment awareness), and connection (team cohesion/kindness) and found a strong correlation between these themes of resilience and mindfulness practice.

Additional research also found that “resilience is considered a key protective factor against the development of debilitating mental health conditions in firefighters and other first responders” and that mindfulness training “may be a promising tool to bolster resilience” (Denkova et al., 2019, p. 5). Jha et al. (2017) found that this might be due to the emphasis on paying attention to the body and the exploration of “interoceptive awareness by cultivating attentional control and tolerance of challenging experiences, both external (e.g., harsh environmental conditions) and internal (e.g., distressing thoughts, physical pain, intense emotions)” (p. 49).

Resilience from the ability to tolerate high levels of stress, termed *distress tolerance*, also seems to be correlated with better workplace function and also improved mood regulation. Research by Liu et al. (2020) stated that distress tolerance, defined as “one's ability to manage and tolerate emotional distress [is] strongly associated [with] low levels of depressive and anxiety, and PTSD symptoms” (p. 5). This would seem to be an important finding given that research discussed previously shows that the effects of PTSD from other pandemics and disasters last well into the future.

With this in mind, it might seem that seated meditation is the key to a less stressful life and that everyone should be engaging in some form of meditation. However, there are some potential contraindications to seated meditation practice that might be relevant to healthcare providers, especially those who have experienced trauma due to their work during the COVID-19 pandemic. In his work on trauma-sensitive mindfulness, David Treleaven (2018) discussed that for people with a trauma history or recent traumatic exposure, “mindfulness meditation can

exacerbate symptoms of traumatic stress ... includ[ing] flashbacks, heightened emotional arousal, and dissociation” (p. xvi).

Treleaven (2018) offered ways that practitioners can address the role of four key aspects of trauma—attention, arousal, relationship, and dissociation—while also calling attention to our social context to create a trauma-informed mindfulness meditation practice. While this type of reaction will not occur with all practitioners who have experienced trauma, it is of particular concern in recommending this form of mindfulness to healthcare providers who are frontline workers during the COVID-19 pandemic.

The benefit of mindfulness in high stress occupations, such as healthcare providers, seems to be based in both the development of attunement to present moment awareness, the physiologic effect of downregulation of the SNS and activation of the PNS, and the increase in interoceptive awareness. All of these interventions discussed are active tasks that can be recruited by the practitioner to help reduce stress, increase resilience, and develop more mindful lifestyle habits. Yet, one important opportunity for mindfulness happens when the day is done: sleep.

### **Mindful Rest**

Sleep, like food, is an essential part of life, and good quality sleep is important for maintaining well-being. While sleep might not be the first thing that comes to mind when thinking of mindfulness, it plays a critical role in our physiologic, emotional, and cognitive functioning that can help to lay the foundation for a mindfulness practice. A recent study by Simione et al. (2020) found that mindfulness “was negatively correlated with stress and sleep disturbance scales, while it was positively correlated with well-being scales. Stress scales positively correlated with sleep disturbance scales and negatively correlated with well-being

scales” (p. 433). Thus, if one loses out on sleep, one gains or maintains stress and vice versa. Sleep improves our well-being and ability to handle daily stress.

Their work also demonstrated the important role that stress plays and stated that “the model showed that the positive relationships that mindfulness has with both sleep quality and well-being fully depend on the mediational role of stress” (Simione et al., 2020, p. 446). Simone et al. (2020) reinforced the feedback loop that is created by stress and sleep whereby stress induces poor sleep which then further creates additional stress.

Additional research by Lee et al. (2021) further suggested that there is a bidirectional correlation between sleep and mindfulness, and they stated, “that poorer sleep may be associated with lower mindfulness and vice versa due to negative cognitive and metacognitive processes (e.g., rumination, arousal, worry)” (p. 105). They went on to state that “mindfulness allows for more observant and accepting approaches to cope with bedtime worries and hyperarousal, which are associated with suboptimal sleep at night. However, the inverse is also plausible because insufficient sleep may degrade individuals’ ability to be mindful” (Lee et al., 2021, p. 105). Lee et al. again highlighted the cyclical nature of lack of sleep and how one night of poor sleep can bleed into the next day and continue this maladaptive pattern.

Awareness around creating good sleep hygiene appears to play an important role in sleep quality and the ability to engage in mindfulness practices on a daily basis. Beyond the awareness of the importance of sufficient sleep, there appear to be significant physiological effects of sleep that may also link to similar effects from meditation and mindfulness. In line with the research by Simione et al. (2020), the physiological effects of sleep appear to be greatly mediated by presence or absence of stress. Research conducted by Zhang et al. (2020) on college students



concluded that functional connectivity in several brain networks is directly linked to sleep but also found again that stress played a key role on sleep.

Their research explores the relationship between psychological stress and emotion regulation as well the perceptual and cognitive biases that result from poor quality sleep.

According to the cognitive model of insomnia, uncontrollable worries about stress events trigger emotional arousal before going to sleep, which further leads to cognitive biases of events, so that people make distorted cognitive evaluations of stress events and subjective sleep quality declines (Harvey, 2002). According to this model, people under psychological stress are more likely to have perceptual bias and triggered negative emotion, leading to serious decline in sleep quality. ... [and] that psychological stress can affect sleep quality through the brain functional connectivity between the SM [sensory-motor] and CO [cingulo-opercular] networks among the college students. (Zhang et al., 2020, pp. 2, 6).

Additional research shows that it is not only functional connectivity that is impacted but that stress hormones also play a role. Lack of sleep has been shown to produce “an elevation of evening cortisol (the main stress hormone) and an increase of a measure of sympathetic nervous system activation (another index of physiological stress response),” and further research showed that “acute partial or total sleep deprivation leads to elevated evening cortisol, which was interpreted as a detrimental alteration in regulatory mechanisms of the stress response” (Simione et al., 2020, p. 448). Thus, lack of sleep impacts us not only emotionally, but mentally and physiologically as well.

It has been discussed that COVID-19 has been documented to increase stress levels in healthcare providers as well as increasing levels of anxiety and depression. It might be concluded

that this added stress and anxiety may be a major contributing factor to any sleep disturbances that they experience. Furthermore, the negative feedback loop of the stress–sleep cycle predisposes HCP’s to a reduced ability to perform daily functions as a result of the prior nights poor sleep due to increased rumination, worry, thereby leading them to experience disruptions to their cognitive abilities and emotional rationality as the stress-sleep cycle persists. Increased education around sleep hygiene in combination with increased interoceptive awareness of bodily needs may provide a path to combat the negative physical effects of both stress and poor sleep.

### **Discussion**

The popularity of mindfulness has pushed it into the mainstream as a way to alleviate suffering and develop a sense of calm and peace. The elements of mindfulness are rooted in the history and evolution of Buddhism and have been demonstrated to be effective by recent scientific studies. It appears from a review of current literature that mindfulness may play an integral role in providing tools for healthcare providers to combat burnout and compassion fatigue experienced as a result of the COVID-19 pandemic.

Research from Akat and Karatas (2020) demonstrated the detrimental effects of COVID-19 on the physical and emotional life of healthcare workers. As healthcare providers are already subject to and experiencing burnout and compassion fatigue, it seems likely that additional stress of COVID-19 may prove to greatly increase the rate of burnout and compassion fatigue on the healthcare system in the future if it is not attended to.

Research reviewed for this study demonstrates that the hyperarousal created by the increased stress, repeated exposure to the trauma of caring for patients, and significant expenditure of empathy/caring during the COVID-19 pandemic results in over-activation of the sympathetic nervous system (SNS), the primary system involved in our fight/flight/freeze

response and commonly activated in trauma patients. This hyperarousal appears to be accompanied by other symptoms of post-traumatic stress disorder (PTSD), such as anxiety, depression, insomnia, and other sensory motor symptoms, thereby creating a feedback loop negatively associated with coping.

However, the research presented on mindfulness, in particular the role of breath work, suggests that it can play a significant role in contributing to or attaining regulation of the autonomic nervous system via activation of our primary relaxation system, the parasympathetic nervous system or PNS. Research by Treleaven (2018) demonstrates the effectiveness of utilizing mindfulness with trauma patients but also reinforces that care must be taken to engage in true trauma-sensitive mindfulness practices as patients may have negative effects if not being guided by an experienced practitioner.

Research into the different types of mindfulness interventions provided a broad base from which HCPs can integrate mindfulness in incremental and yet meaningful ways. Research by Marx et al. (2017) into the areas of mindful nutrition, in particular nutritional psychology, revealed the biological impact of food we eat and how closely tied our digestive system is to our neurobiology via the vagus nerve, which again is also tied to our SNS. Additional research by Naidoo (2019) also suggests a link between increases in serotonin in the gut influencing serotonin in the brain and the ability to boost our mood with our food.

Neurotransmitter increases are also demonstrated in research done by Ratey and Manning (2014) who found that movement contributes to neuroplasticity and improved mood. Research seems to suggest that mindfulness plays a key role in developing and maintaining resilience and that this provides a protective factor in shielding providers from the effects of stress due to COVID-19.

Finally, the role of sleep as an aspect of mindfulness reveals the physical effects of poor sleep seen in HCPs during COVID-19 and links these effects to increases in stress hormones, such as cortisol, often observed in trauma survivors. Overall, multiple forms of mindfulness appear to be a good fit to address the psychological, cognitive, and physical issues created by COVID-19 and offer promise in addressing the possible traumatic effects of the pandemic over both short and long-term time frames.

Research in this study highlights the significant stress that these individuals have endured during COVID-19 and aligns them with the experience of both primary and secondary trauma. Furthermore, it highlights and supports the use of mindfulness in healthcare providers during the COVID-19 pandemic in order to reduce burnout, improve coping and resilience, and play a role in reducing the likelihood and severity of secondary traumatic stress.

Interventions discussed in the areas of nutrition, movement, and sleep are more easily adopted lifestyle changes that can create significant impact with minimal effort; however, meditation should be approached with caution for those with a pre-existing trauma history or those who demonstrate high level of trauma from COVID-19 exposure.

### **Limitations**

The limitations in the work reviewed here are mainly comprised of the recent nature of the work on COVID-19 and the lack of long-term effects of COVID-19 as the pandemic has not concluded. Limitations on mindfulness during the COVID-19 pandemic include lack of pre-pandemic study to determine baseline mental health and stress measures. Additional limitations include small sample size in many of the studies, again due to COVID-19, and length of follow up for studies that involve COVID-19. Diversity was also a limitation encountered in both studies involving COVID-19 and mindfulness and speaks to the disparity of the healthcare

system worldwide. Those who were recruited for many of the studies had the time and means to do so, which may represent a narrower economic section of the population. Additionally, access to institutions conducting the studies may have resulted in a more educated study population based sheerly on the locations of the study (often in a hospital or university) and the exposure of the study advertising to potential participants given that most of this research was conducted during times of lockdown.

Limitations on mindfulness research or research for mindfulness interventions include comparatively limited studies in the field, despite recognition in popular culture and individual fields such as neuroscience, and psychology. Mindfulness is a newer area of research and has been slow to catch on in the world of academic study despite significant work by pioneers in the field such as Jon Kabat-Zinn, Joseph Goldstein, and Daniel Siegel.

### **Future Research**

Ideally, future research should address long term physical, emotional, and psychological effects of COVID-19 as well as address the potential widespread nature of trauma due to COVID-19. Future research might also include the impact of the COVID-19 vaccine on mental health, feelings of safety in transitioning or returning to normal life, and how trauma might persist despite vaccination. Additional research should also seek to use a more diverse lens for participant recruitment and may also direct focus towards how providers with pre-existing mental health disorders have fared during the isolation of lockdown, both the stress of being a healthcare provider coping with their own mental health issues and how these aspects affect their transition towards a more pre-COVID-19 lifestyle. Of particular interest will be the evolution of COVID-19 research in regard to mental health as we move further and further away from living in active crisis mode.

### **Conclusion**

Research reviewed for this paper suggests that mindfulness can be an effective tool for coping with general stress and the effects of burnout and secondary stress experienced by healthcare providers. It further suggests that these findings are relevant during the COVID-19 pandemic and that the practice of mindfulness is associated with increased resilience and improved coping during these extraordinary times. Research demonstrates the neurobiological and neuroplastic effects of mindfulness across a broad spectrum of mindfulness interventions ranging from nutrition and movement to more standardized meditation and sleep practices.

### References

- Akat, M., & Karataş, K. (2020). Psychological effects of COVID-19 pandemic on society and its reflections on education. *Turkish Studies, 15*(4), 1–13.  
<https://doi.org/10.7827/TurkishStudies.44336>
- American Psychiatric Association. (2020, August). *What is posttraumatic stress disorder?*  
<https://www.psychiatry.org/patients-families/ptsd/what-is-ptsd>
- American Psychological Association. (2017, July). *What is cognitive behavioral therapy?*  
<https://www.apa.org/ptsd-guideline/patients-and-families/cognitive-behavioral>
- Brand, R., Timme, S., & Nosrat, S. (2020). When pandemic hits: Exercise frequency and subjective well-being during COVID-19 pandemic. *Frontiers in Psychology, 11*, Article 570567. <https://doi.org/10.3389/fpsyg.2020.570567>
- Bridgeman, P. A., Bridgeman, M. B., & Barone, J. (2018). Burnout syndrome among healthcare professionals. *American Journal of Health–System Pharmacy, 75*(3), 147–152.  
<https://doi.org/10.2146/ajhp170460>
- Bu, F., Steptoe, A., Fancourt, D. (2020). Loneliness during a strict lockdown: Trajectories and predictors during the COVID-19 pandemic in 38,217 United Kingdom adults. *Social Science & Medicine, 265*, Article 113521.  
<https://doi.org/10.1016/j.socscimed.2020.113521>
- Cavanagh, N., Cockett, G., Heinrich, C., Doig, L., Fiest, K., Guichon, J. R., Page, S., Mitchell, I., & Doig, C. J. (2020). Compassion fatigue in healthcare providers: A systematic review and meta-analysis. *Nursing Ethics, 27*(3), 639–665.  
<https://doi.org/10.1177/0969733019889400>

Center for Nutritional Psychology. (2020). *What is nutritional psychology?*

<https://www.nutritional-psychology.org/what-is-nutritional-psychology/>

Centers for Disease Control. (2020). *Frequently asked questions.*

<https://www.cdc.gov/coronavirus/2019-ncov/faq.html#Basics>

Day, J. C., & Christnacht, C. (2019, August 14). *Your health care is in women's hands.* United

States Census Bureau. <https://www.census.gov/library/stories/2019/08/your-health-care-in-womens-hands.html>

Decker, J. T., Brown, J. L. C., Ong, J., & Stiney-Ziskind, C. A. (2015). Mindfulness, compassion fatigue, and compassion satisfaction among social work interns. *Social Work and Christianity*, 42(1), 28–42.

Denkova, E., Zanesco, A. P., Rogers, S. L., & Jha, A. P. (2020). Is resilience trainable? An initial study comparing mindfulness and relaxation training in firefighters. *Psychiatry Research*, 285, Article 112794. <https://doi.org/10.1016/j.psychres.2020.112794>

Ding, D., del Pozo Cruz, B., Green, M. A., & Bauman, A. E. (2020). Is the COVID-19 lockdown nudging people to be more active: A big data analysis. *British Journal of Sports Medicine*, 54(20), 1183–1184. <http://dx.doi.org/10.1136/bjsports-2020-102575>

Emerson, D., & Hopper, E. (2011). *Overcoming trauma through yoga: Reclaiming your body.* North Atlantic Books.

Falk, G., Carter, J. A., Nicchitta, I. A., Nyhof, E. C., & Romero, P. D. (2021, January 12), *Unemployment rates during the COVID-19 pandemic: In brief*\_(R46554). Congressional Research Service. <https://crsreports.congress.gov/product/pdf/R/R46554>



- Gerritsen, R. J. S., & Band, G. P. H. (2018). Breath of life: The respiratory vagal stimulation model of contemplative activity. *Frontiers in Human Neuroscience*, *12*, Article 397. <https://doi.org/10.3389/fnhum.2018.00397>
- Gethin, R. (1998). *The foundations of Buddhism*. Oxford University Press.
- Goleman, D., & Davidson, R. J. (2017). *Altered traits: Science reveals how meditation changes your mind, brain, and body*. Avery.
- Goodman, M. J., & Schorling, J. B. (2012). A mindfulness course decreases burnout and improves well-being among healthcare providers. *The International Journal of Psychiatry in Medicine*, *43*(2), 119–128. <https://doi.org/10.2190/PM.43.2.b>
- Herman, J. L. (1992). *Trauma and recovery*. Basic Books.
- Hsu, T., & Forestell, C. (2021). Mindfulness, mood, and food: The mediating role of positive affect. *Appetite*, *158*, Article 105001. <https://doi.org/10.1016/j.appet.2020.105001>
- Institute for Quality and Efficiency in Health Care. (2020, June 18). *Depression: What is burnout?* InformedHealth.org. <https://www.ncbi.nlm.nih.gov/books/NBK279286/>
- Jha, A. P., Morrison, A. B., Parker, S. C., & Stanley, E. A. (2017). Practice is protective: Mindfulness training promotes cognitive resilience in high-stress cohorts. *Mindfulness*, *8*(1), 46–58. <https://doi.org/10.1007/s12671-015-0465-9>
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain and illness*. Bantam Doubleday Dell Publishing Group.
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation in everyday life*. Hyperion.
- Khan, T. A., Qureshi, M. M., Zahid, M. A., Hussain, E., Ashraf, M., & Channa, A. A. (2020). The burden of quarantine on mental health amidst COVID-19 pandemic: A cross

- sectional study. *Pakistan Armed Forces Medical Journal*, 70(2), S584–S589.  
<https://www.pafmj.org/index.php/PAFMJ/article/view/5288>
- Lee, S., Mu, C., Gonzalez, B. D., Vinci, C. E., & Small, B. J. (2021). Sleep health is associated with next-day mindful attention in healthcare workers. *Sleep Health*, 7(1), 105–112.  
<https://doi.org/10.1016/j.sleh.2020.07.005>
- Liu, C. H., Zhang, E., Wong, G. T. F., Hyun, S., & Hahm, H. C. (2020). Factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic: Clinical implications for U.S. young adult mental health. *Psychiatry research*, 290, Article 113172. <https://doi.org/10.1016/j.psychres.2020.113172>
- Magill, E., Siegel, Z., & Pike, K. M. (2020). The mental health of frontline health care providers during pandemics: A rapid review of the literature. *Psychiatric Services*, 71(12), 1260–1269. <https://doi.org/10.1176/appi.ps.202000274>
- Marx, W., Moseley, G., Berk, M., & Jacka, F. (2017). Nutritional psychiatry: The present state of the evidence. *The Proceedings of the Nutrition Society*, 76(4), 427–436.  
<https://doi.org/10.1017/S0029665117002026>
- Morgantini, L. A., Naha, U., Wang, H., Francavilla, S., Acar, Ö., Flores, J. M., Crivellaro, S., Moreira, D., Abern, M., Eklund, M., Vigneswaran, H. T., & Weine, S. M. (2020). Factors contributing to healthcare professional burnout during the COVID-19 pandemic: A rapid turnaround global survey. *PLoS ONE*, 15(9), Article e0238217.  
<https://doi.org/10.1371/journal.pone.0238217>
- Naidoo, U. (2019). Nutritional psychiatry: The gut-brain connection. *Psychiatric Times*, 36(1), 11A–12A. <https://www.psychiatrytimes.com/view/nutritional-psychiatry-gut-brain-connection>

- Ogden, P., Minton, K., & Pain, C. (2006). *Trauma and the body: A sensorimotor approach to psychotherapy*. W W Norton & Company.
- Ortiz-Fune, C., Kanter, J. W., & Arias, M. F. (2020). Burnout in mental health professionals: The roles of psychological flexibility, awareness, courage, and love. *Clínica y Salud, 31*(2), 85–90. <https://doi.org/10.5093/clysa2020a8>
- Paredes, M. R., Apaolaza, V., Fernandez-Robin, C., Hartmann, P., & Yañez-Martinez, D. (2021). The impact of the COVID-19 pandemic on subjective mental well-being: The interplay of perceived threat, future anxiety, and resilience. *Personality and Individual Differences, 170*, Article 110455. <https://doi.org/10.1016/j.paid.2020.110455>
- Quigley, E. M. M. (2013). Gut bacteria in health and disease. *Gastroenterology & Hepatology, 9*(9), 560–569. <https://www.gastroenterologyandhepatology.net/archives/september-2013/gut-bacteria-in-health-and-disease/>
- Ratey, J. (2008). *Spark: The revolutionary new science of exercise and the brain*. Little, Brown.
- Ratey, J. J., & Manning, R. (2014). *Go wild: Free your body and mind from the afflictions of civilization*. Little, Brown.
- Ricard, M., Lutz, A., & Davidson, R. J. (2014). Mind of the meditator. *Scientific American, 311*(5), 38–45. <https://doi.org/10.1038/scientificamerican1114-38>
- Román, N., & Urbán, R. (2019). Mindful awareness or self-regulation in eating: An investigation into the underlying dimensions of mindful eating. *Mindfulness, 10*(10), 2110–2120. <https://doi.org/10.1007/s12671-019-01170-2>
- Siegel, D. J. (2018). *Aware: The science and practice of presence—the groundbreaking meditation practice*. TarcherPerigee.

Simione, L., Raffone, A., & Mirolli, M. (2020). Stress as the missing link between mindfulness, sleep quality, and well-being: A cross-sectional study. *Mindfulness, 11*(2), 439–451.

<https://doi.org/10.1007/s12671-019-01255-y>

Treleaven, D. A. (2018). *Trauma-sensitive mindfulness: Practices for safe and transformative healing*. W W Norton & Company.

West, J., Liang, B., & Spinazzola, J. (2017). Trauma sensitive yoga as a complementary treatment for posttraumatic stress disorder: A qualitative descriptive analysis.

*International Journal of Stress Management, 24*(2), 173–195.

<https://doi.org/10.1037/str0000040>

Zhang, L., Li, D., & Yin, H. (2020). How is psychological stress linked to sleep quality? The mediating role of functional connectivity between the sensory/somatomotor network and the cingulo-opercular control network. *Brain and Cognition, 146*, Article 105641.

<https://doi.org/10.1016/j.bandc.2020.105641>