Spring 2017

Meditation in Medicine: Exploring Complementary and Alternative Methods in Healthcare

Celeste Linders

MEDITATION IN MEDICINE: EXPLORING COMPLEMENTARY AND ALTERNATIVE METHODS IN HEALTHCARE

A thesis submitted to
Regis College
The Honors Program
in partial fulfillment of the requirements
for Graduation with Honors

by

Celeste Linders

May 2017

Thesis written by

Celeste Linders

Approved by

_____

Thesis Advisor

_____

Thesis Reader

Accepted by

_____

Director, University Honors Program

TABLE OF CONTENTS

Preface and Acknowledgements

I would like to personally thank the talented and intelligent minds that supported and guided the creation of this thesis; to Dr. Ashley Fricks-Gleason as my thesis advisor and Dr. Linda Land-Closson as my reader, without their input and feedback this thesis would not have been as holistic and integrative of various disciplines.

To the Honors Program at Regis College, especially Dr. Howe and Dr. Kleier, and all Honors former and current students for continued support and community, thank you.

I am also exceedingly grateful for the support of my friends and family throughout this process. Without their inspiration and encouragement this thesis would not have been possible.

“Natural forces within us are the true healers of disease” -Hippocrates

Chapter 1

Introduction

Personal Perspective

I was led to discover the principles of mind-body medicine through a passion for health, yet one that has developed throughout my life and grown even more so through my Jesuit education, preparation for graduate school, and independent research. I began to discover my deep concern for human health through reading and exposure to science classes in school. Upon transitioning to a Jesuit university, I was exposed to the idea of *cura personalis*. I relate to this idea about caring for others through the lens I have developed to view the whole person. The idea of *cura personalis* in the Jesuit manner stresses the idea of care for the whole person, in a way that does not separate mind from body, or body from spirit.

At Regis, I chose to study psychology, through which I developed a deep concern for issues of mental health. Throughout my time at Regis I have been on a pre-medical school track, studying the likes of science classes meant to prepare me intellectually for the physical component of caring for and treating others. I began to question how to consider aspects other than the physical sciences that make up the human body. I have come to appreciate more and more that multilayered and dynamic facets make up a person, and that a human is more than just a physical body. In the Jesuit approach to caring for people I have learned there are crucial components that affect the mental state

of human health, which in turn affects the spiritual and even physical health of one person.

These concepts led me to question what I believed my career path will look like. I came to the realization that I do not want to be a doctor that filters in patients one after the other to diagnose a physical condition, with strictly physical causes, and for which I can then prescribe a drug before sending the patient on his or her way. The way in which I understand the word treatment encompasses my ideals about how to practice medicine with words like *heal* and *cure* being the center of the ideas I hold as truths for aiding others in addressing health. The word *health* has in turn gained new meanings for me as well. If a person is physically sound, this does not mean there is nothing to be addressed, even in a positive and preventative manner, with that patient. Rather, health has gained the connotation of soundness in mind, body, and spirit, and includes the factor that if one of these is not being addressed and tended to, there will be an imbalance that will appear in multiple components of overall health, especially in the observable physical human body. The preceding definition of human health is that which will be pivotal in the rest of this writing. The physical component of well-being is the facet which we most easily see the effects of ill-health, and therefore tends to be that which we most readily treat and address. In addition, modern Westernized medicine carries the idea that if the physical body seems in acceptable condition, there is no further treatment to be addressed for that patient, as we must move on to the next patient for the sake of promptness.

I believe relationship and rapport are crucial to caring for the wholeness of another person. Particularly in the realm of medicine, where a doctor is a trusted source

of information for many people in society, it is absolutely necessary that a doctor intentionally recognizes the implications of mind and spirit in each patient that is treated. My vision for practicing medicine, which I hope to make a reality, includes assessments of patients as more than just bodies. A trusting relationship should develop between doctors and patients, an aspect that demonstrates a genuineness of both people. It is something that should have undercurrents of real concern and attempts at overall well-being.

Jesuit Perspective

The Jesuit values I was taught and put into practice at Regis University were intrinsically formative in the development of the ideas I have formed surrounding health. In looking through the lens of these values at eventual practices in the field of medicine, I am provided a frame around career development, which is one I must practice to stay true throughout my journey into and through the medical field. The key Jesuit values include the following: *cura personalis,* magis, men and women for others, unity of mind and heart, contemplatives in action, and finding God in all things. Let us examine these further with the mindset of considering medical practice.

The care of the person, or *cura personalis,* is the value that urges us to look at every person as more than simply one layer of complexity. In medicine, this looks like taking into consideration that each person seeking treatment is more than a physical body. Rather, the illness encountered by this person is one small aspect of a greater life that has many layers of intricacy which must be taken in account. Not only does *cura personalis* require physical treatment to manage illness, this concept asks the question of well-being

in the spiritual and mental self. If there is some dissonance between health spanning these aspects, those must be addressed for the person seeking treatment to find wholeness and well-rounded health.

Magis is the concept of searching for the best choice for the greater good. In this concept lies the principle that choices affect not only the person making them, but they also have a positive or negative effect on the larger community as a whole. In the context of medicine, magis is the idea that in treatment, there could be a choice that better serves a patient's long term health over another and one must contemplate holistic patient care rather than just offer a classic prescribed solution. It also includes practicing medicine with the idea that there will always be more to learn and achieve in treatment for optimum health, and each physician must care for patients with a future-oriented mindset for the greater good of the medical community and humanity.

Physicians could benefit from the practice of the Jesuit value of men and women for others. Their profession is of the nature to be in service to others, regardless of status and ego. To be in service of others encompasses looking at their profession as one that gives. This concept calls for men and women for others, as well as *with* others in the sense of practicing solidarity to better reach an understanding with patients. This goes towards the concept of patient care and relations. Using this value to guide his or her practice, a physician can be successful in the sense that they have the patient's best interest in mind and are there to serve his or her needs. The value of service to others is crucial to the practice of a wholesome and successful physician as the caregiver, not simply health provider.

Another valuable quality for physicians to emanate is that of unity of heart and mind. In practicing medicine, there exists the potential for a discrepancy between heart and mind, or morals, beliefs, and judgments. In recognizing the Jesuit values, heart and mind can be united to produce a more thoughtful and effective caregiver. Values which a physician harbors need not be separate from the thoughtful ways in which he or she practices medicine, and in fact have the potential to add genuineness of care being administered.

Contemplatives in action is a value that urges the importance of doing, rather than simply thinking critically. Thinking critically is crucial to practicing medicine, and the value of contemplatives in action begs to take critical thinking further and apply it to treatment. Contemplatives in action in the field of medicine may look like new ideas resulting from critical thinking and reflection taking shape in a new and innovative way. Contemplatives in action is the value which requires application of the knowledge we have access to in a way that can improve the lives of others.

The final Jesuit value is finding God in all things, which is a value that may look differently for every person in the medical field; it could even encompass finding the *good* in all things. The value of finding God, or finding Good, is fundamentally finding a purpose which drives the work a person does. Finding purpose in one's work leads to a reason to complete the work to be done, and do it well. Regardless, finding God in all things can take the form of being able to recognize the positive aspects lying in wait for each person to discover. Personally, I find God in the intricacy of the systems of the

human body, and the delicate balance which the human body maintains. Those in the medical field can practice this value by seeking the good for each person they encounter.

The Jesuit perspective can supplement and guide an intentional and productive approach to life and work in general. In keeping these perspectives in mind, I will be approaching my thesis in the context of being intentional and thinking critically, with guidance from the Jesuit core values.

Chapter 2

Exploring the Meaning of Mind & Body

The words mind and body hold many interpretations across cultures and eras. To define the terms in the context of this writing, I draw from sources in the fields of neurobiology and psychology, as well as terms utilized in Buddhist ideology. The original idea of the mind was influenced by the theories of Rene Descartes. His theory began with the idea that the pineal gland was the "seat of the soul". With this began the idea that the mind is the embodiment of the soul in a physical part of the brain. In Descartes' *Meditations,* he argued that the mind is more deeply known to us than the body. He points out that ideas originate from two sources, the external and internal. External sources can be viewed as the environment, and the internal origination of ideas comes from a place within the human, that which is the mind. Internally sourced ideas do not come through the senses, rather a place that is distinctly internal (Flage, 2014). This idea of the mind proposed by Descartes demonstrates the mind's existence apart from the natural world, and its distinct existence as something intangible and different from the physical body. The brain allows the mind to take form and provides a place of residence for the mind, serving somewhat as a mediator between the natural world and the internal origin of ideas.

Buddhist scriptures commence with the concept that "Mind precedes things, dominates them, creates them" (translation by Bhikkhu Kassapa), and the Dhammapada states that the mind is the source of all good and evil that arises and befalls us (Nyanaponika, 2014). It is our connection to the world around and the way in which we

perceive and interact with our surroundings. The human mind has the power to indulge in both positivity and negativity, good as well as evil. With this perspective considered, we might define the human mind as the guide to navigate the world.

Indian Buddhist philosophy accepts and proliferates the idea of the mind. The mind in Buddhist philosophy can be explored through The Three Marks of Existence. These include unsatisfactoriness (*duhkha*), impermanence (*anitya*), and not-self (*anātman*) (Coseru, 2017). Unsatisfactoriness is a mark of existence which presents challenge as well as room for growth. There are three types of unsatisfactoriness, although for purposes in this writing I will be focusing on unsatisfactoriness proper (*duhkha-duhkhatā*), which encompasses discomforts, pain, and mental states of sadness or discontent. This is the mark of existence which might be remedied through extensive training of the mind in Buddhist practice, and that which is related to suffering that I will be referring to later in this writing such as depression and anxiety.

Impermanence (*anitya*) is the second mark of existence which recognizes the fleeting nature of our perceived reality. This concept describes the nature of all feelings, perceptions, and states which are to be viewed as constantly changing. The third Mark of Existence known as not-self (*anātman*) challenges the tendency to perceive knowledge and experience as a part of an unchanging self, and rather encourages the idea that change is always possible and in turn always occurring (Coseru, 2017). The psychological and physical events we experience are viewed as fluid.

The idea of the mind in Buddhism leads to emphasis on training the mind, for the purposes of enlightenment or even simpler goals, such as improved health. This ideology

especially focuses on self-reliance and the power of the individual to realize and utilize one's own power and potential. The path suggested for this enlightenment and self-actualization is through faith and devotion to one's practice. The Two Truths in Buddhism refer to the philosophical view that there are two levels of reality, one being empirical and relative truth that is perceived. This assists in understanding conditions, labels, and other worldly concepts. The second reality is that of a deeper level of existence beyond the empirical, that which is the fundamental nature of reality. This reality varies and must be understood ultimately through the reason and analysis of the individual ("The Dalai Lama on the Buddhist Concept of Mind | Wisdom Publications," n.d.). Using this model, the mind can be defined for our purposes as the manifestation of a person's spiritual and emotional perception of the world. The structures closely related to our definition of the mind play a large role in creating for us a vivid perception of the environment.

The "neurological anchors" of the mind as described by American neuroscientist and author of *Why God Won't Go Away,* Andrew Newberg, M.D., include the hypothalamus, amygdala, and hippocampus, otherwise known as the limbic system. These structures are generally responsible for control of the autonomic nervous system, higher-order emotional functions, as well as focusing attention and generating emotions, respectively (Aquili, Newberg, & Rause, 2001). The structures of the limbic system work together to integrate emotions with higher order cognitions, and have repeatedly been implicated in spiritual experiences. Studies have shown that electrical stimulation of the limbic system can produce hallucinations, out-of-body experiences, and illusions, similar

to those reported in spiritual states (Weingarten SM, Cherlow DG, & Holmgren E, 1977). These structures have the purpose of generating the most primal human emotions and give way to our perceptions of the intangible world around us. It can be said that the mind is responsible for personal realities, a teaching which can be found in Buddhist philosophy.

The way in which the mind shapes reality can be traced to the anatomy and physiology of the brain. Through neurological testing such as fMRI (functional Magnetic Resonance Imaging), science informs us that our perceptions of reality have a physical basis. The world we experience causes changes in our brain. On a foundational level, the way in which fMRI works is by measuring blood flow changes to varying structures of the brain, such as the parietal lobe, which is the lobe responsible for giving us proprioception, the sense of the relative position of the body.[AF1] The orientation association area is a section of the parietal lobe which is responsible for producing the sense of the body (this is the job of the left orientation association area), while the right orientation association area generates the cues which allow the mind to orient the body in space.

The attention association area, also known as the prefrontal cortex in the brain, is responsible for integrating the senses and movements of the body as well as producing behavior and moderating motivations to attain goals. This area of the brain can be referred to as the neurological seat of the will (Aquili et al., 2001). The prefrontal cortex is the physical basis that integrates structures of the brain to ultimately create the perceived reality.

Taking these concepts of mind into account, it is necessary to connect the human mind to the physical place where it makes residence. The body is the mind made flesh. The mind connects the intangible, conceptual world the individual experiences to a concrete and tangible existence which makes up the body. The body is constantly changing in accordance to the shifts of the mind. It accommodates thought processes, intentions, and psychological states as the job of the mind is to relay these concepts to the body, whether through action or reaction. An intention of the mind to make a physical move, for example, is responded to with an action by the body (the physical act of moving).

The body, for purposes in this writing, can be defined as the biological and physical aspects of a person, encompassing the brain and its structures. The brain holds the neurological foundations and manifestations of the mind (the limbic system, orientation association area, and attention association area, as previously described), and the connection between mind and body can be referred to as brain structures which produce the perceived reality of the mind. Therefore, mindfulness can be explained in terms of attention and consciousness as well as self-awareness (Raffone, Tagini, & Srinivasan, 2010). Equipped with these clarifications of the terms “mind” and “body”, we can begin to understand the mind-body connection and practices associated with Complementary and Alternative Medicine (CAM).

The neurological connections that make up the mind have a specific format which designates particular functions to structures in the brain. The limbic system is responsible, through neurological perceptions, for relaying the environment and the world

around us as sensory experiences that humans are able to process. Higher order executive functioning, such as planning and judgment, reside in the frontal lobes of the brain. This contributes largely to the personality we perceive in others, and contributes to the elements that constitute the mind. The parietal lobes make up the sections of the brain which are responsible for providing spatial cues. Together, the limbic system, frontal lobes, and parietal lobes play a large role in producing the qualities we tend to associate with the human mind as well as body.

The connection between mind and body is most easily compartmentalized between perception and reaction. The foundations which make up the mind are built upon individual perceptions of the world around us. The mind then processes, in an intangible as well as physical sense, and the brain allows for reaction of the body. With this in consideration, we can begin to approach the effects of stress and anxiety on perceptions of the mind, and consequent changes to the body.

Chapter 3

Integrating Mind-Body Mechanisms with Modern Medicine

Foundations

The foundation of healthcare is told in the symbol of the caduceus, an insignia of Greek origin made up of two snakes wound around each other, each a representation of an integral part of medicine and the treatment of ailments. The outer aspect of medicine that is depicted is that of biology. This is a crucial part of healing and curing; however, within the corresponding snake of the caduceus lies another aspect of medicine that is sometimes overlooked, but equally as crucial to the treatment of the body in a biological manner. The other snake represents consciousness, that is, mental and spiritual life (Dacher E.S, 2014).

The idea of integrating mind and body into healing is an idea that is centuries old and serves as the platform of the medicine across cultures and centuries. Hippocrates, considered the father of medicine, explained mind-body medicine as “the natural healing force within each one of us” that serves as the greatest force in getting well (Dacher E.S, 2014). Foundationally, mind-body medicine is based on a harmonious and balanced interplay of body, mind, and spirit, or the inner and outer aspects of life. This is viewed as the basis of a comprehensive well-being of the whole person.

In the Tibetan Buddhist culture, there are currents of the role of consciousness and mindfulness to be observed as well. The Medicine Buddha, present in some forms of Buddhism, like the caduceus, is depicted holding one object in each of his hands. In his right hand is the *Arura* plant, symbolizing external therapeutic approaches, in other words

the biological based approach to healing; in the left hand of the Medicine Buddha is a bowl containing the elixir of wisdom, representing the inner force of healing, much like that which Hippocrates referred to as the natural healing force (Dacher E.S, 2014). This connection between the mental state and physical health has been evidenced over time through various modalities, including the placebo effect and faith healers.

The placebo effect is a psychological phenomenon which has been supported many times over through scientific research. Recent findings provide evidence that the mechanisms of the placebo effect are often virtually indistinguishable from the mechanisms of the drugs the placebo is meant to stimulate (Cohen & Shapiro, 2013). Placebo analgesia, for example, is the relief of pain through what is believed to be a pain-relief medication, but may take the form of a starch or sugar pill. The findings from these studies show that a pain-analgesic placebo can mimic opioids by acting on the opioidergic system in the body, which is the most potent pain-relieving system naturally found in the body. This pill works by stimulating neurons to release endorphins, which bind to the same receptors opioid medications are meant to bind to. These neurons in turn innervate and inhibit the pain-perceiving center of the cortex of the brain. In addition this placebo works by activating the periaqueductal gray matter in the brain, the region of the brain stem which inhibits transmission to the rest of the brain of periphery pain-encoding signals (Cohen & Shapiro, 2013).

Much like the placebo effect, faith healing is a prominent cross-cultural example of a mind-body modality observed in Complementary and Alternative Medicine. This form of healing has been in existence for centuries and persists today. In an observation

study that was conducted viewing three different faith-healing ceremonies, there was much belief placed in the healer's abilities. Many cultural factors go into ceremonies such as these, including physical touch believed to have a calming effect and promotes a sense of well-being. Studies of patient dissatisfaction in allopathic medicine (conventional Western medicine) repeatedly show there is rarely dissatisfaction with the technical interventions, and rather patients feel dissatisfaction due to doctors not paying attention to their needs (Bloom, 2005). The facilitators in faith healing ceremonies often do not have modern medical technology to offer, yet patient (the subjects of healing in the ceremonies) satisfaction in these ceremonies remains high. This could be because human needs are being met, beyond that of the physical illness. The consideration of human needs persists as a priority in alternative medical practices, a possible explanation for the persistence and growing use of complementary and alternative medicine.

The use of Complementary and Alternative Medicines (CAM) has increased, with many American hospitals offering more and more CAM treatments. To define CAM, a wide and inclusive definition is required given the great variance observed in the different modalities. Complementary and alternative medicine is best defined by the National Center for Complementary and Integrative Health (NCCIH) as "a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine" ("NCCIH," n.d.). A non-mainstream practice that is used *alongside* conventional medicine is considered "complementary" while a non-mainstream practice used in place of conventional medicine is considered "alternative" ("Complementary, Alternative, or Integrative Health," 2011). These types

of medicine vary greatly, and include mind-body medicine, mindfulness, and meditation, among many others. In a 2010 study, it was found that 42% of over 700 hospitals surveyed offer at least one CAM therapy. As of 2007, 83% of healthcare workers used complementary or alternative medicine, compared with about 63% of the general population (Fallis, 2012). There are multiple factors that determine the types of demographics that use CAM. These factors reflect that the use of CAM increases with education, and its use is more highly correlated with middle-aged people as well as women, and more chronically ill individuals tend to explore CAM practices as compared to the non-chronically ill (Park, 2013).

Mind-body modalities, such as meditation, relaxation response (RR), and positive psychology, found in complementary and alternative medical practices are found to be the most commonly used. These techniques recognize the effects of brain, mind, body, and behavior on overall health, especially in issues where psychological stress has a physical impact on well-being. Of people in the United States that make use of mind-body practices in their own health practices, 12.7% made use of deep breathing exercises, 9.4% used meditation for the purpose of relaxation and improvement of overall health, and the rest made use of natural products (17.7%), chiropractic care (8.6%), massage (8.3%), yoga (6.1%) and diet-based therapies (3.6%) (Fallis, 2012). In this writing I will be focusing primarily on deep breathing exercises and meditation.

Losing the Connection Between Mind and Body

In the early twentieth-century, the teaching of medicine in North America began to diverge. There existed a prominent school of thought labeled homeopathic medicine,

and the other being allopathic. The medicine labeled homeopathic believed in examining the environmental, attitudinal, and emotional aspects contributing to symptoms. Over time, allopathic was associated with what we know as mainstream conventional medical doctors. While allopathic type medicine gained prominence, homeopathic medicine was used as a sort of catch-all term for alternative medical practices, and those who considered the mind and emotions in relation to physical health were grouped in with people selling potions and homemade cure-alls. This created a stigmatized reputation for mind-body type medicine, and eventually gave way to homeopathic schools being closed down, leaving only the allopathic medical schools (for a period of time before the rise of osteopathic medical schools) or what we know as modern, conventional American medicine today (Gilbert MD, 2003).

The origin of separation between the concept that both mind and body contribute to and control overall well-being and mental health has roots in the "study of the soul", otherwise known as psychology. The field of psychology was formed as a separate, soft-science conceptual field that was quickly and concretely separated from the study of physical health and well-being in medicine. Rene Descartes was a philosopher during the 1600s and his ideas later influenced Enlightenment period. He is considered the father of dualism, the idea which declared that mind and body are separate entities, with the only interface of the two being in the pineal gland in the brain, otherwise known as the "seat of the soul" (Gilbert MD, 2003). The ideas of this period gained popularity and soon were widely accepted as true. From that point on this concept has ruled how many people treat their own health and well-being and the health of others.

In modern times, conventional Western medicine has made astounding strides in the fields of diagnostics and treatment of illnesses. Surgery has become safer, pharmaceuticals have been developed and improved, and human life expectancy has been extended. However, there is a dissonance between our approach to treatment in the biological sense and our consideration of the mind-body interactions.

Psychoneuroimmunology: Bridging the Mind-Body Gap

The primary understanding of the mind-body connection is rooted in ancient Eastern ideals. Upon reaching the West, a neurological and endocrinological understanding developed out of the work of Hans Selye, through his publication of *The Stress of Life* in 1956. His work connected psychological stress to biological and physiological reactions of the body, including, but not limited to, swelling in the adrenal cortex, atrophy of the thymus, and ulcers. In his theory of General Adaptation Syndrome, he addressed the idea of stress being a drain on an adaptive energy supply with which each person is born (Selye, 1955). This energy supply ebbs and flows throughout our lives, with the drain happening largely in periods of life where high amounts of stress are experienced. These stressful life events initiate the physiological stress response in the body by activating the sympathetic nervous system; however, if stress is never turned off or relieved, the sympathetic nervous system remains activated, creating a host of physical responses to stressors in a person's environment. Generalized stress harms the biology of a person and serves the opposite function of protection. Jobs, money, family life and more are ongoing and persistent sources for activating the sympathetic nervous system.

Following the work of Hans Selye was that of Robert Ader and Candace Pert. Their work found that certain neuropeptides, or short chains of amino acids present in the brain and throughout the body, are manufactured and released as a stress response of the body. Neuropeptides and their receptors are responsible for transmitting information across organs, tissues, cells, and DNA. The nature of the information transmitted has a role in regulation of immunocyte trafficking, verifying bidirectional communication between the immune system and the nervous system. The neuropeptides manufactured are crucial in immunoregulation. When these are out of balance because of stress, mental stressors can become physical disorders. This connection between the brain and regulation of the immune system was called *psychoneuroimmunology* (Pert, Dreher, & Ruff, 1998). Psychoneuroimmunology focuses on the interactions between behavior, neural and endocrine function, and immune processes. A major function of the immune system is its ability to recognize foreign bodies (antigens) and eliminate them through the work of white blood cells (leukocytes). There are various types of leukocytes present in the immune system responsible for fighting antigens, whose functionality is sensitive to an organism's perception of and adaption to the environment (Ader & Cohen, 1993). With the delicate balance the body must maintain for immunity, the stressors of the environment can have a significant effect on a person. The psychological effects of stress translate into physical manifestations by way of the neurological systems that may be explained in terms of neuropathology.

Neuropathology of Stress

Tracing the roots of neuropathology, we must revisit the work of Hans Selye. He harbored the belief that with stress comes physical implications and illnesses. He explored the possibilities of diseases having their roots in high stress conditions. Physical symptoms that can be used as indication of General Adaptation Syndrome include adrenal enlargement, atrophy of the thymus and the acute appearance of gastrointestinal ulcers (Pfaff, Martin, & Ribeiro, 2007). The belief that stress contributes to and possibly causes many health disorders and diseases is based on the mechanisms of the Central Nervous System (CNS) (Selye, 1955).

The human response to stress occurs on a large scale with the activation of the sympathetic or parasympathetic nervous system, the components that make up the CNS. The parasympathetic nervous system calms the body and allows for processes such as digestion to occur, as well as lowering heart rate and alertness. The sympathetic nervous system is what becomes activated in the presence of stress, and is the system association with the “fight or flight” response, inducing changes as a result of increased norepinephrine (Radley et al., 2011) . Physiological responses to stress are designed to optimize mobilization of resources for the body and to restore homeostasis (Munck A, Guyre PM, & Holbrook NJ, 1984). The physiological stress response in turn causes an increase in norepinephrine, leading to increased heart rate and blood pressure, and initiates glycogenesis in the liver. These are necessary events when humans are faced with stressful situations, however in the long term can prove harmful if the parasympathetic nervous system is rarely activated.

When an individual is exposed to stressors such as exposure to novelty, unpredictability, threats to ego, or a feeling of losing control, the brain has consequent chemical reactions. The hypothalamic-pituitary adrenal (HPA) axis reacts to stress in the environment. Adaptation to stress exposure from the environment includes the release of corticotropin-releasing hormone (CRH) as well as adrenal glucocorticoid hormones. These alter the body's behavior and metabolism to meet the demands of the environment, often which pose some sort of stressful threat to an individual's well-being. The receptors for these stress-induced hormones are found in brain structures such as the hippocampus, prefrontal cortex, and amygdala (Koenig, Walker, Romeo, & Lupien, 2011).

There is an ideal balance that can be found with the amount of stress with which a person is confronted, and with some exposure to stress, performance increases. This is referred to as the Yerkes-Dodson law, stating a non-linear relationship between arousal (stress) and behavioral performance (achievement). The right amount of stress can optimize achievement, but too much stress causes achievement to decline (Diamond, 2005). When stress extends beyond the optimum level, the increased cortisol in the brain has been correlated with reduced hippocampal volume, reducing cognitive abilities (Lupien, Maheu, Tu, Fiocco, & Schramek, 2007). Some studies have found that depression and stress have the same morphological effect on the brain, both giving way to atrophy and loss of neurons and glia, subsequently leading to reduced size of limbic and cortical areas; areas associated with depression. In fact, brain regions that are linked to depression have been found to be reduced in cortical size in association with stress and stress-related disorders, such as PTSD (Radley et al., 2011). The hippocampus, a region

found to shrink in size in correlation with stress, is linked with the length of depression and is inversely related to time of treatment required (Duman, 2014). With the prevalence of stress in our world today, it is crucial to address the causes and effects associated with prolonged activation of the sympathetic nervous system.

A Stress Epidemic

Western societies are notorious for the levels of stress reported in the population. About one-fourth of North Americans report regularly experiencing high levels of stress (Jensen et al., 2015). In addition, Americans have significantly high rates of physical maladies, including many of the maladies seen to increase with high levels of stress. In the context of this writing, "stress" will be used as a blanket term for general and every day. This is considered the condition when a person feels tense, anxious, worried, or cannot sleep at night due to preoccupation with problems being faced (Wiegner, Hange, Björkelund, & Ahlborg Jr., 2015). The connection between stress and physical as well as emotional health is being uncovered more and more each day. According to a survey released by the American Psychological Association, "Stress in America", stress is ever increasing and predicted to continue increasing. The causes of stress in our society today cause the sympathetic nervous system to be constantly activated when we are exposed to them. Increased stress has been shown as a cause of illnesses including heart disease, anxiety, hypertension, depression, substance abuse, and gastrointestinal disorders (Schure, Christopher, & Christopher, 2008). The prevalence of these disorders are the cause of over 60% of doctors' visits to be for disorders related to or caused by stress (Benson, O'Neill, Murphy, Ferry, & Bunting, 2015).

Stress Related chronic non-communicable diseases are the biggest health care costs of the 21st century (NCD's, cardiovascular diseases, chronic respiratory diseases, diabetes, arthritis, and neuropsychiatric diseases). A direct effect that has been observed with prolonged stress is chronic burnout, which is a condition closely related to Exhaustion Disorder (ED), a disorder which can interfere with every day functioning. In many people reporting depression and anxiety, higher stress levels were reported as well (Wiegner et al., 2015).

Studies in rodent models have focused on different types of chronic stress, which is the most prevalent type of stress in American society from various sources. Loss of spinal synapse connections has also been observed in the presence of chronic stress, leading to functional disconnection and loss of normal control of mood and emotion, main symptoms seen in and resulting from depression (Duman, 2014). Through postmortem and rodent model studies, research has come to that suggest that stress has physical, neurological effects on the brain and nervous system, often correlating with the neuronal changes observed in depression.

The stress present amongst the population of the United States is generally psychosocial stress. This is pressure put on individuals by society, often in the form of demands to work past the point of reason, a focus on obtaining material goods, and a stigma that exists around mental health and seeking help to manage stress related disorders such as depression. With ever-increasing stress amongst working-age populations (18-65 years old) over the past few decades, there has been research into the roots of the stress causing suffering amongst this demographic. Factors thought to be

linked to work-related stress include high mental demand as well as increasing workloads and perceived psychological injustice. Chronic stress has been found to cause both burnout and Exhaustion Disorder (ED) among the working population. This disorder comes with symptoms such as exhaustion, cognitive dysfunction, sleep problems and somatization (e.g. digestive complications), with the most prevalent symptom being lack of energy. Studies found that over half the population seeking primary care perceived significant stress, with one third of women and one in four men reporting this ailment (Wiegner et al., 2015).

Taking into consideration the high rates of stress and stress-related chronic disorders in the adult American population, it begs for action to be taken in reducing the constant stress felt by many people in society. We must confront this underlying cause of illness in our world in an innovative and effective manner. Research has been done on cost-effective and easily accessible remedies for stress in the field of Complementary and Alternative Medicine, including a large focus on meditation and mindfulness to be used as treatment. Let us further explore these types of mind-body medicine.

Chapter 4

Complementary and Alternative Medicine

Meditation and Mindfulness

The World Health Organization (WHO) defines health as not simply the absence of disease, rather a state of complete physical, mental, and social well-being (Warnecke, Quinn, Ogden, Towle, & Nelson, 2011). Considering the connections between stress and illnesses, we are obliged to look at the roots of illness to guide treatment plans. If stress is causing disease and other maladies, how might we treat stress rather than the resulting illness itself in isolation? Complementary and Alternative Medicine (CAM) addresses this question directly and with non-mainstream medical practices. CAM puts emphasis on treating nutritional, spiritual, and emotional aspects of health in addition to the physical aspect. The diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine include mindfulness meditation. With the increase in CAM practices in recent years, the practice of meditation is becoming more common (Willison, Williams, & Andrews, 2007).

With more scientific research lending credibility to meditative practices, there is a better understanding of how the brain changes due to meditation. In a comparison of three meditation traditions including Vipassana, Himalayan Yoga, and Isha Shoonya, electroencephalograms (EEG) were used to measure the activity in the brain during the practice. The Himalayan Yoga tradition uses a mantra to maintain focus, Vipassana is an open monitoring practice but uses somatosensory awareness, and Isha Shoonya is an open awareness practice with no object to focus on. It is known that meditation practice is

associated with anatomical changes in the prefrontal cortex and the areas involved in proprioception. Higher frequency gamma brainwave activation was shown in the EEG of meditators. The higher frequency found in these circumstances has been linked to diverse cognitive functioning, including a neurological connection to higher levels of consciousness (Braboszcz, Cahn, Levy, Fernandez, & Delorme, 2017). Research tells us there are neurological bases for the effects of meditation. The neurological changes that occur during these practices can contribute largely to treatment of mental health disorders as well as physical disorders. As more information is collected on meditation and its neurological as well as psychological effects, we are learning about the ways in which meditation can be used as a safe and effective treatment for many disorders.

Meditation as Treatment

There has been research into a physical manifestation of mental health and states of well-being resulting from practices such as meditation. When we are happy and mentally well, the left prefrontal cortex shows more activity, as researched by Richard Davidson (Lutz, Slagter, Dunne, & Davidson, 2008), and it appears that higher states of consciousness can be achieved. It is becoming more apparent that our brains are affected by our emotional states, which manifest physically. Not only do our brains change, the whole-body changes in the state of well-being versus stress and sickness.

Emotional regulation contributes to better quality of life and resiliency against many stress-related disorders, both physical and psychological. For the purposes of this discussion, I will be addressing the disorders of depression, or Major Depressive Disorder (MDD) and Major Depression (MD), Generalized Anxiety Disorder (GAD), and

hypertension (chronically high blood pressure), all of which have been shown to be linked to and exacerbated by stress (Purohit, Wells, Zafonte, Davis, & Phillips, 2013). Depression has been ranked by the World Health Organization as the fourth leading contributor to the burden of global disease (Tsang, Chan, & Cheung, 2008), and with its growing prevalence around the world there is a call for effective and long lasting therapies. Adverse symptoms of depression include unhappiness, social withdrawal, fatigue, and difficulty concentrating, leading to an impaired quality of life. Treatment for depression using conventional medicine often includes pharmacological therapy, which utilizes prescription antidepressants, rendering patients vulnerable to unwanted side effects. The efficacy of mindful interventions has been supported more and more through recent studies.

Complementary and alternative therapies are increasingly being employed to address symptoms of depression, among other disorders. In a study testing meditation as a treatment for GAD and MDD, mind-body medicine was found to be an effective form of treatment. Mindful attentiveness to somatic cues was used, and significant clinician-assessed improvement of at least 30% was achieved for 81% of patients, even up to three and nine months post treatment (Mennin, Fresco, Ritter, & Heimberg, 2015). Mindfulness-based cognitive therapy (MBCT) has also been utilized as treatment for pregnant women with a history of depression, with up to 30% being at risk to relapse during the perinatal period. MBCT was found to be successful in both the prevention and treatment of perinatal depression (Dimidjian et al., 2015). In addition, meditation is being used to treat depression, anxiety, sleep disturbances, pain, fatigue and stress levels in

demographics such as cancer patients (Kim et al., 2010) and elderly populations (Prakhinkit, Suppapitiporn, Tanaka, & Suksom, 2014).

Not only have mind-body interventions been shown to be successful as a complementary form of medicine in addition to conventional treatment, there is evidence that meditation could be a superior method to address physiological effects of stress, anxiety, and depression. Meditation and breathing practices could in fact be used not just to complement conventional treatment, but these therapies could be used as primary treatments (Jerath, Crawford, Barnes, & Harden, 2015). In trying to maintain homeostasis that becomes disturbed by stress and anxiety, the goal is to regulate breathing and in turn calm the nervous system. Pharmacological treatments are often strictly symptom-based, have limited long term efficacy, and induce severe side effects (Jerath et al., 2015). Breathing and mindfulness meditation target this symptom of anxiety directly in a self-guided manner, free from pharmacological interventions.

While pharmacological and psychological treatments have been found to greatly reduce depressive symptoms, questions of long-term effectiveness arise as many patients go into relapse after treatment and may not even achieve full remission. Mindfulness-based cognitive therapy (MBCT) has been found in many cases to prevent relapse and is recommended by international guidelines as a prevention for relapse in patients with acute MD or recurrent MD (Chiesa et al., 2015). Considering this form of treatment for disorders such as MD and MDD come with the consideration of long-term effectiveness and absence of side-effects. Utilizing mindfulness-based or breathing-based meditation

presents as a lifestyle change rather than a therapy to be used until a disorder has run its course.

In patients with MDD, the primary form of treatment is pharmacotherapy, with effects that are often intolerable by many patients for long periods of time. Only around 50%-60% of patients respond to the first course of treatment offered in the form of psychotherapy, and those who do not reach clinical remission are at high risk for relapse. Patients who employ breathing-based meditation techniques showed an antidepressant response in the form of increased endorphin production and improved antioxidant status, even when the patients had previously been on antidepressants and demonstrated an inadequate response to medication (Sharma, Barrett, Cucchiara, Gooneratne, & Thase, 2017).

The efficacy of mind-body meditation and breathing therapy is in part due to the fact that meditation targets the autonomic nervous system, and therefore targets the mind and body as a whole, while pharmaceutical therapies target the neurochemical imbalance found in the brain. With disorders such as MDD and GAD, there are long term symptoms that are not addressed thoroughly with pharmaceutical therapies (Jerath et al., 2015). In these cases, meditation could prove to be a better long term and generally more effective form of treatment, without the threat of side effects and dependency.

In a study involving young Thai men who had no previous experience with meditation, participants were instructed to practice a type of meditation called Samadhi, a version of Buddhist meditation with the aim of achieving the utmost concentration of thought upon a given subject of salutary nature, and raising concentration on the object to

a level of abstraction. This requires focus on an external object which leads to feelings of serenity and concentration (Sudsuang, Chentanez, & Veluvan, 1991). A very specific version of Samadhi meditation is called Dhammakaya[1], with the ultimate goal in this version being the focusing of attention inward. After six weeks of the experimental group practicing meditation, there were significant physical benefits observed. It appears that practicing this form of Buddhist meditation is shown to decrease serum cortisol levels, decrease both systolic and diastolic blood pressure, and significantly decrease pulse rate. Endocrinological changes were also observed, including decrease in cortisol, the main stress hormone (Sudsuang et al., 1991). Given these findings, Buddhist meditation and transcendental meditation can be applied to and utilized in the reduction of anxiety or the treatment of hypertension and asthma.

Aside from treating psychological disorders such as depression and anxiety, mindfulness meditation has been found to improve symptoms of insomnia and hypertension. When meditation is practiced by individuals suffering from insomnia, total wake time and sleep quality improves (Gong et al., 2016). Individuals with anxiety and increased levels of stress commonly experience comorbid hypertension (Mushtaq & Najam, 2015), which can also be alleviated with the practice of mindfulness meditation and prevention of resulting cardiovascular disease (Yeh, Davis, & Phillips, 2006). Alleviation of other disorders besides depression and anxiety by using meditation can be widely applied to prevention as well. The idea that these CAM practices have the potential to ward off such maladies can be utilized to improve quality of life overall.

Quality of Life and Prevention

The various types of mindfulness meditation including focused attention (FA) and open monitoring (OM) meditation have been reported to be used not only in treatment settings, but they can reduce chronic stress and improve overall life quality. One study assessed a group practicing transcendental meditation (TM), a type of FA meditation, and found higher job satisfaction, less complaints, increased employee effectiveness, and improved work and personal relationships. In addition, students practicing TM for 15 minutes twice a day for four months experienced decreased rule infractions, suspensions, and absentee class periods compared to the control group (Bilican, 2016). These findings present the possibility that mindfulness, when practiced regularly, can possibly make people better students and workers, as well as improving individual quality of life.

Students continually experience higher levels of chronic stress, especially in levels of higher education. In a study involving senior year medical students, mindfulness was used an intervention for chronic stress. The study confirmed that mindfulness was effective in significantly decreasing stress levels (Warnecke et al., 2011). In addition to reducing chronic stress in student populations, the implementation of Buddhist and mindfulness traditional practices in the form of a 15-week course for college students was found to have effects such as more mindfulness, compassion, and higher states of perceived emotional well-being. These effects are thought to increase emotional exploration that can contribute to self-actualization in the student population (Crowley & Munk, 2017). Students with this type of improved quality of life have the potential to be

more effective in their studies and could be presented with better opportunities for success.

Meditation, in addition to its use to reduce chronic stress, has been shown to increase positive emotion and reduce racial bias, two components central to the functioning of a more inclusive society. Loving-kindness meditation (LKM) can be used to decrease automatic processing, increase controlled processing, and is sufficient in reducing implicit prejudice towards a target group (Stell & Farsides, 2016). In addition to increasing controlled processing, focused and sustained attention can be improved with various practices. Cultivation of compassion is also possible with meditation. In a study of a 3-week intensive meditation course where participants were exposed to scenes of human suffering, there was an increase in emotional response characterized by cultivated sympathetic concern for others (Rosenberg et al., 2015). This research of LKM increasing empathy has the potential to be applied through the internet, in a cost-effective and widely available format (Galante, Bekkers, Mitchell, & Gallacher, 2016). It seems a solution to reducing prejudice and increasing empathy may lie in the workings of and practice of meditation.

Other effects observed after meditation include positive influences on creativity and cognitive flexibility, and increased feelings of connectedness to humanity and the natural world. In research with experienced meditators in the form of mindfulness meditation (MM) or concentrative meditation (CM), increases in creativity were observed in just one 20-minute meditation session. Increased cognitive flexibility was observed specifically in the concentrative meditation group (Müller, Gerasimova, & Ritter, 2016).

Feelings of social connectedness and nature connectedness have the potential to be affected by meditation as well. Social and nature connectedness are important psychological needs for well-being. Using LKM and MM, both were found to increase these feelings of connectedness in college students (Aspy & Proeve, 2017). Various types of meditation can be applied to many aspects of a healthy lifestyle and care of the whole person. The benefits for the individual, for both mind and body, are well supported in scientific literature. Beyond improvements of life quality on an individual basis, it is possible that meditation techniques can even be applied to positive changes in society as well. Meditation has potential for care of the whole person and the whole of humanity.

Chapter 5

Cura personalis

Upon examining methods of healthcare included in complementary and alternative medicine, specifically that of meditation, the question of its purpose must be addressed. Society is equipped with knowledge of medicine and multiple ways in which to practice healthcare. As science advances further and there are more treatments that come about with this progress, the question, "how ought we to live?" is presented, and can in fact be posed in the field of medicine as "how ought we to treat?". There is a way to address this question in the manner of Jesuit values. We have the knowledge of how to medically treat many ailments, yet we must examine this in a way that addresses ways to treat human beings. Medicine must treat in the sense that the physical is addressed as well as the whole person. Mind, body, and spirit are all included in vital aspects that create the culmination of a person.

The Jesuit value, *cura personalis*, presents the idea that care of the whole person has multiple facets which cannot be disregarded. This value calls for attention to individualized needs of each person, as well as recognition and respect for unique gifts and circumstances. Living according to *cura personalis* allows for appreciation of the varying approaches to treatment in manners that are appropriate for the individual. In medicine, this could take the form of treating an ailment in multiple manners, and striving to find the most effective healing for each patient. This will no doubt require more effort on the part of a physician, or any type of caregiver or healer. However, in the long term

this method of medicine brings more effective as well as more lasting treatment, and in turn healthier care-seekers and members of society.

The use of meditation in providing healthcare makes use of the knowledge that health is inclusive not only of physical soundness, but soundness of mind and spirit too. *Cura personalis* urges healthcare providers to explore the positive effects of meditation and new ways in which to practice caring for all the aspects of a person. This Jesuit value when applied to the field of medicine illuminates connections between mind, body, and spirit. It is necessary to realize not only the practical ways in which CAM methods can be applied to mental health, but to treating physical health by way of mental and spiritual healthcare.

The recognition of all aspects of a person are included as more than simply an optional form of CAM, but they go hand in hand with the obligation to attempt healing in conjunction with curing. Those in the field of medicine must know their role as guides for healthcare methods, and know that patients have within them the ability to promote their own health. It is the caregivers' role to guide the way in which healing can be attained. The great scholar Hippocrates put it in simple terms when he described a person's ability to promote healing by way of attention to self, claiming that "natural forces within us are the true healers of disease."

This ideal proposed by Hippocrates forges the connection between mind, body and spirit and recognizes the nearly tangible forces that are the building blocks of good health. Hippocrates was one of the earliest healers to address the autonomy that can drive

positive changes in individual health. Giving credit to the various aspects of holistic health can open doors to new treatments and ways to approach curing.

We must apply the knowledge we have of healing and curing to allow for connecting the mind, body, and spirit, and we must actively seek new ways to utilize this knowledge. The concepts of non-maleficence and beneficence are critical values in the practice of providing care. Non-maleficence is the agreement doctors make to do no harm. While this seems simple enough, it is a guideline which in practice means not prescribing treatment that is not effective or is known to have risks that outweigh benefits. The value of beneficence is that which doctors practice with the intention to seek the most good and beneficial treatments for those they encounter in their work ("Beneficence vs. Nonmaleficence," n.d.).

Many studies previously discussed have shown that various types of meditation, including mindfulness-based and breathing based meditation, can be effectively used to treat stress, depression, and anxiety. In addition, it can be used as a component of a healthy lifestyle for disease and disorder prevention. The brain shows morphological changes as well as changes in brainwave amplitude. These changes combat the adverse physiological and mental changes associated with higher rates of stress. In using CAM therapies as a prevention and incorporating them into a lifestyle can contribute to better quality of life and overall improved physical and psychological health.

Increasing research supporting these therapies used to regain and maintain a state of wellness raises the question of how our healthcare system might need to be altered. To

keep up with the research on complementary and alternative medical practices, common forms of treatment and therapy must be constantly altered and added to the repertoire of treatment to promote the most amount of good and the best effectiveness of treatment for a patient. In addition, the access to healthcare is ever-changing in the state of our nation. Universal healthcare is under scrutiny and its availability is changing alongside the economics and politics of the nation. The use of various types of meditation offers a type of healthcare, both preventative and as a treatment, which is available to all types of demographics for a fraction of the cost as compared to pharmacotherapies and psychotherapies. In addition, this type of complementary and alternative treatment is a long-term solution that can be used to maintain health.

It is also worth considering how forms of complementary and alternative medicine, specifically variations of meditation, might be applied to the general population as a preventative practice for better quality of life and overall health. Work and school environments tend to present high levels of stress in the working population and the student population. Knowing the effects of meditation on prevention of maladies and disorders, this might be a common therapy applied in a preventative manner in workplaces and schools. The prospect of implementing meditative practices in institutions would allow an avenue to reach many types of demographics and would not limit this type of therapy to those who seek it because they are already experiencing the adverse effects of stress. By promoting the positive effects of meditation in work and school environments, the beneficiaries of this practice might experience results as mentioned above, including better health, more positive emotion, increased creativity,

reduction of racial bias, increased empathy, and a feeling of increased connectedness to humanity as well as the natural world.

What kind of society might we be in modern times with the above-mentioned consequences? Perhaps the world could be a better place if individuals experience an improved quality of living and reduction in day-to-day stresses. Perhaps productivity would increase, as well as collaboration, and a more positive worldview might be achieved. If action in society's best interest is taken from a bottom-up approach on the level of improving the individual's life quality, benefits might be observed in a collective sense as well. It seems uncanny that a practice as simple as meditation might have the potential to have lasting effects that can contribute to the betterment of society, but in the spirit of the Jesuit values of *cura personalis*, and Magis, it seems that such a simple solution might be worth a wholehearted attempt at improving the human experience.

References

Ader, R., & Cohen, N. (1993). Psychoneuroimmunology: Conditioning and Stress. *Annu. Rev. Psychol. Annual Review of Psychology*, *44*(1), 53–85.

Aquili, E., Newberg, A., & Rause, V. (2001). *Why God won't go away*. Ballantine/Random House.

Aspy, D. J., & Proeve, M. (2017). Mindfulness and Loving-Kindness Meditation: Effects on Connectedness to Humanity and to the Natural World. *Psychological Reports*, *120*(1), 102–117. https://doi.org/10.1177/0033294116685867

Beneficence vs. Nonmaleficence. (n.d.). Retrieved March 29, 2017, from http://missinglink.ucsf.edu/lm/ethics/content%20pages/fast_fact_bene_nonmal.htm

Benson, T., O'Neill, S., Murphy, S., Ferry, F., & Bunting, B. (2015). Prevalence and predictors of psychotropic medication use: Results from the Northern Ireland Study of Health and Stress. *Epidemiology and Psychiatric Sciences*, *24*(6), 542–552. https://doi.org/10.1017/S2045796014000547

Bilican, F. I. (2016). The Relationship Between Focused Attention Meditation Practice Habits, Psychological Symptoms, and Quality of Life. *Journal of Religion and Health*, *55*(6), 1980–1995. https://doi.org/10.1007/s10943-016-0204-0

Braboszcz, C., Cahn, B. R., Levy, J., Fernandez, M., & Delorme, A. (2017). Increased Gamma Brainwave Amplitude Compared to Control in Three Different Meditation Traditions. *PLoS ONE*, *12*(1), 1–27. https://doi.org/10.1371/journal.pone.0170647

Chiesa, A., Castagner, V., Andrisano, C., Serretti, A., Mandelli, L., Porcelli, S., & Giommi, F. (2015). Mindfulness-based cognitive therapy vs. psycho-education for patients with major depression who did not achieve remission following antidepressant treatment. *Psychiatry Research*, *226*(2–3), 474–483. https://doi.org/10.1016/j.psychres.2015.02.003

Cohen, S., & Shapiro, H. (2013). "Comparable Placebo Treatment" and the Ethics of Deception. *Journal of Medicine & Philosophy*, *38*(6), 696–709.

Complementary, Alternative, or Integrative Health: What's In a Name? (2011, November 11). Retrieved March 21, 2017, from https://nccih.nih.gov/health/integrative-health

Coseru, C. (2017). Mind in Indian Buddhist Philosophy. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2017). Metaphysics Research Lab, Stanford University. Retrieved from https://plato.stanford.edu/archives/spr2017/entries/mind-indian-buddhism/

Crowley, C., & Munk, D. (2017). An Examination of the Impact of a College Level Meditation Course on College Student Well Being. *College Student Journal*, *51*(1), 91–98.

Dacher E.S. (2014). A brief history of mind-Body medicine. *Int. J. Transpersonal Stud. International Journal of Transpersonal Studies*, *33*(1), 148–157.

Diamond, D. M. (2005). Cognitive, Endocrine and Mechanistic Perspectives on Non-Linear Relationships Between Arousal and Brain Function. *Nonlinearity in*

Biology, Toxicology, Medicine, 3(1), 1–7. https://doi.org/10.2201/nonlin.003.01.001

Dimidjian, S., Goodman, S. H., Felder, J. N., Gallop, R., Brown, A. P., & Beck, A. (2015). An open trial of mindfulness-based cognitive therapy for the prevention of perinatal depressive relapse/recurrence. *Archives of Women's Mental Health, 18*(1), 85–94. https://doi.org/10.1007/s00737-014-0468-x

Duman, R. S. (2014). Neurobiology of stress, depression, and rapid acting antidepressants: Remodeling synaptic connections. *Depression and Anxiety, 31*(4), 291–296. https://doi.org/10.1002/da.22227

Fallis, J. (2012). Patients driving alternative medicine boom. *Canadian Medical Association Journal*, *184*(9), E453–E454. https://doi.org/10.1503/cmaj.109-4151

Flage, D. E. (2014). Descartes and the Real Distinction between Mind and Body. *Review of Metaphysics*, *68:1*(269), 93–106.

Galante, J., Bekkers, M., Mitchell, C., & Gallacher, J. (2016). Loving-kindness meditation effects on well-being and altruism: A mixed- methods online RCT. *Applied Psychology: Health and Well-Being*, *8*(3), 322–350. https://doi.org/10.1111/aphw.12074

Gilbert MD. (2003). Weaving medicine back together: mind-body medicine in the twenty-first century. *Journal of Alternative and Complementary Medicine (New York, N.Y.)*, *9*(4), 563–70.

Gong, H., Ni, C.-X., Liu, Y.-Z., Zhang, Y., Su, W.-J., Lian, Y.-J., … Jiang, C.-L. (2016). Mindfulness meditation for insomnia: A meta-analysis of randomized controlled

trials. *Journal of Psychosomatic Research*, *89*, 1–6. https://doi.org/10.1016/j.jpsychores.2016.07.016

Jensen, C. G., Lansner, J., Petersen, A., Vangkilde, S. A., Ringkøbing, S. P., Frokjaer, V. G., … Hasselbalch, S. G. (2015). Open and Calm--a randomized controlled trial evaluating a public stress reduction program in Denmark. *BMC Public Health*, *15*, 1245–1245. https://doi.org/10.1186/s12889-015-2588-2

Jerath, R., Crawford, M. W., Barnes, V. A., & Harden, K. (2015). Self-regulation of breathing as a primary treatment for anxiety. *Applied Psychophysiology And Biofeedback*, *40*(2), 107–115. https://doi.org/10.1007/s10484-015-9279-8

Kim, B., Lee, S.-H., Kim, Y. W., Choi, T. K., Yook, K., Suh, S. Y., … Yook, K.-H. (2010). Effectiveness of a mindfulness-based cognitive therapy program as an adjunct to pharmacotherapy in patients with panic disorder. *Journal of Anxiety Disorders*, *24*(6), 590–595. https://doi.org/10.1016/j.janxdis.2010.03.019

Koenig, J. I., Walker, C.-D., Romeo, R. D., & Lupien, S. J. (2011). Effects of stress across the lifespan. *GSTR Stress*, *14*(5), 475–480.

Lupien, S. J., Maheu, F., Tu, M., Fiocco, A., & Schramek, T. E. (2007). The effects of stress and stress hormones on human cognition: Implications for the field of brain and cognition. *Brain and Cognition*, *65*(3), 209–237. https://doi.org/10.1016/j.bandc.2007.02.007

Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, *12*(4), 163–169. https://doi.org/10.1016/j.tics.2008.01.005

Mennin, D. S., Fresco, D. M., Ritter, M., & Heimberg, R. G. (2015). AN OPEN TRIAL OF EMOTION REGULATION THERAPY FOR GENERALIZED ANXIETY DISORDER AND COOCCURRING DEPRESSION: Research Article: An Open Trial of Emotion Regulation Therapy. *Depression and Anxiety*, *32*(8), 614–623. https://doi.org/10.1002/da.22377

Müller, B. C. N., Gerasimova, A., & Ritter, S. M. (2016). Concentrative meditation influences creativity by increasing cognitive flexibility. *Psychology of Aesthetics, Creativity, and the Arts*, *10*(3), 278–286. https://doi.org/10.1037/a0040335

Mushtaq, M., & Najam, N. (2015). HYPERTENSION; DOES PSYCHOLOGICAL STATE OF AN INDIVIDUAL CAUSE TO DEVELOP? *Professional Medical Journal*, *22*(2). Retrieved from http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=10248919&AN=101827628&h=BHL54h8y1TwuI6T5E%2F4h5OkJ%2FNUQwmmSI2G8ZpPvOgtpndPird4fFyf6h5CBI79tWum%2FLQRwlVWV%2BBsKSUj9OQ%3D%3D&crl=c

NCCIH. (n.d.). Retrieved March 21, 2017, from https://nccih.nih.gov/

Nyanaponika, T. (2014). *The Heart of Buddhist Meditation: The Buddha's Way of Mindfulness*. Weiser Books.

Park, C. (2013). Mind-Body CAM Interventions: Current Status and Considerations for Integration Into Clinical Health Psychology. *J. Clin. Psychol. Journal of Clinical Psychology*, *69*(1), 45–63.

Pert, C. B., Dreher, H. E., & Ruff, M. R. (1998). The psychosomatic network: foundations of mind-body medicine. *Alternative Therapies In Health And Medicine*, *4*(4), 30–41.

Pfaff, D. W., Martin, E. M., & Ribeiro, A. C. (2007). Relations between mechanisms of CNS arousal and mechanisms of stress. *Stress: The International Journal on the Biology of Stress*, *10*(4), 316–325. https://doi.org/10.1080/10253890701638030

Prakhinkit, S., Suppapitiporn, S., Tanaka, H., & Suksom, D. (2014). Effects of Buddhism walking meditation on depression, functional fitness, and endothelium-dependent vasodilation in depressed elderly. *The Journal of Alternative and Complementary Medicine*, *20*(5), 411–416. https://doi.org/10.1089/acm.2013.0205

Purohit, M. P., Wells, R. E., Zafonte, R. D., Davis, R. B., & Phillips, R. S. (2013). Neuropsychiatric Symptoms and the Use of Complementary and Alternative Medicine. *PMRJ PM&R*, *5*(1), 24–31.

Radley, J. J., Kabbaj, M., Jacobson, L., Heydendael, W., Yehuda, R., & Herman, J. P. (2011). Stress risk factors and stress-related pathology: Neuroplasticity, epigenetics and endophenotypes. *GSTR Stress*, *14*(5), 481–497.

Raffone, A., Tagini, A., & Srinivasan, N. (2010). Mindfulness and the cognitive neuroscience of attention and awareness. *Zygon*, *45*(3), 627–646.

Rosenberg, E. L., Zanesco, A. P., King, B. G., Aichele, S. R., Jacobs, T. L., Bridwell, D. A., … Saron, C. D. (2015). Intensive meditation training influences emotional responses to suffering. *Emotion*, *15*(6), 775–790. https://doi.org/10.1037/emo0000080

Schure, M. B., Christopher, J., & Christopher, S. (2008). Mind-Body Medicine and the Art of Self-Care: Teaching Mindfulness to Counseling Students through Yoga, Meditation, and Qigong. *Journal of Counseling & Development*, *86*(1), 47–56.

Selye, H. (1955). Stress and disease. *Geriatrics*, *10*, 253–261.

Sharma, A., Barrett, M. S., Cucchiara, A. J., Gooneratne, N. S., & Thase, M. E. (2017). A Breathing-Based Meditation Intervention for Patients With Major Depressive Disorder Following Inadequate Response to Antidepressants: A Randomized Pilot Study. *The Journal of Clinical Psychiatry*, *78*(01), e59–e63. https://doi.org/10.4088/JCP.16m10819

Stell, A., & Farsides, T. (2016). Brief loving-kindness meditation reduces racial bias, mediated by positive other-regarding emotions. *Motivation & Emotion*, *40*(1), 140–147. https://doi.org/10.1007/s11031-015-9514-x

Sudsuang, R., Chentanez, V., & Veluvan, K. (1991). Effect of Buddhist meditation on serum cortisol and total protein levels, blood pressure, pulse rate, lung volume and reaction time. *Physiology & Behavior*, *50*(3), 543–548. https://doi.org/10.1016/0031-9384(91)90543-W

The Dalai Lama on the Buddhist Concept of Mind | Wisdom Publications. (n.d.). Retrieved March 16, 2017, from http://www.wisdompubs.org/blog/201510/dalai-lama-buddhist-concept-mind

Tsang, H. W. H., Chan, E. P., & Cheung, W. M. (2008). Effects of mindful and non-mindful exercises on people with depression: a systematic review. *The British*

Journal Of Clinical Psychology / The British Psychological Society, *47*(Pt 3), 303–322. https://doi.org/10.1348/014466508X279260

Warnecke, E., Quinn, S., Ogden, K., Towle, N., & Nelson, M. R. (2011). A randomised controlled trial of the effects of mindfulness practice on medical student stress levels: Effects of mindfulness practice on student stress levels. *Medical Education*, *45*(4), 381–388. https://doi.org/10.1111/j.1365-2923.2010.03877.x

Weingarten SM, Cherlow DG, & Holmgren E. (1977). The relationship of hallucinations to the depth structures of the temporal lobe. *Acta Neurochirurgica*, *1977*, 199–216.

Wiegner, L., Hange, D., Björkelund, C., & Ahlborg Jr., G. (2015). Prevalence of perceived stress and associations to symptoms of exhaustion, depression and anxiety in a working age population seeking primary care - an observational study. *BMC Family Practice*, *16*(1), 1–8. https://doi.org/10.1186/s12875-015-0252-7

Willison, K. D., Williams, P., & Andrews, G. J. (2007). Enhancing chronic disease management: a review of key issues and strategies. *Complementary Therapies In Clinical Practice*, *13*(4), 232–239.

Yeh, G. Y., Davis, R. B., & Phillips, R. S. (2006). Use of Complementary Therapies in Patients With Cardiovascular Disease. *The American Journal of Cardiology*, *98*(5), 673–680. https://doi.org/10.1016/j.amjcard.2006.03.051