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## Integrating the natural healing process for post-traumatic stress disorder treatment in veterans through a healing garden.

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**Integrating the natural healing process for post-traumatic stress disorder treatment in veterans through a healing garden.**

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Landscape Architecture, MLA

Thesis submitted  
to the **Davis College of Agriculture, Natural Resources and Design**  
at **West Virginia University**

in partial fulfillment of the requirements for the degree of

Masters in  
Landscape Architecture

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2020

Keywords: Healing garden, post-traumatic stress disorder, well-being, veterans, therapy, newness.

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## **Abstract**

### **Integrating the natural healing process for post-traumatic stress disorder (PTSD) treatment in veterans through a healing garden.**

**Abigail Taiwo Ajibade**

In 2002, several ex-service personnel brought a court case against the Ministry of Defense for the inability to identify PTSD issues at an early stage and to provide support and effective treatment (Langston et al. 2007). Also in recent times, reports have suggested that US marine and army infantry units returning from duty in Iraq and Afghanistan have a higher level of expected proportions of mental disorders and that about 10% of personnel are returning home are with symptoms of post-traumatic stress disorder (Smith et al., 2008). This discovery made it pertinent to look for natural ways to assist veterans while embarking on a recovery journey.

This study focuses on establishing and integrating the use of therapeutic gardens during the veteran's recovery. The project centers on establishing a healing garden as a natural platform of healing for veterans during the treatment of PTSD. In this context, a veteran is a military personnel who has been affected by his or her experiences, which led to post-traumatic stress disorder while in active service for their fatherland, hoping that this would also serve as a means for occupational therapy for diagnosed patients.

To put the research into perspective, some existing healing gardens are researched to provide more understanding of the benefits of the healing garden concept in aiding the treatment of PTSD by putting veterans in context. This is because of the saying that healing gardens are designed to meet specific medical needs. For example, while a healing garden can be designed to enable seniors to access outdoor activities and the natural environment outside, it can also be designed for children hospitals to help children blow off some steam, calm them down, engage them in garden activities, and converse with nature.

## Dedication

I dedicate this to my mother, **Esther Adedoja Sanni**, for the passion you have for education, but who lacked the opportunity to get one, and for every support you have given to me to ensure that I succeed.

## **Acknowledgement**

I am very grateful to God for His love, blessings, help for the successful completion of graduate school.

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I am thankful for my champs: AnuOluwanimorigba, Oluwasijuanuwomi, OreOluwaonipekun and their daddy. Being a mom to you while in graduate school was genuinely challenging, but your little acts of kindness, the show of love and prayers kept me going.

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## Chapter 1 Introduction

Keywords: Healing, garden, post-traumatic stress disorder, well-being, veterans, children hospital, therapy, newness.

### 1.1 Background

The focus here are veterans returning to the civilian cycle for the gap created throughout active service in the military. Being away from families, familiar environment, and civilian living standards for a long time and, as a result, has brought mental changes to a lot of them. Their encounter often takes away a significant part of their true self and mold them into an acceptable person to enable them to fit into the task before them. These changes for survival do not leave them the same. While some can manage it, some live with it for the rest of their lives, and the struggle with PTSD is real. Also, considering both the physical and the mental effects of war, which rubs on each other, necessitating the need to provide help most naturally. The focus here are veterans returning to the civilian cycle. Military personnel is often at a high risk of exposure to potentially traumatic events. As such, this makes them vulnerable to suffering from psychological distress and mental health problems, including depression, family violence, substance abuse, and post-traumatic stress disorder PTSD (Langston et al., 2007).

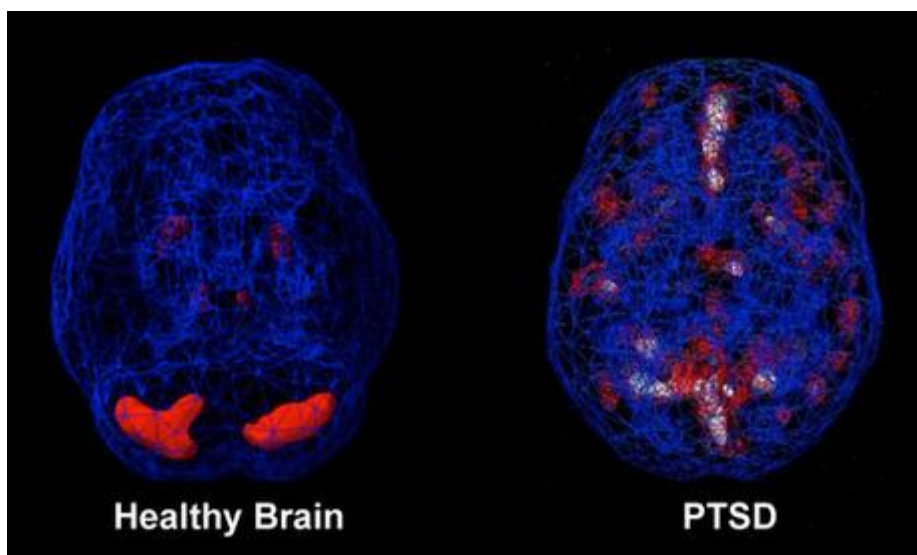


Figure 1. A healthy brain and a brain with PTSD (Source: The trauma of sexual abuse by Tiffany 2015)

Furthermore, many military forces must cope with increasingly complicated conflicts with an ever-decreasing number of soldiers available to fulfill these duties. (Langston et al., 2007). Studies have shown that the extent of psychological trauma from operational duties is proportionally related to the type of warfare fought, and one of the adverse effects of wartime trauma is PTSD. The rates of PTSD in combat veterans varied from 15 to 31%, measured on numerous occasions. These rates are more than the 2 to 3% prevalence of PTSD symptoms recorded in the UK general population (Langston et al., 2007). PTSD is global public health but there is higher concern for the US military due to high prevalence (Gelernter et al. 2019). These are problems for the military services and a threat to their occupational functionality.

## **1.2 Purpose of the Study**

This study aims to assess the causes and symptoms of PTSD in veterans to integrate the concept of a therapeutic healing garden while receiving treatment for veterans. This study includes evaluating existing healing gardens for users' benefits, requirements for designing a healing garden, and planting materials that have calming attributes that help while receiving treatment for post-traumatic stress disorder. PTSD is a global public health problem and of concern to the US military. While PTSD can be attributable to a range of traumatic events, some military personnel's nature and intensity of traumatic events result in unusually high prevalence rates among US military veterans. The veteran's meltdown goes beyond the physical; it is emotional and can also be spiritual. In other words, we probably also need to go a step further with support during the healing process, especially where physical measures become limited. The National Vietnam Veterans Readjustment Study through November 1986 and February 1988, comprising interviews of about 3,016 American Veterans handpicked to provide a class sample of people who served in

the armed forces in Vietnam. The average lifetime prevalence of PTSD among Veterans was 30.9% for men and 26.9% for women, while among Vietnam theater Veterans, there were 15.2% of males and 8.1% of females diagnosed with PTSD when the study was conducted (Gradus 2013). Presently, the 2005 National Institute for Health and Clinical Excellence guidelines do not recommend pharmacotherapy option as first-line treatment. So also, is the 2009 American Psychiatric Association, the guidelines note that pharmacotherapy is not very effective for combat-related trauma in comparison to civilian PTSD (Shishko et al. 2018). The above mentioned gives the need to look inward and consider natural ways to aid treatment.

### **1.3 Research Questions**

- What is the natural environment needs of veterans diagnosed with PTSD?
- How can the concept and design of a healing garden help during treatment?
- How does nature respond to veterans with PTSD?
- How can the concept and design of a healing garden help during the cause of treatment?

### **1.4 Significance of the study**

This study is significant because many persons serving in the military are more likely to experience traumatic events, which makes them an at-risk group since they are easy targets to psychological distress and several mental health problems as depression, domestic violence in families, drug abuse, and the post-traumatic stress disorder (PSTD). The above problems facing military personnel are threatening their occupational functionality (Veterans Health Initiative, 2002). Man is highly dependent on his ability to make decisions, and brain use is incredibly impactful on the mental well-being of those involved in contemporary warfare, which is very dynamic and reliant

on advanced technology. Modern warfare is very strict, leaving no room for errors. Besides from the mental strain, armed forces are also tasked to keep up with the ever-changing and twisted nature of conflicts and a downtrend in troops' numbers at disposal on the battlefields. Research has reportedly linked the level of psychological trauma incurred from discharging military duties directly proportional to the type of combat one engages in per time. PTSD is known for being among the most severe battlefield traumas affecting military personnel (Tanielian et al., 2008). Results from mental health professionals have quoted the rate of PTSD among war veterans between 15% and 31% (Milliken et al., 2007). Post-traumatic stress disorder (PTSD) rates are perhaps surprisingly low amongst British forces, with prevalence rates of around 4% in personnel who have deployed, rising to 6% in combat troops, despite the high tempo of operations in recent years (Hunt et al., 2013).

Former service members in the year 2002 filed a case against the Ministry of Defense for overlooking the issues of people living with PTSD, that is, failing to diagnose the condition in good time and failure to provide the necessary support and care to those affected so that they can get the necessary treatment. The project aims to establish a healing garden as a natural way of healing during PTSD in veterans. It focuses on creating a place of becoming sound again for veterans who have been affected by their experiences leading to post-traumatic stress disorder while sacrificing for their fatherland through the therapeutic garden. It is considered a means for occupational therapy for patients. Healing gardens are known to be designed for a specific purpose; they can be designed to enable seniors to get outside for exercise, sunlight, and fresh air. Meanwhile, it can also be designed for children hospitals to help children blow off some steam, calm them down, engage them in garden activities, and converse with nature.



## **1.5 Scope of the Study Area**

The design is a virtual done with no physical site on the ground for analysis. The consideration for plant material used for this project is based on the healing, color, and calming properties of the plants, of which most of it is suitable for zone eight to zone ten under the United States of America zoning for planting. The state of Florida is virtually considered for this project.

## **1.6 Statement of the problem**

According to the New Directions for veterans, a government arm that was established in 1992, the followings as factors that can affect a veteran's ability to adjust to life after service: relationship with self, identity, their purpose, self-value, the fear of starting afresh, bonding with family and friends. Several types of research provide an understanding of the need for a natural environment to thrive. The ability to eliminate or curb our natural environmental-related problem is the beginning of real living. Inadequacies in environmental and other government policies and human activities have impacted our world so much that the adverse effect robbed us of those unique things and moments in our lives. The government, medical professionals, and researchers are doing a lot to tackle this issue professionally; however, these numerous drugs tend to have their adverse effects in the long run. Returning to our natural root can make much difference, so we need to look inward and use nature to eliminate these diseases.

## **1.7 Audience and Other Partners**

I would be researching several studies of professionals, academia, Veteran affairs and public data for information and advice that will be used for the success of this project. This qualitative research

method will be made through existing research work, interviews, and tools with a clear focus and theory-based pattern for analyzing unique characters and information.

**1.8 Graphic Methodology**

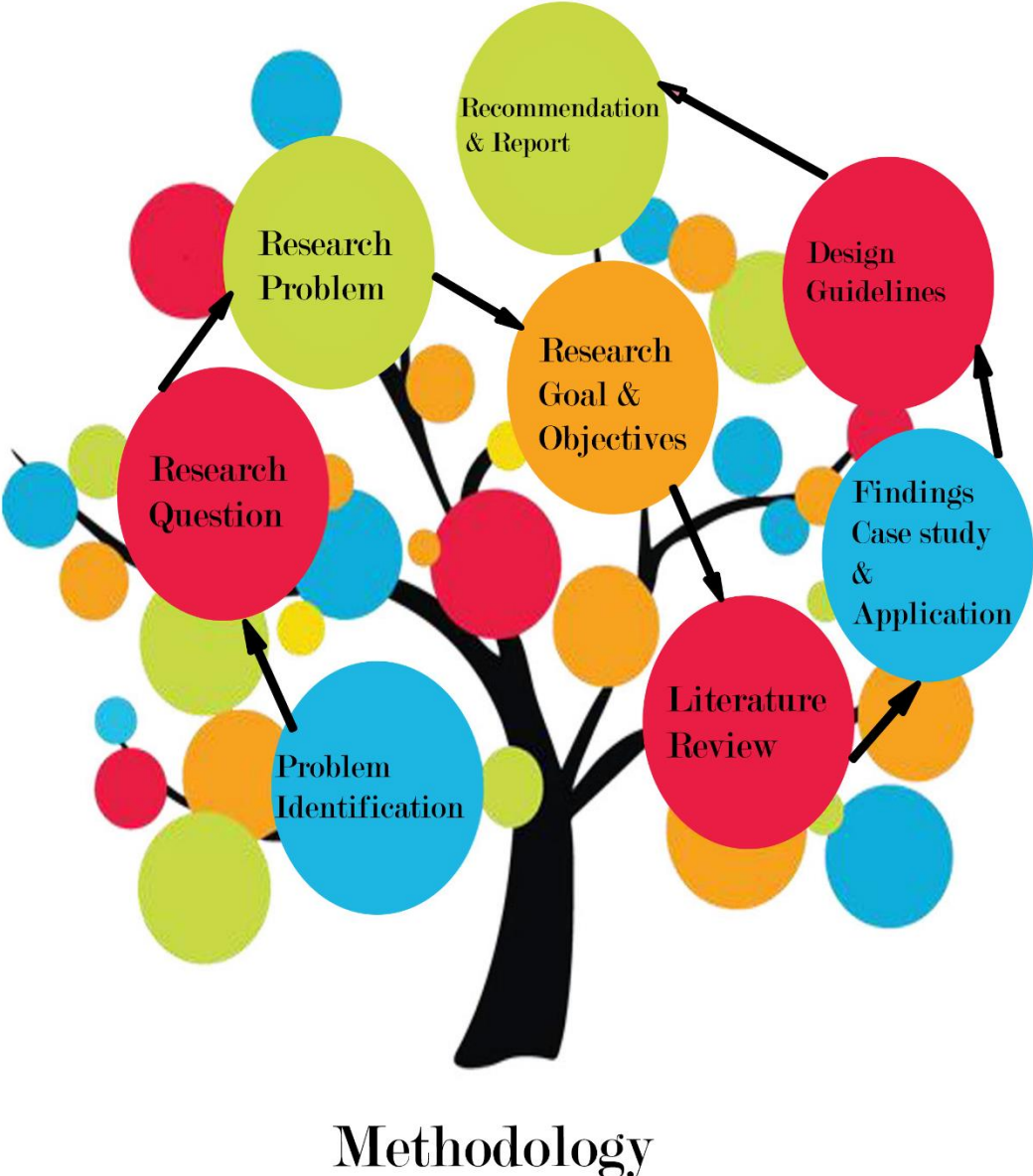


Figure 2 Graphic flow chart Methodology

## Chapter 2 Literature Review

### 2.1 Definition and causes of Post-Traumatic Stress Disorder (Ptd)

The American psychiatric association defines post-traumatic Stress Disorder (PTSD) is an anxiety disorder that occurs after experiencing or witnessing a traumatic situation. A life-threatening event leading to traumatic circumstances can be such as military combat, natural disasters, terrorist incidents, significant accidents, and physical or sexual assault in adult or childhood. Many survivors of trauma often come back to being normal after a little time. However, it is not the same for some who have stress reactions that will not go away on their own or get worse over time. These individuals may develop PTSD (Hamblen, 2009). Post-traumatic stress disorder (PTSD) can be an acute, chronic, or delayed reaction to a traumatic event or experience.

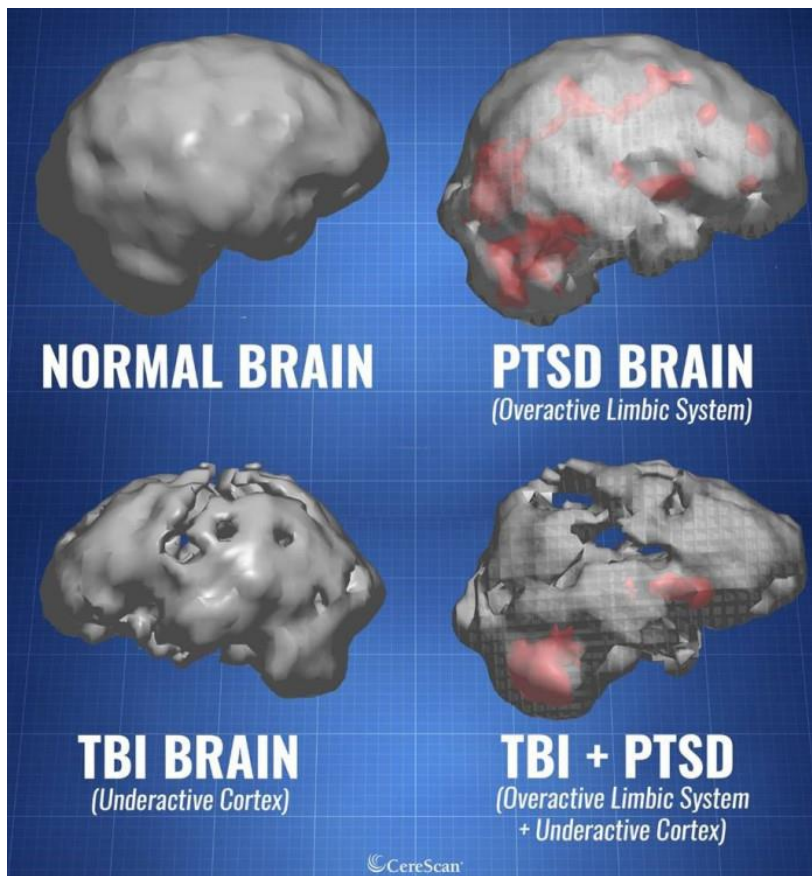


Figure 3 Difference between normal, PTSD and TBI Brain (Source: Brain scan photos by Cerescan. <http://www.cerescan.com>)

It is essential to say that PTSD is not the same as Traumatic Brain Injury, which is severe neurological disabilities result from severe traumatic brain injury and often cause death and disability in young people (Ghajar 2000).

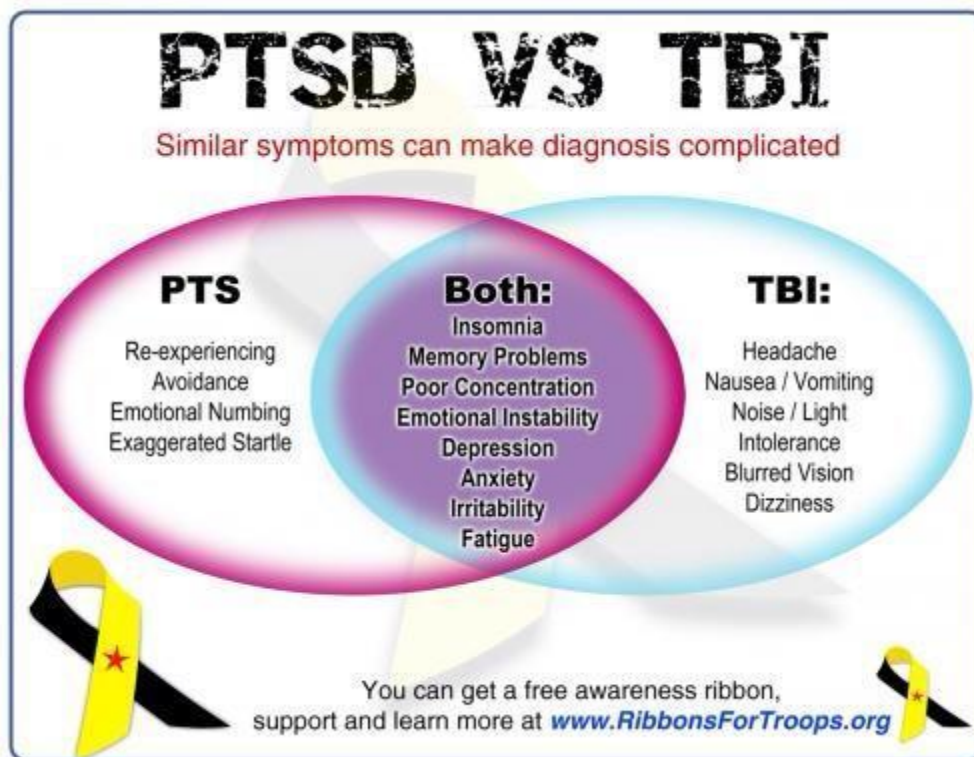


Figure 4 Similarities and differences of PTSD and TBI (Source: www.RibbonsForTroops)

Interviews of a national representative sample of about 9,282 Americans between 18 and older around February 2001 and April 2003 were carried out by the National Comorbidity Survey Replication (NCS-R). In their series of interviews, PTSD was assessed among 5,692 participants using the DSM-IV criteria; this estimated lifetime prevalence of PTSD among adult Americans to be 6.8%, with an estimated 3.5% PTSD prevalence in the previous year; the twelve-month prevalence was 1.8% among men and 5.2% among women (Gradus 2013). The point prevalence of combat-related PTSD in US military veterans ranged from approximately 2% to 17%. Studies of recent conflicts suggest that combat-related PTSD afflicts between 4% and 17% of US Iraq War

veterans, but only 3–6% of returning UK Iraq War veterans (Richardson et al., 2010). Over 40% of the cohort deployed between 2001 and 2006 for baseline and follow-up. However, 24% were deployed for the first time to provide support during the wars in Iraq and Afghanistan. New record rates of 10-13 cases of post-traumatic stress disorder per 1000 person-years occurred in the millennium cohort. New-onset self-reported post-traumatic stress disorder symptoms or diagnoses were identified in about 7.6-8.7% of deployers who reported being exposed to combat, 1.4-2.1% of deployers who did not report combat exposures, and 2.3-3.0% of non-deployers. For some of those with self-reported symptoms of post-traumatic stress disorder at baseline, deployment did not affect the persistence of symptoms (Smith et al., 2008).

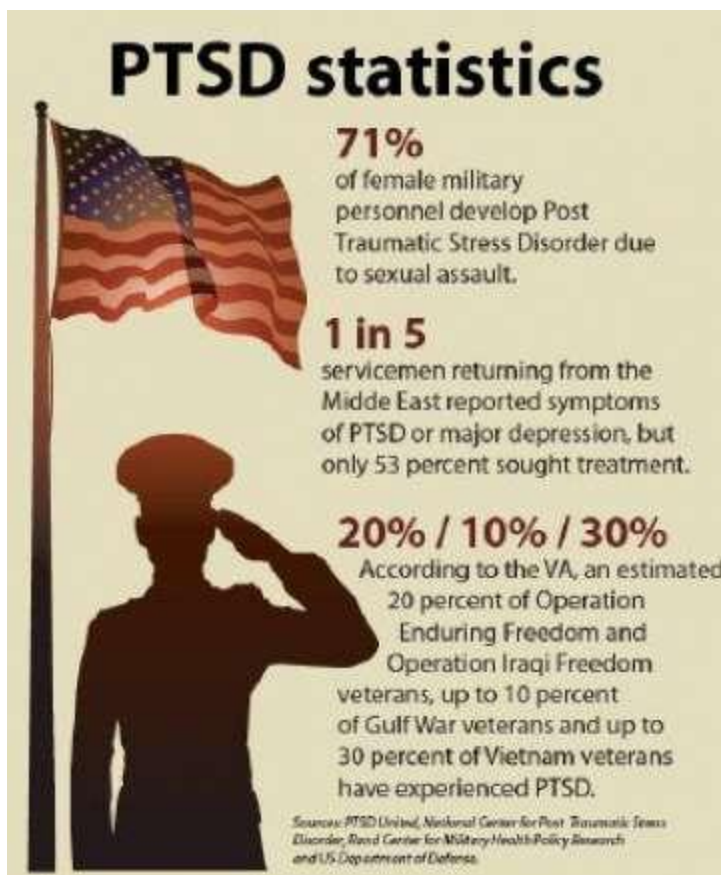


Figure 5 PTSD Statistics among service men and women (Source: Jenn Griffin 2016)

The variation from the above rating can be attributed to several factors like sampling size, veteran's willingness to share their experience, measurement strategies, and timing. Also, experiencing a

stressful situation can cause harm to our mental health. Spriggs gives the medical explanation of what happens in the body when one experiences stress; according to her, stress produces specific physiological effects such as a rise in blood pressure, an increase in the level of heart rate, muscle tension, and changes in the brain wave function and mental concentration. PTSD is associated with overwhelming stress but is not defined by exposure to overwhelming stress (Gerlach, 2004). However, it is necessary to note that many of the individuals exposed to extreme stress do not develop PTSD.

## **2.2 Symptoms of PTSD**

A true-life story as shared by Friedman.

Mr. K, a National Guard soldier, age 38, was assessed in an outpatient psychiatric clinic months after his return from a 12-month deployment to Sunni Triangle, Iraq, where he was first exposed to combat in his ten years of being a National Guard. Before then, he was a successful automobile salesman, happily married with children ages 10 and 12 years, and was socially outgoing considering his large circle of friends and active involvement in civic and church activities. While he was in Iraq, he was extensively exposed to real combat, and his platoon was seriously shelled and ambushed on many occasions. This often resulted in death and injury to his colleagues, especially his close friends. He held a passenger on patrols and convoys in which roadside bombs destroyed many vehicles where people he became close with got wounded or killed. He was in the consciousness that he had killed many combatants in the opposition and feared that he might have also become responsible for the deaths of some civilian bystanders. He was unable to forgive himself for being unable to prevent his best friend's death, who got shot by a sniper. His state of helplessness and inability to intervene while some group of children and women were killed in a

crossfire was one of his worst moments while in deployment. He has very anxious, highly irritable, and often being on edge most of the time since he returned home. He grew more preoccupied with concerns about his safety and that of his family, thereby making him keep a loaded 9-mm pistol with him everywhere and even under his pillow at sleep time. He suffered from lack of sleep, and when sleep eventually comes, it is often interrupted by lucid nightmares during which he moves about uncomfortably, kicks his bed partner, or jumps out of bed to quickly switch the lights on. He also became overly protective of his children to the extent that he would not allow them out of his reach. This made them complained a lot about the changes that had occurred in their father. At some point, his m how emotional distant he had been since he returned. She also complained about how driving the car by others had become fear anytime he is a passenger.

This is because he would sometimes reach over and suddenly grab the steering wheel because he thinks he has seen a roadside bomb. His friends got tired and discouraged inviting him over or to other social engagements as he does not honor their invitations to have a get to together. His work also had begun to suffer; although his employer had been very patient with him and gave him all the support he needs, he observed that he has become so preoccupied with deep thoughts while often getting irritable with customers. This often led to mistakes because his functionality level was affected compared to how productive he was at the same company where he was on top of his game as a salesman. Mr. K recognized that he had changed a lot since his deployment, and he further confirmed that he sometimes experiences strange surges of fear, panic, guilt, and unusual despair. There are times he has felt emotionally drained, unable to return the love and warmth shown to him by his family and friends. His life had become a scary burden. Although Mr. K had not been actively thinking of suicide, he confirmed that sometimes he thinks everyone would be

better if he never returned from his tour in Iraq (Friedman 2006). Although the symptoms of PTSD can begin immediately after a traumatic event, PTSD cannot be diagnosed until the symptoms persist for at least a month and either cause significant distress or interfere with work or home life (Hamblen, 2009). For someone to be medically diagnosed with PTSD, a person must have been exposed to an extreme stress element or traumatic event to which he or she responded with fear, helplessness, or horror and have three different types of symptoms which are re-experiencing of the event, avoidance of reminders of the event and hyperarousal symptoms (Yehuda, 2002).

PTSD usually involves periods of increased symptoms followed by remission or a decrease, although some individuals may experience long-lasting and severe symptoms. Some older veterans, who reported a lifetime of just mild symptoms, experience increases in its symptoms after their retirement, a severe medical illness in themselves or their spouses, or reminders of their military service, such as reunions and anniversaries (Hamblen, 2009). The first set of symptoms involves reminiscing the trauma so that it becomes upsetting when confronted with a traumatic event, which often sends a reminder or makes a person think about the trauma when trying to do something else. Re-experiencing symptoms include daytime recollections, traumatic nightmares, and flashbacks, in which the event's components are relived (Yehuda, 2002). Many re-experiencing symptoms result from excessive retrieval of traumatic memories that often retain their vividness and power to evoke distress for decades or even a lifetime (Quervain, 2007). The second set of symptoms is linked to either staying away from situations, people, or locations brings the trauma to mind, isolating from other people, and the feeling of numbness. The third set of symptoms has to do with things such as feeling so much on guard, becoming irritable, or getting startled easily (Hamblen, 2009). The course of PTSD is variable; this means the effect and reaction



can differ among different people. These differences, however, can change over a period. PTSD usually begins right after the traumatic incident, but it can also be delayed for many years (VA National Center for PTSD, 2010). For many people diagnosed with PTSD, the symptoms improve over the first year. The course of PTSD is variable; this means the effect and reaction can differ among different people. These differences, however, can change over a period. PTSD usually begins right after the traumatic incident, but it can also be delayed for many years (VA National Center for PTSD, 2010). For many people diagnosed with PTSD, the symptoms improve over the first year. Treatment reduces symptoms for some, while it can last a lifetime for roughly about 30% of individuals who eventually develop a chronic type. PTSD usually involves periodic symptom increase followed by remission or decrease, although some individuals may experience severe and long-lasting symptoms.

### **2.3 Challenges encountered with managing emotional stress**

Managing traumatic and work stress has become a complicated and highly controversial topic in civilian and military settings. Remarkably, the military is a challenging environment to provide any form of medical and psychological treatment. Numerous physical barriers to care exist in operations such as logistical constraints, rugged terrain, wide dispersal of personnel, limited practitioners, and hostility to outsiders. Within the Israeli Defense Force, it was revealed that an officer is saddled with the responsibility to achieve his recovery compared to an ordinary soldier. It is considered an officer's way to combat stress reactions. In other words, the higher the rank of the person in question, the lesser he thinks positively of psychological help as being practical. This attitude and way of thought also cut across the British military, where personnel who experienced stress were considered weak (Langston, 2007). The significant costs involved in training,

recruiting, and retaining military personnel make it essential to identify robust psychological support systems to avoid valuable personnel's loss to the effects of psychological trauma (Langston et al. 2007). Equally, psychological studies have drawn attention to different forms of intrusive cognition that may underlie specific symptoms and interact to determine the outcome. This implies that researchers need to develop strategies that enable them to focus more explicitly on individual symptoms than on PTSD (Brewin et al. 2003). Stigma is also one of several reasons that might explain people's behavioral choices toward getting mental health. Stigma is believed to be a sign of disgrace or discredit, which sets a person apart from others. The consequences of the stigma associated with mental illness are well cited. Stigma may occur at every stage of mental illness from help-seeking to treatment and discharge and has been commented as being more devastating, life-limiting, and long-lasting than the primary illness. This means that the effects of stigma can often be felt long after the original problems have disappeared. The World Health Organization states that the most critical barrier to overcome in the community is the stigma and associated discrimination toward persons suffering from mental and behavioral disorders. (Langston et al., 2007)

#### **2.4 Treatment For PTSD**

Evidence suggests that like military combatants and their healthcare provider's exposure to a series of life-threatening situations will increase the rate of adverse psychological disorders after traumatic experiences. However, being in a supportive environment with a strong sense of meaning and purpose seems to help mediate the impact of many dangerous and stressful events (Gibbons 2012).

## **I. Ministry of prophets**

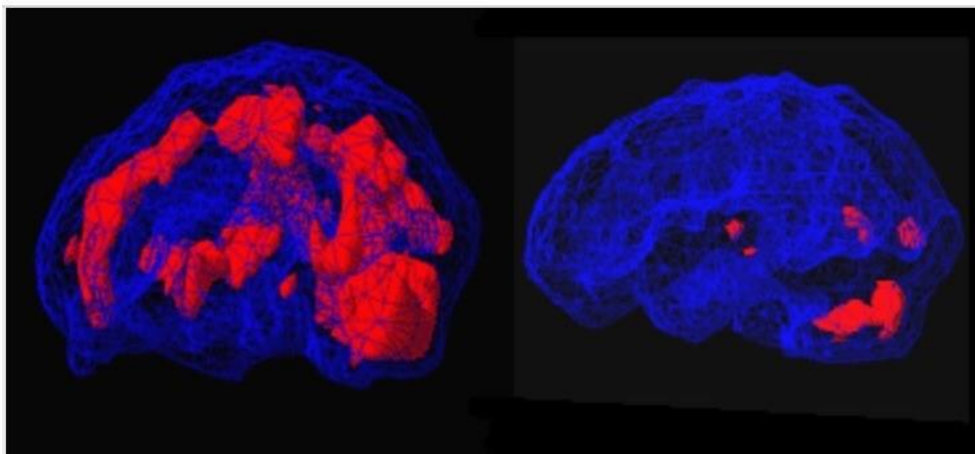
Many sought spiritual assistance to overcome the struggle with PTSD. According to Bhebe, during an informal discussion in the Mberengwa district, a war veteran, who had joined a church Ministry in September 2008, met a prophet who managed to exorcise the spirit of a person he killed during the war been haunting me since 1969 (Bhebe 1999). Following the prophet's healing, he confirmed he no longer itch for human blood, that he now found rest and peace from this edge for war and violence. Because of the healing that he had received (Moyo, 2015). This encouraged him to invite some of my colleagues who are also haunted to get help from the prophet. Makumbe believe that war veterans have not been afforded the repair of injured morals and emotional demobilization after obtaining political independence from colonial rule following a bloody guerrilla war (Bhebe, 1999)

## **II. Meditation**

The tenets of Taoism are known to have embraced a natural way of life. The way of nature can be simplicity, authenticity, and spontaneity. This leads us to consider the role played by Taoist meditation during the healing process. Traditional Taoist masters have developed the art of meditation like the Buddhist meditation in style but with sitting (chenyuhsi 2015). They also practice moving exercises such as Tai Chi Chuan and other essential energy exercises (chi kung or Qigong). While Buddhism accentuates the cultivation of one's mind to develop insights to freedom, Taoism hopes to unify the body and the mind in its spiritual practice, believing that the spiritual energy known as chi would connect humans with the Tao, or the ultimate attribute of the great Cosmos, and therefore the cultivation of chi through breathing exercises is the very first step in the right direction. Taoism's perspective enables people to cope with changes and adverse events with equanimity and reveals the path to happiness even when things go wrong (Chenyuhsi, 2015).

### III. Psychotherapy or Cognitive Behavioral Therapy

Various psychotherapy forms treat PTSD, that is, talk therapy and pharmacotherapy, which is medication. It is important to note that there is no single best treatment, but some treatments appear to be quite promising, especially cognitive-behavioral therapy (VA National Center for PTSD). CBT includes several diverse but related techniques such as cognitive restructuring, exposure therapy, eye movement desensitization, and reprocessing (Hamblen 2009). Researchers have found a significant association between PTSD and impairments in cognitive functioning, specifically with tasks requiring attention, verbal memory, and new learning even after controlling for IQ and attention deficits. A meta-analysis of about 32 previous studies examining PTSD and verbal memory found that PTSD and impairment in verbal memory are very associated, particularly in war veterans.



#### **Before and after EMDR brain scans.**

Left photo shows woman with Post Traumatic Stress Disorder. Right photo shows same woman after four ninety minute EMDR sessions. The red areas indicate over-activity in the brain. Photo by Dr. Daniel Amen

Figure 6 Before and after EMDR brain scan (Source: The Breakthrough Therapy for Overcoming Anxiety, Stress, and Trauma – Francine Shapiro)

In 2009, Johnsen and Asbjørnsen studied the role of encoding strategies in learning new material in patients with PTSD and found evidence of impaired use of organizational strategies, suggesting that the disorder interfered with executive processes used while learning new material (Johnson et al. 2009). EMDR which is also known as Eye Movement Desensitization and Reprocessing helps people to heal from both the symptoms and emotional distress due to troubling life situation (Shapiro 1989).

#### **IV. Counselling**

An essential component of treating someone who had been traumatized persons is the provision of education, a feeling of safety, and support, which can be done by primary care providers. Being educated on the nature of illness and everything that revolves around it helps patients understand the nature of their unique situation and the journey to recovery. Patients must be aware that their symptom is a representation of a psychobiologic reaction suffered due to overwhelming, stressful occurrence rather than a defect in character or a sign of weakness. Clinicians can provide a noncritical ear and emphasize that patients are not alone (Yehuda 2002).

#### **V. Pharmacotherapy (medication)**

A prescription of low-dose cortisol 10 mg/day of hydrocortisone was given orally for a month to three patients who suffered chronic PTSD using a double-blind, placebo-controlled, crossover design under a 3-month observation period. In each patient investigated, there was a significant treatment effect with cortisol-related reductions in one of the daily-rated symptoms of traumatic memories without causing adverse side effects (Aerni et al., 2004). The administration of this low dose of cortisol for one month does not cause significant side effects and does not suppress

endogenous cortisol production (Cleare et al., 1999). The trial medication was also carried out in the first ten weeks, where the patients maintained both pharmacotherapy and psychotherapy that they had started before randomization, with no new treatment included. Participants continued to receive prazosin or placebo in a double-blind manner. However, other pharmacologic therapies (except prazosin, trazodone, or psychostimulants) or psychotherapeutic treatments could be added, discontinued, or modified according to the judgment of the treating clinicians for about 16 weeks. (Raskind, 2018). Persistent retrieval and reconsolidation of traumatic memories is a process that keeps these memories vivid and, thereby, the disorder alive (Quervain et al., 2008). Persistent retrieval, re-experiencing, and reconsolidation of traumatic memories is a process that keeps these memories vivid and, thereby, the disorder alive (De Kloet et al. 2005). Medications can also benefit persons who have suffered trauma and can be prescribed by a primary care physician. Randomized clinical trials demonstrate that medications such as selective serotonin-reuptake inhibitors, tricyclic antidepressants, and monoamine oxidase inhibitors alleviate the symptoms of PTSD and are associated with improvements in overall functioning (Yehuda 2002).

## **VI. Front-line Treatment**

The most acceptable form of treatment for battlefield combat stress reactions is front-line treatment. It is known that the further to the rear of the battlefield a stress casualty was evacuated, the less likely that casualty was to be successfully treated and returned to combat. The treatment is following these three basic principles; Proximity meaning as near as possible to the battle zone, Immediacy which means as soon as possible after the injury is sustained and Expectancy, which ensures that the soldier will return to his unit and resume his former duties (Langston et al. 2007). The quick-fix approaches to preventing PTSD have been advocated by many, along with single-

session psychological debriefing, which is a process through which forced emotional ventilation was purported to prevent the start of PTSD. It is now apparent that single-session debriefings are not beneficial in reducing psychological distress and preventing the onset of PTSD and in some cases may be associated with deterioration in an individual's emotional state (Langeston, 2007)

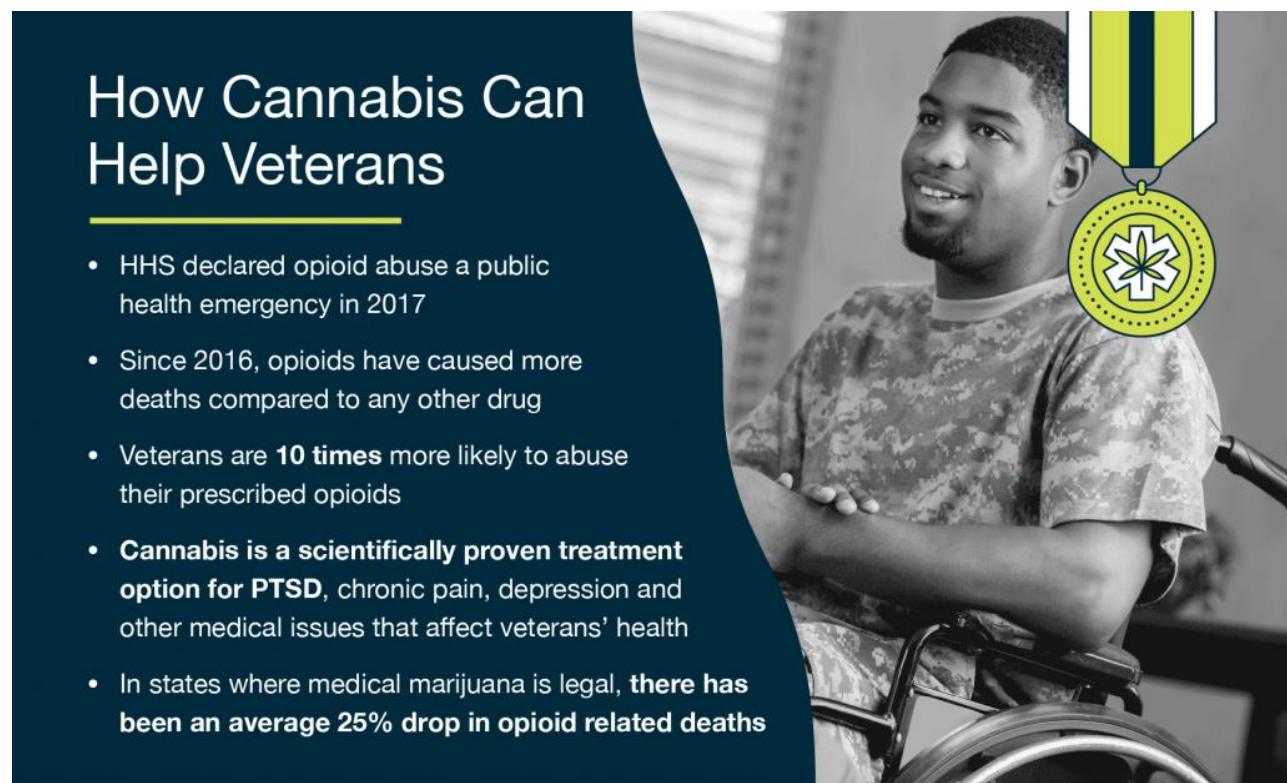
## I. The Use of Marijuana

The use of marijuana for the treatment of medical conditions is currently becoming a thing of growing concern. Some veterans have used marijuana as a form of the drug to relieve themselves from the symptoms of PTSD. As of 9<sup>th</sup> November 2016, the legal use of medical marijuana was approved in about 28 states including District of Columbia while 16 more states approved the use for medical treatment of PTSD (Shishko et al. 2018).



Figure 7 Medical Marijuana and Veterans (Source: Veterans and medical marijuana By Affordable Marijuana license)

Despite these huge legal acceptances, it is worthy of note to state that no studies or systematic review of literature have been done to consider and show how safe or effective the use of medical marijuana is for many conditions like PTSD (Yarnell 2015). So, there is no evidence that marijuana is useful for treating PTSD; instead, research has suggested that marijuana can be very harmful to individuals diagnosed with PTSD. While marijuana is under consideration to be a potential mental health treatment solution to ease anxiety in patients, it may support some symptoms associated with PTSD, worsening the condition. It is known that many who have PTSD often abuse alcohol and drugs, incredibly nervous system tranquilizers like marijuana.



**How Cannabis Can Help Veterans**

- HHS declared opioid abuse a public health emergency in 2017
- Since 2016, opioids have caused more deaths compared to any other drug
- Veterans are **10 times** more likely to abuse their prescribed opioids
- **Cannabis is a scientifically proven treatment option for PTSD**, chronic pain, depression and other medical issues that affect veterans' health
- In states where medical marijuana is legal, **there has been an average 25% drop in opioid related deaths**

The infographic includes a photograph of a smiling Black man in a military camouflage t-shirt sitting in a wheelchair. A circular logo with a green and yellow border and a white star with a green leaf inside is overlaid on the image. The background of the infographic is dark blue with white text.

Figure 8 Medical Marijuana and Veterans (Source: Veterans and medical marijuana By Affordable Marijuana license)

According to research, studies carried out reveals that conflicting data exist with the use of marijuana for the treatment of PTSD; however, present evidence is narrowed to anecdotal



experiences, some case reports, and observational studies, thereby making it challenging to provide clinical recommendations (Shishko et al. 2018).

## **2.5 What is a healing garden?**

A healing garden is an outdoor environment created for health recovery purposes for its users in specific locations. The healing garden is often used in healthcare centers to enhance people's health status. Gardens tend to attract more users because it is a safe and comfortable area where users meet nature, thereby creating a healing journey. It is a place of safety, comfort, far away from piercing condemnation eyes; a healing journey starts with nature and self. A healing garden is a landscape or garden designed for a specific population, place, and intended positive health outcome. The term healing gardens are mostly applied to green spaces in hospitals and other healthcare facilities categorically for improving health outcomes. These gardens are established to provide a place of refuge, comfort, and promote healing for users who often are patients, families, and staff. A natural environment can promote healing, but gardens are specifically able to do so because humans are hard-wired to find nature engrossing and soothing. It is a place of safety, comfort, far away from piercing eyes of condemnation; a journey to healing starts with nature and self (Kreitzer et al. 2016).

A green space that allows for interaction with nature plants and flowers is considerably a source of improvement to improve the human senses and sanity by decreasing the stress associated with anxiety, depression, neurotic impairment, and other psychologic symptoms (Khan et al., 2016).

A healing garden can meet varying needs ranging from meeting adult cancer patient needs to children's cancer patients' needs to autistic children. To elaborate on this research work, I will like

to identify the critical elements of the healing garden for children hospital side-by-side with PTSD treatment. A rehabilitation garden, therapeutic garden, or enabling garden is a garden where physical, occupational, horticultural, and other therapies occur. A restorative landscape or landscape for health is any landscape wild or designed, large or small, that facilitates human health and well-being (Warner, 1995). A therapeutic outdoor environment provides a place that supports several outdoor activities that allow users to engage in familiar tasks that they can accomplish with limited assistance, such as gardening and other light chores, walking, standing, or just sitting and observing nature. In effect, outdoor spaces extend the living or activity areas of the building into the landscape. These spaces provide a place for large group gatherings, small seating areas for visiting, pathways and benches allowing enjoyment of solitude, and various natural colors, forms, textures, and sounds to create an ambiance that reduces stress. At their best, therapeutic outdoor environments are designed based on a master plan that integrates the built environment with the landscape from the perimeter of the property to the residence itself.

The therapeutic landscape is designed to give a specific effect and an outcome that seems measurable upon a disease process within a given patient and/or group of patients. It can be thought of as a medication taken for a specific disease or illness (Thaneshwari et al. 2017). The Therapeutic Landscape is not focused on healing in the spiritual context and more akin to the disease model of illness as practiced in most allopathic medical systems. For example, in considering treatment gardens for Alzheimer's patients, it was highlighted that the goal was to create a well-designed environment with good planning and medical and social management to reduce symptoms and ease the burdens on family members or caregivers (Bixler et al., 1998). An Aggressive nature is one of the symptoms and behavior associated with this degenerative disease. This is sometimes

reduced by exposure to the natural environment however, one category not mentioned in existing literature so far about the healing garden were those who have PTSD (Hebert 2003). Healing garden has gone beyond being an idea to actualization to an essential part of a patient's healing process, especially in terms of relaxation while awaiting treatment or recovering from an ailment or a surgical procedure. The presence of beautiful flowers and trees with a flowing water source can be likened to creating an oasis in the desert of a medical facility with so many scary sites of giant machines and a highly sterile environment.

## **2.6 Concepts of healing garden And Plant Usage in Healthcare**

The concept of therapeutic landscape is first introduced by medical geographers to define places with natural or historical features to maintain health and well-being (Velarde et al. 2007). The garden's design physical aspects and programming activities that take place there are informed by research. Most healing gardens, also referred to as restorative gardens and healthcare gardens, are in healthcare facilities, including general acute care hospitals, outpatient clinics, assisted living and skilled nursing facilities, mental and behavioral health facilities, hospices, and specialty facilities such as rehabilitation, pediatric, and cancer hospitals and clinics (Kopeck, 2018). Positive outcomes, including stress reduction, are derived through both passive and active nature connection and can take place indoors via indoor plants or from viewing nature through a window and outdoors. Nature is defined quite broadly, and while mainly referring to vegetation, it also refers to wildlife, water, stone, the weather, sky, clouds, wind, and sun. Access to nature includes actual passive and active, indoor, and outdoor engagement with nature through any or all the senses active indoor and outdoor engagement with nature through any or all the senses (Marcus et al., 2013). Nature is thought to have restorative powers, and healing spaces were nearly always found

in natural healing spring, a sacred grove, a unique rock or cave (Marcus et al., 1999). In Restorative Gardens, Nancy Gerlach-Spriggs, explain restorative gardens as places meant for both the healthy and the unwell. For someone who is sick in body or troubled in spirit, the same garden relaxes and soothes and encourages the body and the mind to restore themselves (Gerlach et al., 1998). There was a time when open spaces in many hospitals were gone due to unique circumstances with the individual facility. However, as the interest, research, and need for therapeutic landscapes grew, there came a revival for creating more healing garden in medical facilities around the United States of America in the early 90s (Shan Jiang, 2013). Presently, hospitals and healthcare institutions have engaged in keeping very extensive gardens and landscapes a vital part of healing. However, over the last 50 years, with the rapid growth of medical technology and economic pressure, this ancient concept has been neglected (School Vegetable Garden).

Healing garden, its notion, and importance for patients can be dated back to centuries with traces to many cultures. During the early twentieth century, professionals in design and administration began focusing on creating enabling environments that would be efficient for delivering new medical innovations and technology (Ulrich 2002). The movement of recuperation rehabilitation medicine is developed because it is a sustainable idea and measure. From the view of recuperation rehabilitation medicine, it is vital to regard healing gardens and therapeutic landscapes as one of the critical therapeutic measures (Zhang et al., 2009). A hospital is often a stressful place for patients, as they are consistently subjected to stresses, trauma, physical pain, health discomfort, and, as a result, are confronted with physiologic, psychological, and physical health complications. To speed up the postoperative recovery of patients and improve their lives during hospitalization, it is crucial to reduce stresses and counter them with positive distractions in the environment alongside the best possible treatment, which would provide a soothing and stress-reducing effect

(Lautenbacher et al. 1998). Research reveals that gardens located in or nearby acute care facilities favorably affect patients' health outcomes and contribute significantly to reducing stress for families, hospital staff, and patients. (Carman, 2011). Considering that gardens generally can be aesthetically pleasing, it has often been believed that it is also medically efficient. (Brandt & David, 2012). It is believed that medical practitioners and health workers did not see the effect and appreciate this evolving trend Cooper Marcus says it is unfortunate that the hospitals themselves are not paying as he feels that the concept is not well appreciated. He hopes that sometime soon, hospitals will see that these spaces are not just a cosmetic extra that philanthropists organize but as an essential part of the healthcare environment (Marcus 2014).

Research in recent times on healthcare design has identified a unique positive link between people's well-being in residential healthcare settings and exposure to nature. Residents with access to outdoor environments are more aware of their surroundings and time of day and seasonal changes, are more engaged in activities, and benefit from fresh air, exercise, and sunlight. Moreover, the design may incorporate features that support treatment programs, including physical, recreational, occupational, and horticultural therapy (Reid 2006). A significant goal for a landscape architect is to incorporate elements of the natural world into people's outdoor living and workspaces, which is especially relevant for this project where my primary clients are hospital patients, their families, and staff who face enormous stressors daily. We all understand the health benefits of being in nature, and it is even more vital for the most vulnerable members of our communities. The effect of natural environments on health has only been recently systematically studied. An integrated approach introduced since the mid-1980s has been instrumental to medicine in reawakening the hope that the garden plays a significant role in the healing process. Maybe the

best-documented study to date is surgical patients who got access to view the outside world conducted by Roger Ulrich in 1984. This study revealed and helped to understand the relationship between hospitalization duration, the use of pain medication, and the ability to view nature through a hospital window. In one of Ulrich's study, patients with access to a view recovered faster and needed less pain medication to do so; this is a winning outcome for both the patient and the facility (Ulrich 1984). Many healthcare institutions increasingly recognize the need for exposure to natural environments within the context of healthcare. The Joint Commission for the Accreditation of Hospitals Organization has stated the need for patients and visitors should have the opportunity to connect with nature through outside spaces, plants, indoor atriums, and views from windows (Steve 1999). An emerging research area and design focus within landscape architecture has sought to address the relationship of designed natural environments to health and healing.

As landscape architecture increasingly addresses the interface between designed natural environments and health, confusion has developed regarding various terms applied to this concept. The healing garden is often applied to gardens explicitly designed to enhance speedy recovery from illness. In healthcare, healing is a broad term, which does not necessarily refer to the cure from an illness. Instead, healing is seen as an improvement in overall well-being that incorporates the spiritual and the physical. A therapeutic landscape design is more specific and relates to an aspect of a disease or healing process. Humans have a close relationship with the natural world, and interacting with nature is very essential for both increasing the quality of life and delivering a range of measurable benefits to people (Dijkstra et al. 2008) (Pretty 2004), including psychological benefits and cognitive performance (Keniger et al. 2013). (Deng & Deng, 2018). The focus is on the creation and development of a natural environment to improve well-being. A project was

inspired by a new recommendation from the Forest Agency of Japan, which in the early 1980s began advising people to take strolls in the woods for better health. The practice was called forest bathing, or *shinrin-yoku*, and it was believed to lower (Tsunetsugu et al. 2010). In other words, Cultural theories propose that we are taught by society to have positive feelings towards certain types of environments. For example, Native American and Asian cultures have taught their peoples to respect nature (Bonnie Barnes Hebert 2003). Furthermore, nature, particularly plants and a green environment, holds a tremendous positive distraction capability, reducing human worry and ailments (Ulrich 1992).

Green atmosphere due to plants and flowers develops positive emotions that ameliorate pain and stress, thus distracting patients' mindset from their worries or making them feel more competent to cope with it (De Wied & Verbaten 2001). Plants and flowers have a natural soothing and calming effect on the human psyche just as indoor plants and vegetation create a natural milieu inside buildings that facilitates a positively enhancing perception and contributes to well-being (Mary & Rice 2008). This confirms that the presence of foliage plants and flowers not only changes peoples' emotions and feelings and positively improves their physiologic responses, such as heart rate, blood pressure, respiration rate, and muscle tension, and decreases the consumption of analgesics. Research shows that the blood pressure and heart rate of schizophrenic patients decrease while starring at the indoor plant -*Ficus Benjamina* is placed in front of the wall compared to a blank wall in a healthcare center (Wichrowski et al. 2005). One thing this research would like to reiterate is what a healing garden is not. While the effects of engagement with nature have been researched and well documented, an explanation for this process's mechanism is yet to be determined (Kreski, 2016). We cannot argue that a garden of itself can heal someone diagnosed with cancer or fix a

broken leg; in contrast, some would say that gardens can serve health care even in settings where unavoidable deterioration in health will continue (Hartig et al. 2006). According to Gerlach-Spriggs, healing or restorative gardens are not intended to replace medical treatment, nor are they cures. It is more like creating an alternative environment where support is given while reaching medical goals and where therapists and other specialists can collaborate. Researchers suggested that specific interventions geared towards these verbal memory impairments may provide veterans with better educational prognosis (Sinski, 2012).

## **2.7 Perceived benefits of a healing garden**

Recent studies have confirmed the positive benefits of hospital outdoor space (Hebert, 2003). One of these researches has extended into living facilities such as Alzheimer's treatment centers, group homes, and assisted living facilities for the elderly (Hebert, 2003). The impact of therapeutic garden and natural elements to aid the recovery process of a patient was first brought to light in *Notes on Nursing*, a publication by Florence Nightingale in 1960 where she postulated that staring at nature through the hospital window or from a patient's bedside serves as a great assistance to them during recovery (Nightingale, 1863). Gardens often provide psychological, social, physical, emotional, and spiritual benefits to man. This can be tied to human's positive reaction to nature, as a result, so healing gardens need to have lots of green vegetation, flowers, and water elements. The analysis results reveal that horticultural therapy influences therapeutic landscapes and healing gardens in China (Jiang 2014). Researchers have shown significant facts on the effect and benefits of natural landscape on people's well-being (Gesler, 2003) spiritually, physically, medically, emotionally, environmentally, and psychologically. The impact of therapeutic garden and natural elements to aid the recovery process of a patient was first brought to light in *Notes on Nursing*, a



publication by Florence Nightingale in 1860 where she postulated that staring at nature through the hospital window or from a patient's bedside serves as a great assistance to them during recovery (Nightingale, 1863). The primary objective is to create a space that increases users' health, happiness, and well-being. Secondary goals included ways to encourage users to explore the outdoors while sustaining safety and security feelings, facilitating group activity, and offering a pleasant space for them to host their visitors in on admission.

The garden also encourages socialization with others while interacting with nature. Healing gardens generally aim for more passive involvement and are designed to benefit diverse populations with different needs. In *Healing Gardens*, Marcus and Barnes identify three aspects of the healing process to clarify how a garden may benefit from physical symptoms or awareness of those symptoms, Stress reduction, and improvement in the overall sense of well-being. Horticultural therapy is a very efficient procedure for patients' treatment in hospitals because it improves the physical features of a body, relaxes mind and spirit, improves the quality of life and overall satisfaction with the treatment procedure, and promotes the well-being of the patient. Doctors' reasonable suggestion was that the hospital must be provided with plants in all stages of growth to see the complete cycle of plant life, as observing plants growing features/processes encourages a positive strength. It has been observed that engaging with the outdoor natural environment has significant positive physiological and psychological health benefits. This suggests that integrating the natural environment into indoor space can be an effective way to extend engagement with nature and benefit people (task performance, health, and stress) (Bringslimark et al. 2009; Shibata and Suzuki 2002). Therapeutic horticulture needs to be adopted at an appropriate stage by hospital administration, as it is a nonpharmacological and noninvasive

treatment approach that is medically beneficial as well as cost-effective to both patients and hospital administration. (Khan et al., 2016). Managing traumatic and work stress has proved a controversial and challenging topic within civilian and military settings. In particular, the military is challenging to provide any medical and psychological treatment (Langston et al., 2007). Having explored the effort being put in by professionals to assist and bring healing to veterans having PTSD, using and exploring the benefits of a healing garden should be included in the sessions, healing process, and schedule of treatment for enhancement of medical practitioner's effort and to aid the healing process. These benefits are:

**A. Encourage exercise**

Exercising is important because, aside from the physical benefits of being physically active, just a mild form of movement improves man's mood. Gardens offer a desired destination that prompts people to walk there and motivate people to explore once there (Kreitzer & Larson 2016). Gardens that encourage walking as a form of exercise correlate with lower levels of depression (Pouya et al. 2015).

**B. Provide Positive Distractions and Minimize Intrusions**

Natural distractions such as plants, flowers, and water features decrease stress levels. Other activities, such as working with plants and gardening, can also provide positive distractions in the garden setting (Thaneshwari 2017). Gardens offer a break from the hospital environment and provide various pleasant things to look at and listen to. Humans naturally find nature interesting, so find it easy to be engaged in a garden with various colors, textures, light, and sound negative factors such as urban noise, smoke, and artificial lighting are minimized in the garden. Natural lighting and sounds add to the garden's positive effects (Kreitzer & Larson 2016).

### **C. Minimize Ambiguity and Encourage social interaction**

Abstract environments with a high sense of mystery or complexity can be exciting and challenging to the healthy, but they may produce counter-indicated effects to the ill. Several studies show that abstraction in design is not well tolerated by patients or persons who are stressed. Identifiable features and garden elements should be incorporated into the design. Abstract art in the facility and garden is often inappropriate (Pouya et al. 2015). Social support enhances immune functions, promotes better moods, and produces better treatment compliance. Gardens can encourage this interaction if they are easily accessible to patients, families, and staff and offer groupings of lightweight, moveable chairs (Pouya et al. 2015).

### **D. Promote serenity, spiritual well-being And Enhance a sense of control**

For many people, being in nature and interacting with the natural world brings a sense of peace, tranquility, and feelings of connectedness - with self, others, and a higher power. We all need to feel that we have choices about what we can do, but the hospital effectively removes much of that: we give up control over what we wear when we can eat and sleep, and our privacy. People in hospitals are generally physically less capable, and their everyday lives, work, and social support are disrupted. Gardens can enhance a sense of control if they offer a variety of spaces to choose from-some private and some open, some sunny, some shady, some with background sounds, some without, and so forth.

## **E. Stress Reduction**

Gardens reduce stress and promote a sense of well-being. This leads to measurable psychological, physiological, and behavioral benefits, such as reduced anxiety, sadness, and other negative moods, lower blood pressure and improved immune functioning, and better compliance with the treatment protocol.

### **2.8 What is the standard requirement for a healing garden?**

The transfer of medical mode and the increasing demands on the medical environment design of outdoor views have become the focus of hospital construction and reformation while Zhang believes the well-being culture of traditional Chinese philosophy, religion, herbalists, and the classical garden has crucial guidance for constructing China's therapeutic landscape (Xu et al. 2009). Design Principles in Therapeutic Landscapes an emerging area of research and design focus within landscape architecture has sought to address the relationship of designed natural environments to health and healing. As landscape architecture increasingly addresses the interface between designed natural environments and health, confusion has developed regarding various terms applied to this concept. Healing gardens is a term frequently applied to gardens designed to promote recovery from illness. In healthcare, healing is a broad term, not necessarily referring to a given illness's cure. Instead, healing is seen as an improvement in overall well-being that incorporates the spiritual and the physical. Gordon Orians and Judith Heerwagen have shown that people prefer open, distant views with scattered trees, water, and refuges and paths that suggest ease of movement in their studies on landscape aesthetics. In studies of users of some urban parks, properties such as vegetation, water, and savanna-like qualities, such as scattered trees, grass, and spatial openness, seemed to correlate with ratings of restoration (Ulrich and Addoms, 1981). The

most crucial feature in a healing garden is real nature-green vegetation, flowers, and perhaps a calm water element. A garden full of sculptures and structures will not offer the healing benefits of nature. It is particularly important to avoid abstract art and sculpture, which ill people often interpret negatively. For example, patients thought a sizeable gazing ball in one garden was the evil eye (Kreitzer et al., 2016). Healing gardens should also be situated where the city's sounds or loud mechanical noises do not intrude. Furthermore, the outdoor smoking area should be located far away from the garden.

**a. Variety of Spaces for both group and solitary occupancy**

The patient is given choices by providing various spaces, thus providing an increased sense of control, leading to lower stress levels. An area for solitary occupancy allows one to "get away" from the hospital's sterilized environments. Areas for small groups (e.g., family members or support staff) to congregate and provide social support to the patient.

**b A Prevalence of Green Material**

Hardscaping is minimized, and plant materials dominate the garden. The goal would be to minimize hardscaping to only one-third of the space being occupied. Through the softening of the landscape, patients can feel an improvement in their overall sense of wellness. Therapeutic Landscape Design is more specific and relates to an aspect of a disease or healing process. The Therapeutic Landscape is designed to produce a given effect and measurable outcome upon a disease process within a given patient or group of patients. It can be thought of as a medication taken for a specific disease or illness. The Therapeutic Landscape is thus less focused on healing in the spiritual context and more akin to the disease model of illness as practiced in most allopathic medical systems. An impressive entrance that invites and embraces the visitor into the garden and

the water element for its psychological, spiritual, and physical effects is vital. Creative use of color and lighting (be they plant or human-designed light sources) to elicit emotion, comfort, and awe in the visitor. The emphasis on natural features as grounding points, such as rocks, wood, natural fences, screens, trellises, wind, and sound, is key to designing a healing garden. The integration of art to enhance the overall mood/spirit of the garden. Garden features that attract wildlife and provide habitat to a diversity of wildlife. Overall, the healing garden design should comfort the soul and renew the spirit. No matter if it consists of a bench next to a tree or an intricately designed landscape. Of most significant importance is honoring the design element and its relationship to nature's spirit (Marcus et al. 1999).

The power of great inspiration in design ideas is essential to ensuring unity in everything in the creation of space rather than just a part of it. The designer puts his superlative being, idea, creativity, and passion for designing a beautiful place. This is not measurably yet highly significant to the success of the design. The first consideration is given safety, security, and privacy where users are believed to be weak and undergoing so much physical and emotional stress; thus, their safety and security must be highly placed and guided. Accessibility is of great importance. Creating easy access for all in respect of size, age, disability, this can be achieved using the universal design methods and guidelines. One would assume that in healthcare, where the goal is to promote and restore human health, healing, or therapeutic gardens would be landscapes that sustain both people and the environment. Examples exist in which design for sustainability and healing support each other, and an increasing number of designers and healthcare organizations are working to bridge and marry the two intentions. Nevertheless, some landscapes are designed that do little to nurture either people or the environment or are sometimes harmful to both (Marcus,

C. C., & Sachs, N. A. 2013). Much of the focus on sustainability in healthcare has been on water and energy conservation, avoidance of toxic chemicals, and waste reduction. As Kellert and Heerwagen 2008 state, these strategies are necessary but insufficient as they fail to heal the breach between people and natural systems. The way most sustainable constructions and places might positively connect people with nature is neglected.

c      **Programming and Site planning considerations**

This involves consideration for highly functional programs, which will be influenced by the design of available space and the facility's end-users' yearning and the garden itself. This implies that every part of the site should pass a special message of care and assurance paramount to the users. One needs to carry out adequate site analyzes as this would aid planning particularly. Every site has its unique resources and identity, so a comprehensive site analysis is required. A proposed healing garden site in the United States is very different from that of Ghana. This will range from physical attributes to soil texture to plant hardiness, and temperature to mention a few. Also, creating reasonable access to nature for new development will be somewhat restricted in existing users that need to be remodeled.

d      **Budget and funding and maintenance**

Gardens are living systems. As such, there are both initial requirements and ongoing needs that must be met. A designer must consider necessary conditions that will enable plants to thrive, such as the amount of sunlight, the depth and quality of the soil, and the amount of water and enough nutrients. These factors all play a role, and the appropriate needs of the plant species must be understood. Therefore, it is best if the garden area is planned during the earliest stages of site development and is designed by a landscape architect who is well-versed in horticulture, preferably

one explicitly trained in therapeutic garden design. If an indoor garden is planned, a specialist in interior planting and maintenance must be on board from the beginning (Marcus, C. C., & Sachs, N. A. 2013).

#### e **The use of professionals**

You cannot give what you do not have or put a square peg in a round hole. This reiterates the need to use well-grounded landscape architects who have experience in healing garden construction and design for creating one. Some professionals have gone a step further by specializing in healing gardens for specific users in a healthcare facility; examples of specific users are children, cancer patients, Alzheimer's e.t.c. As designers, it is necessary to take extra care and go a little above board to ensure that users' safety is not at risk or jeopardized.

### **2.9 Evaluation of healing garden**

Despite a long history in healthcare, the effects of natural environments on health have only been recently systematically studied. Since the mid1980s, an integrated approach to medicine has helped reawaken the belief that gardens can play a significant role in the healing process (Forest Lecture note). Perhaps the best-documented study to date is that of surgical patients and their access to views to the outside world conducted by Roger Ulrich in 1984. This study demonstrated a relationship between hospitalization duration, pain medication usage, and the ability to view nature through a hospital window. Based on Ulrich's study's findings, patients with access to a view recovered faster and needed less pain medication to do so, which is a winning outcome for both the patient and the facility. Healthcare institutions are increasingly recognizing the need for exposure to natural environments within the context of healthcare. The Joint Commission for the Accreditation of Hospitals Organization has stated, Patients and visitors should have opportunities



to connect with nature through outside spaces, plants, indoor atriums, and views from windows (1999). Unbiased evaluation of a healing garden should commence even before physical construction starts by creating a plan to check the users' anticipated results. This is important as a designer should have a vague idea of his work's results on the patients, healthcare workers, and their families. One of the best ways to do this is to survey users' personal experiences, which, of course, does not have to be a questionnaire served on paper. It can take the form of a group talk or one-on-one interview with users to collect their views on the garden's effectiveness during recovery. It is essential that his work's results show some healing gardens succeed, and others fail. Landscape architecture, like other design professions, has been lax in evaluating past work. Unless this happens consistently, designers cannot learn from past mistakes, and the profession cannot move forward. Systematic evaluation indeed costs money. This suggests the need for a line item in the budget for a garden that covers an evaluation and fine-tuning one to two years after implementation.

Some of the resistance to evaluating built work and publishing the results is the fear of being perceived as having made mistakes on the designer or the client. However, any evaluation is an opportunity to learn, improve an existing space, and add to the design knowledge fund. A problem for the evaluators of built environments is that designers rarely make their hypotheses explicit and rarely record their design goals and how the resulting environment reflects those goals. The recording of this necessary information will light the way for POEs that genuinely reflect the evidence-based design. Also essential is greater understanding by designers of how to read and interpret available research. This is one step in the right direction in developing the Evidence-based Design Accreditation and Certification (EDAC) through the Center for Health Design. The program certifies individual designers, healthcare providers, and staff, and researchers in the EBD

process. An unbiased, systematic evaluation of a healing garden two or three years after construction can document how well the garden's intent and its users' needs were understood. That is, how well the original goals of the design were adequately translated into physical form; how well the garden serves the users it was intended for as well as those it was not planned for; how well the planting is doing; how well space is being maintained; and what changes in physical design, maintenance, or policy need to be implemented. POE is one of the best methods for this kind of analysis. While some designers will say that they routinely conduct POEs of their projects, these usually consist of a meeting with the client and a quick walk-through. While this can provide useful information for the designer and the client, it is neither a rigorous nor an objective evaluation (Marcus & Sachs 2013).

### **Chapter 3 Case Study**

#### **3.1 The gardens at the Fisher House in the Veterans Administration Medical Center**

Creating this garden is to create a tight space that brings a high level of belonging and connection. The garden is used for exercise, meditation, play area for children, a place of escape, and gardening. The facility house veterans and their families who require medical attention temporarily. While it is understandable that families cope with a series of daily challenges, incredibly emotional trauma from medical treatment, creating a source that brings them closer to nature, is most relieving and satisfying.

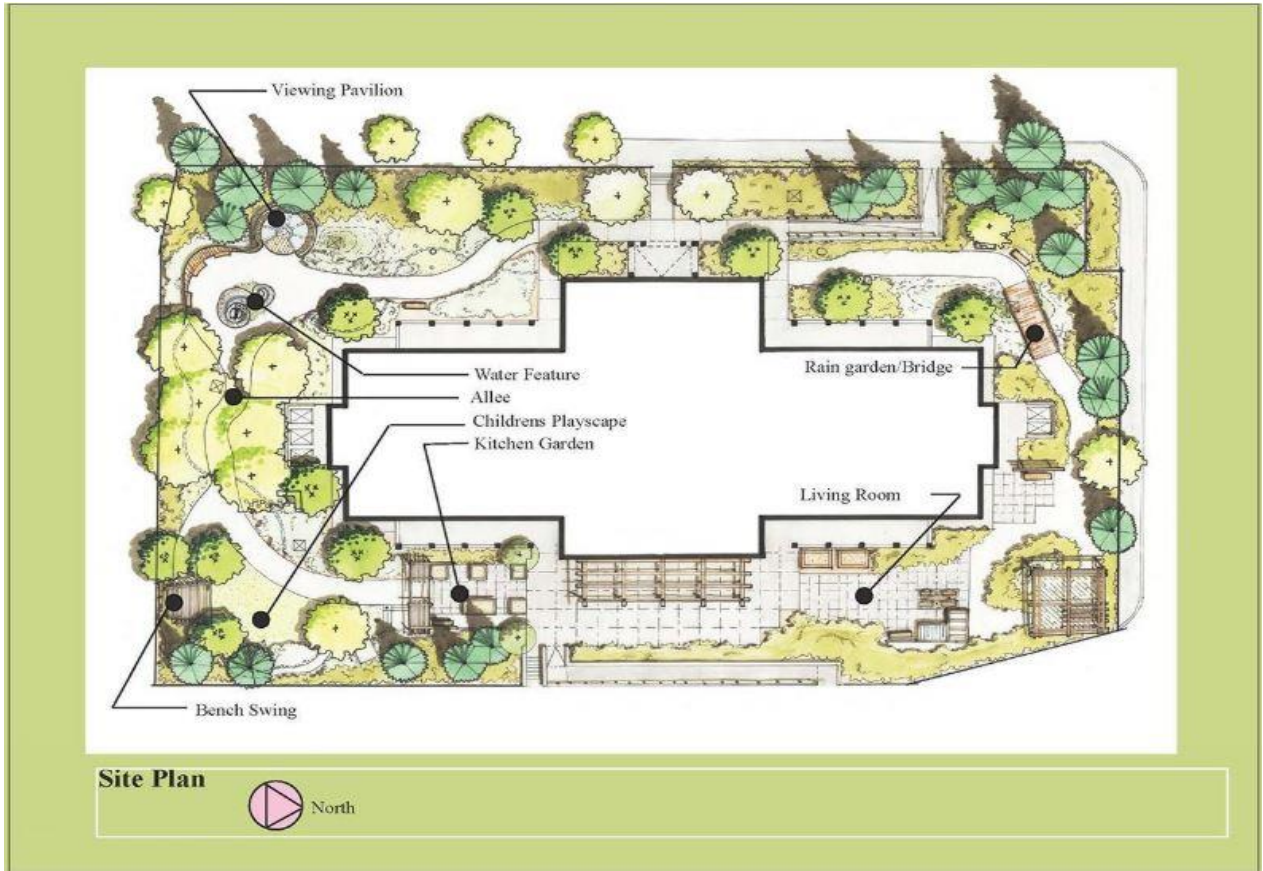


Figure 9 Creating Home, A Healing Garden for Veterans and their Families (Source: 2014 ASLA Student Awards).

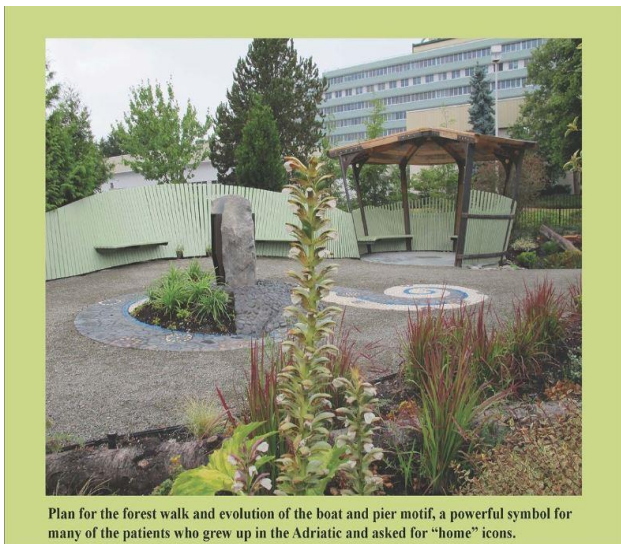


Figure 10 & 11 Creating Home, A Healing Garden for Veterans and their Families (Source: 2014 ASLA Student Awards).

### 3.2 Betty Ruth & Milton B Hollander Healing Garden/Smilow Cancer Hospital at Yale-New Haven, CT

The healing garden is a creative seven-floor rooftop garden for an outdoor environment for interaction, relaxation, and great views of the garden and around the city area. It is a meeting point for families, patients, and healthcare practitioners. They have the choice of sitting in the seating areas or visiting the garden alone. The garden was designed mainly for the need for cancer patients. It was carefully designed and approved with the inputs of families, patients, and staff. Circulations around the garden can be via foot or wheelchair. It has naturalistic views, recirculating streams, around the garden, and ends in a reflecting pool.



Figure 12 Master Plan for Betty Ruth & Milton B Hollander Healing Garden/Smilow Cancer Hospital at Yale-New Haven by Towers (Source| Golde—Architizer)





Figure 13 & 14 Betty Ruth & Milton B Hollander Healing Garden/Smilow Cancer Hospital at Yale-New Haven by Towers | (Source: Golde—Architizer).

### 3.3 Healing Garden at Massey Cancer Center

According to Becky Massey, the healing garden was designed with the sole aim of nourishing and inspiring its users. It allows families, patients, and medical staff to enjoy nature and stay away from the health environment's stimulation and stress. The healing garden comprises shade trees, perennials, shrubs, vines, evergreens, and groundcovers. Design elements like reeds and birds were borrowed from close Egyptian buildings, which also the main building of the medical school built-in 1845.

The restorative power of healing gardens has therapeutic power and an ancient concept. Healing garden compliments medicine is quite different from medicine. What is seen and experienced in them are the benefits that come from delicate plants and trickling water. The garden plants have anti-cancer properties, including the yew tree, which is the source of the drug paclitaxel, Madagascar periwinkle, and makes vinblastine medication, and autumn crocus, which is among the substance tested against leukemia. The plants are gotten from everyday life. The garden is seen as a place of peace and hope for the stressed medical practitioner, stressed relative, or a sick patient.



Figure 15 Master Plan for Massey Cancer Center (Source: Oates landscape.com)



Figure 16 & 17 Tree of Honor at Massey Healing garden center (Source: Massey Cancer Center)

### 3.4 Upper Chesapeake cancer center, Located in Northeastern Maryland

The garden is a virtual space in the healthcare environment, focusing on guiding the cancer center's goals and principles. The physical identity, stress reduction, and having a healthy patient environment are among the design's main principles. It took about \$39 million to conclude the expansion of the Upper Chesapeake.



The project's goals include having a distinct entry point, vehicular access with an excellent link to the existing hospital, flexible and multi-use design. It has different seating areas, habitat for butterflies and birds', lovely views from the 2- level courtyard garden, and the interior. Open space (lawn) for fitness classes and events center. Lovely plants with patterns, texture, and colors, a water fountain for relaxing for families, visitors, patients, and staff.



Figure 18 Healing garden at Upper Chesapeake cancer center, Northeastern Maryland (Source: Mahan Rykiel Associates)





Figure 19 & 20 Healing garden at Upper Chesapeake cancer center, Northeastern Maryland (Source: Mahan Rykiel Associates)



Figure 21 Healing Gardens Archives. (Source: Mahan Rykiel Associates)



### **3.5 Healing Garden, Located in University of Maryland, Baltimore Washington Medical Center**

The healing garden is a quiet and beautiful place to be where its users enjoy throughout the year. Strategically located behind the Tate Cancer Center is supported through grants by TKF Foundation (Nature Sacred). The garden has some unique features a windy stream, reflecting pools, seating areas. Inscribed bricked walkway with names of donors and inspirational messages. It is a place of great relaxation for families and patients. Users do have a great time walking along the fantastic landscape, looking at the names of donors and family members who have contributed to the healing garden's success.

Pledges given to Baltimore Washington Medical Center Foundation or a \$1000 gift can give the donor (families and friends) the opportunity for a brick inscription. Purchase of equipment, replacement technology, staff training (schooling in the most advanced practices and procedures), providing good services to patients and families are used with the donations. The donations are tax-deductible.



Figure 22 Nature sacred at Baltimore Washington Medical Center (Source: Massey cancer center).



Figure 23 Nature Sacred at Baltimore Washington Medical Center (Source: Massey cancer center)

### **3.6 University of Maryland rehabilitation and orthopedic Institute**

The healing garden is a therapeutic facility designed for educating families, visitors, patients, and health care professionals/staff on how to handle stress to move along with community demands and strengthen their interest in gardening. It further helps the patients work around the community and home after being discharged from the hospital. The garden was designed to serve as a therapeutic instrument to teach patients the best way to handle physical challenges as they go back into their everyday lifestyle while also boosting their interest activities such as gardening.

The garden is a beautiful, quiet, and natural place for families and visitors to relax. Employees were not left out. They also use the garden space to relax from the hospital duties. It has different ground textures and patterns for patient's mobility skills and getting them ready for the community as they return to their various homes. It has been seen from the study that there is a connection







Figure 25 & 26 University of Maryland Rehabilitation and Orthopedic Institute (Source: Nature Sacred)

### 3.7 Mercy Hospital Healing Garden

The healing garden is categorized as a sacred place for all who need healing, refreshing, and wholeness. It is an intimate place for families, friends, patients, and hospital staff. It is physically located in the inner court of the hospital facility. The garden's different elements have their uniqueness; the garden's entry point shows a book pedestal with "With God; all things are possible." With the sole aim of providing healing to the body, mind, and spirit, focal points have three murals for its user's walk-through for spiritual guidance and healing. **The Irish room** connects and invites people to use the bridge to get to a secluded seating area. The **Mediterranean room** has a gently flowing water fountain serving as rest areas designed to remind its users of the sea: pond **room**, a shaded area for sitting, and reflection. The **rose room** has tree roses and ground roses with different colors; the waterfall room has beautiful and peaceful sound flowing over rocks. The final one being the **zen** room with sand for meditation or reflection



by raking the sand with right placed rocks to depict structure and simplicity. This garden was designed between 2015 -2016 and was also constructed in the same year on a landmass of 11 HQ. The budget was estimated at £1,000,000.



Figure 27 & 28 Mercy Hospital Designs Serene Healing Garden (Source: Bomanite Concrete)



Figure 29 Mercy Hospital Healing Garden (Source: Bomanite Concrete)





Figure 30 Mercy Hospital Serene Healing Garden (Source: Bomanite Concrete).

### 3.8. Case-Study Summary

The final part of this research work is a proposed design of a healing garden for its integration during the recovery process. As a result, there is a need to review existing healing gardens for their design capacity concerning meeting the patients' needs and how functional it is in terms of use. The above case studies showcase innovation, provide education, and build a foundation upon which I would be building to create a final design as design generally is built on not just in written works but also in visual document. The above case-studies were diligently selected for what they represent. The gardens at the Fisher House in the Veterans Administration Medical Center was specifically built to meet veterans' need with a highlight to allow for exercise, meditation, and a place to escape. The proposed design development would reflect these features. The garden at Betty Ruth & Milton B Hollander /Smilow Cancer Hospital, though built on a rooftop, is considered an outdoor garden, which relates to the proposed garden's idea. The highlight here is the family connection, which it allows while patients are at their recovery stage. The design

features lots of shrubs and a curvilinear shape, which adds beauty to the project. The healing garden at Massey cancer center comprises shade trees, perennials, shrubs, vines, evergreens, and groundcovers. The proposed would explore this aspect with the design concept to have a large green area since the site is a virtual location; it would afford a limitless opportunity to plant and try out many plant materials suitable for zone 10 in the United States of America. The garden also features anti-cancer properties, including the yew tree, which is the source of the drug paclitaxel, Madagascar periwinkle, makes vinblastine medication autumn crocus, which is among the substance tested against leukemia. I would love to explore planting materials with calming properties for the proposed to explore how having these plant materials in the garden helps during the garden and generally during recovery.

The healing garden at Upper Chesapeake cancer center's goals includes having a distinct entry point, vehicular access, flexible and multi-use design. This case study is essential as the idea of the proposed healing garden design considers having a multi-use. These uses would range across therapy sessions, exercise, relaxation, walk, among others. The healing garden at the University of Maryland, Baltimore Washington Medical Center features seating areas, a walkway, and a reflecting pool. This is relatable as it brings on board the idea to create a series of small pools in a sectional form since there is a large land area to work. The healing garden at the University of Maryland Rehabilitation and Orthopedic Institute is designed to educate users on handling stress and encouraging gardening. This is key to developing the proposed garden because it is designed to aid patients' recovery already going through a stressful situation. This is achieved through the gardening activity carried out on site.

The mercy hospital healing garden showcases a strong tie to the proposed garden design. One primary goal of the garden is wholesomeness. The design features an intimate place for users in

an inner court; this reveals the need to have gardens within an enclosure, vital to the proposed healing garden's design concept. This case study is directly relatable to the idea of faith in connecting to nature. It further features focal points, a sectional design idea with the flowing water in the fountain room, a room filled with roses, and a secluded seating area. This idea is great for the proposed bulb healing garden having many circular spots to allow for seclusion.

## **Chapter 4 Detailed Design**

### **4.1 Pre-Design Stage**

This is the preliminary design stage, where research of restrictions and requirements is carried out. Locational features like existing buildings and services are identified. It is a stage where environmental factors like moisture retention, climate, soil type, and erosion problems are identified. This is essential as preliminary research before the commencement of work can lead to massive setbacks during development.

### **4.2 Conceptual Design Stage**

The conceptual stage is the stage where preliminary analysis is carried out. It involves having multiple sketches and drafts of possible designs. It is necessary to create a plan with an average level of understanding of what needs to be done. There is a need to look at factors that need to be considered to ensure compliance and sort out possible issues that may arise from governing bodies. The design is virtual with no physical site on the ground for analysis. The consideration for plant material used for this project is in consideration of healing, color, and calming properties of the plants, of which most of it is suitable for zone 8 to zone 10. The state of Florida is considered for this project. This is further graphically represented in the diagram below.



In this case, the design concept shows the integration of the use of healing garden during PTSD treatment in veterans. As earlier mentioned, presently, the 2005 National Institute for Health and Clinical Excellence guidelines do not recommend pharmacotherapy (which is the use of medicine) option as first-line treatment. So also, is the 2009 American Psychiatric Association, the guidelines note that pharmacotherapy is not very effective for combat-related trauma in comparison to civilian PTSD (Shishko et al. 2018). The above mentioned gives the need to look inward and consider natural ways to aid treatment. It is important to note that this research is not offering an alternative to medical intervention rather, it is focused on the integration of healing garden during medical treatment in order to aid speedy recovery. It considers transitioning or minimizing the use of medicine to exploring nature as a source of healing. Nature in this case would be the presence tree elements, water, boulders where different activities can be done in order to keep users engaged.



Figure 31 Graphically representation of Design concept

### **4.3 Design Development**

The design stage is a stage where the architect considers all forms of calculations and investigate specific features of the structure, and components like grading, stormwater, elevation drawings among others. The conceptual design is agreed upon and refined to meet the necessary specifications like codes and other developer's need. Here, ADA access is addressed so also is the full list of plants required for the project, this include method of planting, quantity and detailed maintenance for them.

### **4.4 Goals**

According to numerous writers, it has been suggested that incorporating environments that support both the emotional and spiritual recovery needs of patients or users will increase the quality of the experience and coping ability during the recovery process. The goals for designing this healing garden project are as follows:

1. To provide a soothing environment for veterans receiving treatments for PTSD, their therapist, and family members who are sometimes involved during the period of healing.
2. To further enhance the quality for garden use, by incorporating certain activities into the design such that while the garden aids the recovery process, users can also be engaged with some worthwhile events, filling up empty spaces.

**4.5 Objectives** To create a waterfall. Water is essential in designing a healing garden to explore this feature in the design of this project.

1. To use native stone in its severe form creates a soothing environment for the healing garden.

2. To provide natural lighting. Since receiving treatment within the hospital, the environment is characterized by little or no lighting and ventilation.
3. To have a full understanding of both the physical and emotional needs of Veterans and their family members.
4. To use planting materials that have calming properties, colorful with a mix of evergreen tree options.
5. Encourage exercise by incorporating open spaces, yoga, walking, meditation, therapist session, reading, and relaxation.

#### 4.6 The Spatial Bubble Diagram

The decision making for designing this spatial bubble diagram is made to align with the above listed goals and objectives.

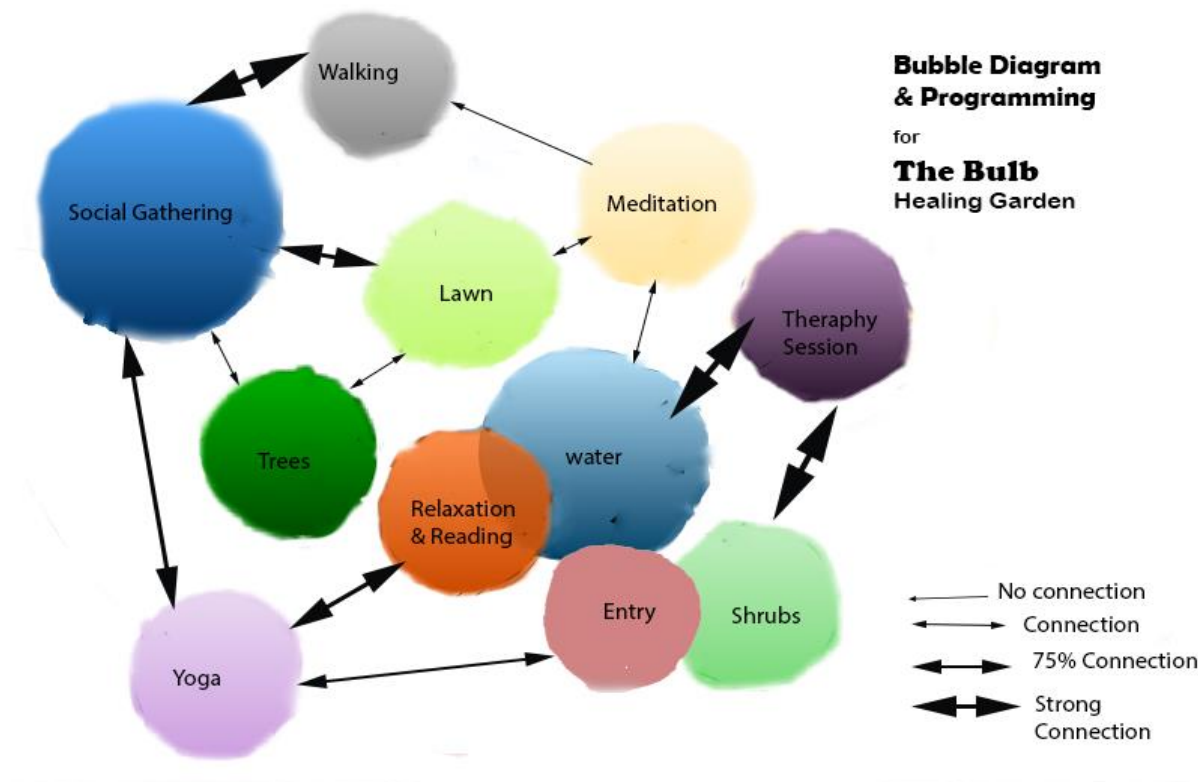


Figure 32 Spatial Bubble Diagram

#### 4.7 The Bulb Healing Garden

You will agree with me that birth takes place in a secluded place, not in the open. I will be exploring this concept of the enclosure to enable users to have the privacy they need in recovery or rebirth. To get to the core of a broken man, some level of effort is required. This is reflective in the design of the virtual healing garden with the aim of providing a place of comfort, relaxation where patient can enjoy freedom and have a one on one time with self or therapist as the case maybe.



Figure 33 Graphically representation of bulb concept (Onion Bulb)



Chapter 5 Detailed Design

5.1 Master Plan



Figure 34 Master Plan



Figure 35 Elevated Master Plan



The onion is a nutritious vegetable also called the bulb onion. The idea of the bulb healing garden stems from an onion bulb with several layers, which people often term to Meaning that there is more to them than what first meets the eye. This explains the unique case of every veteran diagnosed with PTSD. Earlier literature explained the different characteristics of a patient with symptoms, how they react to it, and options available when seeking help. As the onion age, the outer layer remains dry and starts to crack while covering up the inside's fresh and fleshy layer. This cracked outer skin needs to be removed to get to the fresh and well moisture layer of the onion. Patients with PTSD can be regarded in this way, and a conscious effort must be made to reach for them, especially when they have started to show the symptoms of withdrawing, being overtly scared, or over-protective of families.



Figure 36 Labelling of Highlighted areas

This garden's design reflects circular spaces to allow for self-healing, engagement with nature, and enable one on one with the therapist. It is intentionally built to provide a place of comfort, to allow for private time with self, families, and friends. In designing this garden, everything nature is the priority. There is a water feature to give life into the garden, several trees and shrubs element ranging from fruit trees to non-fruit trees (green areas), and boulders. The garden also features a walking space to walk or do exercise, ADA access for the disabled, and seating areas. There are sections for social gathering, therapy sessions, reading, meditation, and an open field for outdoor activities where a group therapy session is needed. The odor from woody plants, the trickling of water and it's movement, the serenity,



Figure 37 The Bulb Healing Garden Section AA





The Bulb Healing Garden Section BB

Figure 38 The Bulb Healing Garden Section BB



Perspective 1

Figure 39 Perspective 1





Perspective 2

Figure 40 Perspective 2



Perspective 3

Figure 41 Perspective 3



Perspective  
4



Figure 42 Perspective 4



Perspective 5

Figure 43 Perspective 5





## Perspective 6

Figure 44 Perspective 6

### 5.5 Plant Materials

People in urban areas frequent urban parks to experience vegetation, water, grasslands, and spatial openness in search of the restoration feeling (Ulrich and Addoms, 1981).

There is a need to screen the healing garden away from mechanical noise like air condition unit and the city's sound, and smoking area (it should station far away from the space).

Other materials to be used are wood from timbers, sand, stone, and permeable membrane materials for outdoor flooring.

Native Stone, when used as one of the elements of the healing garden design in its real and natural form, creates a soothing environment for the users.

## Materials

- Materials to be used are main wood from timbers, sand, stone, and permeable membrane materials for outdoor flooring.



Figure 45 Plant material

Native Stone when used as one of the elements of the healing garden design in its true and natural form creates a soothing environment for the users.

## The plant zone in the USA

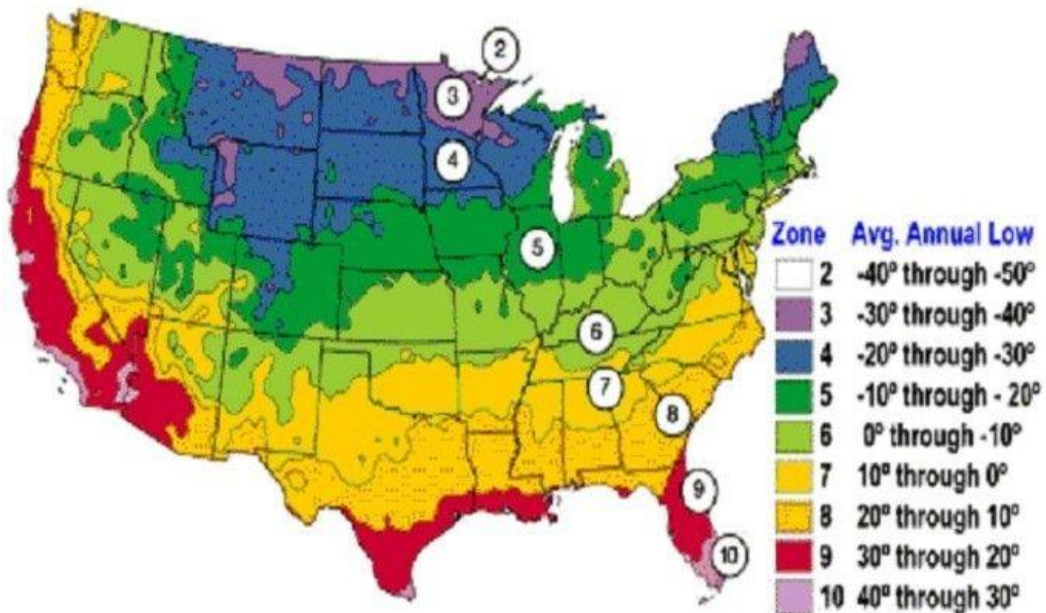


Figure 46 Plant zone in the USA (Source: Pinterest)



## Plant Selection Details

Figure 47 **Red-edged Dracaena** (Source: Pinterest)



This plant is known for bringing a pop of color into space with its purple-red edged leaves. This fast-growing shrub is also credited for its air-purifying properties, which promotes a clean and relaxed ambiance. It can rid the air of chemicals including xylene, trichloroethylene, and formaldehyde. These

harmful chemicals can increase stress, lack of concentration, and a high level of anxiety.

Figure 48 **Palm tree** (Source: Home Guides)



The Areca palm is a popular air-purifying plant, which many have in both their homes and offices. It is easy to care for as long as it is not overwatered. It adds moisture to the surrounding atmosphere, and it is being proven to remove unwanted toxins such as formaldehyde, benzene, and

trichloroethylene from the air. Breathing in purer air lowers anxiety levels and blood pressure, which calms one's mental and physical state.

Figure 49 **English Ivy** (Source: Pinterest)



The English Ivy is a species of flowering plant native to Western Asia and Europe. This species is a great companion for persons who wish to calm their allergies, especially suitable for asthmatic patients. According to NASA, this plant is the best for removing harmful gases

like benzene and trichloroethylene. It is also a fast-growing expressive plant that can help you create a wild natural feel wherever it is planted. It to lower airborne mold by 94% in as within 12 hours and promote restful night sleep at home.

Figure 50 **Ginkgo biloba** (Source: Google Photo)



This is a deciduous tree with beautiful yellow foliage in fall. It is ommonly known as ginkgo or ginkgo, also known as the maidenhair tree, is the only living species in the division Ginkgophyta, all others being extinct. It is an herb used to treat altitude sickness (prevention), cerebral vascular insufficiency, cognitive disorders, dementia, dizziness/vertigo, intermittent claudication, macular degeneration/glaucoma, memory loss, premenstrual syndrome, SSRI-induced sexual dysfunction, and as a vasodilator.

Figure 51 **Oakleaf hydrangea** (Source: Proven Winners)



A deciduous shrub is a dramatic, *Hydrangea quercifolia*, commonly known by its translation oakleaf hydrangea or oak-leaved hydrangea, is a species of flowering plant in the family Hydrangeaceae. It's white-blooming shrub with four seasons of interest. It blooms best in areas where summers are somewhat hot, but it is winter hardy farther north than the macrophylla (mophead). A tremendous advantage of the Oakleaf is that it can thrive in much dryer locations

Figure 52 **Strawberry** (World Crops Database)



An evergreen shrub or small tree and its perennial

The garden **strawberry** (or simply **strawberry**; *Fragaria × ananassa*) is a widely grown hybrid species of the genus *Fragaria*, collectively known as the **strawberries**, which are cultivated worldwide for

their fruit. The fruit is widely appreciated for its characteristic aroma, bright red color, juicy texture, and sweetness.

Figure 53 **Chinese hibiscus** (Source: Pinterest)



A tropical shrub, *Hibiscus rosa-sinensis*, known colloquially as Chinese hibiscus, China rose, Hawaiian hibiscus, rose mallow and shoeblackplant, is a species of tropical hibiscus, a flowering plant in the Hibisceae tribe of the family Malvaceae.

It offers an excellent source of summer color in the landscape,

and are among our most popular tropical and subtropical flowering plants.

Figure 54 **Gerbera daisies** (Source: Pinterest)



This brightly colored, flowering plant is a good air purifier. It is known for its ability to remove trichloroethylene from home. It also removes benzene from the air, a chemical associated with inks. It promotes a calming ambiance and relaxing sleep time. It

requires much light and well-drained soil. In order to promote healthy growth, it is good to mist

the leaves several times a week. When this flower blooms, its colorful petals can last up to two weeks. The pretty hue not only adds energy to our environment but having brightly colored plants around or to behold promotes happiness. It is an annual, perennial Gold (flowering plant) shrub perennial.

Figure 55 **Golden Pothos** (Source: Eldeber)



Another robust plant material to invest in when tackling low air quality and stress affecting factors, so plants with air-purifying qualities cannot incorporate too much. The Golden Pothos comes in the shape of a fast-growing vine, which creates a waterfall of lushness when displayed. It promotes a very relaxing ambiance. Another unique feature of this plant is its ability to stay green, even in a dark room. Ensuring this plant gets lots of bright and indirect light can keep it in excellent condition during the day. It is also good to avoid overwatering, as this will cause the root to rot.

Figure 56 **Chrysanthemums** (Source: Pinterest)



These herbaceous perennial shrubs have many medicinal benefits that not only adds color and vibrancy to the home but it is proven to purify the air, lessen symptoms of worry and stress, and calm and relax our bodies when taken as a tea. Asides from its air-purifying benefits, this plant species is highly medicinal. It treats high blood pressure, chest pain, fever, type 2 diabetes, cold, headache, swelling, and dizziness. When combined with other herbs, it also treats prostate cancer. Its tea boasts calming and relaxing benefits, which helps treat anxiety symptoms by relaxing the nervous system.



Figure 57 **Aloe Vera** (Google Photo)



Aloe Vera, an evergreen perennial shrub, is predominantly used as a herbal remedy. A succulent plant species that can be traced back to the beginning of the first century improve overall air quality. It is suitable for soothing scars, inflammation, and sunburn. Aloe

Vera can be said to be among the most potent plant air purifiers globally as it lowers carbon dioxide levels at night. It helps to remove harmful chemicals such as formaldehyde and benzene from the air. Its juice is also said to help ease high blood pressure and improve digestion to cap it up. It is also an excellent option for those looking for a low maintenance plant as it requires minimum water and attention; little wonder the Egyptians named it the 'plant of immortality' due to its resilience.

Figure 58 **Rosemary** (Source: Pinterest)



A woody perennial evergreen herb and a mint family native to the Mediterranean region help improve one's memory. It also improves air quality and improves memory function, reduces stress, and eliminates anxiety. It is a fragrant evergreen herb native to the Mediterranean. It is used as a culinary condiment,

to make bodily perfumes, and for its potential health benefits. Rosemary is a member of the mint family Lamiaceae, along with many other herbs, such as oregano, thyme, basil, and lavender.

Figure 59 **Jasmine** (Source: Pinterest)



Jasmine, an outdoor shrub, evergreen, perennial, with a fantastic fragrance, is not only sweet to the senses as it is being proven to promote better night's sleep. One is likely to feel less anxious and more at peace in an environment filled with jasmine. Jasmine helps with sleep as the former plays a vital role in our physical and mental well-being; this results in waking up more alert. If you lack adequate sleep, have trouble making decisions, control emotions, solve problems, and handle change, planting jasmine around you can be highly helpful.

Figure 60 **Turf** (Source: Pinterest)



Centipede grass is a low maintenance turf as it tolerates poor soil, slow growth habit. Centipede grass is a popular turf grass for lawn in the Southern part of the United States. Centipede grass' ability to grow in poor soils and its low maintenance needs make it an ideal grass for many homeowners in warmer areas. While centipede grass needs little care, some centipede grass maintenance required.

Figure 61 **Lavender** (Source: garden26variegata)



The lavender, a mint family, is mostly used as an essential oil. It is used to fight against anxiety. Its fragrance, often used in making body lotion and body spray, is a plus to this excellent plant. According to research, lavender reduces

the level of stress, slows down heart rate, and lowers blood pressure. It is also known to improve sleep, lowers heart rate, and calms uncomfortable babies. It is excellent for hedges and borders.

Figure 62 **Snake Plant** (Source: PhilNews.ph)



The snake plant is also known as "mother-in-law's tongue. It has air purifying properties, which is very useful for reducing anxiety, headache and helps with many respiratory problems. Native to West Africa, the Snake Plant belongs to the Asparagaceae family. If you suffer from eye irritation, headaches, or breathing problems, this is a great plant to install in your home. It also improves energy levels. NASA was amongst the first to discover the benefits offered by the snake plant. They sealed a single snake plant in an enclosed chamber for 24 hours while releasing several toxic gases during their studies. Results showed that Benzene levels were reduced by 53% and trichloroethylene by 13.4%. Having plants in the environment around one is a must if you wish to lower blood pressure, improve well-being, increase productivity, and raise job satisfaction. It also improves reaction times, increases concentration, promotes restful sleep time, and reduces anxiety levels.

Figure 63 Plant Palette


Plant List	Autum		Winter		Spring		summer		Plant foliage and qualities
	Early	Late	Early	Late	Early	Late	Early	Late	
Lavender cotton									Great for hedges, borders, shrub
Jasmine									Shrub, evergreen, perennial
Rosemary									Woody perennial evergreen herb (shrub)
Aloe Vera									Shrub, evergreen perennial
Chrysanthemums									Herbaceous perennials, shrubs
English Ivy Plant									Evergreen woody tree rarely shrub
Areca Palm									Evergreen woody plant
Golden Pothos									An evergreen plant that thrives even in neglect
Red-edged Dracaena									Evergreen tree green, low maintenance and bright colours
Gerbera daisy									Perennial although can be treated as annual in colder region and colourful
Snake Plant									Herbaceous, evergreen, perennial, flowering plant (grows/ thrives well in pot)
Ginkgo biloba									Deciduous tree and turns yellow in fall
Oakleaf hydrangea									Deciduous shrub
Chinese hibiscus									Evergreen tropical shrub or small tree and its perennial
Strawberry									Evergreen shrub or small tree and its perennial
Centipede grass									Centipede grass, low mtnce, tolerates poor soil, slow growth habit

Figure 59 Plant Palette



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PLANT SCHEDULE							
DECIDUOUS TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	REMARKS
	GIN BIL	Ginkgo biloba	Maidenhair Tree	---	1		
EVERGREEN TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	REMARKS
	DRA ALE	Dracaena aleytriformis	Dragon Tree	---	23		
	HED DIA	Hedera helix	English Ivy	---	20		
FRUIT TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	REMARKS
	FRA ANA	Fragaria x ananassa	Strawberry	---	4		
PALM TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	REMARKS
	ARE TRI	Areca triandra	Areca	---	21		
ANNUALS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	REMARKS
	HIB ROS	Hibiscus rosa-sinensis	Chinese Hibiscus	---	12		
	SAN TRI	Sansevieria trifasciata	Mother-in-law's Tongue	---	21		
PERENNIALS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	QTY	DETAIL	REMARKS
	DEN XG2	Dendranthema x grandiflorum	Chrysanthemum	---	15		
	JAS ANG	Jasminum angulare	South African Jasmine	---	23		
	LAV RE4	Lavandula x 'Regal Splendour'	Regal Splendour Lavender	---	34		

Figure 60 Plant Schedule

## **Chapter 6 Conclusion**

Marcus and Barnes have identified the three aspects of healing from the book, the healing gardens. The aspects make clear how the healing garden may be beneficial, and the first aspect is the relief from physical symptoms. The second aspect is stress reduction, and finally, an improvement of the individual's general well-being. Horticultural therapy, also described by a green environment, is a crucial healing method in hospitals since it improves the state of the body's organs, relaxes the mind and soul, and contributes to good quality of life lived and general contentment with the services and treatment received in the hospital. Plants contribute to the well-being of the patient, and according to mental health doctors, health centers should have plants at all stages of their development so that patients may observe the cycle of life of the plant, and since observing plants and their features builds up positive strength in the person. Interacting with the natural outdoor environment has been linked to positive physiological and psychological health benefits.

Therefore, it is necessary to recreate the natural environment in an indoor space to extend the invalids' interaction and benefit them (Bringslimark et al., 2009; Shibata). Health institution administrators also need to adopt Horticultural therapy since it is a nonmedicinal and noninvasive treatment technique with health benefits on top of being cost-effective to both the patients and the hospital administration. Coping and dealing with traumatic and work-related stresses are a challenging task for both civilians and service members. The military environment's vibrant life requires service members to be catered for in medical and psychological treatment and support. Some of the constraints that face the treatment and support of the affected persons may include poor transport accessibility, logistical barriers, a limited number of deployed operators, and hostility in the environment and outsiders. Having explored the effort being put in by professionals

to assist and bring healing to veterans having PTSD, I will like to propose that using and exploring the benefits of a healing garden should be included in the sessions, healing process, and schedule of treatment for enhancement on medical practitioner's effort and to aid the healing process. One thing I will like to reiterate is what a healing garden is not. According to Gerlach-Spriggs, healing or restorative gardens are not intended to replace medical treatment, nor are they cures. Healing gardens are not and cannot be an alternative to medicine, but if we have seen physical therapy work, healing gardens can be put into this context of a therapeutic way of healing from the inside while interacting with nature. It is more like creating an alternative environment where support can be given while reaching medical goals and where therapists and other specialists can collaborate. This garden can either be outdoor or indoor. This will depend on many factors like available location, available resources, the expected number of users, season, etc. In designing this healing garden, the designer's first goal is the process of healing, while designing a natural environment is the second goal. This is important in consideration of the needed features that will serve as a catalyst for healing, increase speed during recovery, and eventually restore the soul. In other words, just like drugs are prescribed for the treatment of PTSD, I am proposing that healing sessions should be prescribed during treatment for about 20 to 30 minutes or more within certain days interval in a week and as needed. This can be done in two different ways:

### **6.1 Private or Personal Healing**

We can use relaxation and imagery to think about reducing our stress. However, viewing nature seems to be the preferred method of stress reduction. Furthermore, we begin to feel better within minutes of viewing nature (Hebert, 2003). The healing process differs for everyone. Some people believe in self-healing; they are considered the private patient for this research. This routine should



be made flexible but with some guidance on the use and available activities that can be engaged in during the patient's session.

## **6.2 Assisted Healing**

Many people are not strong-willed to go through the healing process on their own, and as a result, they require the assistance of external personnel or professional who can be trusted enough to share their pain and life with to get them through their healing process. In this situation, the therapist could either be a psychotherapist, a healing garden healing professional, a yoga instructor, a dance instructor, or whatever aspect of physical engagement that appeals to the patient can take advantage of during the garden session. Although there were no studies done, this would positively impact the healing process of patients. This research is open-ended, and it is essential to note that there is no empirical or clinical study to establish the effectiveness of prescribing a monitored timing in the healing garden to facilitate a speedy recovery for patients with PTSD; it would be great to carry out a clinical study for this purpose. Healing gardens are not and cannot be an alternative to medicine, but if we have seen physical therapy work, so also, the healing garden can be put into this context of a therapeutic way of healing from the inside while interacting with nature. The appearance of healing gardens and natural settings in hospitals can also enhance caregivers' sense of well-being in such high-pressure workplaces.

The healing garden can either be outdoor or indoor. This will depend on many factors like available location, available resources, the expected number of users, season, etc. In designing this healing garden, the designer's first goal is healing, while designing a natural environment second goal. This is important in consideration of the needed features that will serve as a catalyst for healing, increase speed during recovery, and eventually restore the soul. In other words, just like drugs are

prescribed for the treatment of PTSD, this is proposing that healing sessions should be prescribed during treatment for about 20 to 30 minutes or more within certain days interval in a week and as needed. The suggested duration in the garden during the recovery process works in two different ways:

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