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# Nature's effect on mental health

Hannah Thomas  
*James Madison University*

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Nature's Effect on Mental Health

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An Honors College Project Presented to  
the Faculty of the Undergraduate  
College of Health and Behavioral Sciences  
James Madison University

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by Hannah E. Thomas

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Accepted by the faculty of the School of Nursing, James Madison University, in partial fulfillment of the requirements for the Honors College.

FACULTY COMMITTEE:

HONORS COLLEGE APPROVAL:

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Project Advisor: Christine Fasching-Maphis, MSN,  
RN-BC, FNP-BC  
Instructor, School of Nursing

---

Bradley R. Newcomer, Ph.D.,  
Dean, Honors College

---

Reader: Betsy Herron, PhD, RN, CNE  
Assistant Professor, School of Nursing

---

Reader: Joy Harnage, DNP, RN  
Assistant Professor, School of Nursing

---

Reader: Deborah Sturm, Ph. D.  
Associate Professor; Director of Counseling  
Programs, Department of Graduate Psychology

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### **Nature's Effect on Mental Health**

Our country is plagued with an increasing number of cases of chronic illness. When one initially thinks of chronic illnesses, physical conditions such as asthma, hypertension, and diabetes may come to mind. Some often overlooked chronic illnesses are mental illnesses. As much as 18.1% of the US population suffers from any type of mental disorder. This accounts for 43.6 million people. In the nation 6.7% of the population has a depressive disorder and 18.1% struggle with an anxiety disorder (NIMH, 2016). Only 41% of people with a mental disorder will receive treatment (NAMI, 2017), and it is expected that the treatment of mental health problems and substance abuse disorders will reach 280.5 billion dollars in 2020 (SAMHSA, 2014). Even though not even half of those affected by these debilitating mental illnesses are being treated, costs are still expected to rise significantly. Not enough is being done to treat these patients effectively. In order for more patients to be treated and for the health care system to save money, simple, inexpensive, and proactive interventions must be developed to prevent the development of these disorders.

### **Background**

#### **Stress Adaptation and Burnout**

Adaptation is the response to change to preserve an individual's integrity and return to homeostasis (Townsend, 2015). These adaptations can sometimes become maladaptive responses. Hans Selye, in 1956, developed the general adaptation syndrome including the stages of alarm reaction, resistance, and exhaustion. The alarm reaction stage is characterized by a fight or flight response. Resistance involves the individual using defense mechanisms as a method of

protection in an attempt to restore homeostasis and adapt to the stressor. During this phase, if healthy defense mechanisms are used to adapt, the patient will return to baseline. When maladaptive responses occur during the resistance stage individuals may become stuck in the exhaustion stage. When this happens mental illness can occur. Other outcomes of the exhaustion phase can be headaches, coronary artery disease, ulcers, and colitis. The exhaustion phase occurs when the person has been exposed to the stressor for too long causing a depletion of energy and resources to cope with the stressor. Some examples of healthy adaptation would be journaling, talking to close friends or family about thoughts and feelings, or taking time to relax when overstressed. Examples of unhealthy adaptations are alcohol and drug abuse, self-harm, and isolating oneself (Townsend, 2015). When individuals are unable to adapt effectively and use unhealthy coping mechanisms, burnout may occur, which can be detrimental to many areas of the individual's life.

Burnout is defined as a “prolonged response to physical or emotional stressors that result in feelings of exhaustion, being overwhelmed, self-doubt, anxiety, bitterness, cynicism, and ineffectiveness” (Magtibay, Chesak, Coughlin, & Sood, 2017, pg. 391). Burnout negatively impacts many aspects of health care including the physical and mental health of nurses, cost of care, and patient satisfaction and outcomes. An astounding 18% of nurses suffer from depression according to a study done by the Robert Wood Johnson Foundation. It has been found that there are fewer mental health problems in nurses that effectively use healthy stress coping mechanisms (Magtibay, et al., 2017).

In the Organization for Economic Cooperation and Development countries (OECD), stress-related psychological ill health is the main cause of work absenteeism, costing

approximately 20 billion (in the European Union) annually (Perski, Grossi, Perski, & Niemi, 2017). A study was conducted to identify tertiary interventions to implement that would reduce stress, depression, and anxiety in order to increase return to work in the population. Many of the interventions were found to be useful when used in clinical settings for employees. These interventions included psychoeducation, mindfulness and relaxation exercises, time management training, and the development of personal coping strategies (Perski, et al., 2017). Other less common interventions were assertiveness training, seeking advice from labor experts, and establishing a workplace dialogue (Perski, et al., 2017).

In 2016, 45.8% of physicians had at least one symptom of burnout (Schrijver, 2016). This burnout can be caused by chronic fatigue, perceived threat of malpractice suits, loss of autonomy, an imbalance of work and life needs, inefficiencies in staff or equipment, ever-evolving technology, and the difficult decisions made daily between life or death (Schrijver, 2016). Burnout can lead to physicians leaving the field, poor patient outcomes, and personal cost to the health professional (for needed therapies) (Schrijver, 2016). The conductors of the study concluded that it is crucial to implement "healing for the healer", by providing services to reduce or prevent burnout that can lead to mental illness if left untreated (Schrijver, 2016).

### **Statistics**

In 2014, in a 12-month prevalence study, 18.1% of the US population reported any type of mental illness with mild to severe impairment. That accounts for 43.6 million people affected by a mental illness (NIMH, 2016). The highest rates of mental illness occurred in 18-25 year olds (20.1%) and 26-49 year olds (20.4%) (NIMH, 2016). In 2015, another 12-month prevalence study was conducted finding that 6.7% of the population in the US had major depressive disorder

(NIMH, 2016). Out of those, 58.7% had serious major depression and only 13.4% received healthcare treatment (NIMH, 2016). Of that care, 52.6% was prescription, 40.5% was outpatient, and 7.5% was inpatient (NIMH, 2016). Only 41% of those with any mental illness will seek treatment (NAMI, 2017). Another study for any anxiety disorder was done finding 18.1% of the population had any anxiety disorder and 22.8% of those cases were severe (NIMH, 2016). Out of those only 36.9% received healthcare treatment, and 34.3% received minimally adequate treatment (NIMH, 2016). It is obvious that mental illness affects a large portion of the US population, but not nearly enough of those people are treated.

Mental illness is a debilitating disease that affects multiple aspects of a patient's life including their career, their social environment, their self-esteem and outlook on life (NIMH, 2016). Emotional wellness requires that an individual have some degree of self-worth, the perception that he possesses a measure of value to self or others. Predisposing factors to positive self-esteem include a sense of competence, unconditional love, sense of survival, realistic goals, sense of responsibility, and reality orientation (Townsend, 2015). With such a small percentage receiving care, it is important to spread the word and reduce the stigma about mental illness. Many are embarrassed or ashamed of their condition while others just cannot afford the costs of such care. In 2006, 36.2 million Americans paid for mental health services, equating to 57.5 billion dollars. The average person spent \$1,591 on the care for a mental illness (NIMH, 2016). The cost of care is expected to rise to 280.5 billion by 2020 (SAMHSA, 2014).

### **Depression**

In 2012, 16 million people had at least one depressive episode in that year (Townsend, 2015). Depression affects 5.8% of all men and 9.5% of all women worldwide in any given year

(Gonzalez, Hartig, Patil, Martinsen, & Kirkevold, 2011). During their lifetime, 21% of women and 13% of men will become clinically depressed (Townsend, 2015). Women are two times more likely to become depressed than men (Townsend, 2015). Depression is more common in individuals with a low socioeconomic status as well as divorced individuals (Townsend, 2015). People are more likely to become depressed in specific seasons as well. One occurs in the spring months of March, April, and May and the second in the fall months of September, October, and November (Townsend, 2015). Seasonal patterns of exacerbations of symptoms in the winter and reduction of symptoms in the spring and summer are seen in 15-25% of major depressive disorder cases (Townsend, 2015). It is predicted that this is due to temperature and pressure changes, sociodemographic variables such as returning to school, or biochemical fluctuations in serotonin function (Townsend, 2015). Depression occurs in all developmental levels from children to the elderly (Townsend, 2015).

Townsend described the DSM-5 criteria for Major depressive disorder. This disorder is characterized by a depressed mood, loss of interest or pleasure in usual activities, and impaired social and occupational functioning that has lasted at least 2 weeks that is not due to a history of manic behavior, substance use, or other medical conditions (Townsend, 2015). It can be a single episode (the first episode) or recurrent (history of prior episodes). Signs and symptoms include depressed, sad, hopeless, or empty mood, diminished pleasure and interest in all or almost all activities, significant weight loss or gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or excessive or inappropriate guilt, diminished ability to concentrate, or indecisiveness, recurrent thoughts of death, suicidal ideation, suicide attempt, or a plan to commit suicide (Townsend, 2015). Depression may be

diagnosed if a patient presents these signs and symptoms most of the day, nearly every day, for at least two weeks (NIMH, 2016). Patients are encouraged to be active, exercise, try not to isolate themselves, socialize, and educate themselves on the disease and treatment options (NIMH, 2016).

Predisposing factors to developing depression include genetics (family history), deficiency of norepinephrine, serotonin, and dopamine, endocrine disorders, medication side effects from steroids, hormones, sedatives, antibiotics, antineoplastics, analgesics, and anti-inflammatories, hormonal disturbances as in adrenal gland dysfunction, electrolyte disturbances such as excessive sodium bicarbonate or calcium, neurological disorders including stroke, brain tumors, Alzheimer's disease, Parkinson's, and Huntington's, and nutritional deficiencies in vitamins B1, B6, B12, C, niacin, iron, folic acid, zinc, calcium, and potassium (Townsend, 2015).

Depression tends to become chronic and lead to work disability (Gonzalez, et al., 2011). Treatments include individual therapy, group therapy, family therapy, cognitive therapy, electroconvulsive therapy, transcranial magnetic stimulation, light therapy, and pharmaceuticals (Townsend, 2015). Cognitive therapy involves retraining the brain to control thought distortions. This therapy has been shown to be equal or even better in treating patients than medications (Townsend, 2015). Patients are taught to reframe their thinking by describing the evidence that supports and disputes their initial thought in order to find the truth (Townsend, 2015). Electroconvulsive therapy (ECT) is used only when medications are ineffective and involves inducing a grand mal seizure through application of an electrical current to the brain (Townsend, 2015). Transcranial magnetic stimulation consists of sending short pulses of magnetic energy to

stimulate nerve cells in the brain (Townsend, 2015). One benefit to this over ECT is it does not induce generalized seizure activity (Townsend, 2015). Light therapy is also used mainly during the winter months when there are more hours of darkness (Townsend, 2015). Scientists believe that due to longer periods of darkness more melatonin is produced (Townsend, 2015). Melatonin is the hormone that prepares the body for sleep. Light therapy is used in hopes of reducing the amount of melatonin produced to avoid excessive tiredness and lack of energy (Townsend, 2015).

There are many different types of medications used to treat depression and for many they work very well. Some of these include tricyclics, monoamine oxidase inhibitors, selective serotonin reuptake inhibitors, heterocyclics, and selective norepinephrine reuptake inhibitors (Townsend, 2015). These medications however come with the possibility of many uncomfortable side effects. All of these classes can result in dry mouth, sedation, nausea, and discontinuation syndrome (Townsend, 2015). Tricyclics and heterocyclics can result in blurred vision, constipation, urinary retention, orthostatic hypotension, reduction of seizure threshold, tachycardia, arrhythmias, photosensitivity, and weight gain (Townsend, 2015). SSRIs and SNRIs can result in insomnia, agitation, headache, weight loss, sexual dysfunction, and serotonin syndrome (change in mental status, restlessness, myoclonus, hyperreflexia, tachycardia, labile blood pressure, diaphoresis, shivering, and tremors) (Townsend, 2015). MAOIs can have the serious side effect of hypertensive crisis (headache, palpitations, nausea and vomiting, nuchal rigidity, fever, sweating, high blood pressure, chest pain, and coma) (Townsend, 2015). For some, the side effects of these medications are not tolerable, so it is important that they are given many options for alternative and complimentary therapies.

## **Anxiety**

Anxiety is the most common of all psychiatric illnesses with considerable function impairment and distress (Townsend, 2015). Of the anxiety disorders, 3-5% are generalized anxiety, 13% are social anxiety, and 25% are phobias (Townsend, 2015). Women are 2 times more likely to be anxious than men (Townsend, 2015). Individuals with a low socioeconomic status and familial disposition are also more likely to have an anxiety disorder (Townsend, 2015).

Anxiety is usually a normal reaction to a realistic danger or threat. Under normal circumstances, anxiety will dissipate once the threat is gone; however, in an anxiety disorder this response is out of proportion to the situation that is creating it or it interferes with social, occupational, or other important areas of functioning (Townsend, 2015). Townsend described the DSM-5 criteria of anxiety disorders. Symptoms include persistent, unrealistic, and excessive anxiety and worry more days than not for at least 6 months that are not attributable to organic factors like caffeine intoxication or hyperthyroidism (Townsend, 2015). Other symptoms experienced are muscle tension, restlessness, or feeling on edge (Townsend, 2015). Generalized anxiety disorder is diagnosed using symptom measurement tools such as DSM-5, and will usually only be diagnosed after symptoms have been present for months (NIMH, 2016). Patients are encouraged to join support groups and educate themselves about stress management (NIMH, 2016).

Due to these manifestations, individuals suffering from an anxiety disorder usually avoid activities or events that may result in negative outcomes or spend considerable amounts of time

and effort preparing for such activities (Townsend, 2015). These behaviors often result in procrastination in actions and decision making (Townsend, 2015).

There are many theories about the causes of anxiety disorders. One is the psychodynamic theory that states there is delayed ego development which causes the ego to be unable to intervene between the superego and id resulting in anxiety (Townsend, 2015). The id is the part of one's personality that is driven by pleasure. "Id- driven behaviors are impulsive and may be irrational" (Townsend, 2015, pg. 29). The superego is the part of one's personality that values morals and helps the person decipher right from wrong; good from bad. The superego assists the ego in controlling the id's impulses. The ego is rational and is the mediator between the id's impulses and the superego's need for perfection. The cognitive theory states there is faulty, distorted, or counterproductive thinking patterns that accompany or precede maladaptive behaviors and emotional disorders which results in the inability to reason through problems (Townsend, 2015). The neuroanatomical theory states anxiety can be caused by changes in brain structure, whereas the biochemical theory states that there are abnormal elevations in blood lactate resulting in anxiety and the neurochemical theory states that there is an overproduction in norepinephrine (Townsend, 2015). Anxiety can be caused by one or a multitude of factors.

Treatment for anxiety disorders includes individual therapy, cognitive therapy, behavior therapy, and pharmaceuticals. Behavior therapy consists of positive and negative reinforcement in an effort to modify behavior. Medications often used to treat anxiety include anxiolytics such as benzodiazepines, antidepressants, and antihypertensive agents. Anxiolytics are great for some patients struggling with anxiety, but they can also cause side effects such as sedation, confusion, and addiction (Townsend, 2015).

**Studies on Current and Future Medical Professionals with Depression and/or Anxiety**

One of the often overlooked groups with high rates of depression and anxiety are healthcare workers, nurses, physicians, and students studying in these fields. There has been a decrease in physician mortality from smoking related illnesses, heart disease, stroke, and cancer, but not from depression and suicide (Center, et al., 2009). These rates are actually higher in the physician population than in the general population in the United Kingdom (Center, et al., 2009). In 2002, a two day workshop took place in order for experts to develop a consensus on depression and suicide in physicians and methods of preventing the occurrence. The workshop was held by the American Foundation for Suicide Prevention. Participants were broken up into groups for breakout sessions in which the participants conducted a literature review and would give a formal presentation to the entire body. It was found that the lifetime prevalence of depression in the general population is 12.8% (Center, et al., 2009). Medical student and resident prevalence was higher, reaching 15-30% (Center, et al., 2009). It was also noted that late onset of depression in females was much higher in the physician population than the general population (Center, et al., 2009). The main risk factor for suicide is mental or substance abuse disorder; 90% of suicide deaths had a mental disorder, most commonly depression (Center, et al., 2009). Other factors included predispositions for suicide and stressful events (Center, et al., 2009). Protective factors include effective treatment for mental and physical disorders, social and family support, resilience and coping skills, religious faith, and restricted access to lethal means (Center, et al., 2009). Depression prevention and treatment can lead to better health in physicians and productivity resulting in better patient outcomes as well (Center, et al., 2009).

Center and colleagues found that if physicians are treated for suicidality, the quality of treatment may be compromised (Center, et al., 2009). This can be due to a number of factors including relationships with the provider giving treatment and the provider giving the physician-patient freedom to choose treatment and self-medicate (Center, et al., 2009). Thirty-five percent of physicians do not have a regular source of health care, which is associated with less use of preventive medical services (Center, et al., 2009). Center and colleagues made an observation that in the healthcare field there is low priority placed on the care of the healthcare workers such as physicians (Center, et al., 2009). This has become part of the culture causing many suffering to not seek help. Practicing physicians suffering from mental illness often encounter discrimination in medical licensing, hospital privileges, health insurance, and/or malpractice insurance (Center, et al., 2009). There have been a number of cases in which licensing board requested psychiatric records solely based on the diagnosis of a mental disorder not based on impairment (Center, et al., 2009). The Americans with Disabilities Act has been successfully used in legal challenges to discriminatory policies by medical licensing boards (Center, et al., 2009). It is crucial that a regular source of health care is established for physicians specifically dealing with mental health, that healthcare workers learn to identify the signs and symptoms of mental illness in themselves, educate about confidentiality measures to decrease fears and anxieties in seeking help, and conduct routine screenings for mental illness and suicide (Center, et al., 2009). There has not been enough recent research on the rates of mental illness and suicide in healthcare workers and it is recommended that studies investigate the patterns of seeking help, barriers, risk factors, impairment, depression, and suicidality in physicians and other healthcare workers (Center, et al., 2009). Other recommended studies include a large scale psychological

autopsy of physicians to investigate the degree of treatment, its effectiveness, adherence, seeking help and quality of care (Center, et al., 2009).

More is known about medical students. They have low rates of seeking help, with only 22% of those who had screened positive for depression using mental health services (Center, et al., 2009). For depressed students with suicidal ideation, only 42% received treatment (Center, et al., 2009). Barriers to care included lack of time (48%), lack of confidentiality (37%), stigma (30%), cost (28%), and fear of documentation on academic record (24%) (Center, et al., 2009).

In a 2009 study, it was found that 28.6% medical students showed signs of depression and 28.7% showed signs of anxiety, as well as 7.8% doctors showing signs of depression and 2.2% showing signs of anxiety (Ahmed, Banu, Al-Fageer, & Al-Suwaidi, R., 2009). The mean score on the Beck Depression Index (BDI) was 23.1. (1-10 normal; 11-16 mild mood disturbance; 17-20 borderline clinical depression; 21-30 moderate depression; 31-40 severe depression), and the mean anxiety score was 30.1 (0-21 low anxiety; 22-35 moderate; over 36 severe) (Ahmed, et al., 2009). Second year students had the highest rates of depression and anxiety (Ahmed, et al., 2009). Crying was most common depression symptom and fear of the worst happening was the most common anxiety symptom (Ahmed, et al., 2009). A significant correlation between depression and anxiety occurring together in medical students was noted (Ahmed, et al., 2009). Medical student academic load places them under considerable pressure causing growing concern of emotional distress. Medical professionals work in high stress environments. Both of these populations are at risk for mental health problems (Ahmed, et al., 2009).

In an investigation done in 2004, it was found that 36.3% of nurses suffered from depression and 14.2% had anxiety (Huang, Ying, & Xiao, 2004). Nurses with both disorders

accounted for 11.6% of the 779 nurse sample (Huang, et al., 2004). The mental health of nurses correlated positively with the level of occupational stress they experienced in the clinical field (Huang, et al., 2004). In a study of nursing students, 51.1% experienced mild to severe depression, 59.8% suffered from anxiety, and 82.6% struggled with stress (Rathnayake & Ekanayaka, 2016). There was a positive correlation found in between depression, anxiety, and stress (Rathnayake & Ekanayaka, 2016). The poor mental health of these students can lead to poor academic performance and an interference with their capability to learn (Rathnayake & Ekanayaka, 2016). Factors associated with depression were age, academic year, satisfaction with the nursing program, physical well-being, possible stressors, and self-rated physical health (SRPH) and self-rated mental health (SRMH) (Rathnayake & Ekanayaka, 2016). Anxiety factors were similar, including age, SRPH, and SRMH (Rathnayake & Ekanayaka, 2016). Factors associated with stress were possible stressors, SRPH, and SRMH (Rathnayake & Ekanayaka, 2016). The researchers recommend prioritizing the improvement of the nursing students' mental health by providing stress management and counseling for them (Rathnayake & Ekanayaka, 2016).

### **Nature Assisted Therapy**

#### **Definition of Nature Assisted Therapy (NAT)**

The research on nature-assisted therapy is centered on Wilson's biophilia hypothesis of humans' innate emotional affiliation with other living organisms (Annerstedt, 2011). It was found that the connection humans have with nature is a fundamental component to good health and the disruption of that connection, like urbanization, can alter or even damage our psycho-

physical health (Annerstedt, 2011). Nature-assisted therapy is any intervention with the aim to treat, hasten recovery, and/or rehabilitate patients with disease or a condition of ill health (mental disorder, substance abuse, dementia, behavioral disturbance, and various physical disorders such as obesity, cancer, hearing impairment, and handicaps) using plants, natural material, or outdoor environments (Annerstedt, 2011). This does not include interacting with animals. Other therapies with direct contact with animals do exist such as pet therapy and hippotherapy. The subdivisions of nature-assisted therapy include social and therapeutic horticulture (garden therapy), natural environments therapy (wilderness or outdoor adventure therapy), and technical background concerning methodology of available evidence (improve public health by increasing knowledge of evidence based practice for implementing NAT) (Annerstedt, 2011).

### **Benefits of Nature Assisted Therapy**

#### **Emotional.**

Natural landscape scenes resulted in better health effects compared to urban ones. There were three main types of health effects: short term recovery from stress or mental fatigue, physical recovery from illness or reduced incidence of illness, and long term behavioral change (increased social interaction and decreased aggression) and overall improvement in wellbeing (Velarde, Fry, & Tveit, 2007). Studies showed the greener the environment the better overall wellbeing (Velarde, et al., 2007). Exposure to landscapes related to nature reduced stress, improved attention capacity, facilitated recovery from illness, improved physical well-being in elderly people, and improved mood and general well-being (Velarde, et al., 2007). These effects have been addressed by means of viewing natural landscapes during a walk, viewing from a window, looking at a picture or a video, or experiencing vegetation around residential or work

environments (Velarde, et al., 2007). More classification is needed to best understand what landscapes will produce the most positive effect by defining the scene more clearly (Velarde, et al., 2007).

A study conducted in 2010 showed an association between lower levels of stress and visits to nature. Annerstedt and colleagues tested the similarities and differences of visitors that went to broad-leaved forests versus coniferous forests. The broad-leaved forest visitors had higher levels of stress in women that were further away from the forest (Annerstedt, et al., 2010). It was also found that longer time spent in the forest resulted in lower stress for men (Annerstedt, et al., 2010). There were no statistically significant findings for the coniferous forest visitors (Annerstedt, et al., 2010). Based on the results of this study, there is a possible link between lower levels of stress and closer proximity to broad-leaved forests and longer amounts of time spent in them (Annerstedt, et al., 2010).

Cotton and Butselaar conducted a study in 2013 testing the effectiveness of outdoor adventure camps for individuals with mental illness. There were two camping groups; STEPS was for participants aged 18-25 and HORIZONS was for 26 years and older. Activities such as low and high ropes course, mountain biking, open camp fire, and raft building were offered for the participants. They were assessed at the beginning, the end, and 4 weeks after the camp ended via questionnaire. Significant improvements were found in mastery, self-esteem and social connectedness from baseline to end of the camp in the HORIZONS group, but were not sustained until the 4 week follow-up (Cotton & Butselaar, 2013). There were significant decreases in social anxiety in the STEPS group from baseline to end of camp (Cotton & Butselaar, 2013). The camping interventions had an immediate impact on participants by

instilling a greater sense of wellbeing (Cotton & Butselaar, 2013). The “Challenge by Choice” philosophy is integral to the camping experience by challenging participants to extend their boundaries. Challenge by Choice involves the principles of setting goals, choosing one’s experiences, and making informed decisions (Cotton & Butselaar, 2013).

A study of veterans experiencing depression, anxiety, or post-traumatic stress disorder (PTSD) was conducted in which 98 veterans were placed in 12 different groups with 5-10 people that took part in nature based recreation. They were surveyed 1 week before, 1 week after, and 1 month after the experiment for changes in their mental state, including their background, psyche, social function, and life outlook. Findings of the study showed improved self-esteem, emotional control, and social connectedness, as well as improved mood, attentional function, coping, and overall well-being (Duvall & Kaplan, 2014). The study was able to conclude that natural settings have restorative and reflective properties that can improve mental illness symptoms as seen in the veterans that were studied (Duvall & Kaplan, 2014). It was also found that they maintained their higher level of function and mood after the study was over (Duvall & Kaplan, 2014).

The Morikami Museum and Japanese Gardens in Delray Beach, Florida was used as the setting for a study conducted in 2007 focusing on older adults with depression. One group would walk alone through the garden, another with a group guided by a facilitator, and the last was art therapy, used as a control group. Group 1 noted enjoyment of walking and saw the walking as something to look forward to. They also had a sense of peace and serenity in the garden and were able to reflect on the meaning of life. Group 2 had feelings of being able to leave problems in the past, made relationships with group members, and noticed things they would not have if alone through the guided imagery by the facilitator. Group 3 learned more about themselves,

developed relationships with group members, shared experiences with group members, and gained perspective on their emotions. Participants in all three groups felt as though the interventions they experienced were helpful in relieving depression and in improving mood and overall attitude concerning life. Nurses should be aware of depression in older adults as well as all ages and how to identify its manifestations in order to improve quality across the lifespan and in all stages of development. The study concluded that simple, inexpensive, safe interventions such as garden walks, guided imagery garden walks, or art therapy are effective for reducing depression in older adults (McCaffrey, 2007).

Gonzalez and colleagues (2011) described existential meaning as “the cognizance of order, coherence, and purpose in one’s existence, the pursuit and attainment of worthwhile goals, and an accompanying sense of fulfilment” (as cited in Reker & Cousins, 2000, pg. 41). Therapeutic horticulture (TH) can enhance existential issues with its reflective properties. TH is used to improve participants’ well-being by actively or passively participating in activities with plants, whether that be working in a garden or sitting on a bench in a natural setting (Gonzalez, et al., 2011). Spending time in nature and gardening involve spiritual and existential reflection time in non-clinical and clinical groups (Gonzalez, et al., 2011).

Two studies were conducted in which there was a 12 week program with gardening activities including active parts (sowing, germinating, polling, planting, composing beds, cultivating vegetables, and rooting various cuttings of flowers) and passive (walking around, sitting on benches, picking flower bouquets, and watching birds, insects, butterflies, the weather, and the landscape). The first study showed significant decreases in the Beck Depression Index during the intervention and at the 3 month follow up but no significant findings for existential

issues (Gonzalez, et al., 2011). The participants did comment that the TH was meaningful and had influenced their life regard (Gonzalez, et al., 2011). The second study found a significant decline in the BDI again, and also a significant correlation in BDI and existential outcomes using a different measurement tool than the first study (Gonzalez, et al., 2011). Interaction with the natural environment results in reflection allowing people to find meaning in past experiences, make plans for the future, discover one's creativity and spirituality, and find meaning in life (Gonzalez, et al., 2011). Depression has roots in existential issues such as a lack of meaning in life, so by spending time in nature, one is able develop mechanisms to cope with life experiences and find meaning in them to avoid depression symptoms (Gonzalez, et al., 2011).

### **Cognitive.**

By 2020, depression will become the second leading cause of burden in the world (Vujcic, et al., 2017). The Stress Recovery Theory and the Attention Restoration Theory both conclude that nature has the ability to reduce stress and allow the brain to rest and recover from mental fatigue (Vujcic, et al., 2017). Gardening activities have been found to improve mood, self-esteem and physiological measures such as cortisol, which is associated with stress on the body. (Vujcic, et al., 2017).

The Attention Restoration Theory (ART) draws on research demonstrating that attention can be separated into two components: involuntary attention, in which attention is caught by interesting stimuli, and voluntary attention, which is directed and controlled by ones cognition (Berman, et al., 2012). According to ART, interacting with environments that contain intriguing stimuli (such as nature) invokes involuntary attention, allowing the brain a chance to recover

from mental fatigue (Berman, et al., 2012). A study was done to examine whether interacting with nature has beneficial effects on memory performance and affect in individuals diagnosed with Major Depressive Disorder. The results were increased positive affect and improved BDS (backwards digit scale) score in nature walk participants. There was a decrease in negative affect and frequency of thoughts of negative experiences (Berman, et al., 2012). These effects were observed even though participants were instructed prior to their walks to think about a painful negative experience. The degree of change noted in individuals with MDD in this study was nearly five times as large as results in healthy individuals suggesting that individuals with depression benefit even more from such interactions (Berman, et al., 2012). Interacting with nature is, for the most part, widely accessible, simple and affordable (Berman, et al., 2012).

Another theory called the Stress Recovery Theory focuses on how humans are drawn to natural environments in times of physiologic stress in order to recuperate (Berto, 2014). This theory recognizes that humans developed in a natural environment and physiologically and psychologically are more adapted to handle stress in these environments compared to urban ones (Berto, 2014). The main difference in this theory from the Attention Restoration Theory is the drive to seek out a restorative environment in a natural setting- the Stress Recovery Theory being physiologic stress and the Attention Restoration theory being mental fatigue (Berto, 2014). Both however agree on the fact that humans have an innate need for restoration of cognitive resources by seeking out natural environments that allow them to recover emotionally and physically to reach the optimal level of physiological activation (Berto, 2014). Nature can serve as a “distraction” in times of stress instilling a sense of control and privacy that encourages

individuals to participate in physical activity and invest in personal relationships, which can serve as coping mechanism during stressful times (Berto, 2014).

### **Physical.**

A systematic review of controlled and observational studies related to nature's effect on health found evidence that there is a significant effect on therapeutic goals and decreased measurable symptoms of disease (Annerstedt & Wahrborg, 2011). In another study evaluating the mortality rates in women based on the amount of vegetation in the area in which they lived, women in the highest quintile of cumulative average greenness had a 12% lower rate of mortality from any non-accidental cause (James, Hart, Banay, & Laden, 2016). The strongest association was with respiratory and cancer mortality (James, et al., 2016). These lower levels of mortality still exist when adjusted for risk factors of mortality. James and colleagues suggest that new policies should be developed to increase vegetation in all areas, which may increase physical activity, reduce harmful exposure, increase social interaction, decrease obesity, improve cardiovascular function, and improve mental health, because there will be a lower exposure to air pollution, extreme heat, and noise (James, et al., 2016).

Pulmonary and cardiac hospital patients were studied to determine if there was an effect on their well-being if they had a view of a natural setting while in the health facility. Women with blocked views showed decreased physical health, while men with blocked views suffered mentally only (Raanaas, Patil, & Hartig, 2012). More patients with the natural view chose to stay in their room and wanted to be alone to cope with their rehabilitation program (Raanaas, et al., 2012). Those with natural views were more satisfied with their rooms (Raanaas, et al., 2012). Results varied depending on gender and diagnosis. The evidence in conjunction with other

findings suggests that patients would benefit from staying in facilities with rooms with pleasing natural views to help them cope with the stress and pain throughout their recovery (Raanaas, et al., 2012).

Other benefits of nature include reduced all-cause mortality and mortality from cardiovascular disease, improved healing times and self-perceived general health, reduced stress, reduced respiratory illness and allergies, reduced risk of poor mental health, improved social cohesion, and improved cognitive ability (Shanahan, et al., 2015). Trees and vegetation in urban areas counteracted the urban heat island effect by providing shade and providing moisture for evapotranspiration in which water on the leaves evaporates allowing a transfer of heat away from the ground (Shanahan, et al., 2015). This results in increased temperature moderation and therefore decreased heat stress in the human populations in urban areas (Shanahan, et al., 2015). Grassy areas also provide a softer ground surface than concrete (Shanahan, et al., 2015). The shade and more comfortable walking areas can increase people's drive to meet recommendations for physical activity (Shanahan, et al., 2015). Physical activity is a preventative strategy against multiple chronic illnesses and mental illness (Shanahan, et al., 2015).

Exercise has many benefits for the mentally ill, but comes with its challenges. The benefits result in empowerment, social interaction, and group support, but challenges include cost of programs, medicine side effects, and body image from "gym anxiety" (Maier & Jette, 2016). Mentally ill patients are more likely to be sedentary (Maier & Jette, 2016). In Australia and the UK, higher rates of chronic illnesses, homelessness, and incarceration were evident in people with mental illness compared to those not in distress (Maier & Jette, 2016). Their conditions can affect the ability for them to receive quality care (Maier & Jette, 2016). Outdoor

exercise is cost effective and a preventative treatment for cardiovascular disease (Maier & Jette, 2016). Promoting low self-conscious activities such as gardening and walking in nature overcomes many of these challenges. Nature based exercise promotes connection to self and others without appearance or performance anxiety (Maier & Jette, 2016). Using the “Exercise is Medicine” initiative, practitioners use exercise referrals to improve patient conditions. It is recommended that health professionals reach out to Parks and Recreation departments to increase park use for public health improvement (Maier & Jette, 2016).

### **Barriers.**

Barriers do exist to using nature to benefit one's mental health. Though there are many benefits seen from nature, it is difficult to pinpoint exactly what aspect of it allows these benefits. It is necessary to identify a specific and measurable property of nature, define it and its function, identify how it effects humans, and its health benefits all while considering other factors that may influence the effects of that aspect on humans and the outcomes humans experience from its effects (Shanahan, et al., 2015). Other physical barriers to individuals spending time in nature would be little access to natural areas, deforestation (less natural areas), pollution, allergies, poor or harsh weather conditions, and individuals' physical incapacity to be transported to a natural area.

## **Study Design and Results**

### **Design**

A study was designed to test nature's effect on the mental health of current and future health professionals. Each volunteer was assigned randomly to a group. Students and faculty between

the ages of 20 and 50, who are also in the College of Health and Behavioral Studies at James Madison University, were the targeted population. Research shows that this age range is more likely to struggle with a mental illness. The first group had no change in daily routine. The second group took care of a small plant in their home every day for four weeks. The third group took a 30 minute walk 5 times per week for four weeks in a natural or rural area such as a national forest, a park, or a garden. The participants were assessed two weeks prior to beginning the new routine for baseline data, week 1, week 2, week 3, and week 4 of the routine, and two weeks following the routine. This study will more information to add to the literature about the effect of exposure to nature on mental illness. Variations in the benefits of nature according to the type of nature engagement will be able to be analyzed. Study outcomes could benefit those looking for non-pharmological treatments for mental illness.

The means of measuring mental status for participants in this study was based on an already clinically proven and acceptable scale. The GAD-7 anxiety screen and the PHQ-9 depression screen were used (Jarvis, 2016). These scales were chosen because they are well accepted, validated, easy to complete, understand and score, and they are in the public domain. Questions were formatted from these scales into a Qualtrics survey for participants to fill out including a section indicating how many hours each week they took part in the activity assigned to them to monitor adherence to the intervention. There will be no personal identifiers used in this survey process. Participation is completely voluntary and online at the convenience of the participant. A website ([natureandmentalhealth.weebly.com](http://natureandmentalhealth.weebly.com)) was constructed that included instructions for each group, a random number generator for assignment, a link to the Qualtrics survey, and a general overview of the purpose of the study.

**Results**

Unfortunately, due to lack of participation, no data was available for interpretation. No conclusions on nature's effect on the mental health of students and professors in the Health and Behavioral Studies Department at James Madison University were able to be drawn. Future hopes for this study include a second trial in which the targeted population is expanded to all of the university's students and professors rather than a focus on current and future health professionals in order to determine if poor mental health is a problem at the school. If a problem is detected, more research will be conducted to develop a curriculum for a course on stress management. This course will allow students in their first year at university to be able to explore different methods of coping, including nature assisted therapy. The course would be held in a natural location. An appeal to the school will be made to add this developed course, if proven effective, to the students' general education requirements.

**Limitations**

A limitation to this study was recruiting enough participants via advertisement and a website with information. If the study was done on a larger scale, encompassing more students and faculty, more participants may have been recruited. Another limitation was no personal identifiers being available to the researcher in order to send reminders to participants about expectations of the study and survey deadlines. Incentives may also have increased participation.

**Conclusion**

In conclusion, spending time in nature has been shown to have positive emotional, cognitive, and physical outcomes. Based on this information supported by numerous studies,

current and future health professionals and the general public should utilize this as a resource for their patients and themselves. Some practitioners are now “prescribing” nature. Dr. Daphne Miller believes exposure to nature could become the next vital sign. An example of one of her prescriptions is as follows, “Drug: Exercise in Glen Canyon Park (See attached Google map.) Dose: 45 minutes of walking or running Directions: Monday, Wednesday, Friday, and Saturday at 7:00 AM Refill: Unlimited”. She has been involved in the National Park Service’s “Healthy Parks, Healthy People” initiative since 2008 (Miller, 2014).

In order to continue using nature as an alternative or complementary means of dealing with mental illness or just day to day stress, it is crucial that health professionals and the public advocate for more green spaces especially in urban areas, decreased pollution and more strict regulations on disposing of waste to keep natural areas clean and healthy, and the preservation of natural habitats by reducing deforestation and encouraging more wilderness sanctuaries. More research needs to be done on nature’s effect on mental health, and practitioners and patients need to be educated on its benefits, locations that are available to them, as well as symptoms of depression and anxiety to look out for in themselves and others. Prevention is the key to reducing the prevalence of mental illness. Nature-assisted therapy is an affordable, proven, and viable intervention for preventing mental illness from occurring and managing symptoms in patients who are mentally ill. The general public, the mentally ill, and health professionals will benefit immensely from utilizing this therapy for themselves and patients.

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