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Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation

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HOOVES 4 HEALING:
THE CAPACITY OF THE HORSE IN
BREAST CANCER REHABILITATION

by

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DEDICATION

Nobody can make you seek out your education.

You have to do that for yourself.

—Robert Parris Moses 1935-2021

I would like to dedicate this work to my parents, especially my dad,

who have instilled in me the value of education.

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I would like to thank all the “families” that made this endeavor possible.

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HOOVES 4 HEALING:

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ABSTRACT

Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation is a multifaceted, evidence-based program that uses horses and nature as the media for the physical, cognitive, and psychological rehabilitation of individuals who have or had breast cancer. Such vulnerabilities may occur from the cancer disease itself, as well as from the processes used to treat it. Physical vulnerabilities include decreased strength, range of motion and upper-body coordination, cardiovascular endurance, balance, and mobility. Cancer-related cognitive impairments include vulnerabilities in executive functioning such as planning, memory, attention, and problem-solving. Cancer and its treatments often elicit mental fatigue that negatively affects attention and the joy of life. Collectively, these vulnerabilities may lead to occupational imbalance through the loss of independence and engagement in important and meaningful roles and relationships. Through grooming and quiet reflective interactions with horses in outdoor environments such as paddocks or fields, Hooves 4 Healing addresses these vulnerabilities. Engaging in a novel equine-based rehabilitation program in a nonclinical environment will support participants' physical, cognitive, and psychosocial needs in a restorative, nature-rich setting, thus facilitating the return to meaningful occupations and life roles.

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LIST OF ABBREVIATIONS

ADL…….activities of daily living

AOTA……American Occupational Therapy Association

ASCO.....American Society of Clinical Oncology

EAAT……...equine-assisted activities and therapies

EAGALA …….Equine-Assisted Growth and Learning Association

EF……executive functioning

FACIT-F …….Functional Assessment of Chronic Illness Therapy: Fatigue

HHRF……..Horses and Humans Research Foundation

HPSO…….Healthcare Providers Service Organization

IADL……...instrumental activities of daily living

MMSE-2:BV……Mini Mental State Examination, version 2: brief version

MMT…….Manual Muscle Test

PTSD……posttraumatic stress disorder

QoL ……..quality of life

RCv3……..Role Checklist, version 3

ROM…….range of motion

SRAL…….Shirley Ryan Ability Lab

UBQ……..upper-body quadrant

UE…….upper extremity

CHAPTER ONE – Introduction

This chapter serves as the introduction to the Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program. This program identifies the importance of an innovative, motivating, and comprehensive solution to address the complex and multilayered requirements of individuals who have or had breast cancer and require rehabilitation to regain their ability to engage in meaningful occupations. There is an identified need for comprehensive rehabilitation that focuses on physical, pharmacological, and psychological interventions to improve survivors' quality of life (QoL) and facilitate a return to meaningful work. However, these interventions are often limited to indoor settings such as clinics, hospitals, or outpatient rehabilitation facilities (Cocchiara et al., 2018). Sullivan and Kaplan (2015) described the challenges of designing an effective health care setting, such as technical details, rigid regulations, and imposing professional standards needed to promote the well-being of a widely diverse and vulnerable population. Indoor interventions do not encompass the health- and wellness-promoting qualities of being outdoors (Kirschbaum & Donbavand, 2014; Ohly et al., 2016). Therefore, the intent of this multifaceted program is to consider the health-promoting effects of being outdoors and using horses and their natural environment as the vehicle for rehabilitation.

The Problem and its Effects

Breast cancer and its impact are widespread. As of 2021, 3.8 million women in the United States either will either have been diagnosed and are currently receiving treatment for breast cancer or will have had breast cancer at some time in their lives

(BreastCancer.org, 2021). According to recent research, 30% to 50% of women experience limited arm mobility and pain after treatment, 65% experience cancer-related fatigue, and 75% experience cognitive decline related to their treatments and the stress of the diagnosis. Of them, 35% experience that decline after cessation of their treatments (Chrischilles et al., 2019). Functionally, these effects are worrisome, with 65% of women sustaining up to an 80% decline in their working income (van Muijen et al., 2017), and 26% able to drive only short distances or unable to drive altogether (Silver & Gilchrist, 2011). Not surprisingly, this population's QoL is greatly reduced. This is particularly relevant for those experiencing physical limitations (e.g., pain and reduced arm and shoulder function), high stress levels, and pervasive cancer-related fatigue, as well as low perception of QoL (Joshy et al., 2020; Schmidt et al., 2012).

The Affordable Care Act, enacted in 2010, brought affordable medical care to those who were uninsured (Obama, 2016). Medical care, such as rehabilitative services, are now available to larger populations. Health care reform now focuses more on the delivery of postacute rehabilitation, which includes the population targeted for this program. However, inefficiencies in the health care system and delivery of care still exist (Graham et al., 2018).

Graham et al. (2018) spoke to the importance of patient-centered care that offers the "triple aim" of health care: better care, health, and value. Health-service research is also necessary to determine if there are sufficient rehabilitative interventions to promote increased access to health care; determine the presence and efficacy of variations in care delivery that increase access; and analyze current health policies, programs, practices,

interventions, and techniques and their effects on a person's functional status, symptom severity, and QoL (Berwick, 2015). Berwick (2015), President and CEO of the Institute of Healthcare Improvement, identified the need for rehabilitative health care reform. On a larger scale, the United Nations (n.d.) identified the need for better quality and availability of health care through their "Goal 3: Ensure Healthy Lives and Promote Well-Being for All at All Ages."

To achieve the mission of better health care, Berwick (2015) identified 10 tenets. These tenets include respecting and accommodating patient, family, and community values within the rehabilitation process; increasing patients' engagement in their journey toward better health; and developing new care designs that are innovative and challenge long-standing assumptions on what (or who) constitutes an effective therapy program. The Measurement Networking Group of the American Congress of Rehabilitation Medicine Task Force was created in 2016 to address these tenets through the facilitation and improved collaboration of rehabilitation-related research (Graham et al., 2018). These improvements would increase the level of care and outcomes in rehabilitation and lead to overall health benefits. Considering the above needs, providing purposeful, person-centered, rehabilitative activities that use horses as rehabilitative tools outside in nature could address the loss of physical mobility, cognitive prowess, and QoL, and thus contribute to increased access to effective health care.

The Role of Occupational Therapy

In the *Declaration of Independence*, Thomas Jefferson wrote, "We hold these Truths to be self-evident, that all Men are created equal, that they are endowed by their

Creator with certain unalienable Rights, that among these are Life, Liberty and the Pursuit of Happiness." Occupational therapy holds this same premise through the concept of occupational justice. As Wilcock and Townsend (2009) defined, *occupational justice* is "the right of every individual to be able to meet basic needs and to have equal opportunities and life chances to reach toward her or his potential but specific to the individual's engagement in diverse and meaningful occupation" (p. 193). Just as Jefferson identified basic human rights to include liberty and happiness, occupational therapy identifies occupational justice as addressing autonomy, engagement, and inclusion.

The average age of a person receiving a cancer diagnosis is 63 years (Komen.org, 2021), thus affecting women considered to be of physically, socially, and cognitively vital ages. Therefore, the inclusion of occupational justice to regain one's occupations, both chosen and required, is important. Occupational therapy emphasizes resuming important and meaningful occupations and, in some instances, the cultivation of new occupations that give life joy and purpose. Such gains were shown in a study of veterans with posttraumatic stress disorder who engaged in a 6-week horsemanship and riding program. That is, Johnson et al. (2018) reported secondary improvements, including regaining leisure horseback-riding occupations and the onset of new occupations such as volunteering as a side-walker during children's therapeutic riding sessions.

Resuming work occupations is equally important. The survival rate of breast cancer is improving with early detection and more effective treatments (BreastCancer.org, 2021). Therefore, addressing work-performance skills has become

more vital than ever. Zajacova et al.'s (2015) study on employment and income loss due to cancer revealed that adults between the ages of 25 and 64 and diagnosed with cancer are 10% less likely to gain employment within 5 years of a diagnosis. It also noted that individuals working at the time of diagnosis lose roughly 5 weeks of employment due to the cancer and its treatments. This financial loss often extends after the diagnosis, with a 20% reduction in total family income at 2 and 3 years postdiagnosis. Cocchiara et al. (2018) found that returning to work is a hallmark of returning to normalcy, and with normalcy comes better QoL, increased self-esteem, and return of self-identity. Further, Desiron et al. (2013) stated that

> work has the potential to help patients regain a sense of normality, of being valued and helps them to find meaning in reintegration into society. Returning to work can help cancer patients to regain confidence in their abilities and improve their quality of life. (p. 517)

The rate of survivors returning to work is high in the United States (93%). However, many factors influence individuals' ability to return to work. Islam et al. (2014) indicated these as being "socio-demographic factors such as education and ethnicity; treatment-oriented factors such as chemotherapy; work related factors such as heavy physical work; disease related factors such as poor health condition and fatigue; and psychological factors such as depression and emotional distress" (p. 1). Rehabilitation services must emphasize remedying these factors so individuals may return to their expected and familiar routines, ultimately resuming equilibrium and autonomy.

One of Silver and Gilchrist's (2011) key recommendations for effective cancer survivorship, gleaned from the Institute of Medicine and National Research Council's report titled, *From Cancer Patient to Cancer Survivor: Lost in Translation*, were to minimize the adverse effects of cancer on employment. The concept of employment as it relates to *work* begs the question: Does the common phrase, "return to work," indicate the return to a job? The definition of work is complex. As Merriam-Webster (n.d.) indicated, *work* has three components, including the need to fulfill duties for monetary compensation (e.g., wages), perform tasks that have continued operations or require sustained effort, and exert oneself physically or mentally for a purpose.

Further, the American Occupational Therapy Association ([AOTA], 2017, 2020) considered work to be an occupation. These factors reveal that work encompasses not only one's paid vocation, but also tasks that signify a full, satisfying, and productive life. For example, basic and instrumental activities of daily living such as caring for oneself, others, and the home, as well as leisure tasks such as hobbies and favorite pastimes are temporally dependent and could be grounded in work. The AOTA's Occupational Therapy Practice Framework: Domain and Process outlines occupational therapy as using active processes of engaging in occupation to achieve health, well-being, and participation in life. Meaningful occupation involves many interrelated factors (e.g., individuals' values, beliefs, and physical functions) and how they affect skills (e.g., motor and cognitive). Daily patterns, such as habits and routines, and the context or environment in which the performance occurs further influence participation. Effective rehabilitation is considered essential to address the specific cancer-related factors that

affect work engagement, the disease-related and psychological factors Islam et al. (2014) identified, and those factors identified by occupational therapy to ultimately return cancer survivors to their previous life roles. Together, these arguably encompass more than the straightforward dictionary definition of *work*.

Work also gives individuals a sense of purpose. Therefore, rehabilitation is essential for breast cancer survivors to regain skills and return to work, which gives them purpose and makes their life meaningful and unique. These skills will stretch across all life's work "genres," including vocational work, work with one's family, work within the home, and leisure work. They enable individuals to regain their self-identity and purpose in life. Occupational therapy practitioners recognize the importance of returning to work to fulfill meaningful life occupations and the many aspects that must be addressed to do so.

The Program

The Hooves 4 Healing program addresses three main areas identified as being most effective to resuming meaningful roles: physical limitations, including reduced strength, mobility, and endurance of the upper body because of cancer treatments; cancer-related cognitive limitations, such as decreased attention; and cancer-related fatigue, which may be severe and pervasive, thus greatly diminishing QoL (Schmidt et al., 2012). Each area will be addressed through individualized, client-centered activities with quiet and nurturing horses. Furthermore, participants will experience the restorative qualities associated with nature, which are explained by the attention restoration theory (Kaplan, 2001).

Conclusion

Occupational therapy recognizes the often complicated and personally meaningful journey to regain independence in both the instrumental and leisure activities that make individuals' daily lives fulfilling. Engaging with the horse in this journey can meld rehabilitation from a life-altering disease with enjoyable and contemplative experiences, allowing individuals to address areas that make their lives worth living.

CHAPTER TWO – Project Theoretical and Evidence Base

Overview of the Problem

At the 2019 Professional Association for Therapeutic Horsemanship Conference (Labranche & Moraitis, 2019), University of Massachusetts, Amherst, Professor of Kinesiology Dr. Labranche and nurse practitioner Moraitis spoke of the need for sustained activity for the rehabilitation and long-term health of breast cancer survivors. Further, they speculated that horses could fulfill this need. Both ground and mounted activities with horses can help address commonly experienced rehabilitative needs that individuals with breast cancer demonstrate. These include fatigue, reduced physical use of upper extremities (shoulder, arm, and hand) due to surgery and localized treatments such as radiation, reduced balance, overall loss of cardiovascular function, and cognitive impairments related to systemic treatments such as chemotherapy (Cerulli et al., 2014; Ehlers et al., 2017; Nelson et al., 2018). There is also evidence that reduced quality of life (QoL) and despondency from diagnosis-related stress and rigorous, life-altering treatments (Kosko, 2017) could be addressed through engagement in therapeutic equine programs, such as the Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program.

Theoretical Base

Theory of Planned Behavior

The theory of planned behavior comprises three constructs: an individual's (a) behavioral intention, (b) attitude toward that behavior, and (c) subjective norms (how people in the individual's life feel toward that behavior (Ajzen, 1991). The premise is that

these constructs motivate individuals to complete the behavior, and they inform and influence that motivation. Taken together, this theory informs about how to change behavior and adapt new supportive behaviors.

Cancer and its treatments can produce severe and pervasive cancer-related fatigue. Schmidt et al. (2012) identified that between 60% and 93% of individuals with breast cancer reported experiencing fatigue at some point during or sometimes well past the course of their treatment, adversely affecting their QoL. Schmidt et al. further determined that up to 27% of individuals experiencing moderate fatigue reported a decline in both their financial situation and their occupational position in their jobs. Fatigue has significant impacts on the well-being of individuals with cancer: 55% identified an emotional impact, 58% a self-care impact, 69% a leisure impact, and 71% a social impact. Further, 63% rated fatigue in the top three cancer side effects (Díaz et al., 2008).

Fatigue can adversely affect an individual's QoL. Jitender et al. (2018) defined QoL as a multidimensional perspective that includes the physical, psychological, social, and spiritual systems. These four systems interrelate, and the disruption of one has potential to affect the balance of the others. Therefore, addressing the QoL of individuals with cancer both before and after treatment is important for their health, well-being, and success of cancer treatment. Further, Chrischilles et al. (2019) established a strong correlation among reduced QoL posttreatment and the severity of upper-extremity disability, lower socioeconomic status, lower health literacy, and the cancer treatment type.

An individual does not have complete control over the presence or level of fatigue from causal physiological factors. Therefore, ensuring a strong QoL goes beyond addressing cancer and its treatment's physical or visible effects. It should include other factors significant to the person. For instance, in Quinn et al.'s (2011) study, all respondents reported that when they received their cancer diagnoses, they perceived a lack of control. However, when given the choice to participate in a clinical trial, they felt they regained some control. That is, the option to choose between standard medications and a clinical trial—along with their perceived attitude about cancer, the support of their doctor and family, and the choice of how to proceed with treatment—returned some individuals' sense of control over their situation. "A sense of control over one's health is a key factor in quality of life measures and indicators of cancer survivors" (p. 647). Further, 100% of participants referenced "control" over their disease through actions such as electing to pursue a treatment.

To extrapolate these findings to the Hooves 4 Healing program, energy-conservation education must focus on reducing cancer-related fatigue and finding ways to adjust behaviors that maximize autonomy despite that fatigue. The program will incorporate the theory of planned behavior principles to effectively address cancer-related fatigue and build perceived control by reinforcing small areas of daily life.

Toglia's Multicontext Approach

Toglia's (1991) multicontext approach recognizes the importance of transferring knowledge learned during the occupational therapy process to broader contexts. Toglia noted the lack of effective treatment strategies to do so and developed a treatment

approach that would directly address learning within the treatment process. She postulated that true learning, and thus progress, would occur if new learning were generalized to a broader, more functional, and applicable platform. This learning process emphasizes the dynamic interplay among the individual, the task, and the environment. It seeks to layer potentially effective concepts (current environment, physical limitations, personal habits, self-awareness, and intrinsic desire to change) within the presented task.

Toglia (1991) established an organizational framework for learning that uses the multicontext approach as a basis for treatment. She advocated for a targeted strategy (input) on several tasks in various settings, based on the patient's current level of functioning. That targeted strategy would incorporate metacognitive and processing strategies to promote self-awareness (elaboration) and tie new information to previously learned knowledge or skills (output). Thus, this multicontext approach emphasizes learning for adults with brain injuries and the resulting cognitive and perceptual impairments. The approach forms the foundation for effective global learning while supporting the cognitive–perceptual profile of those with acquired brain injuries (e.g., forward insight, problem-solving, plan formulation and execution, self-perceived weaknesses, self-monitoring, and self-control).

Attention Restoration Theory

The Hooves 4 Healing program is unique in its recognition of the restorative aspects of nature for both cognitive fatigue and stress. The intention of the program is to use nature to help those with breast cancer resume previous occupational roles by reducing their fatigue and stress. Sullivan and Kaplan (2015) outlined the effects of

nature on both attentional fatigue (via attentional restoration theory) and stress (via stress reduction theory).

The stress reduction theory suggests that health care environments can be supportive if they provide individuals opportunities to experience a sense of control, to access social support, and for positive distractions such as nature (Ulrich, 1984). The attention restoration theory calls on four concepts: being away from everyday environments (being away); being involved in activities that are effortlessly fascinating (soft fascination); being involved in activities that capture attention and, thus, engagement (extent of engagement); and compatibility of the activity to fit with the individual's desires (compatibility; Kaplan, 2001). For example, Sullivan and Kaplan (2015) engaged participants in the stressful task of public speaking. Then, the authors showed participants pictures of streets contained varying densities of trees, and the participants rated their stress levels. Those who viewed streets with higher tree density reported greater stress reduction. These findings led the researchers to conclude that individuals with attending difficulties due to overstimulation and subsequent fatigue of the brain's attentional centers could experience rejuvenation through exposure to nature or nature elements.

In the Hooves 4 Healing program, individuals with breast cancer will be engaged in grooming a horse in an outdoor paddock (being away, extent, compatibility). They will use brushes in a specific sequence to increase shoulder range of motion (ROM), hand strength, and overall upper-body endurance. In addition to providing the cognitive rest inherently found in nature (soft fascination), layering the collection of brushes and

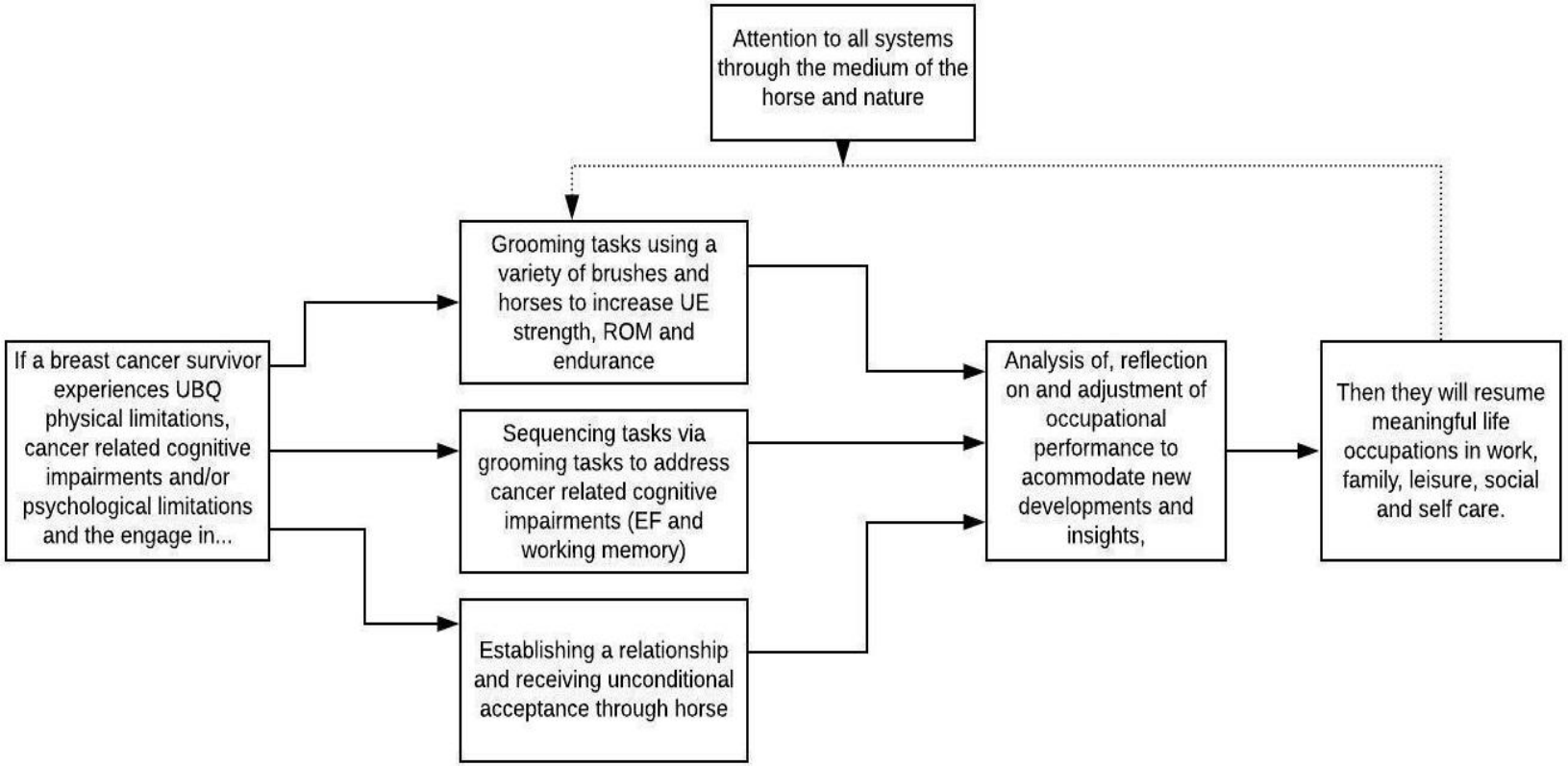
recollection of the correct sequence will address cognitive challenges, such as memory, attention, and problem-solving. Reduced QoL and cancer-related fatigue will be addressed as factors in energy-conservation education sessions. These sessions will commence either inside or outside the barn. The intention of these sessions is to improve physical status and self-empowerment and to learn and build social connections—all of which are factors that affect QoL.

Visual Model Based on Theoretical Frameworks

The initial visual model of the theoretical framework (Figure 2.1) illustrates the clientele intended for Hooves 4 Healing. They include those currently or previously diagnosed with breast cancer; undergoing or who have undergone treatments, including chemotherapy, radiation, or surgery; and who have at least one physical, cancer-related cognitive, or psychological limitation that results in difficulty performing life roles, leading to reduced engagement in meaningful occupations. Through the media of nature and horses, these three areas are addressed with the goal of resuming fulfilling occupations.

Figure 2.1

Initial Visual Model



Note. UBQ, upper-body quadrant; UE, upper extremity; ROM, range of motion; EF, executive functioning.

Literature Search Questions

A literature search was performed, and the existing literature was explored to determine whether horses influence the physical, cognitive, or psychological status of a person with breast cancer. This search focused on connecting equine-assisted activities and therapies (EAAT) with the treatment of breast cancer.

The following questions were posed for the literature search:

1. Is there evidence that engaging in EAAT provides physical and mental health benefits, including increased strength, ROM, coordination and balance, and improved self-perception of QoL?
2. Is there evidence that engaging in EAAT provides cognitive benefits, such as improved attention and executive functioning?
3. Is there evidence to support the use of EAAT as an adjunct to traditional cancer-rehabilitation protocols?

The search strategy included exploring the CINAHL, APA PsychInfo, PubMed, and American Occupational Therapy Association databases and professional therapeutic horse organizations, such as the American Hippotherapy Association, Professional Association of Therapeutic Horsemanship, and Horses and Humans Research Foundation.

To maximize the search results, nesting and Boolean terms were used as appropriate. The initial broad search of MeSH terms included: *equine assisted activities*, *breast cancer AND physical limitations*, *pain*, *balance*, *weakness*, *fatigue*, *cancer*, *quality of life*, and *stress*. Because limitations from breast cancer can mimic those from other

health conditions, the following terms were added: *arthritis*, *posttraumatic stress syndrome,* and *multiple sclerosis*. Key words and references were gleaned from pertinent articles and cross-referenced. Articles that had not been peer reviewed or were not published in English were excluded. Finally, the visual model (Figure 2.1) was consulted to ensure the three main and established areas of impact—physical, cognitive, and psychological—were included in the search. Results are addressed in the following sections according to the literature search question.

Question One

Is there evidence that engaging in EAAT provides physical and mental health benefits, including increased strength, ROM, coordination and balance, and improved self-perception of QoL?

Results of a study funded by the National Institutes of Health determined that 85% of people experience musculoskeletal pain caused by cancer treatments, such as chemotherapy, immunotherapy, or endocrine therapy. This musculoskeletal pain is a leading cause of disability in persons with or recovering from cancer and can be severe enough to require them to discontinue treatment (Zhu, 2019). Breast cancer surgeries (lumpectomy, mastectomy, and lymph node dissection) can complicate or exacerbate pain in the body's upper quadrant (i.e., the neck, upper back, shoulder, chest, arm, and hand).

In a nursing study, White-Lewis et al. (2019) explored the use of EAAT with adults between the ages of 53 and 75 years who were experiencing loss of function due to arthritis. The participants reported mild to moderate arthritis, pain, at least 20% reduction

in shoulder function, and reduced QoL due to these limitations. During a 6-week program in which participants engaged in grooming, saddling, and riding a horse for 1 hour weekly, participants experienced improved shoulder ROM as early as 3 weeks into the program. White-Lewis and colleagues suggested that the increased ROM and decreased shoulder pain were due to the strengthening of the shoulder-girdle muscles that resulted from grooming and saddling a horse.

White-Lewis et al.'s (2019) outcomes and a task analysis of grooming a horse indicated the need for sustained isometric contractions of the shoulder girdle, biceps, and wrist stabilizers. Combining these with gentle circular motions at the shoulder joint can increase arm strength and endurance. Additionally, the proprioceptive input received from holding the brush, the warmth of the horse, and weight-bearing through the upper limb to thoroughly brush the horse's coat increase neuromuscular input. They thereby also contribute to attaining strength. These gains may be translatable to a program focused on improved function for individuals with breast cancer.

Cerulli et al. (2014) examined the effects of an equine program on those with breast cancer. They made two interesting conclusions that more directly support the premise of ground-based EAAT: (a) the increased strength, particularly in the shoulder girdle and upper back, is likely due to the work of the upper body during grooming and saddling, and (b) the varied and sweeping movements completed when grooming a horse can contribute to improved ROM of the shoulder.

In addition to upper-quadrant dysfunction, chemotherapy-induced peripheral neuropathy caused by systemic cancer treatments can affect balance, gait, and overall

independence, including increased fall risk. Bahcaci and Demirbuken (2019) found that breast cancer patients undergoing chemotherapy, or within 2 years following chemotherapy, experienced increased balance problems and falls due to the toxic side effects of chemotherapy and body changes such as lymphedema. Those researchers stressed the importance of providing balance exercises for individuals receiving chemotherapy to combat the risk of falls.

Kneis et al.'s (2019) study found physical activity to be helpful in balancing muscle co-contractions and providing increased somatosensory feedback, thereby improving balance in 50 cancer survivors experiencing chemotherapy-induced peripheral neuropathy. Giagazoglou et al. (2012) examined effects of a hippotherapy intervention program on static balance and leg strength in adolescents with intellectual disabilities. After engaging in EAAT twice weekly for 10 weeks, the participants demonstrated significant improvements in balance, leg strength, and increased proprioception in the pelvis and legs, which translated into improved balance and functional mobility.

De Araújo et al. (2013) found similar positive effects on balance and leg strength in their study, which examined the effects of EAAT on persons between the ages of 60 and 84 years. After engaging in an equine-focused program, which included preparing the horse for riding, riding the horse, and performing stretches after riding, all participants' scores improved in several balance and strength tests. These tests included the Berg Balance Scale (Shirley Ryan Ability Lab [SRAL], 2020b), the 30-second Sit to Stand Test (SRAL, 2013), and the Timed Up and Go (SRAL, 2014). Rigby and Grandjean's (2016) research supported this premise. They looked at the efficacy of

EAAT on improving overall physical function in healthy older adults and people with various diagnoses, such as cerebral palsy, multiple sclerosis, and incomplete spinal cord injury. They found that EAAT contributed to improvements in gross-motor function, muscle-symmetry, and spasticity domains. For the healthy adult participants, these activities improved lower-leg strength and balance. Therefore, for individuals with breast cancer, engaging in EAAT likely may fill the need for balance exercises (Bahcaci & Demirbuken, 2019).

The horse is an effective medium to achieve individuals' physical improvements and lead to better functional performance in their daily lives, such as raising an arm to brush their own hair, putting on a shirt, rising from a chair, and safely negotiating uneven terrain. Furthermore, research has shown the impact of horses and horse-related activities for regaining QoL. In a poster presentation evaluating the effectiveness of EAAT, LeVan et al. (2020) noted several qualitative themes identified by their program's participants, including increased social engagement, improved perception of motor skills leading to increased self-confidence, and opportunity for engagement in a more "normal" pastime that offers a separation from everyday routines.

Arnon et al. (2020) referenced a multitude of studies that established the efficacy of using EAAT as an alternative treatment method for mental health disorders, including mood and anxiety disorders and despondency over a terminal-illness diagnosis. They noted positive gains in overall psychological functioning, emotional regulation, self-esteem, and self-efficacy. Garcia-Gomez et al.'s (2020) systematic review found that participation in EAAT led to a significant increase in heart-rate variability. This, in turn

activated the parasympathetic nervous system and suppressed the sympathetic nervous system, leading to improved cognitive, social, emotional self-regulation, perception of QoL, and overall health.

Further, extensive literature has examined the positive, calming effect horses have on veterans with posttraumatic stress disorder (PTSD). Arnon et al. (2020) conducted a study with veterans diagnosed with PTSD who worked with horses in a series of ground exercises that incorporated grooming, leading, and effective communication with the horse. The outcomes were positive, with high participant satisfaction, follow-through with the treatment program, and clinical improvement on the test measures. Lanning and Krenek (2013) also worked with veterans with PTSD who demonstrated vulnerabilities in general health, vitality, and emotional-health stabilization through increased scores on quantitative testing that measured at-risk behaviors. The veterans reported anecdotal improvements in their well-being, sociability, and feelings of hopefulness and a reduced sense of isolation after participating in EAAT. Through both groundwork and riding, participants improved communication between themselves and the horse, improved muscle function and coordination, and decreased stress. The veterans stated that working with the horse improved their perceptions of safety, acceptance, compassion, and unconditional positive regard.

Persons with or recovering from breast cancer also have had traumatic disruptions to their daily lives and routines. Working with horses in an environment of unconditional regard and acceptance can similarly allow this population to process changes in their bodies, lifestyles, and relationships. They can achieve feelings of self-efficacy and self-

actualization, which are important to move forward. G. Ryan (personal communication, September 1, 2020) is a lifelong equestrian with metastatic breast cancer who required a double mastectomy, chemotherapy, radiation, and continued maintenance treatments. She reported strong feelings of loss and lack of control when she received her diagnosis and as she progressed through her extensive surgeries and treatments. She reflected that riding or leading a horse "gives you a sense of control as to where to lead the horse to, metaphorically, 'steer my life in my desired direction.'" Additionally, she stated that working with horses was a catalyst for her to focus on and care for a living being other than herself.

Acquiring a new skill such as horsemanship can reinforce the abilities to move on and to learn, thereby contributing to a sense of mastery over one's environment. G. Ryan (personal communication, September 1, 2020) also spoke of the therapeutic value of being outdoors. She laughed when she told me about mounting her friend's horse for the first time after her mastectomy: "I was off balance from my mastectomy and weaker than I thought I was. I lost my balance getting on and landed on the ground, where I looked up at the sky, trees, and the horse looking down on me, and I laughed!" Ryan's reference to the sky, trees, and fresh air she had experienced when working with the horse pointed to the value of therapeutic interventions that take place outside of a traditional clinic setting.

Question Two

Is there evidence that engaging in EAAT provides cognitive benefits, such as improved attention and executive functioning?

Chemotherapy or other systemic cancer treatments can cause subtle but impactful

cancer-related cognitive impairments, including diminished higher level cognitive functioning, such as executive functioning and working memory (Ehlers et al., 2017). Cancer-related cognitive impairments are estimated to affect 30% of persons with cancer prior to chemotherapy treatment, up to 75% during chemotherapy, and 35% for years after the chemotherapy has ceased (Ehlers et al., 2017; Janelsens et al., 2014). Janelsens (2014) referenced a study in which 61% of people with cancer exhibited significant learning, attention, and processing declines. Additionally, those with subjective memory impairment reported negative effects from performing activities of daily living, working, overall QoL, and perceived self-efficacy (Phillips et al., 2017).

Another factor potentially affecting cognitive performance is PTSD. *Cure*, an online journal and resource for individuals with cancer and their families, interviewed physician and senior cancer investigator Fremonta Meyer of the Dana Farber Cancer Institute. She shared that one in five persons with cancer have PTSD and its accompanying difficulties in cognitive functioning around memory and concentration (Kosko, 2017). Further to this point, Hermelink et al.'s (2017) study established a correlation between increased errors and delayed reaction time in persons diagnosed with both breast cancer and PTSD who did not undergo chemotherapy. Cancer and its treatments can be demanding and contribute to mental fatigue, leading to difficulty in sustaining memory, focus, and direct attention to things of importance with an active disregard for things that are not (Bolton & Isaacs, 2018).

The attention restoration theory postulates that spending time in nature provides distinctive cognitive benefits that address mental fatigue by allowing the brain to rest

from strong stimuli that require sustained direct attention. Kaplan (1995) reported that nature has soft and engaging features, such as gently moving leaves and puffy clouds, that need only gentle attention. They thereby allow areas of the brain that are responsible for directed attention to rest, rejuvenate, and experience reduced stress. The Hooves 4 Healing program has been specifically created to provide rehabilitation interventions in horses' natural outdoor or barn environments. These environments capitalize on attention restoration theory's premise by harnessing the restorative aspects of nature to address cancer-related cognitive impairment.

Question Three

Is there evidence to support the use of EAAT as an adjunct to traditional cancer-rehabilitation protocols?

Overlaying traditional interventions (e.g., cardiovascular, strength, and cognitive training) with organic media, such as the horse and outside environments, allows both the physical and psychological effects of cancer and its treatments to be addressed in a seamless and holistic manner. S. MacPhail is a licensed mental health counselor who uses the Equine-Assisted Growth and Learning Association's (n.d.) model to help individuals process traumatic events. In an interview, MacPhail (personal communication, September 4, 2020) reflected on the powerful relationship that develops between a person and the horse through groundwork such as grooming, leading, or even just spending quiet time together. She shared that because horses are prey animals, they have an exquisite sense of perception that can detect conflict and unrest. Through their gentle and unconditional yet responsive manner, horses can assist individuals to work through the

process of conflict.

Cerulli et al. (2014) referenced this process by studying both the physical and psychosocial effects of working with horses within at least 6 months from active breast cancer treatment on women who underwent a mastectomy. Twenty women (*M* = 45 years old) participated in a 16-week EAAT program that involved both groundwork and riding. Those authors discussed that the multidimensional relationship the person and the horse develop through riding and grooming can provide physiological, emotional, and psychological support. The psychological portion of this relationship supports the individual's process of restructuring body image and thereby contributes to increasing self-esteem and self-confidence.

Cerulli et al.'s (2014) study of breast cancer survivors noted that all their study participants demonstrated reduced cardiovascular fitness, reduced strength in their principal leg and shoulder-muscle groups, and reduced QoL as measured by the Functional Assessment of Chronic Illness Therapy-Fatigue version 4 (FACIT-F; FACIT Group, n.d.). The FACIT-F assesses well-being in the areas of physical, social, family, emotional, and functional activities. After participating in this program, each participant demonstrated significant improvements in cardiovascular response to activity, body composition, strength in all muscle groups tested, and QoL. Participants also reported significant increases in all well-being areas measured on the FACIT-F. That study's findings supported the premise for a ground-based equine-assisted program: The increase in strength, particularly in the shoulder girdle and upper back, are likely due to the upper body's work during grooming and saddling. The researchers also validated the

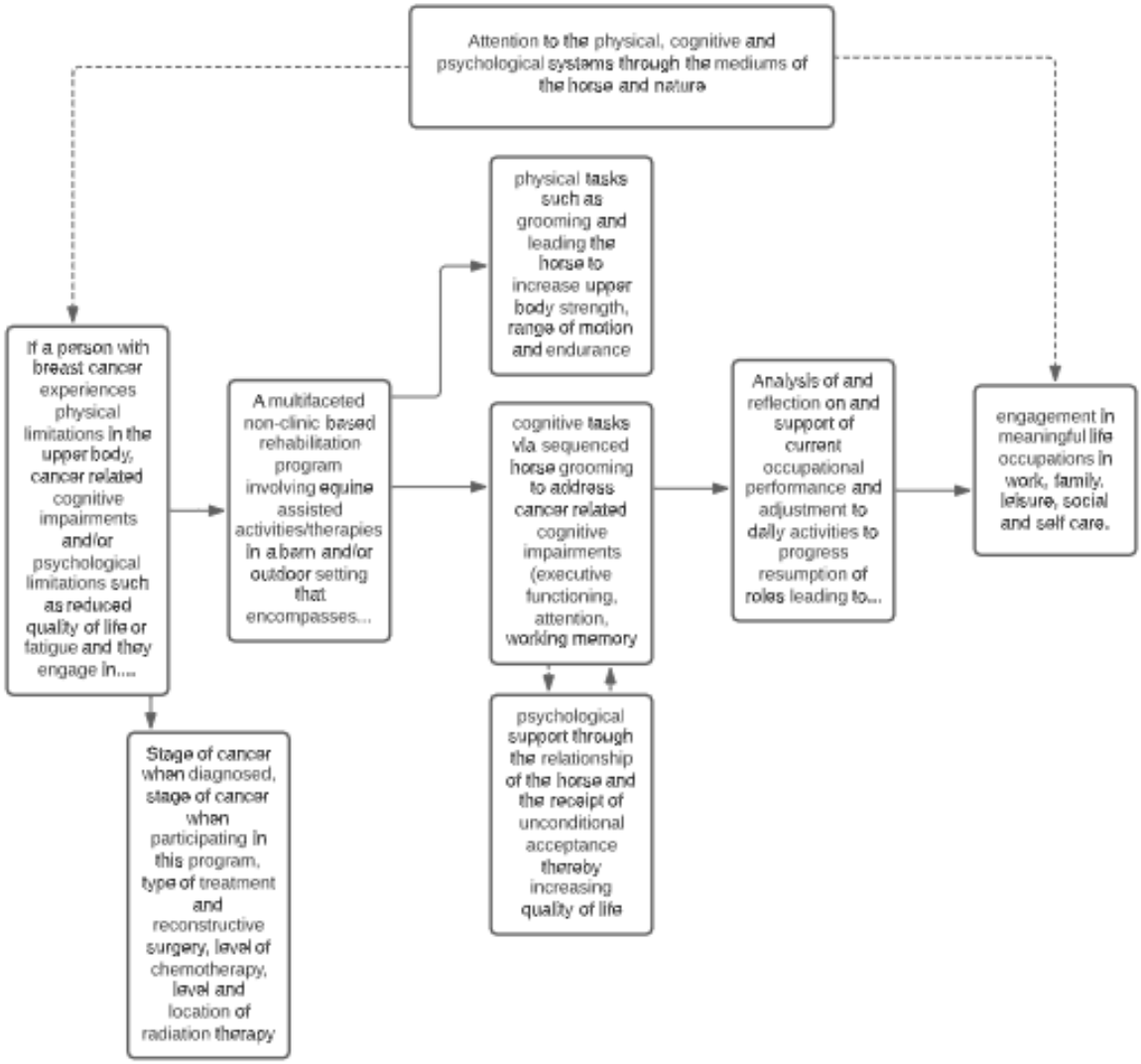
importance of the psychological work of regaining trust in, familiarity with, and acceptance of one's body that occurs during the quiet interactive time spent caring for the horse. Addressing the limitations one faces in a supportive and encompassing environment allows the goal of any rehabilitative endeavor—the return to meaningful roles and occupations—to be realized in a positive and rejuvenating manner.

Revised Visual Model

Based on the review of the literature and synthesis of the findings, a revised visual model (Figure 2.2) was developed. It includes the addition of one modifier indicating the cancer stage and treatment in the rehabilitation process. It further includes two expansions of mediators encompassing the influence of psychological support on QoL (particularly regarding cancer-related fatigue) and an analysis of tasks, roles, and reflections that relate to the impact of fatigue in fulfilling those roles. Based on anecdotal information from several personal conversations with women who experienced breast cancer, each with different treatments and outcomes, a modifier was added to show that the breast cancer stage at the time of diagnosis and the treatment type could affect the participation in or efficacy of this program. Future studies on this potential moderator are important. Additional emphasis was placed on analysis of occupational performance and adjustments, given the magnitude that cancer-related fatigue plays in the resumption of roles (Savina & Zaydiner, 2019). Further, the impact of receiving rehabilitation in a nonclinical setting and the pivotal role horses and nature play in this program were emphasized based on Cimprich and Ronis's (2003) research on natural environment interventions, such as outdoors or indoor garden conservatories.

Figure 2.2

Revised Visual Model



Extended Literature Search Questions

Another literature search was performed to cross-reference EAAT with more traditional rehabilitation programs that focused on the physical, cognitive, and psychological status of a person with breast cancer. The following questions were posed for the literature search:

4. What interventions exist to achieve improved QoL for individuals with breast cancer, and what is the evidence of their effectiveness?
5. Is there evidence that manualized exercise-based interventions for individuals receiving cancer treatment are associated with positive outcomes?
6. Is there evidence that applying the multicontext approach (Toglia, 1991) improves cognitive function, and for which client populations?

The search strategy included exploring the CINAHL, APA PsychInfo, American Occupational Therapy Association, and PubMed databases. To maximize the search results, nesting and Boolean terms were used as appropriate. The initial broad search of MeSH terms included *cancer*, *breast cancer*, *quality of life*, *stress*, *yoga*, *mindfulness*, *exercise*, *meditation*, *pain*, *range of motion*, *strength*, *stretching*, *cancer-related cognitive impairment*, *reduced cognition*, *fatigue*, and *executive functioning*. These key words and references were gleaned from pertinent articles and cross-referenced. Articles that were not peer reviewed or were not published in English were excluded. The revised visual model (Figure 2.2) was consulted to ensure that the three main and established areas of impact—physical, cognitive, and psychological—were included in the search.

Question Four

What interventions exist to achieve improved QoL for individuals with breast cancer, and what is the evidence of their effectiveness?

Individuals who are actively experiencing breast cancer, those in subsequent treatment, and those whose cancer has been cured may experience reduced QoL. Jitender et al. (2018) presented QoL as extending across all dimensions of life and as having the potential to affect all systems of functioning. One factor affecting QoL is the stress that often accompanies living with cancer. Although not focused specifically on individuals with cancer, Morgan (2017) explored the impact of educating young adults on several modalities to combat stress. The dual purpose of this study was to educate participants on effective stress-reduction means and to determine which, if any, modality was effective in reducing stress and thus influencing QoL. Other interventions included education on concepts such as conflict resolution, communication skills, and reflective journaling—all applicable to individuals with cancer.

In Morgan's (2017) study, participants engaged in one of three 45-minute interventions: yoga, mindfulness forest hikes, or EAAT. The yoga intervention included gentle poses, proper breathing, and mindfulness (e.g., exercise, diet, positive thinking, and meditation). The mindfulness forest hikes instructed participants to mentally note the sights, sounds, and smells of the woods and engage in deep-breathing and positive-thinking practices. In the EAAT intervention, participants interacted with horses using the Equine-Assisted Growth and Learning Association (n.d.) principles. The results, as evidenced by significantly reduced scores on two stress measures, the Cohen Perceived

Stress Scale, and the Present Moment of Stress Scale, determined that all three modalities had positive short-term effects on reducing stress.

Like the intention of Morgan et al.'s (2017) study, Kim et al. (2013) looked at the effect of meditation on anxiety, depression, and fatigue in women undergoing radiation for breast cancer. Those authors contrasted two groups: one that received 12 meditative sessions over 6 weeks while undergoing radiation therapy, and one that received the usual course of radiation. The group that received the meditation intervention demonstrated decreased anxiety and fatigue through reduced scores on two anxiety/depression and fatigue questionnaires: the Hospital Anxiety and Depression Scale and the Revised Piper Fatigue Scale. Further, those participants demonstrated increased scores on a QoL questionnaire, the European Organization for Research and Treatment of Cancer–Quality of Life Core-30.

Another mind–body intervention to consider for cancer rehabilitation is yoga. In the United States, over 36 million people regularly practice yoga: 56% reported stress relief, and 49% reported improved overall health. In 2017, yoga was the most used complementary medicine practice (The Good Body, 2021). Danhauer et al. (2017) performed a review of the research evaluating the use of yoga during cancer treatment and found significant improvements in adult participants' mental health, including reduced negative affect and increased positive affect, and reduced distress, depression, and anxiety. The participants also reported improved QoL.

Perhaps the most compelling study addressing interventions to improve QoL focused on the instruction of traditional Greek dancing. Over the course of 2 years, more

than 300 individuals with cancer participated twice weekly for 8 weeks in a traditional Greek dancing lesson, with each lesson lasting 1 hr. These individuals experienced significant improvements in all QoL indicators, including emotional, cognitive, and social function. They also showed improvements in physical functions such as sleep and appetite and decreased pain and fatigue levels. Improvements in these factors contributed to statistically significant improvements in role completion. Additionally, those researchers noted that involvement in the dance lessons provided much needed psychosocial support (Karathanou et al., 2020).

As discussed earlier, Morgan et al. (2017) touched upon the role of nature in combating stress that reduced QoL through their investigation of mindfulness hiking. Cimprich and Ronis's (2003) seminal work further investigated the role of nature on fatigue and loss of the ability to focus or sustain attention due to fatigue. This study was important because decreased cognitive function can impair completion of many occupational roles and reduce satisfaction in life. Using principles of the attention restoration theory (Kaplan, 1995), which postulates that exposure to the softly directed and rhythmic features of nature reduces cognitive impairments, Cimprich and Ronis (2003) evaluated the effect of a natural restorative environment intervention on attentional fatigue in women who were recently diagnosed with and undergoing primary treatments for breast cancer. The women who participated were asked to simply create a list of preferred activities related to nature, such walking, watching a sunrise or sunset, or visiting an arboretum. They agreed to perform those activities for a minimum of 120 min per week and to log their activity. The participants' attention and problem-solving skills

were assessed before and after the intervention. Participants demonstrated significantly better performance after the intervention on high-demand cognitive tasks, such as recalling a span of digits backwards or filtering out competing information to accurately and efficiently connect important information to solve a task.

Question Five

Is there evidence that manualized exercise-based interventions for individuals receiving cancer treatment are associated with positive outcomes?

Individuals who have had a combination of mastectomy and postoperative radiation are more susceptible to upper-extremity disabilities due to the radiation's extension into the chest wall, shoulder, axilla areas, and deeper structures such as the internal mammary nodes (Chrischilles et al., 2019). Upper-extremity disabilities may occur immediately or several years after the cancer event. M. Cole (personal communication, January 7, 2021), who underwent a lumpectomy and radiation due to breast cancer, experienced soft-tissue tightness at the site of the radiation, which resulted in reduced ROM and discomfort, several months after the initial event. B. Andon (personal communication, December 30, 2020) underwent a bilateral mastectomy with both chemotherapy and radiation due to breast cancer. The experienced pain and reduced ROM she experienced immediately after her surgery extended well into the next year. She found completing manual leisure tasks with her horse to be difficult. G. Ryan (personal communication, April 1, 2020) underwent a bilateral mastectomy with reconstruction and radiation. Among other limitations, she experienced a loss of strength, resulting in difficulty rolling over or getting out of bed. These examples shared by Cole,

Andon, and Ryan show that limitations resulting from important interventions designed to combat their cancer and effectively save their lives created later complications. That is, the complications led to impairments, making completion of meaningful occupational roles (e.g., completing ADL and leisure tasks) difficult.

Pain is another factor that can contribute to upper-extremity disabilities. De Groef et al. (2017) found that 27% to 79% of individuals with cancer experience pain from 1 month postsurgery and, in 12% to 82% of those individuals, that pain can extend up to 1 year. Chen et al. (2020) studied the effects of exercise on those who had upper-extremity cancer-related surgery without reconstruction and were experiencing shoulder–arm restrictions. The exercise program began immediately—while the individual was still in the hospital—and extended after discharge with rehabilitation in an outpatient clinic. The results suggested that engaging in regular shoulder–arm exercises mediated the severity of postoperative symptoms, such as pain and reduced movement. The researchers noted that many individuals ceased their exercise program once they "felt better" and then experienced a return of weakness. This underscored the importance of patient education.

Ceprnja and Maka (2015) performed a study examining the effects of an exercise program on shoulder function in individuals who had undergone breast cancer surgery. They found small, but not clinically significant, increases in the shoulder ROM and strength, movements of flexion and abduction, and reduction in shoulder pain. Although these gains were not clinically significant, they resulted in an overall ability increase.

Cancer treatments also affect bodily systems, such as the cardiovascular system.

Herrero et al. (2006) investigated the effects of aerobic and resistance training on cardiorespiratory fitness, strength, endurance, and functional prowess on cardiac function in individuals with a recent history of breast cancer. Participants engaged in an 8-week resistance and aerobic exercise program three times per week for 30 min each. The results showed improvements in peak oxygenation and dynamic strength in the legs, which facilitated functional tasks such as rising from a chair. Participants' endurance increased and their overall body composition improved, all of which positively affected general well-being and the completion of daily tasks.

Upper-extremity pain after cancer-related surgery and treatments is common and can affect the completion of daily life tasks. Of those who have undergone breast cancer treatment, 9% to 57% reported long-term limitations in ADL (De Groef et al., 2017) due to variable amounts of pain, edema, decreased muscle strength, and decreased ROM (Reitman et al., 2003). Many people with cancer seek therapeutic massage to reduce pain, swelling, and overall suffering; however, the objective means by which this can be accomplished continues to be investigated (Sagar et al., 2007). For instance, De Groef et al. (2017) examined the effects of myofascial release techniques along with a standard physical therapy regimen to address persistent upper-extremity pain. No significant differences were found in the prevalence or intensity of pain. However, there was a reduction in pain caused by pressure from surrounding structures and in the overall quality of the pain. Further, no significant differences were found between the experimental and control groups in shoulder function or QoL. Leading a horse requires one to be mindful of their arm position to encourage a relaxed and collected gait from the

horse. Therefore, keeping the upper extremity in a position of shoulder depression and retraction and elbow and wrist extension will encourage an open posture that will facilitate functional arm use in many instrumental ADL, such as self-care tasks.

Question Six

Is there evidence that applying the multicontext approach (Toglia, 1991) improves cognitive function, and for which client populations?

The efficacy of Toglia's (1991) direct instructional model for assessing cognitive limitations and her multicontext approach to treat those cognitive limitations became more widely referenced for adults with acquired brain injuries as the body of research around the function of learning grew and was more understood. A study performed in 2010 used the multicontext approach on individuals who had acquired a brain injury between 3 to 5 years prior to the study and demonstrated difficulty following multistep directions. After engaging in the multicontext treatment approach, all participants demonstrated increases in self-regulatory skills, strategy usage to support cognitive weaknesses, and transferring learning to functional tasks (Toglia et al., 2010). Similarly, a study performed in 2011 revealed that the multicontext approach increases self-awareness and learning transference several years after acquiring brain injuries (Toglia et al., 2012). The model used in that study emphasized self-generated strategies to promote generalization and independence in ADL. Toglia et al. (2012) more specifically outlined strategy and application types. Therefore, she broadened the multicontext approach's scope of applicability with the following statement:

> Individuals across the lifespan experiencing different occupational performance issues can benefit from effective strategy use to enhance their learning and performance. Occupational therapy interventions, such as . . . the multicontext approach have demonstrated that occupational performance can be improved through strategy use. (p. 226)

This statement indicated that any individual who demonstrates decreased occupational performance and requires teaching, with the intent to apply such teaching to improving their independence, would benefit from the constructs of the multicontext approach. Obermeyer (2018) specifically linked the multicontext approach's effectiveness to students with executive functioning challenges. Another study looked at the efficacy of Toglia's Weekly Calendar Planning Activity, which uses constructs from her multicontext approach, on at-risk adolescents (Weiner et al., 2012). The Weekly Calendar Planning Activity has also been validated to gather information on the executive functioning strategies used by adolescents with generalized epilepsy (Zlotnik et al., 2020).

Toglia's (1991) multicontext approach to cognitive rehabilitation is sensible, logical, and easily applied to any functional task, including those proposed to provide oncology rehabilitation with the help of horses. This model can support functional tasks, such as grooming: Start the grooming with one isolated task and build on that task to provide more robust grooming activities (e.g., a horse with a thicker mane, adding grooming utensils, recalling which brush should be used first, collecting all the necessary supplies). Tasks, such as this grooming one, supports Toglia's (2005) overall approach to

treating cognitive limitations. For instance, participants can apply their cognitive improvements to their personal self-care routines.

Conclusion

This chapter reviewed traditional and alternative forms of rehabilitation, the theory of planned behavior (Ajzen, 1991), Toglia's (1991) and Toglia et al.'s (2020) multicontext approach, and the attention restoration theory (Kaplan, 2001) to determine whether EAAT as an adjunct intervention can affect the physical, cognitive, or psychological status of a person with breast cancer. Upper-extremity disability, cancer-related cognitive impairment, and cancer-related fatigue are common after breast cancer treatments, but they are underevaluated and undertreated (Bai & Yu, 2021; Chrischilles et al., 2019; Savina & Zaydiner, 2019). Chrischilles et al. (2019) and Silver and Gilchrist (2011) identified the role of occupational and physical therapists in oncology rehabilitation. Many impairments experienced by individuals with cancer are systemic (e.g., decreased endurance and deconditioning). Therefore, those authors suggested that a wrap-around rehabilitation program involving exercise, strength training, aerobic conditioning, balance retraining, energy-conservation education to combat cancer-related fatigue, and psychosocial support benefit rehabilitation. By receiving rehabilitation while working with horses in outdoor environments offers this wrap-around opportunity through self-paced, multifaceted activities that focus on functional movements in a healthy and occupation-based environment, participants simultaneously receive unconditional acceptance through the gentle nature of the horse.

CHAPTER THREE – Description of the Program

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program is designed to be a wrap-around clinical intervention using horses as rehabilitative vehicles to address physical, cognitive, and psychological vulnerabilities in individuals who have or had breast cancer. The program draws upon the theory of planned behavior (Ajzen, 1991), Toglia's (1991) and Toglia et al.'s (2020) multicontext approach, the attention restoration theory (Kaplan, 2001), and traditional and alternative rehabilitations for this population. Additionally, research on the restorative aspects of nature supports the program's premise. The program proposes a novel and comprehensive treatment approach that takes place in an inherently restorative environment. Using one medium (the horse) to deliver the therapy creates a cohesive approach to reach the program's goals: to return the participant to their meaningful occupations and, perhaps, introduce them to a new occupation (Lanning et al., 2017). The following case of "Martha"—a collection of several people interviewed while developing this program—illustrates the program's application for a single participant.

"Martha": Example of Intended Participant with Specific Application to this Program

Martha, an engaging 60-year-old woman, was diagnosed with breast cancer 4 years ago. Now, she is 3 years postmastectomy (right side) with a latissimus dorsi flap and radiation to the right neck, axilla, and chest wall, and is 2 years postchemotherapy. Martha is married, cares for a 4-year-old grandchild part-time, and works as a billing coder for a large medical office. She reports that she needs to make lists to keep track of

open cases because she has become forgetful since cancer treatment. Martha enjoys gardening, hiking, and walking her dog. She has limited experience with horses but has always found them beautiful to watch.

Martha demonstrates reduced active and passive range of motion (ROM) in the right shoulder with reported fear of overstretching the donor or reconstruction site. She has also reported decreased strength (particularly in the shoulder-girdle muscles and hand) and balance on uneven ground, with neuropathies in both feet from the systemic chemotherapy medications. Martha dresses herself, is independent in the general community, can perform her job and homemaking duties, and is safe when caring for her grandchild because he is mobile.

Despite this level of independence, Martha wishes to overcome more limitations. She cannot reach necessary medications that are stored out of her grandson's reach, cannot push herself to stand after sitting on the floor while playing with her grandson, and worries about taking him to the playground because she fears she may fall on the uneven grass. Additionally, she is reluctant to use her arm for vigorous, repetitive, or robust tasks for fear of disrupting either the donor or reconstruction site. She also expresses annoyance that her cognitive clarity is not as sharp as it had been prior to her cancer. These limitations reduce her quality of life (QoL) because one vision that pushed her through her cancer treatments was the thought of surviving and being a "fun" grandmother to her new grandson.

Martha would greatly benefit from participation in this program because her interests include outdoor activities, and she is open to the idea of working with horses.

Further, she demonstrates vulnerabilities in the areas the program addresses, including decreased independence of the affected extremity, balance, memory, mental flexibility, and execution of occupational roles. Martha's limitation level is very high and, despite being unable to complete many of her desired occupations, she may not meet the standard occupational and physical therapy clinical-evaluation and treatment-plan thresholds once her current therapy course ends.

Martha attends occupational therapy sessions once a week for her decreased strength and coordination in her right hand and for cognitive impairments such as her reduced memory. She attends weekly physical therapy sessions for the decreased ROM and strength in her right shoulder and her reduced balance. She also attends quarterly oncology appointments to assess her response to the chemotherapy treatments.

Martha arrives at the barn on a quiet early summer morning after a busy week with her clinical appointments. She reports fatigue from the home exercises that the occupational and physical therapist assigned, a busy week at her job, and feeling slightly stressed while waiting for the lab results from her oncology appointment. Martha reports that she has been looking forward to "this reprieve from her daily life."

The horse has been fed and is standing quietly in the wide barn aisle. The large barn doors are open, and one cannot help but appreciate the summer morning outside. Martha greets the horse, who gently sniffs her hand, and gathers the grooming bucket. She chooses a rough grooming brush, which provides moderate resistance against the horse's coat, and slowly and rhythmically begins to brush the horse. She spends 20 min grooming the horse with two brief rests due to fatigue in her arm. Thinking of Martha's

concern with vigorously using her arm or disrupting her surgical repair, the physical therapist has chosen a smaller horse so Martha can reach over the horse's back and around the horse's belly without straining.

Once the horse is groomed, Martha and the licensed mental health counselor lead the horse out of the barn to the outside paddock. In the paddock, Martha throws some hay to the horse and spends time quietly interacting with the horse as it munches on the hay. Occasionally the horse nudges Martha's elbow. The birds are singing, and puffy white clouds move slowly across the blue sky. The leaves on the trees softly and gently dance in the wind. As Martha relaxes in the warm sun, her thoughts wander, and she reflects on her week. At this moment, Martha feels content that, as a natural caregiver for her family, she also independently cared for the horse and that the horse is set for the day.

Description of the Context

A literature review using the search words "nature and well-being," "nature and cancer," and "nature and occupational therapy" revealed a lack of related articles. Most of the resulting articles focused primarily on children and the healing benefits of building green spaces in places such as hospitals. One article proposed the efficacy of a program similar to the proposed program. However, the scope of that program was more limited than the Hooves 4 Healing program; it focused only on the psychosocial aspects of working with horses (Murphy et al., 2019).

Some individuals are less amenable or have less access to treatments that take place in more traditional environments such as a hospital or clinic, or they have experienced treatments barrier in more traditional environments due to the chronicity of

their disease process. Selby and Smith-Osborne (2013) addressed the effectiveness and appeal that equine interventions offer to this population. For example, those authors demonstrated that the increased problem-solving opportunities in equine settings are not often present in more scripted clinical settings. Therefore, Selby and Smith-Osborne's study filled the gap in education and provided an effective, alternative environment when treating a variety of individuals recuperating from and living with breast cancer.

Program Inclusion/Exclusion Criteria

The population served by Hooves 4 Healing will be those who have active breast cancer or are posttreatment for breast cancer. As the research demonstrated, limitations caused by breast cancer treatments, such as chemotherapy and surgeries, can extend up to 20 years posttreatment (Ahles et al., 2012). Individuals who have or had breast cancer can experience limitations in upper-body mobility, including decreased strength and endurance; impaired cognition from chemotherapy, fatigue, or stress; and reduced QoL due to pain, fatigue, stress, or loss of important life roles. Studies have indicated the importance of engaging in rehabilitative activities in environments outside of clinics (Selby & Smith-Osborne, 2013). Participating in purposeful rehabilitative activities while outside in nature can address all these vital areas. Therefore, there will be no time threshold to participate in this program.

Exclusion criteria for participation in the program may include those who are allergic to horses, do not like horses, or have outside allergies such as to bee stings or pollen. Individualized consideration for participation will be made for those with lymphedema because they are more susceptible to significant injury from the insect bites

and small cuts that may occur in this setting. Because this program is facilitated outside, a special consideration for all participants may be tolerance for extreme temperatures. For example, cold temperatures are less tolerated by those with Raynaud's Syndrome, which can occur alongside breast cancer. However, embracing the principles of attention restoration theory (Kaplan, 1995) dictates exposing oneself (reasonably) to the elements of nature as part of the program's healing process.

Beneficiaries of the Program

The beneficiaries of this program often experience a loss of independence and fulfillment of life roles due to pain and decreased strength, endurance, and upper-extremity ROM from cancer treatment or surgery. They also show decreased balance due to neurological changes from systemic cancer treatments (Bahcaci & Demirbuken, 2019; Ceprnja & Maka, 2015; De Groef et al., 2017; Herrero et al., 2006; Morris & Lewis, 2020). Psychological distress from the cancer diagnosis and impaired cognition due to chemotherapy or other treatments also may be present (Ahles & Root, 2018; Joshy et al., 2020). Joshy et al. (2020) found a strong correlation between increased limitations in physical functioning and moderate to high measures of psychological distress, as well as a fair correlation to poor ratings of overall health. These limitations could affect the pursuit and completion of meaningful occupations, thus leading to a loss of overall independence and joy for life.

Others who will benefit from this program are the family, friends, and employers of the participant. As humans, we contribute to a large and complex web of relationships. This web is disturbed when a central contributor to those relationships is unable to fulfill

their role. From an emotional and personal perspective, it is proposed that family and friends will benefit as the participant regains the independence to complete important and meaningful self-fulfilling roles, such as cooking dinner or attending a book club. From a financial perspective, the participant's employer will benefit when the person is able to resume work responsibilities.

Additionally, this program will benefit health care providers. For example, physicians can offer another option for their patients' rehabilitative needs. Occupational, physical, and speech therapists who practice in clinical settings could recommend this program as an adjunct to their clinical treatment. Insurance companies could benefit because the participant may have a faster or more complete response to traditional treatments when a comprehensive, natural environment rehabilitation program that addresses all areas of need (physical, cognitive, and psychosocial) is added. Daily time in nature has been shown to reduce postoperative recovery time and symptoms of attention-deficit/hyperactivity disorder in children and to increase natural cancer-fighting responses.

Evidence supported the connection between interactions with nature and health. A seminal study linking nature with health studied patients recovering from a cholecystectomy. Participants whose hospital room looked out onto a verdant green space exhibited reduced recovery time, need for nursing care, and need for heavy analgesics during recovery compared to patients whose view was of a brick wall (Ulrich, 1984). Forest bathing and immersive and contemplative walks in a forest significantly increase human natural-killer activity and natural-killer proteins (Li et al., 2010). Further, results

of a large-scale national study found that daily exposure to nature reduced symptoms of attention-deficit/hyperactivity disorder in children (Kuo & Faber Taylor, 2004).

Program Features

Two unique and innovative concepts are associated with the Hooves 4 Healing program. First, this program is designed around the horse, which provides the opportunity and impetus to achieve greater independence in the physical, cognitive, and psychosocial areas of an individual's life. The second unique aspect is the program's recognition of the restorative aspects of nature for both cognitive fatigue and stress. This program intends to use nature to resume previous occupational roles by reducing both fatigue and stress in those with breast cancer.

Program Activities

Hooves 4 Healing is envisioned to contain three stations: the grooming station, the educational station, and the groundwork station. Although each station has a primary focus, they are designed to interrelate and operate via the medium of the horse.

The grooming station will take place in the barn, in either a grooming stall or a quiet aisle. This station focuses on progressing upper-body strength, ROM, coordination, and cancer-related cognitive impairments through grooming activities. It will involve using a set of brushes to brush the horse's coat. The brushes and the sequence of grooming can be graded to the level of strength, ROM, and endurance each participant demonstrates. For example, the entire sequence of grooming involves three brushes in a specific pattern, and each brush is designed to exert a different level of resistance to fully clean the horse's coat. The first brush, the curry comb, is perhaps the most resistive

because it is designed to dig deep into the coat to loosen dirt. Second, the rough brush provides less, but still significant, resistance to lift the dirt from the coat. The soft brush is the third used and is designed to glide easily over the coat and disperse the oils from the horse's skin to the coat. If a participant has a weak shoulder, arm, or hand, the grooming tasks could be adapted by eliminating the first two brushes. The participants would then begin grooming with the soft brush, which provides the least resistance. This station also will address cancer-related cognitive impairments, which can negatively affect autonomy, return to work, social relationships, and self-confidence.

Many factors are understood to cause cancer-related cognitive impairments (e.g., reduced short-term and working memory, attention, processing speed, and executive functioning; Lange et al., 2019). Individuals who have or had breast cancer report difficulties with tasks that involve shifting attention, solving problems, and concentrating, which affect occupational roles such as returning to work (Ehlers et al., 2017). By using concepts of the multicontext approach (Toglia, 1991), this grooming station will allow for cognitive progression. That is, it establishes independence in the first grooming sequence, which is scaffolded for the second and third sequences. The station is unscripted, allowing recognition and creation of metacognitive strategies to increase cognitive skills. Additionally, this activity will be easily transferable to the individual's personal self-care routines, thereby promoting generalization of that skill.

The second station—the educational station—also will take place in the barn in a quiet setting such as the tack room. This station examines the individual's symptoms and level of fatigue. Participants will discuss how that fatigue is affecting the completion of

individual roles. Then, they will explore the impact of fatigue on cognition and will be educated on energy conservation. In this station, they will be provided with a tailored daily activity log.

The groundwork station is the third station of the program. This will be outside, where the principles of equine growth and learning will take place through unstructured interactions between the individual and the horse. Principles of the health-promoting attention restoration theory (Kaplan, 1995) and biophilia (Kellert & Wilson, 1993) are embedded throughout this program because it takes place in nature. These interactions are aimed to facilitate not only introspection and acceptance of individual limitations, regrets, and fears, but also successes and positive events. Additionally, physical activities, such as leading the horse around the paddock, will take place outdoors and thereby increase overall endurance to activity and functional use of the affected arm, while being outdoors and in nature.

Methods of Delivery

Hooves 4 Healing will run for 8 weeks, with participants meeting once a week for 2 hours at a barn in New England. The barn has outside areas, including yards, paddocks, and arenas. This program is intended to run year-round, even in moderately inclement weather. The planned method of delivery will be “round-robin” style with multiple participants moving between stations. As described earlier, the program will have three stations where the participant will groom the horse, receive energy conservation education, reflect on fatigue, and work with the horses.

Kaplan (2001) reported that modest outdoor environments provide restorative

benefits to cognitive and physical fatigue with little to no action required from the individual. Participating in activities that are congruent with nature heightens these effects. The groundwork station will allow participants to process positive and negative feelings through their interactions with the horse and engage in physical rehabilitative activities by leading the horse. This outdoor time will also provide restorative cognitive and psychosocial benefits by embracing nature through grassy areas, paddocks, outdoor riding arenas, and large open-air grooming stalls and barn aisles. Outdoor barn environments are rich with a variety of sensations—such as the breezes that run through the barn and paddocks and the smell and sounds of the horses—yet simultaneously can be quiet, inviting introspection and mindfulness.

Although participants will engage in each station, the program's focus will adapt to each participant's area of greatest need. For example, if an individual's goals reflect the need for more introspection and processing of regret, fear, or sadness over the loss of life roles, then the program will adapt to have that person start and spend more time with the licensed mental health counselor than with the physical therapist. Conversely, if the participant's self-identified goal from the interview reveals a desire for greater strength and ROM of the affected arm—which would increase their independence in self-care—then the focus will be on grooming the horse. Finally, the participant's level of balance, strength, endurance, and ability to lead the horse will guide whether that portion of the program may be delivered in fields, along dirt roads, or in more controlled settings, such as a paddock.

Hooves 4 Healing's uniqueness comes from the organic interactions with horses

and natural environments. These interactions will allow participants to achieve their goals of resuming previous occupational activities and roles. For example, whereas the program's goal is to improve physical areas such as ROM, strength, dexterity, and endurance, the goal of the grooming station is to merely groom the horse. See Appendix A for a detailed description of the intended programmatic activities of the Hooves 4 Healing program and the methods for their delivery.

Role of Personnel

Occupational Therapist

An occupational therapist, who will be responsible for monitoring progress, task analysis, and task adaptation to the participants' skills, will oversee the program implementation. The occupational therapist will also be responsible for providing energy-conservation education services and administering the following assessment tools: the *Quick*DASH (Institute for Work & Health, n.d.), the Functional Assessment of Chronic Illness Therapy-Fatigue version 4 (FACIT-F; FACIT Group, n.d.), the Mini Mental State Examination-version 2: brief version (MMSE-2:BV; Shirley Ryan Ability Lab, 2020a), and the Role Checklist version 3 (RCv3; Scott, 2019). The occupational therapist will also set the program's overall premise and goal to resume meaningful occupations. Although the occupational therapist is the program's primary overseer, other professionals are equally responsible and important to achieving this goal.

Physical Therapist

The physical therapist will provide physical therapy to participants through grooming and leading the horse. As will other personnel, the physical therapist will

contribute to program development to ensure the program is inclusive and sensitive to physical limitations and needs. The physical therapist will complete the *Quick*DASH (Institute for Work & Health, n.d.) in conjunction with the occupational therapist and assess progress in upper-extremity strength and ROM through goniometry, tracking active time of arm use during grooming tasks, manual muscle testing, and use of a dynamometer.

Licensed Mental Health Counselor

The licensed mental health counselor will be formally trained in equine-focused therapies. They will facilitate mental health support using an equine-centered model such as the ones used by equine-assisted psychotherapy, equine-assisted learning, or the Equine-Assisted Growth and Learning Association (n.d.). They will further contribute to the program's development, ensuring it is inclusive and sensitive to the psychological needs of both the client and the horse.

Participant Ambassador

The participant ambassador is an individual who has had cancer in the past. They will provide guidance in the program's development to ensure that it is inclusive and sensitive to cancer-related needs. The program ambassador will contribute to the content and delivery of the energy-conservation education workshops in which all participants will partake. Additionally, they may serve as a potential referral source for other participants.

The Horses

Perhaps the most integral part of the program, the horses will deliver all rehabilitation. From a psychological perspective, horses provide gentle and unconditional interactions by nurturing people to move forward, away from the stressors and barriers that may block them from resuming their occupations. From a cognitive standpoint, tasks done with horses require sequencing, problem-solving, and sustained attention. Additionally, working with horses on repetitive and rhythmic tasks in a quiet and restorative environment will allow the participant's brain to rest from the robustness of daily activities and strengthen cognitive functions. From a physical and motoric standpoint, horses provide the impetus to perform physical activities that facilitate improvements in ROM, cardiovascular capacity, strength, endurance, and balance. These needed gains are transferable to other occupations, such as work and self-care. This program would not exist without the horse's presence.

Program Resources

The Hooves 4 Healing program will take place in environments that embrace nature—grassy areas, paddocks, outdoor riding arenas, and a barn. Although this program may be suspended during extreme cold spells, it is envisioned to occur during all months of the year, even in moderately inclement weather. As mentioned before, the program will utilize barn spaces (i.e., grooming stalls or quiet aisles) and outdoor spaces (i.e., paddocks, yards, and outdoor riding arenas). Depending on the participant's levels of balance, strength, endurance, and ability to lead the horse, portions of the program may be delivered in fields and along dirt roads. The program emphasizes exposure to nature.

Therefore, work with the horses will be conducted outside if weather permits. There will be limited reliance on technology due to little or no Internet accessibility in barn settings; assessments will be completed in paper form.

Evaluation Plan

Pre- and postintervention surveys evaluating cancer-related fatigue and the completion of important roles and self-care tasks will be completed at the onset, midpoint, and conclusion of this 8-week program. A semi-structured interview will be conducted in the 1st week of the program to establish rapport and further target the personal goals of each participant. Quantitative data from the *Quick*DASH (Institute for Work & Health, n.d.), FACIT-F (FACIT Group, n.d.), and RCv3 (Scott, 2019) will be recorded in paper form and stored in a secure location. Information from these evaluations and the participant's identified goals will be cross-referenced weekly to ensure movement toward the desired outcome. The overall goal is to resume meaningful occupations through increased strength, ROM, endurance, management of cancer-related fatigue, and reduced stress-related barriers resulting from cancer diagnosis and treatments. Along with informal weekly check-ins, the level of progress toward that goal (as noted from the onset to midpoint and the midpoint to conclusion evaluation) will inform the program leaders of necessary program activity or environmental adaptations to ensure continued progress.

Potential Barriers and Challenges

Participant Level

Potential barriers for this program at the participant level include patient health considerations such as allergies, to either horses or other environmental factors (e.g., grass or bees). Sensitivity to moderately inclement weather also can become a barrier to participation. Although this program will depend largely on clement weather, Kaplan (2001) argued that even moderately inclement weather holds restorative value. However, extreme weather (extreme temperatures or humidity) may present challenges in executing this program.

Additionally, the participant's level of balance may be a barrier. The grounds at a barn and along dirt access roads, fields, and paddocks can have various surface levels, firmness, and footing, and include hills, potholes, and ridges. Because horses are large animals, interacting with one could affect a person's balance even when shifting weight due to standing for long periods. Thus, the participant's balance at baseline should accommodate moderate perturbations without significant balance loss.

Lastly, the individual's health status can create barriers to participation. Sunlight intolerance, among other side effects of chemotherapy and medications, should be considered. Particular attention should be paid to individuals with lymphedema, for whom small cuts or insect bites can cause severe health implications.

Staffing Level

The greatest barrier at the staffing level is finding qualified program leaders who possess the unique combination of equine and partnering (occupational and physical

therapy) skills. Another potential barrier is procuring staff who can accommodate the program's unique schedule: 2 hours from midmorning to midday. These specific hours could be difficult to work around if the staff have other jobs.

Resource Level

Financial resources will likely be the largest barrier for this program's implementation because horses and their insurance can be costly. Another potential challenge will be reimbursement from third-party payers such as insurance companies, which could affect the program's duration and frequency or whether it could be implemented at all. Although alternative therapies are gaining popularity, and more medical centers are integrating alternative therapies into their conventional medical protocols, there is still skepticism of the effectiveness of alternative approaches (Marcus, 2020). Engaging in robust single-subject and mixed-method research on this program is crucial to measure its efficacy, which will directly affect the program's ability to be routinely implemented and, more importantly, viewed as an effective and valuable rehabilitative option. To ensure this program is viable, data collection will begin at the first visit to the barn, the midway point (4 weeks), and the last visit. Each of the three program directors (the occupational therapist, physical therapist, and licensed mental health counselor) will conduct assessments using measures that have interrater reliability and bias control built into their design (described in Chapter Four, "Evaluation Plan").

Finding a barn with suitable horses that can provide the participant with an accepting and nurturing environment could be a barrier. However, the program has access to personal horses that have already been assessed for good temperament. Horses are prey

animals and are sensitive to their environment. A study evaluating the effects that horses' environments have on their stress and behavior revealed that horses with adequate accommodations (e.g., stalls that provide views of a field and open poles between stalls to allow socialization with other horses) and behavior management techniques (e.g., increased turn-out time instead of stall confinement) had reduced levels of stress hormones in their blood (Park et al., 2013). Using horses that have naturally gentle temperaments and are not experiencing extraordinary stress is particularly important for the Hooves 4 Healing program.

Baldwin et al. (2018) hypothesized that the impact of EAAT, when the horse and human connect, is indicated by an increase in both humans' and horses' heart-rate variability. In humans, this indicates increased awareness of their bodies and emotions. In horses, it indicates a state of relaxation and security. High heart-rate variability between humans and equines indicates a sense of autoregulation.

To reduce barriers in the human–equine partnership, several factors must be considered: Horses should be recognized as equal partners and have some autonomy in the interaction, they are equally affected by this relationship, and their regulation system has a physiological impact on their human partner. Therefore, selecting both a barn environment that provides good care to its horses and horses that are willing partners for this program are important. Facilitating the program in a nurturing environment will positively affect this program in two ways: The participants may feel more at ease to explore their limitations, and the horses will be of sound mind to help with this process.

Conclusion

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program was created with a holistic view of rehabilitating the entire person: mind, body, and spirit. The program will be staffed by occupational and physical therapists, a licensed mental health counselor, a participant ambassador, and the horses. Program beneficiaries include the participants, their families, health care providers, and insurance companies. Some potential barriers include patient health considerations, weather conditions, and resource availability.

Simply working with horses can address multiple bodily factors affected by cancer and its treatments. Grooming, leading, and spending unstructured time petting and bonding with the horse can address participants' physical strength, cognition, rest, relationships, and roles that were lost due to the illness. How does this occur? Grooming the horse increases balance, strength and movement of the upper body, and endurance of the cardiovascular system. Grooming also addresses cognitive functions by remembering and carrying out the sequence of grooming. Being present with the horse allows its calm and organized sensory system to influence the participant, thereby relieving stress and providing time to reflect and problem solve. Engaging in these activities in a nature-rich setting addresses the areas of limitation that may hinder individuals wishing to return to their whole selves after breast cancer.

CHAPTER FOUR – Evaluation Plan

Hooves 4 Healing, The Capacity of the Horse in Breast Cancer Rehabilitation's goal is to return breast cancer survivors to their meaningful occupations and life roles. By using a wrap-around clinical intervention with horses as the rehabilitative vehicle, the program addresses physical, cognitive, and psychological vulnerabilities in this population. The program's efficacy will be measured through a mixed-methods research design. The data will be analyzed through formative and summative data analyses.

Vision for the Program Evaluation Research

The short-term vision for completing this program's evaluation research is to perform a mixed-methods study. This research will build upon small Murphy et al.'s (2019) mixed-methods pilot study. Those results suggested that psychosocial-support work with horses for cancer survivors is helpful, as indicated by a significant difference in pre- and posttesting of global quality of life (QoL) scores. The preliminary evaluation process for Hooves 4 Healing will include both pre- and posttest qualitative and quantitative data collection from the participants.

The long-term vision for this program's evaluation research is a randomized controlled trial. In this trial, the control group and the experimental group will receive the same care: occupational and physical therapy to address their physical and cognitive needs and licensed mental health services to address their psychosocial needs. The control group will receive their care in a traditional clinical setting, whereas the experimental group will receive their care through the Hooves 4 Healing program. Both groups will be assessed using the same quantitative measures and semi-structured

interviews.

Research Design and Methodology

The program evaluation will involve a mixed-methods research design. The qualitative data will focus on achieving goals participants identified at the onset of the program and their resumption of previous occupations. The focus of the quantitative data will be range of motion (ROM), the amount of time the affected body part is used, and increased participant evaluation scores. These qualitative data will be gathered through an initial, semistructured interview composed of open-ended questions predetermined by the primary developers of the program. Efforts will be made to design the interview for interrater reliability to allow for consistent data collection. The open-ended questions will allow respondents freer expression of goals, desires, and regrets. Specific interview questions have not been determined but will include questions regarding individually identified goals and the loss or reduction of meaningful roles, engagements, and relationships.

The initial interview will be scheduled individually for each participant. The interview will take place in a comfortable setting, with the horse present, during a quiet time at the barn to ensure privacy, invite introspection, and facilitate the bond between the participant and the horse. Afterward, a copy of the interview questions will be sent home with the participant to give them more time for reflection and to ensure that their purpose for engaging in this program is clear and can be addressed by the program developers.

Quantitative data will be collected through multiple valid and reliable measures:

the Mini Mental State Examination-version 2: brief version (MMSE-2:BV; Shirley Ryan Ability Lab, 2020a), *Quick*DASH (Institute for Work & Health, n.d.), the Functional Assessment of Chronic Illness Therapy-Fatigue version 4 (FACIT-F; FACIT Group, n.d.), and the Role Checklist version 3 (RCv3; Scott, 2019). The information gleaned from these quantitative tools will dictate how to grade grooming activities with which individuals begin and progressively increase the demand on the upper extremity. For example, individuals with weaker arms may be assigned a shorter horse and a softer brush. The FACIT-F will be used to gather data on fatigue levels that may affect cognitive impairments (Ehlers et al., 2017) and decreased QoL (Treanor & Donnelly, 2016) that individuals with cancer experience. Results will be a starting point for energy-conservation education to decrease fatigue and improve the participants' ability to complete meaningful activities, thereby increasing their QoL. The MMSE-2:BV will measure cognitive status, and the RCv3 will evaluate the return to meaningful occupational activities and roles, which is the goal of this program.

All individual data will be collected via pencil and paper because Internet connections are unstable in rural barn settings. Electronic devices can also falter with the presence of dust and cold temperatures. The participants' confidentiality will be ensured by assigning each participant a coded number at the onset of the program. All paper copies of notes and assessments will be placed in a lockbox to ensure confidentiality and security. Audio and video recordings are not anticipated to be part of this program.

The MMSE-2:BV will be administered at the initial and final visits. The FACIT-F will be completed at the beginning of each visit to gauge individuals' responses to the

intervention and inform the program leaders of how to modify that day's activities, if needed. The amount of time engaged in grooming activities will also be evaluated each visit to ensure progress with physical goals. The *Quick*DASH will be readministered at the conclusion of the program to determine the level of independence the participant has achieved in their affected upper extremity for all activities of daily living and instrumental activities of daily living. The RCv3 will be readministered with a two-fold focus on how individuals are progressing toward completing their meaningful life occupations and roles. An anonymous survey created via an online survey program such as Survey Monkey (2021) will be sent approximately 1 week postintervention to gather retrospective feedback.

Program Facilitation and Analysis

The program will have a soft launch trial using these measures. Feedback from the participants and stakeholders after the soft launch will be applied as appropriate, and then a second program will be initiated. The data will be analyzed nonparametrically based on a small sample size and will measure any score changes in the MMSE-2:BV, *Quick*DASH, and FACIT-F at the start and conclusion of the program. The third launch of the program will compare a randomized controlled trial of the program's effectiveness with that of traditional clinic interventions. A primary developer of this program is an adjunct professor at a nearby university; thus, the institutional review board process will be initiated through that institution.

Synthesis of raw data will allow hermeneutic methods to apply. Responses to the open-ended survey questions will be compiled in written form. Enumerative data analysis

will be conducted by an impartial group that is not involved with the program. This group will look for themes and analyze findings to adapt future iterations of the program as appropriate. To ensure clarity and purity of the findings, triangulation of the stated methods will be used.

Preliminary Plan for Formative Data Analysis

The open-ended survey questions that will be implemented before, during, and at the end of the program will help determine emerging themes. Following the program's conclusion, an anonymous survey will be administered, and the results will be included in the thematic analysis. Based on the survey findings, themes will be determined using objective evaluators and a qualitative data analysis program, such as InVivo. The information gathered from the first two interviews will be organized so that each program director can conduct concluding interviews to establish whether the program interventions were consistent and appropriate for participants' identified needs and goals. The qualitative information will be shared with stakeholders for feedback and to ensure their commitment to this program's development and execution (see Chapter Six, "Dissemination Plan").

Preliminary Plan for Summative Data Analysis

The *Quick*DASH, MMSE-2:BV, FACIT-F, and RCv3 measures will be completed at the barn. These measures have interrater reliability and bias control built into their design. Higher postintervention scores indicate greater return to occupational and life roles. The data will be kept in the paper forms on which they were initially administered. A nonparametric pre- and postintervention analysis will be conducted on

the data. Each of the three program directors will conduct the assessment measures. A team meeting will take place after the interview to establish a treatment plan based on the interview outcomes. For example, if the individual's goals reflect a need for more introspection and processing of regret, fear, or sadness over loss of life roles, then the intervention plan may have that individual spend more time with the licensed mental health counselor instead of the physical therapist. Table 4.1 illustrates the dependent variables and how they will be measured within this program.

Confirmatory Process

The confirmatory process will include the quantitative data collected at the beginning, midpoint (4 weeks), and conclusion of the program. The first focus will be on the physical increases in strength, ROM, coordination, and endurance through grooming and leading the horse. This will be correlated with the scores on the *Quick*DASH. The second focus will be on the participant's fatigue management through grooming and energy-conservation education. Lastly, an anonymous online survey will be sent out within 1 week postintervention. The survey will contain a combination of yes/no, short-answer, and open-ended questions that focus on both goal attainment and program administration logistics. The survey results will be sent to impartial stakeholders.

Table 4.1

Dependent Variables and Their Measures

Dependent variable	Formative measure (first visit)	Midintervention measure (fourth visit)	Summative measure (eighth visit)
Range of motion	-Goniometry -*Quick*DASH[a]	-Goniometry -*Quick*DASH[a]	-Goniometry -*Quick*DASH[a]
Muscle strength	-Manual muscle test -Dynamometer -Time active use of upper body during grooming	-Manual muscle test -Dynamometer -Compare/graph time of active use measured across all interventions	-Manual muscle test[b] -Dynamometer -Compare time of active use measured across all interventions
Balance	Timed Up and Go[b]	Informal Measures	Timed Up and Go[b]
Cognition	FACIT-F MMSE-2:BV[e]	FACIT-F	FACIT-F MMSE-2:BV
Occupational independence	RCv3	RCv3	RCv3

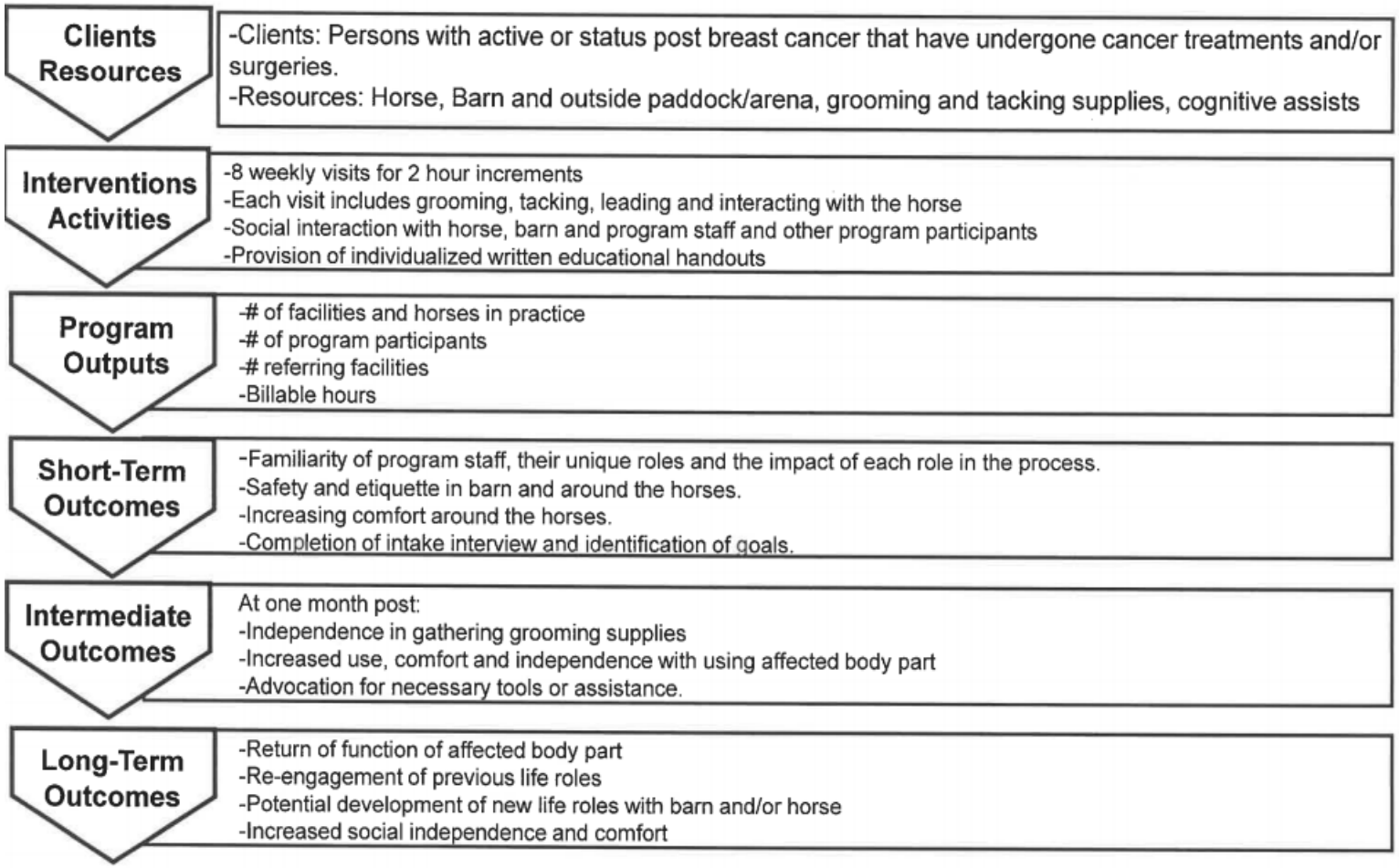
Note. [a]*Quick*DASH (Institute for Work and Health, n.d.); [b]Timed Up and Go (Shirley Ryan Ability Lab, 2014). FACIT-F, Functional Assessment of Chronic Illness Therapy-Fatigue version 4 (FACIT Group, n.d.); MMSE-2:BV, Mini Mental State Examination-version 2: brief version (Shirley Ryan Ability Lab, 2020a); RCv3, Role Checklist version 3 (Scott, 2017).

Logic Model

The simplified logic model (Figure 4.1) outlines the expectations for the Hooves 4 Healing program.

Figure 4.1

Simplified Logic Model



Engagement of Stakeholders: Understanding the Outcomes

Stakeholder groups who may be interested in Hooves 4 Healing's evaluation research findings include cancer support groups, local metropolitan Boston area outpatient clinics, physician groups, and the Dana Farber Cancer Institute (2021). Other stakeholder groups could include professional associations of therapeutic horsemanship and alternative complementary therapies associations, such as the National Center for Complementary and Integrative Health (2021).

G. Ryan (personal communication, September 1, 2020) is one of the founders of Grateful Friends, a nonprofit organization that provides financial and emotional support to those going through cancer. Through Ryan, the Hooves 4 Healing program has identified and connected with important stakeholders, including her physical therapist and a licensed mental health counselor certified in the Equine Assisted Growth and Learning Association's (n.d.) model. Grateful Friends may be a referral source, and they could benefit from learning about the research that supports the program. Table 4.2 lists the important stakeholders and their related research questions.

Table 4.2

Program Stakeholders

Stakeholder	Qualitative research question	Quantitative research question
Researcher	-Is this program relevant to occupational therapy? -Does this program effectively address occupational inefficiencies? -Will this program contribute to educational or practice gaps in occupational therapy?	-Does this program increase scores on tools measuring occupational impairments (i.e., RCv3 and MMSE-2:BV)?
Cancer patient or survivor	-Will participating in this program improve quality of life?	Will doing this program: -increase arm strength, range, and endurance? -increase hand strength and coordination? -improve balance? -improve thought clarity? -help with daily occupations?
Occupational therapist, physical therapist, licensed mental health counselor	Will this program: -effectively address function-related goals? -provide the wrap-around service envisioned?	Will this program: -increase arm strength, range, and endurance -improve balance -increase walking speed, cadence, coordination, and endurance

Physician, social worker, alternative medicine practitioner	Will this program: -make sense as a health care practitioner? -provide quality care that a health care practitioner can recommend to their clients?	Will this program: -provide effective alternative treatment? - increase scores on quantitative tests[a]?
Community, director of senior center, participant ambassador	Will this program: -be easily accessible for the community? -improve quality of life? -positively support members of the community?	Will this program: -increase community volunteerism? -increase community financial support through resuming a previous job?

Note. [a]Such as the *Quick*DASH (Institute for Work & Health, n.d.) and Functional Assessment of Chronic Illness Therapy-Fatigue version 4 (FACIT Group, n.d.). RCv3, Role Checklist version 3 (Scott, 2017); MMSE-2:BV, Mini Mental State Examination-version 2: brief version (Shirley Ryan Ability Lab, 2020a).

Intended Outcomes of the Program

The proposed long-term outcome of the program will be to establish the following causality: If an individual engages in individualized equine-assisted activities and therapies, then they will experience increased strength, ROM, endurance, and reduced fatigue, which will help them complete individually meaningful activities. Short- and intermediate-term changes will include increased strength, ROM, balance, activity tolerance, mood, goal-directed behavior, and QoL. The long-term changes will be resumption of previous life roles and, perhaps, the onset of new life roles.

Conclusion

The American Cancer Society (2019) reported that treatments (e.g., hormonal treatment, radiation, chemotherapy) can vary depending on the type and stage of cancer and the patient's age at diagnosis. They also reported an increase in the last 8 years of individuals with breast cancer who elected for a contralateral prophylactic mastectomy—the removal of the unaffected breast. They further report that, despite high occurrences of treatment-related disabilities, only 1% to 2% of persons with cancer receive rehabilitation. Therefore, the American Cancer Society has made the increase of rehabilitation for cancer and its treatments a priority. Identifying this gap parallels Berwick's (2015) tenets for improved health care, including critical evaluation of current postacute rehabilitation effectiveness and increasing the rigor of rehabilitative health care professionals.

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program's specialized intervention and its associated research (Cerulli et al., 2014;

Cimprich & Ronis, 2003; White-Lewis et al., 2019) can meet the needs of individuals who have or had breast cancer and demonstrate physical, cognitive, and psychosocial vulnerabilities. The program addresses this spectrum of needs using horses as a rehabilitative medium. This unique aspect of the program adheres to Graham's (2018) challenge of providing better care, health, and value through an innovative use of resources. As such, stakeholders include health care providers, social workers, the community, and the participants. The program's outcomes (increased strength, ROM, endurance, and reduced fatigue) will be evaluated using qualitative and quantitative data collected throughout the duration of the program.

CHAPTER FIVE – Funding Plan

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program focuses on improving the physical and cognitive weaknesses resulting from cancer treatments and surgeries. Often, these same treatments that save lives can lead to difficulty in completing daily roles and routines and, ultimately, reduce quality of life (QoL). This program uses horses, barns, and outdoor settings as media to address the barriers and challenges of resuming meaningful occupations, such as reduced upper-body strength or cancer-related cognitive impairments. Some resources for this program are available, and others will need to be sourced.

Program Resources and Budget

Available Resources

Resources currently available for this program are:

- two horses (one privately owned by the program designer, and a second that will be leased by the hour) with appropriate temperaments and sizes to address physical aspects,
- a variety of rescue horses (free of charge) with appropriate temperaments to address psychosocial aspects,
- barn space with a grooming stall and wide aisles for grooming activities,
- grooming brushes,
- outdoor paddocks for unstructured horse work,
- an outdoor riding arena,

- an indoor riding arena for privacy and shelter from extreme weather conditions, and
- indoor spaces such as a large tack room and office for socializing, meetings, and educational groups.

Needed Resources

Emphasis should be placed on caring for the most essential pillar of this rehabilitation program: the horse. A recent study examined the welfare of equines that participate in the care of humans through the horses' heart rate variability and behaviors such as snorting during horse–human interactions. The results revealed that although horses had stronger heart-rate variability and behavioral reactions to individuals with physical or psychological needs, overall the horses did not view those interactions as either positive or negative (Mendonça et al., 2019). In Hooves 4 Healing, the horses are the medium for all rehabilitative measures and are considered the most important staff members. Thus, the program's largest expenses will be the cost and care of the primary horse and the space for the program to take place. These costs include the horse's board, veterinary and farrier care, and rent for barn, arena, and paddock spaces.

The next largest expenses will be program and equine-maintenance staff. The program staff will include an occupational therapist, physical therapist, and licensed mental health counselor, all with equine-assisted activities and therapies training. These individuals are necessary, to progress the participants' return to meaningful occupations by addressing their physical needs (e.g., increasing the range of motion, strength and coordination of affected extremities) and building strategies to combat energy and

cognition reduction, to facilitate progress in resilience to cancer-related losses, and to provide opportunities for empowerment to regain those losses.

To boost the authenticity and effectiveness of this program, participant ambassadors—individuals who have had cancer—will be contributing members of this program. Johnson et al. (2018) studied the effectiveness of an EAAT program on veterans with posttraumatic stress disorder. Those authors specifically noted the veterans' feedback on the positive impact of socialization and camaraderie with other program members and staff. To that end, a participant ambassador who is intimately knowledgeable about the needs of others with cancer should be available to lead important conversations and lend authenticity and relevance to the program content. They will play an active role alongside the occupational therapist in the group discussion around energy conservation to combat cancer-related fatigue. The program will begin with an unstructured coffee and socialization hour to support fellowship and sharing. Operating costs, such as office supplies, simple food, beverages, and photocopying needs, are also considered.

General liability insurance is paid by the owners of the barn and the barn manager. Therefore, general liability insurance is acknowledged as an overall expense, but not reflected in the cost of running the Hooves 4 Healing program. Extra general liability should be procured by the individual on the letterhead of this business as an extra measure of protection (Table 5.1).

Table 5.1

Budget Costs for Specific Worksite at Breezy Hill Farm, Holliston, MA

Category	Includes	Specific expenditure	Total per program[a]	Total (annual)
Barn	Stall boarding	$500.00/month	$500.00	$6,000.00
	Ring fee	160.00	160.00	1,920.00
Insurance	Barn general liability	2,000.00[b]	0	0
	Personal general liability	266.00	22.16	266.00
Total cost			$682.16	$8,186.00

Note. [a]2x/week for 1 month = eight visits; program is held each month with new participants. [b]Paid by barn.

Table 5.2 lists general program implementation costs. Further, see Chapter Six, for the program dissemination costs.

Table 5.2

Costs for General Program Implementation

Category	Includes	Specific expenditure	Total per program[a]	Total (annual)
Horse 1	Veterinary care	$250.00/yr shots $200.00/yr teeth	$404.16	$4,850.00
	Farrier	$600.00/yr (hoof trim only)		
	Food	$1,400.00/yr hay $2,400.00/yr grain		

Horse 2	Usage fee	$30.00/hr x 2 hr/week	240.00	2,880.00
Program	Occupational therapist	$60.00/hr (current per diem rate @ level of specialization)	960.00	11,520.00
	Professional liability insurance (HPSO)	$266.00/yr (included in general liability policy Table 5.1)	0	0
	Licensed mental health worker with specialty in EAGALA	$60.00/hr or $150.00/day, whichever is greater	1,200.00	14,400.00
	Physical therapist	$60.00/hr (current per diem rate @ level of specialization)	960.00	11,520.00
	Horse handler/trainer[d]	$25.00/hr x 4 hr	100.00	1,200.00
	Participant ambassador	$25.00/hr x 8 hr	200.00	2,400.00
Training	Horsemanship academy	$220.00/yr	18.33	220.00
	Horsemanship basics I and II	$220.00/yr	18.33	220.00
One-time costs	Hand dynamometer	$330.00		330.00
	Goniometer	$6.95		6.95
	Stopwatch	$9.95		9.95
	*Quick*DASH[b] manual	$40.00		40.00
	RCv3 manual	$40.00		40.00

	MMSE-2:BV	$205.00		205.00
	Padlet	Padlet for resource and educational management		69.99
	Comfortable seating for each participant (Pelham Bay stackable high back dining chair)	$38.98 x 10		389.80
Office supplies[c]	Evaluations	FACIT (36 pages)	3.60	43.20
		*Quick*DASH: (24 pages)	2.40	28.8
		RCv3 pre- and postcompletion @ 8 pages each	1.60	19.20
	Test protocols	MMSE-2:BV pre- and postcompletion (8 sets)	168.00	2,016.00
	Photocopies of therapist-prepared energy-conservation education sheets	Energy conservation (20 pages)	2.00	24.00
		3-day log (36 pages)	3.60	43.20
	Photocopies of release of liability forms	4 pages	0.40	4.80
	Stamps	100 ct		55.00
	Envelopes	100 ct		7.99
Fellowship resources	Coffee, bottled water, fresh fruit	Coffee: $13.00 per pound	65.99	791.88

	Bottled water (24 ct): $4.99 Fresh fruit: $12.00 per tray		
Total implementation costs		$4,348.41	$53,335.76
Total costs with worksite costs (Table 5.1)		$5,030.57	$61,521.76

Note. [a]2x/week for 1 month = eight visits; program is held each month with new participants; [b]*Quick*DASH (Institute for Work & Health, n.d.); [c]Per program for four participants @ $0.10 per copy; [d]Handlers are not directly involved in the program but will exercise horses during nonprogram days.
EAGALA, Equine-Assisted Growth and Learning Association (n.d.); FACIT-F, Functional Assessment of Chronic Illness Therapy-Fatigue version 4; HPSO, Healthcare Providers Service Organization; MMSE-2:BV, Mini Mental State Examination-version 2: brief version (Shirley Ryan Ability Lab, 2020a); RCv3, Role Checklist version 3 (Scott, 2017).

Potential Grants and Funding Sources

The mission of the EAAT field is to provide funding and resources to increase evidence-based research on the efficacy of using equines as a medium for improving human health and wellness. To this end, there are many horse-related professional organizations, such as the Horses and Humans Research Foundation (HHRF), Professional Association of Therapeutic Horsemanship, and American Hippotherapy Association. All these organizations offer research opportunities and stipends. The latter two programs focus mainly on the efficacy of therapeutic horseback riding. The Hooves 4 Healing program is a ground-based program that offers a different relationship between the individual and horse. The HHRF's broad research agenda includes basic research and clinical studies that are intended to affect physical and mental health and QoL for people

with disabilities who are involved with EAAT. The organization exists to fund and support research projects that measure quantitative or qualitative evidence for EAAT and the impact of the human–horse relationship. Therefore, the HHRF will be the most appropriate professional organization from which to seek funding.

Additionally, local resources, such as charitable-giving divisions of local banks, should not be overlooked. Lastly, because this program intersects EAAT with occupational therapy, seeking financial support from professional occupational therapy organizations would be appropriate. To note, the individual who will be providing the Equine-Assisted Growth and Learning Association's (n.d.) portion of the program accepts insurance. With this provision, the program will be able to potentially bill insurances and thereby offset the direct program cost of that staff person. Table 5.3 outlines potential funding sources and the amounts .

Table 5.3

Potential Funding Sources

Foundation	Mission	Funding sought
Horses and Humans Research Foundation (HHRF) https://www.horsesandhumans.org/	Advance global knowledge of horse–human interactions on health and wellness; up to $50,000 available for research on therapeutic effects of horse–human interactions	$17,303.14
Grateful Friends https://www.gratefulfriends.org/	A cancer-support group providing financial and emotional support to those with cancer; would consider sponsoring one participant for duration of program	$1,920.00
Middlesex Savings Bank Charitable Giving Foundation[a] https://www.middlesexbank.com/About/Community-Involvement/Giving-Back/Charitable-Foundation Corporate Giving https://www.middlesexbank.com/About/Community-Involvement/Giving-Back/Corporate-Giving	Operating support program; $10,000 or up to 10% of program's operating costs (whichever is less) for operating expenses: staffing, supplies, overhead; grant to consider in the future; supports 501(c)(3) organizations in communities to help neighbors live better	$8,506.00 Based on expected operating costs at Tables 5.1/5.2
American Occupational Therapy Foundation https://www.aotf.org/Grants/Intervention-Research-Grant	A novel approach to adopt new, meaningful occupations, such as horse-related research, which is limited; this grant to work in tandem with the HHRF grant	$17,303.14

Note. [a]This would require that the Hooves 4 Healing program be a formal 501(c)(3) business entity.

Conclusion

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program uses carefully selected horses and qualified staff in its implementation. The horses and their maintenance will be the program's largest expense. The total cost of each program will be $5,030.57, with an annual cost of $61,521.76 (Table 5.2). The program will connect with funding sources, such as HHRF, occupational therapy organizations, and local charities. However, the Hooves 4 Healing program also intentionally uses nature—trees, breezes, grasses, birds, and more. This natural environment, free of cost and inherently found in barn settings, will be part of the rehabilitation process offered through this program. Using all three components will ensure a cohesive and effective rehabilitation program that is outside of a traditional clinic. The goal is to return individuals to their occupations, life roles, and living their life to the fullest capacity.

CHAPTER SIX – Dissemination Plan

Program Description

Cancer affects multiple body systems, causing disability of the upper extremity, cognitive impairment, and severe and potentially debilitating fatigue (Chrischilles et al., 2019; Janelsins et al., 2014; Schmidt et al., 2012). These reductions in function have real-life implications. Silver and Gilchrist (2011) identified that between 33% to 40% of previously high-functioning adults diagnosed with colorectal cancer were unable to return to work 12 months postdiagnosis. Those authors further noted that after treatment for head and neck cancer, 26% of individuals either drove less or not at all.

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program is a wrap-around clinical intervention. It uses horses to address the physical, cognitive, and psychological vulnerabilities in individuals with or have had breast cancer. Hooves 4 Healing draws upon traditional and alternative forms of rehabilitation and the health-promoting aspects of nature for those with or recovering from cancer. Taking place in an inherently restorative environment and using horses as the vehicle for delivery, this program proposes a novel, cohesive, and comprehensive treatment approach to attain the program's goals: to return participants to their meaningful occupations and, perhaps, introduce them to a new occupation (Lanning & Krenek, 2020).

Dissemination Goals

This project's primary goal is establishing the efficacy of a hybrid program, Hooves 4 Healing. This program combines established cancer treatment interventions

including resistance training, cognitive retraining, and education with alternative forms of therapy such as interactions with nature and using horses as the media to return individuals who have or had cancer to their previous level of occupational performance.

The short-term goal of Hooves 4 Healing is to convey this treatment's efficacy to all stakeholders. To do this, stakeholders (physicians, rehabilitation professionals, and persons with breast cancer and their families) will be educated on the innovative use of the horse and nature. This education will include relevant research of using horses and nature to address the medical needs that arise during and after cancer diagnoses and treatments. The physicians' and rehabilitation professionals' (occupational therapists, physical therapists, licensed mental health counselors) educational emphasis will tie physical vulnerabilities to using the horse and nature for rehabilitation, which will then be shared with those who have or had breast cancer because it is important they understand the validity of this approach. However, the educational emphasis will be the restorative aspects of rehabilitation in this unique environment and the development of the horse–human relationship as another form of psychological support.

This program's long-term goal is establishing its efficacy on a wider scale through pilot and, ultimately, randomized controlled trial using mixed-method research. This trial would measure strength and range of motion of the impacted arm and the resumption of life roles. The dissemination of its findings will be published for allied health practitioners; traditional, alternative, and complementary health care practitioners; and oncology journals. See Table 6.1 for a summary of short- and long-term goals.

Table 6.1

Short-Term and Long-Term Dissemination Goals

Short-term goals	Long-term goals
• Return program participants (individuals who have or had cancer) to their desired level of occupational performance	• Adapt program to reflect best cancer treatment practices by using alternative or holistic approaches
• Establish the efficacy of using horses in cancer treatment	• Disseminate information of best practices for using horses as treatment tools
	• Publication of formal research study and randomized controlled trial to both the health care and equine-assisted activities and therapies fields

Target Audience

The primary population served in the Hooves 4 Healing program will be people who have or had breast cancer. The existing literature demonstrated that limitations from breast cancer treatments, such as chemotherapy and surgeries, can extend up to 20 years posttreatment (Ahles et al., 2012). Therefore, there will be no posttreatment time threshold to participate in this program. The beneficiaries of this program often experience loss of independence, fulfillment of life roles, and quality of life (QoL) due to pain, decreased strength, endurance, range of motion in the upper extremity due to cancer treatment or surgery, and balance due to neurological changes from systemic cancer treatments (Bahcaci & Demirbuken, 2019; Ceprnja & Maka, 2015; De Groef et al., 2017; Herrero et al., 2006; Morris & Lewis, 2020). Studies have indicated the importance of

engaging in purposeful activities outside of clinics for rehabilitation (Selby & Smith-Osborne, 2013), which addresses all mentioned limitations.

Chemotherapy-related impaired cognition and psychological distress from cancer diagnoses and treatments also may be present (Ahles & Root, 2018; Joshy et al., 2020). Joshy et al. (2020) found a strong correlation between increased limitations in physical functioning to moderate to high measures of psychological distress and a fair correlation to a poor rating of overall health. These limitations have the potential to affect the pursuit and completion of valuable and meaningful occupations, thus leading to a loss of overall independence and joy for life.

Secondary beneficiaries of this program are the family, friends, and employers of the participant. Individuals belong to a large and complex web of relationships. When individuals are unable to fulfill their roles, this web is disturbed. From an emotional and personal perspective, family and friends will benefit from the participant regaining the independence to complete important and meaningful self-fulfilling roles (e.g., cooking dinner or attending book club meetings). From a financial perspective, the participant's employer will benefit when the individual is able to resume work responsibilities.

Finally, a tertiary population to benefit from the Hooves 4 Healing program is health care providers. Physicians are provided another option for their patients' rehabilitative needs. Occupational, physical, and speech therapists who practice in clinical settings could recommend this program as an adjunct to their clinical treatment. Insurance companies also could be a beneficiary because the participant may have a faster or a more complete response to treatments with the addition of natural environment

settings and a comprehensive rehabilitation program that addresses all areas of need (physical, cognitive, and psychosocial). Table 6.2 outlines the key messages and sources intended for the primary, secondary, and tertiary audiences.

Dissemination Activities

Hooves 4 Healing's results will be shared through various dissemination activities and tools. For the primary and secondary audiences (i.e., individuals who have or had breast cancer and their families), community center and cancer support group lectures will spread awareness of this treatment. A "mascot"—a miniature horse—will be present during these dissemination activities to add a dynamic element and allow potential participants to experience the horse–human relationship firsthand. The program representatives will present an informational video and provide these potential participants a written brochure with a program summary and contact information. Dissemination will also occur online through social media posts on platforms such as Facebook, Instagram, and Twitter. Lastly, colorful informational brochures will be developed for community bulletin boards.

Table 6.2
Audience, Source, and Key Messages for Dissemination Plan

Audience	Source	Key Messages
Primary: those who have or had breast cancer	Healthcare providers (e.g., primary care providers, oncologists, oncology nurse practitioner or physician's assistants, rehabilitation professionals) Community services (e.g., senior center, community bulletin boards, cancer support groups) Online cancer support networks and cancer education sites (e.g., American Cancer Society); These sources present statistics and research relevance and visual content (e.g., pictures of horse–human interactions)	Interventions in natural settings that use horses are effective and should be considered for adjunct therapy with traditional interventions Horses have the capacity to address all areas of concern (physical, cognitive, psychosocial) in a pleasant and nonthreatening environment
Secondary: family, friends, co-workers, employers, and community members of the primary audience	Informational lectures, brochures, and business cards at community service sources Online cancer support networks and cancer-education sites Social media shows relevant pictures to capture viewers' attention; may also be shown on cancer-related social media sites as permitted	Alternative treatment programs may facilitate faster return to previous functioning Alternative treatment programs may elicit joy and enhanced quality of life
Tertiary: health care providers and health insurance providers	Educational materials provided by program organizers (e.g., informational brochures and educational videos) Formal presentations at occupational therapy conferences; informal presentations at special-interest group meetings Publication of formal research studies results	An alternative, yet effective, rehabilitation approach as an adjunct to traditional therapy measures

For the tertiary audience (i.e., health care and insurance providers), a multifold approach will be used to target three distinct groups: (a) medical professionals such as physicians and rehabilitation professionals employed at occupational and physical therapy outpatient clinics; (b) state professional associations, and (c) local barns where people enjoy horses and may either have a cancer diagnosis themselves or know of someone who does. A 30-sec informational video and brochure will be distributed via email to the health care providers (e.g., primary care physicians, oncologists, oncology nurse practitioners, physician assistants, and outpatient therapy clinics) within a 15-mile radius of the barn where the program is facilitated. Depending on each clinic's solicitation policies, informational brochures and business cards will be displayed for patients to take. Increasing the presence of this program with professional organizations, such as the American Occupational Therapy Association and the American Physical Therapy Association, along with their state counterparts, will be effective in reaching a larger number of rehabilitation professionals. Further, program brochures and business cards will be displayed at local barns and riding centers to capture audience attention from the equestrian community. Table 6.3 further outlines the dissemination activity plan for this program, and Table 6.4 shows the dissemination budget.

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Table 6.3

Dissemination Activities

Dissemination activity	Explanation of activity
Community talks	● Program leaders host 45-min lectures at libraries, community and senior centers, and cancer support groups to spread program awareness ● Visual and question-and-answer components will be included ● General information on health insurance coverage ● Brochures and business cards
Social media	● Facebook will be the primary social media platform because it is the most used for the age group of the primary population (*M* = 63 years) ● Informational posts shared on the program developers' pages and, with permission, tagged on specific cancer support group pages ● Dissemination through "liking" and "sharing"
Informational brochure	● Easy-to-read brochure with information of horse–human interactions, attention restoration theory, and biomechanical approach ● Brochures outline how combined approaches create effective treatment for the physical, cognitive, and psychosocial limitations from cancer ● Information on the program location, health insurance coverage, and contact information
Two informational videos	1. Public education video with scenes to capture potential participant interest, narrated to disseminate outline of program activities and therapeutic value, attention restoration theory, horse–human interaction (EAGALA), and biomechanical approaches; references included at end of video 2. Health care provider education video with scenes that illustrate this approach's innovation and educate professionals on the power of horses, nature, attention restoration theory, horse–human interactions (EAGALA), biomechanical, and cognitive approaches with empirical and research-based evidence; includes a breakdown of program activities; references included at end of video

Professional presentations	● Program's occupational therapist will submit a poster presentation or lecture proposal for annual conferences (e.g., Massachusetts Occupational Therapy Association, American Hippotherapy Association, Professional Association of Therapeutic Horsemanship, and Horses and Humans Foundation) with appropriate terminology ● Presentation will discuss program's innovative treatment with supporting evidence to increase the occupational therapy field's knowledge of the horse–human interaction and to relate the program's relevance to periods of public health crises, such as COVID-19 ● Presentations and peer-reviewed publications will also shed light on the efficacy of using horses as treatment tools in therapy and oncology

Note. EAGALA, Equine Assisted Growth and Learning Association.

Table 6.4

Dissemination Budget

Dissemination Activity	Specific expenditure	Dissemination Expenses
Community talks		$0.00
Handouts (physicians and community)	Business cards (200) Brochures (250) Brochure holder (10)	$43.18 165.74 90.00
Informational videos		$0.00[a]
Massachusetts Occupational Therapy Association annual conference lecture presentation	Conference registration Google slides Copy of slides handout	$225.00 $0.00 $12.50
Article submission fees		$500.00
Total budget for dissemination plan		$1,036.42

Note. [a]Informational videos will be created using iMovie video editor.

Evaluation

The dissemination's success will be determined by the achievement of the short- and long-term goals. For the primary audience of this program, a successful dissemination plan will result in increased participants. As previously stated, the program's goal for the primary audience is the resumption of meaningful occupations and life roles. Successful dissemination to the secondary and tertiary audience will yield increased external referrals (rather than only self-referrals) from health care providers, reimbursement from health insurance providers, and affirmative reviews from professional organizations such as the Massachusetts Occupational Therapy Association and the American Hippotherapy Association.

The long-term goal of this program is affirmation from relevant professional and public communities. To do so, peer reviewed articles will be published to support the efficacy of this approach. This is the optimal vehicle of dissemination for professional audiences.

Conclusion

The dissemination plan for the Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program is a three-pronged approach that includes educating the breast cancer and health care communities of the value of involving horses in rehabilitation efforts. The equine industry will also be educated on the value of horses for treatment of medical profiles other than developmental disabilities (autism, attention-deficit/hyperactivity disorder, etc.).

Dynamic dissemination of program information, such as informative videos, effectively illustrate the value horses and nature bring to the rehabilitation process. Brochures containing information on the program's philosophical basis, format, and overall goals including resumption of previous life roles, improved self-care, and contact information will also be distributed.

The proposed dissemination budget is minimal, but effective. Although not necessary, adding a miniature horse for community outreach will offer a more dynamic and memorable experience. However, this inclusion will increase the budget tenfold. The resources outlined in the plan are essential for community education and outreach. Most importantly, the message must be conveyed that the program developers and leaders are an extension of the health-promoting benefits of nature and the horse.

CHAPTER SEVEN – Conclusion

There is something about the outside of a horse that is good for the inside of a man.

—Winston Churchill

Cancer is a prevalent disease. Among women in the United States, breast cancer is the second most common form of cancer (Centers for Disease Control and Prevention, 2021). The American Cancer Society (2019) reported that approximately one in eight women will be diagnosed with breast cancer, making it likely that breast cancer and its treatments will affect not only the whole person, but also their social support networks such as their family, friends, and community. Completion of personally meaningful daily occupations is important to those who have or had breast cancer, as well as their families.

Physically, this population experiences decreased cardiovascular functioning, strength, and motion (Chrischilles et al., 2019; Herrero et al., 2006; Silver & Gilchrist, 2011), mobility and balance affecting their safety to move around (Wechsler & Wood, 2021), and cognitive impacts such as decreased attention, memory, clarity of thought, and problem-solving (Ehlers et al., 2017). Extreme fatigue and pain can affect the ability to complete self-care, activities of daily living, and quality of life (QoL; De Groef et al., 2017; Jitender et al., 2018; Savina & Zaydiner, 2019; Schmidt et al., 2012). A disruption in any or all of these systems may result in reducing the QoL enjoyed prior to the cancer diagnosis.

Cancer rehabilitation should be an interdisciplinary program focused on diagnosing and treating physical and cognitive impairments. These rehabilitation activities should be led by rehabilitation specialists such as occupational therapists, physical therapists, licensed mental health counselors, and speech therapists (BreastCancer.org, 2021). Horses also can fit into the category of rehabilitative specialists. The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program aims to be a rehabilitative program that addresses the whole person—the physical, mental, and spiritual aspects of people—that takes place in an enjoyable and refreshing outdoor atmosphere with others who share cancer diagnoses, through the medium of horses. Through natural activities involving horses, the program addresses the physical, cognitive, and psychosocial impacts of cancer.

People who desire an animal-based program such as Hooves 4 Healing would find their work with horses to be engaging and meaningful. The connection from caring for the horses can be transferred to caring for oneself through the mindful creation of activities that transfer from one environment (the barn and horse) to another (oneself and home). Lanning and Krenek (2013) noted the importance of occupations to facilitate health. In their study, those authors specifically assessed the effect of equine-based work on QoL. Participants involved in a therapeutic horsemanship and horseback-riding program reported increased life activities as a positive outcome.

The basic premise of occupational therapy is that occupations—personally meaningful acts of intention that bring joy, value, and purpose to one’s life and influence their surrounding lives—are crucial to living a wholly satisfying life. The Hooves

4 Healing program's goal is to improve the physical, cognitive, and psychosocial health of individuals who have or had breast cancer through participation in specifically crafted activities with horses and nature to resume previous occupations and, ultimately, create new occupations. Thus, these individuals can build a wonderfully full and meaningful life.

APPENDIX A – Outline of the Hooves 4 Healing Program

Table A1

Physical Activities

	Vulnerability in:				
	Range of motion	Strength	Fine motor	Sensation	Balance
Addressed by	Groom and lead the horse: shoulder flexion; horizontal abduction/ adduction, extension; elbow flexion and extension; wrist extension; hand flexion, extension, opposition, adduction	Groom and lead the horse: isokinetic strength of upper extremity, including neck, upper back, hand; isometric strengthening of leading arm	Tack the horse, including adjust buckles for stirrups and girth, attach reins	Desensitization addressed through grooming and handling different lead lines (leather vs. rope)	Traverse uneven terrain, move through resistive terrain (long grass, loose footing in indoor ring); navigate inclines/ declines; open/close outdoor arena, paddock, field gates; maintain balance while leading
Conducted by	PT, OT	PT, OT	OT	PT, OT	PT
Graded by	Height of horse[a]; section of horse to be groomed (neck vs. underbelly)	Height of horse[a]; speed of horse's gait; distance horse is led; side horse is led on For hand strength: types of grooming tools used (rough or		Use of various grooming tools (curry comb, curry glove); section of horse being groomed (coat vs. mane); short vs. long	Dynamic: horses with different speeds or forceful forward motion. Static: reaching, weight shifting while grooming;

		soft brush, curry comb)		brush strokes; type of horse groomed	miniature horses for seated individuals to groom if appropriate
Assessed by	Goniometry; functional achievements (e.g., donning upper body clothing)	Manual muscle testing; dynamometer; pinch gauge; duration of grooming without rest	Pinch gauge; Grooved Pegboard Test	sharp/dull discrimination	Berg Balance; Timed Up and Go

Note. [a]Horse could be miniature, if appropriate. OT, occupational therapist; PT, physical therapist, UE, upper extremity; MMT, manual muscle test.

Table A2

Cognitive Activities

	Vulnerability in:				
	Memory	Sequencing	Attention	QoL	ADL/IADL
Addressed by	Grooming: recall tools needed across sessions; recall steps to tack or groom	Grooming: recall steps to tack or groom	Grooming: break down and rebuild tasks to increase attention	Grooming tasks; work outdoors; develop a relationship with horse	Grooming tasks
Conducted by	OT	OT	OT	OT	OT
Graded by	Visual aids (e.g., pictures of needed tools); checklists; verbal and/or visual cues, location of grooming task progressing from a quiet stall to the central barn corridor	Visual aids (e.g. task sequence board); verbal cues/aids place items needed for tasks in view and sequential order	Add tasks as attention increases: grooming; tacking; place items needed for additional tasks in view to prompt initiation to next step	Select horse's personality for clients: For unworthiness, find: nurturing, kind, gentle For despondency find: humorous, quirky Social interaction with barn personnel	Horse's size; selecting the grooming utensils; completion of self-care,
Assessed by	MMSE-2:BV	MMSE-2:BV	Work duration (establish baseline and parameters such as number of cues)	Role Checklist version 3 completion; goal identification; priority role identification	Pre- and postcompletion of the Disabilities of the Arm, Shoulder and Hand questionnaire

Note. OT, occupational therapist; MMSE-2:BV, Mini Mental State Examination-version 2: brief version; QoL, quality of life; ADL, activities of daily living; IADL, instrumental ADL.

Table A3

Fatigue Activities

	Vulnerability in energy
Addressed by	Targeted interactions with the horse to maximize benefit Energy conservation education Completion of 3-day log Analysis of 3-day log Targeted feedback on activities from 3-day log Completion of Role Checklist version 3
Intervention by	Occupational therapist
Graded by	Minutes spent grooming Brush type used for grooming Distance walked to reach horse Provision of seating when interacting with the horse Minutes spent leading the horse
Assessed by	Successive completion of Role Checklist version 3 Completion of FACIT-F every other week Compare FACIT-F results to previous weeks Completion of Visual Analog Scale Perceived level of exertion during tasks

Note. FACIT-F, Functional Assessment of Chronic Illness Therapy-Fatigue version 4.

APPENDIX B – Executive Summary

Cancer is a prevalent disease, and breast cancer is the second most common cancer among women in the United States (Centers for Disease Control and Prevention, 2021). The American Cancer Society reported that approximately one in eight women will be diagnosed with breast cancer (American Cancer Society, n.d.). This means that breast cancer and its treatments affect not only the whole person physically, mentally, and spiritually, but also their families and communities. Those who have or had cancer experience decreased cardiovascular functioning, strength, motion (Chrischilles et al., 2019; Herrero et al., 2006; Silver & Gilchrist, 2011), balance (Wechsler & Wood, 2001), memory, clarity of thought, and problem-solving (Ehlers et al., 2017). Pain and cancer-related fatigue affect this population's quality of life (QoL) by disrupting the systems that make a person whole (De Groef et al. 2017; Jitender et al., 2018; Savina & Zaydiner, 2019; Schmidt et al., 2012). However, the American Society of Clinical Oncology ([ASCO], 2021) stated that participating in cancer rehabilitation can improve QoL by reducing pain and other limitations, thereby leading to a productive life after cancer.

Program Overview

The Hooves 4 Healing: The Capacity of the Horse in Breast Cancer Rehabilitation program is designed to use horses as the rehabilitative vehicle through which the physical, cognitive, and psychological vulnerabilities that individuals who have or had cancer experience. Along with the horses, rehabilitation professionals such as occupational and physical therapists, licensed mental health counselors, and a program ambassador will facilitate this program.

Hooves 4 Healing is unique because the horses serve as pivotal members of the rehabilitation team. Further, the program takes place in quietly restorative and peaceful natural environments such as outside paddocks. Participants will complete three stations: the first in a spacious and airy barn, where grooming will address upper-body restrictions such as decreased strength and endurance; the second in a quiet area of the barn to present energy-conservation education classes that address cancer-related fatigue and participation in activities of daily living; and the third will expose participants to nature, where the participant will process positive and negative feelings through interactions with the horse and allow the areas of the brain responsible for sustained attention and memory to replenish. Outdoor barn environments are rich with sensations: the breezes that run through the barn and paddocks and the smell and sounds of the horses. Simultaneously, this environment is quiet and invites introspection and mindfulness.

Key Findings

Breast cancer and its treatments have multisystemic effects on physical, mental, and emotional health (ASCO, 2021). Disruptions in any of these systems may result in reduced QoL. Although participating in cancer rehabilitation can improve QoL, many practical, emotional, and physical needs of individuals who have or had cancer are not addressed during treatment (Livestrong.org, 2021), and only 1% to 2% of people with cancer engage in rehabilitative programs. Cancer support organizations, such as the American Cancer Society (2019), have made it their mission to increase participation in cancer rehabilitation programs. Current health care reform calls attention to the effectiveness of “top heavy” postacute rehabilitation efforts. These efforts include

identifying new interventions that increase access to rehabilitation care and determining program functional efficacy, participant experience and satisfaction, and whether the program is truly patient centered (Graham et al., 2018).

What about a rehabilitation program that takes place in nature, an environment that is far from the traditional rehabilitation settings? Studies and articles have related the positive attributes of interacting with nature. Since the advent of Kaplan's (1995) attention restoration theory, the importance of interacting with nature for both cognitive and stress benefits has been supported. Recently, this has been more relevant with the global COVID-19 pandemic and its related stresses. An article in *Forbes Magazine* listed better health, stress and anxiety relief, and hope and resilience as some benefits to being outside in nature (Randall, 2020). Further, a joint study from the U.S. Forestry Service and medical professionals revealed that exposure to nature can reduce blood pressure and heart rate (Kondo et al., 2018). Studies have found that working with horses resulted in reduced heart-rate variability and increased upper-body strength (Cerulli et al., 2014; White-Lewis et al., 2019). By combining the expertise of all professionals involved in facilitating the Hooves 4 Healing program, this program can completely address the unique challenges that cancer presents like no other program available.

Recommendations

The target population for this program are those who have or had breast cancer. The literature has shown that limitations from breast cancer treatments (e.g., chemotherapy and surgeries) can last up to 20 years posttreatment (Ahles et al., 2012). Therefore, Hooves 4 Healing places no time limitations based on when the diagnosis was

received. People who have experienced physical, mental, and spiritual vulnerabilities relating to their cancer diagnosis and treatment, which results in reduced QoL, would benefit from participating in this program. Studies have indicated the importance of engaging in rehabilitative activities in environments outside of clinics (e.g., Selby & Smith-Osborne, 2013) and engaging in purposeful rehabilitative activities in nature.

Individuals who do not like horses or are allergic to horses, pollen, or insect bites may not benefit from this program. Additionally, people with lymphedema are more susceptibility injury from bee stings, bug bites, and small cuts—all of which may occur in this setting—and may elect not to participate in this program. Because this program is facilitated outside, special considerations include tolerance for cold or slippery conditions. However, according to attention restoration theory (Kaplan, 1995), the benefit of nature and exposing oneself to all elements of nature is considered part of the healing properties of this program.

General Conclusions

Imagine a treatment that addresses the whole person: the physical, mental, and spiritual aspects of each person. Now, imagine that treatment taking place with other people experiencing cancer in an enjoyable outdoor environment. The Horses 4 Healing program addresses the effects of cancer through activities in nature that involve the unconditional regard of horses. Because each participant is encouraged to provide fellowship, support, and education to their counterparts, there is a sense of camaraderie. This program's goal is for participants to leave feeling refreshed, rejuvenated, and reflective with a clear view of their purpose and return to their meaningful occupations

and life roles.

Executive Summary References

Ahles, T. A., Root, J. C., & Ryan, E. L. (2012). Cancer and cancer treatment associated cognitive change: An update on the state of the science. *Journal of Clinical Oncology*, *30*; 3675–3686. https//doi.org/10.1200/JCO.2012.43.0116

American Cancer Society. (n.d.). *Breast cancer*. https://www.cancer.org/cancer/breast-cancer.html

American Cancer Society. (2019). *Cancer treatment and survivorship: Facts and figures; 2019–2021*. https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-treatment-and-survivorship-facts-and-figures/cancer-treatment-and-survivorship-facts-and-figures-2019-2021.pdf

American Society of Clinical Oncology. (2021). *Supportive care and treatment related issues*. https://www.asco.org/research-guidelines/quality-guidelines/guidelines/supportive-care-and-treatment-related-issues

Centers for Disease Control and Prevention. (2021, August 16). *Cancer*. https://www.cdc.gov/cancer/index.htm

Cerulli, C., Minganti, C., DeSantis, C., Tranchita, E., Quaranta, F., & Parisi, A. (2014). Therapeutic horseback riding in breast cancer survivors: A pilot study. *Journal of Alternative and Complementary Medicine*, *20*, 623–629. https://doi.org/10.1089/acm.2014.0061

Chrischilles, E. A., Riley, D., Letuchy, E., Koehler, L., Neuner, J., Jernigan, C., Gryzlak, B., Segal, N., McDowell, B., Smith, B., Sugg, S. L., Armer, J. M.,

& Lizarraga, I. M. (2019). Upper extremity disability and quality of life after breast cancer treatment in the Greater Plains Collaborative clinical research network. *Breast Cancer Research and Treatment, 175*, 675–689. https://doi.org/10.1007/s10549-019-05184-1

De Groef, A., Van Kampen, M., Vervloesem, N., De Geyter, S., Christiaens, M. R., Neven, P., Vos, L., De Vrieze, T., Geraerts, I., & Devoogdt, N. (2017). Myofascial techniques have no additional beneficial effects to a standard physical therapy programme for upper limb pain after breast cancer surgery: A randomized controlled trial. *Clinical Rehabilitation*, *31*, 1625–1635. https://doi.org/10.1177/0269215517708605

Ehlers, D. K., Aguiñaga, S., Cosman, J., Severson, J., Kramer, A., & McAuley, E. (2017). The effects of physical activity and fatigue on cognitive performance in breast cancer survivors. *Breast Cancer Research and Treatment*, *165*, 699–707. https://doi.org/10.1007/s10549-017-4363-9

Graham, J. E., Middleton, A., Roberts, P., Mallinson, T., & Prvu-Bettger, J. (2018) Health services research in rehabilitation and disability-the time is now. *Archives of Physical Medicine and Rehabilitation*, *99*(1), 198–203. https://doi.org/10.1016/j.apmr.2017.06.026

Herrero, F., San Juan, A. F., Fleck, S. J., Balmer, J., Pérez, M., Cañete, S., Earnest, C. P., Foster, C., & Lucia, A. (2006). Combined aerobic and resistance training in breast cancer survivors: A randomized control pilot trial. *International Journal of Sports Medicine*, *27*, 573–581. https://doi.org/10.1055%2Fs-2005-865848

Jitender, S., Mahajan, R., Rathore, V., & Choudhary, R. (2018). Quality of life of cancer patients. *Journal of Experiential Therapeutics and Oncology*, *12*, 217–221.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, *15*, 169–182. https://doi.org/10.1016/0272-4944(95)90001-2

Kondo, M. C., Jacoby, S. F., & South, E. C. (2018). Does spending time outdoors reduce stress? A review of real-time stress response to outdoor environments. *Health Place*, *51*, 136–150. https://doi.org/10.1016/j.healthplace.2018.03.001

Livestrong. (2021). *Help starts here*. https://www.livestrong.org/

Randall, C. (2020, April 9). Why going outside is good for your health, especially right now. *Forbes Magazine*. https://www.forbes.com/sites/cassidyrandall/2020/04/09/why-going-outside-is-good-for-your-health-especially-right-now/?sh=164d4a632de9

Rietman, J. S., Dijkstra, P. U., Hoekstra, H. J., Eisma, W. H., Szabo, B. G., Groothoff, J. W., & Geertzen, J. H. B. (2003). Late morbidity after treatment of breast cancer in relation to daily activities and quality of life: A systematic review. *European Journal of Surgical Oncology*, *29*(3), 229–238. https://doi.org/10.1053/ejso.2002.1403

Savina, S., & Zaydiner, B. (2019). Cancer-related fatigue: Some clinical aspects. *Asia Pacific Journal of Oncology Nursing*, *6*, 7–9. https://doi.org/10.4103/apjon.apjon_45_18

Schmidt, M. E., Chang-Claude, J., Vrieling, A., Heinz, J., Flesch-Janys, D., & Steindorf, K. (2012). Fatigue and quality of life in breast cancer survivors: Temporal courses and long-term pattern. *Journal of Cancer Survivorship, 6*, 11–19. https://doi.org/10.1007/s11764-011-0197-3

Selby, A., & Smith-Osborne, A. (2013). A systematic review of effectiveness of complementary and adjunct therapies and interventions involving equines. *Health Psychology*, *32*, 418–432. https://doi.org/10.1037/a0029188

Silver, J. K., & Gilchrist, L. S. (2011). Cancer rehabilitation with a focus on evidence-based outpatient physical and occupational therapy interventions. *American Journal of Physical Medicine and Rehabilitation*, *90*, 5, s5–s15. https://doi.org/10.1097/PHM.0b013e31820be4ae

White-Lewis, S., Johnson, R., Ye, S., & Russell, C. (2019). An equine-assisted therapy intervention to improve pain, range of motion, and quality of life in adults and older adults with arthritis: A randomized controlled trial. *Applied Nursing Research*, *49*, 5–12. https://doi.org/ 10.1016/j.apnr.2019.07.002

Wechsler, S., & Wood, L. (2021). The effect of chemotherapy on balance, gait, and falls among cancer survivors: A scoping review. *Rehabilitation Oncology*, *39*(1), 6–22. https://doi.org/10.1097/01.REO.0000000000000238

APPENDIX C – Fact Sheet

BOSTON UNIVERSITY

Hooves 4 Healing:

The Capacity of the Horse in Breast Cancer Rehabilitation

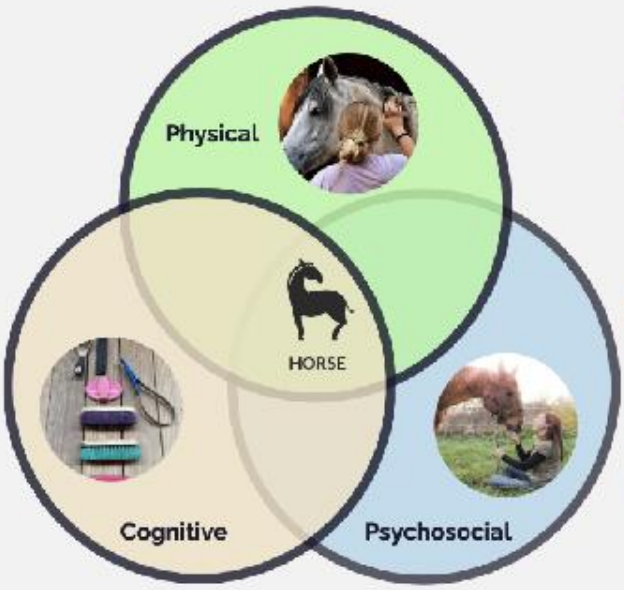
Laura A. Ryan, OT, OTR, OTD Candidate

Introduction to the Problem

- Breast cancer is the most commonly diagnosed cancer with more than 3.8 million women in the US having been diagnosed (American Cancer Society, 2019).
- 82% of women will survive cancer however limitations from their treatments can extend for years (American Society, 2019).
- Cancer-related loss of function can be due to a reduction in cognition, strength and motion of the upper body, pain, and/or fatigue.
- Only 1-2% of persons with or have had cancer receive rehabilitation (American Cancer Society, 2019).
- Health care reform identifies the need for effective rehabilitation that challenges conventional standards and is person centered.

Introduction to the Solution

Hooves 4 Healing is an innovative, motivating and comprehensive solution to address the complex and multifaceted needs of a person with, or has had breast cancer by using the horse and the outside environment as the primary rehabilitation vehicle to regain the ability to engage in meaningful occupations. All rehabilitation occurs while interacting with the horse.



Physical vulnerabilities such as reduced strength, range of motion, endurance, and coordination are addressed through grooming activities using the size of the horse, the distance that a horse is led, and the types of grooming brushes, which increase or decrease resistance across the horse's coat.

Psychosocial vulnerabilities such as despondency, stress, and regret resulting from the cancer diagnosis and its treatments are addressed through quiet, unstructured and contemplative interactions with the horse and time spent in a natural outside environment.

Cognitive impairments, including reduced working memory, mental clarity, and organizational skills such as prioritizing are addressed through specifically tailored grooming tasks that embed appropriate strategies and skill building.



Theories and Guiding Practices

Biomechanical Frame of Reference: This frame of reference is a remedial approach to physical limitations such as decreased movement, strength, or endurance that lead to a reduction in the execution of occupational performance. Interventions focus on amending underlying restrictions that result in improved occupational performance in desired occupations (OTTheory, 2021).

Toglia's Multicontext Approach: This approach promotes metacognitive strategy based interventions to be used across a wide range of personally meaningful tasks to promote the generalization of learning, which can then be transferred to functional performance (Toglia et al. 1991).

Attention Restoration Theory: This theory postulates that exposure to nature, including exposure to green settings, helps to recover from mental fatigue and increases the capacity to focus (Kaplan, 2001).

52% of women with breast cancer demonstrated improvements in attention after a randomized control study using a natural environment intervention (Cimprich & Ronis, 2003).

Implications for Occupational Therapy

The Affordable Care Act has made therapy more accessible for the US population, however healthcare reform identifies the need for effective rehabilitation that challenges conventional standards and is more person centered (Obama, 2016, Graham 2018). This program addresses each area of need in a uniquely coordinated manner and provides wholistic, engaging patient centered rehabilitation which is a basic tenet in the practice of occupational therapy.

References

American Cancer Society (2019). Cancer treatment and survivorship: facts and figures 2019-2021. Retrieved from: https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-treatment-and-survivorship-facts-and-figures/cancer-treatment-and-survivorship-facts-and-figures-2019-2021.pdf

Cimprich, B & Ronis, D.L. (2003). An environmental intervention to restore attention in women with newly diagnosed breast cancer. *Cancer Nursing 26* (4), 284-292. https://doi:10.1097/00002820-200308000-00005

Ehlers, D., Aguiñaga, S., Cosman, J., Severson, J., Kramer, A. and McAuley, E. (2017). The effects of physical activity and fatigue on cognitive performance in breast cancer survivors. *Breast Cancer Research and Treatment 165*, 699–707. https://doi.org/10.1007/s10549-017-4363-9

Graham, J.E., Middleton, A., Bettger, J.P., & Mallinson, T. (2018) Health services research in rehabilitation and disability: the time is now. *Archives of Physical Medicine and Rehabilitation 99* (1), 198-203. https://doi.org/10.1016/j.apmr.2017.06.026

Kaplan, S. (2001). Meditation, restoration and the management of mental fatigue. *Environment and Behavior 33* (4), 480-506.

Toglia, J.P. (1991). Generalization of treatment: A multicontext approach to cognitive perceptual impairment in adults with brain injury. *American Journal of Occupational Therapy 45*(6), 505-516. https://doi.org/10.5014/ajot.45.6.505

Obama, B. (2016) United States health care reform: progress to date and next steps. Journal of American Medical Association 316 (5), 525-532. doi: 10.1001/jama.2016.9797

OT Theory (2021). Biomechanical frame of reference. https://ottheory.com/therapy-model/biomechanical-frame-reference

REFERENCES

Ahles, T. A., & Root, J. C. (2018). Cognitive effects of cancer and cancer treatments. *Annual Review of Clinical Psychology, 7*, 425–451. https//doi.org/10.1146/annurev-clinpsy-050817-084903

Ahles, T. A., Root, J. C., & Ryan, E. L. (2012). Cancer and cancer treatment associated cognitive change: An update on the state of the science. *Journal of Clinical Oncology, 30*; 3675–3686. https//doi.org/10.1200/JCO.2012.43.0116

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

American Cancer Society. (n.d.). *Breast cancer*. https://www.cancer.org/cancer/breast-cancer.html

American Cancer Society. (2019). *Cancer treatment and survivorship: Facts and figures; 2019–2021*. https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-treatment-and-survivorship-facts-and-figures/cancer-treatment-and-survivorship-facts-and-figures-2019-2021.pdf

American Occupational Therapy Association. (2017). Occupational therapy practice framework: Domain and process; third edition. *American Journal of Occupational Therapy, 68*, S1–S48. https://doi.org/10.5014/ajot.2014.682006

American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process; fourth edition. *American Journal of*

Occupational Therapy, *74*, 7412410010. https://doi.org/10.5014/ajot.2020.74S2001

American Society of Clinical Oncology. (2021). *Supportive care and treatment related issues*. https://www.asco.org/research-guidelines/quality-guidelines/guidelines/supportive-care-and-treatment-related-issues

Arnon, S., Fisher, P. W., Pickover, A., Lowell, A., Turner, J. B., Hillburn, A., Jacob-McVey, J., Malajian, B. E., Farber, D. G., Hamilton, J. F., Hamilton, A., Markowitz, J. C., & Neria, Y. (2020). Equine-assisted therapy for veterans with PTSD: Manual development and preliminary findings. *Military Medicine*, *185*, 557–563. https://doi.org/10.1093/milmed/usz444

Bahcaci, U., & Demirbuken, I. (2019). Effects of chemotherapy process on postural balance control in patients with breast cancer. *Indian Journal of Cancer*, *56*, 50–55. https://doi.org/10.4103/ijc.IJC_47_18

Bai, L., & Yu, E. (2021). A narrative review of risk factors and interventions for cancer-related cognitive impairments. *Annals of Translational Medicine*, *9*(1), 72–85. https://doi.org/10.21037/atm-20-6443

Baldwin, A. L., Rector, B. K., & Alden, A. C. (2018). Effects of a form of equine facilitated learning on heart rate variability, immune function and self-esteem in older adults. *People and Animals*, *1*(1), Article 5. https://docs.lib.purdue.edu/paij/vol1/iss1/5

Berwick, D. M. (2015). Health services research, Medicare, and Medicaid: A deep bow and a rechartered agenda. *Milbank Quarterly*, *93*(4), 659–662. https://doi.org/10.1111/1468-0009.12154

Bolton, G., & Isaacs, A. (2018). Women's experiences of cancer related cognitive impairment, its impact on daily life and care received for it following breast cancer treatment. *Psychology, Health and Medicine*, *23*, 1261–1274. https://doi.org/10.1080/13548506.2018.1500023

BreastCancer.org. (2021, February 4). *U.S. breast cancer statistics*. https://www.breastcancer.org/symptoms/understand_bc/statistics

Ceprnja, D., & Maka, K. (2015). Implementation of an exercise program in breast cancer rehabilitation to improve shoulder outcomes: A pilot study. *Internet Journal of Allied Health Sciences and Practice*, *13*(2), Article 9.

Centers for Disease Control and Prevention. (2021, August 16). *Cancer*. https://www.cdc.gov/cancer/index.htm

Cerulli, C., Minganti, C., DeSantis, C., Tranchita, E., Quaranta, F., & Parisi, A. (2014). Therapeutic horseback riding in breast cancer survivors: A pilot study. *Journal of Alternative and Complementary Medicine*, *20*, 623–629. https://doi.org/10.1089/acm.2014.0061

Chen, I. H., Wang, C. H., Wang, S. Y., Cheng, S. Y., Yu, T. J., & Kuo, S. F. (2020). Mediating effects of shoulder arm exercise on the postoperative severity of symptoms and quality of life of women with breast cancer. *BMC Women's Health*, 20, Article 101. https://doi.org/10.1186/s12905-020-00968-w

Chrischilles, E. A., Riley, D., Letuchy, E., Koehler, L., Neuner, J., Jernigan, C., Gryzlak, B., Segal, N., McDowell, B., Smith, B., Sugg, S. L., Armer, J. M., & Lizarraga, I. M. (2019). Upper extremity disability and quality of life after breast cancer treatment in the Greater Plains Collaborative clinical research network. *Breast Cancer Research and Treatment, 175*, 675–689. https://doi.org/10.1007/s10549-019-05184-1

Cimprich, B., & Ronis, D. L. (2003). An environmental intervention to restore attention in women with newly diagnosed breast cancer. *Cancer Nursing, 26*, 284–292. https://doi.org/10.1097/00002820-200308000-00005.

Cocchiara, R. A., Sciarra, I., Egidio, V. D., Sestili, C., Mancino, M., Backhaus, I., Mannocci, A., De Luca, A., Frusone, F., Di Bella, O., Di Murro, F., Palmeri, V., Lia, L., Paradiso, G., Aceti, V., Libia, A., Monti, M., & La Torre, G. (2018). Returning to work after breast cancer: A systematic review of reviews. *Work, 61*, 463–476. https://doi.org/10.3233/WOR-182810

Dana Farber Cancer Institute (2021, August 8). *The Jimmy Fund.* https://danafarber.jimmyfund.org/

Danhauer, S. C., Addington, E. L., Sohl, S. J., Chaoul, A., & Cohen, L. (2017). Review of yoga therapy during cancer treatment. *Supportive Care in Cancer, 25,* 1357–1372. https://doi.org/10.1007/s00520-016-3556-9

de Araújo, T. B., de Oliveira, T. J., Martins, W. R., de Moura Pereira, M., Copetti, F., & Safons, M. P. (2013). Effects of hippotherapy on mobility, strength and balance

in elderly. *Archives of Gerontology and Geriatrics, 56,* 478–481. https://doi.org/10.1016/j.archger.2012.12.007

De Groef, A., Van Kampen, M., Vervloesem, N., De Geyter, S., Christiaens, M. R., Neven, P., Vos, L., De Vrieze, T., Geraerts, I., & Devoogdt, N. (2017). Myofascial techniques have no additional beneficial effects to a standard physical therapy programme for upper limb pain after breast cancer surgery: A randomized controlled trial. *Clinical Rehabilitation, 31,* 1625–1635. https://doi.org/10.1177/0269215517708605

Desiron, H. A. M., Donceel, P., de Rijk, A., & Van Hoof, E. (2013). A conceptual practice model for occupational therapy to facilitate return to work in breast cancer patients. *Journal of Occupational Rehabilitation, 23,* 516–526. https://doi.org/10.1007/s10926-013-9427-z

Díaz, N., Menjón, S., Rolfo, C., García-Alonso, P., Carulla, J., Magro, A., Miramón, J., Rodriguez, C. A., de Castellar, R., & Gasquet, J. A. (2008). Patients' perception of cancer-related fatigue: Results of a survey to assess the impact on their everyday life. *Clinical and Translational Oncology, 10,* 753–757. https://doi.org/10.1007/s12094-008-0282-x

Ehlers, D. K., Aguiñaga, S., Cosman, J., Severson, J., Kramer, A., & McAuley, E. (2017). The effects of physical activity and fatigue on cognitive performance in breast cancer survivors. *Breast Cancer Research and Treatment, 165,* 699–707. https://doi.org/10.1007/s10549-017-4363-9

Equine Assisted Growth and Learning Association. (n.d.). *The global standard for psychotherapy & personal development incorporating horses*. https://www.eagala.org/index

FACIT Group. (n.d.). *FACIT-F: Functional Assessment of Chronic Therapy-Fatigue*. https://www.facit.org/measures/FACIT-F

García-Gómez, A., Guerrero-Barona, E., García-Peña, I., Rodríguez-Jiménez, M., & Moreno-Manso, J. M. (2020). Equine-assisted therapeutic activities and their influence on the heart rate variability: A systematic review. *Complementary Therapies in Clinical Practice*, *39*, 101167. https://doi.org10.1016/j.ctcp.2020.101167

Giagazoglou, P., Arabatz, F., Dipla, K., Liga, M., & Kellis, E. (2012). Effects of a hippotherapy intervention program on static balance and strength in adolescents with intellectual disabilities. *Research in Developmental Disabilities*, *33*, 2265–2270. https://doi.org/10.1016/j.ridd.2012.07.004

The Good Body (2021, June 18). *57 amazing yoga facts: The history, benefit, poses (fun!)*. https://www.thegoodbody.com/yoga-facts/

Graham, J. E., Middleton, A., Roberts, P., Mallinson, T., & Prvu-Bettger, J. (2018) Health services research in rehabilitation and disability-the time is now. *Archives of Physical Medicine and Rehabilitation, 99*(1), 198–203. https://doi.org/10.1016/j.apmr.2017.06.026

Hermelink, K., Bühner, M., Sckopke, P., Neufeld, F., Kaste, J., Voigt, V., Münzel, K., Wuerstlein, R., Ditsch, N., Hellerhoff, K., Rjosk-Dendorfer, D., Braun, M.,

von Koch, F. E., Härtl, K., Hasmüller, S., Bauerfeind, I., Debus, G., Herschbach, P., Mahner, S., & Harbeck, N. (2017). Chemotherapy and post-traumatic stress in the causation of cognitive dysfunction in the breast cancer patient. *Journal of the National Cancer Institute*, *109*(10). https://doi.org/10.1093/jnci/djx057

Herrero, F., San Juan, A. F., Fleck, S. J., Balmer, J., Pérez, M., Cañete, S., Earnest, C. P., Foster, C., & Lucia, A. (2006). Combined aerobic and resistance training in breast cancer survivors: A randomized control pilot trial. *International Journal of Sports Medicine*, *27*, 573–581. https://doi.org/10.1055%2Fs-2005-865848

Institute for Work & Health. (n.d.). *About the* Quick*DASH*. https://dash.iwh.on.ca/about-quickdash

Islam, T., Dahlui, M., Majid, H. A., Nahar, A. M., Taib, N. A. M., Su, T. T., & MyBCC Study Group. (2014). Factors associated with return to work of breast cancer survivors: a systematic review. *BMC Public Health*, *14*, Article s8. https://doi.org/10.1186/1471-2458-14-S3-S8

Janelsins, M. C., Kesler, S. R., Ahles, T. A., & Morrow, G. R. (2014). Prevalence, mechanisms and management of cancer related cognitive fatigue. *International Review of Psychiatry*, *26*, 102–113. https://doi.org/10.3109/09540261.2013.864260

Jitender, S., Mahajan, R., Rathore, V., & Choudhary, R. (2018). Quality of life of cancer patients. *Journal of Experiential Therapeutics and Oncology*, *12*, 217–221.

Johnson, R. A., Albright, D. L., Marzolf, J. R., Bibbo, J. L., Yaglom, H. D., Crowder, S. M., Carlisle, G. K., Willard, A., Russell, C. L., Grindler, K., Osterlind, S., Wassman, M., & Harms, N. (2018). Effects of therapeutic horseback riding on post-traumatic stress disorder in military veterans. *Military Medical Research*, *5*, Article 3. https://doi.org/10.1186/s40779-018-0149-6

Joshy, G., Thandrayen, J., Koczwara, B., Butow, P., Laidsaar-Powell, R., Rankin, N., Canfell, K., Stubbs, J., Grogan, P., Bailey, L., Yazidjoglou, A., & Banks, E. (2020). Disability, psychological distress and quality of life in relation to cancer diagnosis and cancer type: Population-based Australian study of 22,505 cancer survivors and 244,000 people without cancer. *BMC Medicine*, *18*, Article 372. https://doi.org/10.1186/s12916-020-01830-4

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, *15*, 169–182. https://doi.org/10.1016/0272-4944(95)90001-2

Kaplan, S. (2001). Meditation, restoration, and the management of mental fatigue. *Environment and Behavior*, *33*, 480–506. https://doi.org/10.1177/00139160121973106

Karathanou, I., Bebetsos, E., Filippou, F., Psirri, A., & Konas, I. (2020). Greek traditional dance as a practice for managing stress and anxiety in cancer patients. *Journal of Cancer Education.* Advance online publication. https://doi.org/10.1007/s13187-020-01761-x

Kellert, S. R., & Wilson, E. O. (1993). *The biophilia hypothesis.* Island Press.

Kim, Y. H., Kim, H. J., Ahn, S. D., Seo, Y. J., & Kim, S. H. (2013). Effects of meditation on anxiety, depression, fatigue, and quality of life of women undergoing radiation therapy for breast cancer. *Complementary Therapies in Medicine*, *21*, 379–387. https://doi.org/10.1016/j.ctim.2013.06.005

Kirshbaum, M. N., & Donbavand, J. (2014). Making the most out of life: Exploring the contribution of attention restorative theory in developing a non-pharmacological intervention for fatigue. *Palliative and Supportive Care*, *12*, 473–480. https://doi.org/10.1017/S1478951513000539

Kneis, S., Wehrle, A., Müller, J., Maurer, C., Ihorst, G., Gollhofer, A., & Bertz, H. (2019). It's never too late: Balance and endurance training improves functional performance, quality of life, and alleviates neuropathic symptoms in cancer survivors suffering from chemotherapy-induced peripheral neuropathy: Results of a randomized control trial. *BMC Cancer*, *19*, Article 414. https://doi.org/10.1186/s12885-019-5522-7

Komen.org. (2021, June 8). *Age*. Retrieved February 23, 2021, from https://www.komen.org/breast-cancer/risk-factor/age/

Kondo, M. C., Jacoby, S. F., & South, E. C. (2018). Does spending time outdoors reduce stress? A review of real-time stress response to outdoor environments. *Health Place*, *51*, 136–150. https://doi.org/10.1016/j.healthplace.2018.03.001

Kosko, K. (2017, November 28). PTSD rates among patients with cancer are three times above the general population. *Cure*. https://www.curetoday.com/view/ptsd-rates-among-patients-with-cancer-are-three-times-above-the-general-population

Kuo, F. E., & Faber Taylor, A. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health, 94*, 1580–1586. https://doi.org/10.2105/AJPH.94.9.1580

Labranche, J. B., & Moraitis, A. M., (2019, April 29). *Exercise and cancer: Defining the new normal* [Paper presentation]. PATH International Regional Conference, Amherst, MA, United States.

Lange, M., Joly, F., Vardy, J., Ahles, T., Dubois, M., Tron, L., Winocur, G., De Ruiter, M. B., & Castel, H. (2019). Cancer-related cognitive impairment: An update on state of the art detection and management strategies in cancer survivors. *Annals of Oncology, 30*, 1925–1940. https://doi.org/10.1093/annonc/mdz410

Lanning, B., & Krenek, N. (2013). Examining effects of equine-assisted activities to help combat veterans improve quality of life. *Journal of Rehabilitation Research and Development, 50*(8), vii–xiii. https://doi.org/10.1682/JRRD.2013.07.0159

Lanning, B., Wilson, A. L., Krenek, N. & Beaujean, A. (2017). Using therapeutic riding as an intervention for combat veterans: an international classification of functioning, disability and health (ICF) approach. *Occupational Therapy in Mental Health, 33*(3), 259–278. https://doi.org/10.1080/0164212X.2017.1283282

LeVan, D., Kiss, K., Gaffney, J., LaDuke, A., Flint, L. & Lacy, A. (2020). Saddle up for success: Equine assisted activities and therapy program evaluation survey. *American Journal of Occupational Therapy, 74*, Article 7411500016. https://doi.org/10.5014/ajot.2020.74S1-PO2403

Li, Q., Kobayashi, M., Inagaki, H., Hirata, Y., Li, Y. J., Hirata, K., Shimizu, T., Suzuki, H., Katsumata, M., Wakayama, Y., Kawada, T., Ohira, N., Matsui, N., & Kagawa, T. (2010). A day trip to a forest park increases human natural killer activity and the expression of anti-cancer proteins in male subjects. *Journal of Biological Regulators and Homeostatic Agents*, *24*, 157–165.

Livestrong. (2021). *Help starts here*. https://www.livestrong.org/

Marcus, D. M. (2020). Alternative therapies in medical centers compromise evidence-based patient care. *Journal of Clinical Investigation*, *130*, 1549–1551. https://doi.org/10.1172/JCI137561.

Mendonça, T., Bienboire-Frosini, C., Menuge, F., Leclercq, J., Lafont-Lecuelle, C., Arroub, S., & Pageat, P. (2019). The impact of equine-assisted therapy on equine behavioral and physiological responses. *Animals*, *9*, 409. https://doi.org/10.3390/ani9070409

Merriam-Webster. (n.d.). Work. In *Merriam-Webster.com dictionary.* Retrieved June 12, 2021, from https://www.merriam-webster.com/dictionary/work?src=search-dict-hed

Morgan, B. M. (2017). Stress management for college students: An experiential multi-modal approach. *Journal of Creativity in Mental Health, 12*, 276–288. https://doi.org/10.1080/15401383.2016.1245642

Morris, R., & Lewis, A. (2020). Falls and cancer. *Clinical Oncology*, *32*, 569–578. https://doi.org/10.1016/j.clon.2020.03.011

Murphy, L., Goehman, B., & Panczykowski, H. (2019). Healing with horses: Pilot study of equine-facilitated therapy. *Alternative and Complementary Therapies*, *25*, 201–207. https://doi.org/10.1089/act.2019.29229.lmu

National Center for Complementary and Integrative Health. (2021, August 8). *What does NCCIH do?* https://www.nccih.nih.gov/

Nelson, J. A., Lee, I. T., & Disa, J. J. (2018). The functional implications of breast reconstruction: An overview and update. *Plastic and Reconstructive Surgery – Global Open 6*(3), e1640. https://doi.org/10.1097/GOX.0000000000001640

Obama, B. (2016). United States health care reform progress to date and next steps. *JAMA: The Journal of the American Medical Association*, *316*, 525–532. https://doi.org/10.1001/jama.2016.9797

Obermeyer, I. (2018). Executive function for school-aged children. *SIS Quarterly Practice Connections*, *3*(4), 2–5. https://www.aota.org/

Ohly, H., White, M. P., Wheeler, B. W., Bethel, A., Ukoumunne, O. C., Nikolaou, V., & Garside, R. (2016). Attention restoration theory: A systematic review of the attention restoration potential of exposure to natural environments. *Journal of Toxicology and Environmental Health, Part B*, *19*, 305–343. https://doi.org/10.1080/10937404.2016.1196155

Park, S. K., Jung, H. J., Choi, Y. L., Kwon, O. S., Jung, Y. H., Cho, C. I., & Yoon, M. (2013). The effect of living conditions on stress and behavior of horses. *Journal of Animal Science and Technology*, *55*, 325–330. https://doi.org/10.5187/JAST.2013.55.4.325

Phillips, S. M., Lloyd, G. R., Awick, E. A., & McAuley, E. (2017). Relationship between self-reported and objective measured physical activity and subjective memory impairment in breast cancer survivors: Role of self-efficacy, fatigue and distress. *Psycho-Oncology*, *26*, 1390–1399. https://doi.org/10.1002/pon.4156

Quinn, G. P., Pratt, C. L., Bryant-George, K., Caraway, V. D., Paternoster, B., Roldan, T., Shaffer, A., Shimizu, C. O., Vaughn, E. J., Williams, C., & Bepler, G. (2011). Lung cancer patients' decisions about clinical trials and the theory of planned behavior. *Journal of Cancer Education*, *26*, 641–648. https://doi.org/10.1007/s13187-010-0169-8

Randall, C. (2020, April 9). Why going outside is good for your health, especially right now. *Forbes Magazine*. https://www.forbes.com/sites/cassidyrandall/2020/04/09/why-going-outside-is-good-for-your-health-especially-right-now/?sh=164d4a632de9

Rietman, J. S., Dijkstra, P. U., Hoekstra, H. J., Eisma, W. H., Szabo, B. G., Groothoff, J. W., & Geertzen, J. H. B. (2003). Late morbidity after treatment of breast cancer in relation to daily activities and quality of life: A systematic review. *European Journal of Surgical Oncology*, *29(*3), 229–238. https://doi.org/10.1053/ejso.2002.1403

Rigby, B. R., & Grandjean, P. W. (2016). The efficacy of equine-assisted activities and therapies on improving physical function. *Journal of Alternative and Complementary Medicine*, *22*, 9–24. https://doi.org/10.1089/acm.2015.0171

Sagar, S. M., Dryden, T., & Wong, R. K. (2007). Massage therapy for cancer patients: A reciprocal relationship between body and mind. *Current Oncology, 14*, 45–56. https://doi.org/10.3747/co.2007.105

Savina, S., & Zaydiner, B. (2019). Cancer-related fatigue: Some clinical aspects. *Asia Pacific Journal of Oncology Nursing, 6*, 7–9. https://doi.org/10.4103/apjon.apjon_45_18

Schmidt, M. E., Chang-Claude, J., Vrieling, A., Heinz, J., Flesch-Janys, D., & Steindorf, K. (2012). Fatigue and quality of life in breast cancer survivors: Temporal courses and long-term pattern. *Journal of Cancer Survivorship, 6*, 11–19. https://doi.org/10.1007/s11764-011-0197-3

Scott, P. J. (2019). *Role Checklist-version 3: Participation and Satisfaction (RCv3), 2019*. MOHO Web. https://www.moho.uic.edu/productDetails.aspx?iid=6

Selby, A., & Smith-Osborne, A. (2013). A systematic review of effectiveness of complementary and adjunct therapies and interventions involving equines. *Health Psychology*, *32*, 418–432. https://doi.org/10.1037/a0029188

Shirley Ryan Ability Lab. (2013, May 30). *Rehabilitation measures database: 30 second Sit to Stand Test*. https://www.sralab.org/rehabilitation-measures/30-second-sit-stand-test

Shirley Ryan Ability Lab. (2014, January 29). *Timed Up and Go dual task; Timed Up and Go (cognitive); Timed Up and Go (motor); Timed Up and Go (manual)*. Rehabilitation measures database. https://www.sralab.org/rehabilitation-

measures/timed-and-go-dual-task-timed-and-go-cognitive-timed-and-go-motor-timed-and

Shirley Ryan Ability Lab. (2020a, June 20). *Mini Mental State Examination*. Rehabilitation measures database. https://www.sralab.org/rehabilitation-measures/mini-mental-state-examination

Shirley Ryan Ability Lab. (2020b, June 30). *Berg Balance Scale.* Rehabilitation measures database. https://www.sralab.org/rehabilitation-measures/berg-balance-scale

Silver, J. K., & Gilchrist, L. S. (2011). Cancer rehabilitation with a focus on evidence-based outpatient physical and occupational therapy interventions. *American Journal of Physical Medicine and Rehabilitation, 90*, 5, s5–s15. https://doi.org/10.1097/PHM.0b013e31820be4ae

Sullivan, W. C., & Kaplan, R. (2015). Nature! Small steps that can make a big difference. *Health Environments Research & Design Journal*, *9*(2), 6–10. https://doi.org/10.1177/1937586715623664

Survey Monkey (2021, August 8). https://www.surveymonkey.com/

Toglia, J. P. (1991). Generalization of treatment: A multicontext approach to cognitive perceptual impairment in adults with brain injury. *American Journal of Occupational Therapy, 45*, 505–516. https://doi.org/10.5014/ajot.45.6.505

Toglia, J. P. (2005). A dynamic interactional model to cognitive rehabilitation. In N. Katz (Ed.), *Cognition and occupation across the life span* (pp. 29–72). American Occupational Therapy Association.

Toglia, J., Johnston, M. V., Goverover, Y., & Dain, B. (2010). A multicontext approach to promoting transfer of strategy use and self regulation after brain injury: An exploratory study. *Brain Injury 24* (4), 664–667. https://doi.org/10.3109/02699051003610474

Toglia, J., Lee, A., Steinberg, C., & Waldman-Levi, A. (2020). Establishing and measuring treatment fidelity of a complex cognitive rehabilitation intervention: The multicontext approach. *British Journal of Occupational Therapy*, *83*, 363–374. https://doi.org/10.1177/0308022619898091

Toglia, J. P., Rodger, S. A., & Polatajko, H. (2012). Anatomy of cognitive strategies: A therapist's primer for enabling occupational performance. *Canadian Journal of Occupational Therapy*, *79*(4), 225–236. https://doi.org/10.2182/cjot.2012.79.4.4

Treanor, C., & Donnelly, M. (2016). Late effects of cancer and cancer treatment: The perspective of the patient. *Supportive Care in Cancer*, *24*, 337–346. https://doi.org/10.1007/s00520-015-2796-4

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, *224*, 420–421. https://doi.org/10.1126/science.6143402

United Nations. (n.d.). *Ensure healthy lives and promote well-being for all at all ages*. Department of Economic and Social Affairs: Sustainable Development. Retrieved June 28, 2021, from https://sdgs.un.org/goals/goal3

van Muijen, P., Duijts, S. F. A., Bonefaas-Groenewoud, K., van der Beek, A. J., & Anema, J. R. (2017). Predictors of fatigue and work ability in cancer survivors. *Occupational Medicine*, *67*, 703–711. https://doi.org/10.1093/occmed/kqx165

Wechsler, S., & Wood, L. (2021). The effect of chemotherapy on balance, gait, and falls among cancer survivors: A scoping review. *Rehabilitation Oncology*, *39*(1), 6–22. https://doi.org/10.1097/01.REO.0000000000000238

Weiner, N. W., Toglia, J., & Berg, C. (2012). Weekly calendar planning activity (WCPA): A performance-based assessment of executive function piloted with at-risk adolescents. *American Journal of Occupational Therapy, 66,* 699–708. https://doi.org/10.5014/ajot.2012.004754

White-Lewis, S., Johnson, R., Ye, S., & Russell, C. (2019). An equine-assisted therapy intervention to improve pain, range of motion, and quality of life in adults and older adults with arthritis: A randomized controlled trial. *Applied Nursing Research, 49,* 5–12. https://doi.org/ 10.1016/j.apnr.2019.07.002

Wilcock, A. A., & Townsend, E. A. (2009). Occupational justice. In B. A. Boyt Schell, C. S. Spackman, E. B. Crepeau, E. S. Cohn, & H. S. Willard (Eds.), *Willard & Spackman's Occupational Therapy* (11th ed., pp. 192–199). Lippincott Williams & Wilkins.

Zajacova, A., Dowd, J. B., Schoeni, R. F., & Wallace, R. B. (2015). Employment and income losses among cancer survivors: Estimates from a national longitudinal survey of American families. *Cancer*, *121*, 4225–4432. https://doi.org/10.1002/cncr.29510

Zhu, Y. (2019). *Musculoskeletal pain among breast cancer survivors: Through bio-behavioral and imaging lenses*. National Institute of Health. https://grantome.com/grant/NIH/F99-CA234782-01

Zlotnik, S., Schiff, A., Ravid, S., Shahar, E., & Toglia, J. (2020). A new approach for assessing executive functioning in everyday life, among adolescents with genetic generalized epilepsies. *Neuropsychological Rehabilitation*, *30*, 333–345. https://doi.org/10.1080/09602011.2018.1468272

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