THE EFFECT OF AN EDUCATIONAL INTERVENTION ON CLINICIANS' KNOWLEDGE, SKILLS, AND ATTITUDES REGARDING OCCUPATIONAL THERAPY FOR CANCER-RELATED COGNITIVE IMPAIRMENT

by

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ABSTRACT

CHRISTINA Z. PAGE. The Effect of an Educational Intervention on Clinicians’ Knowledge, Skills, and Attitudes Regarding Occupational Therapy for Cancer-Related Cognitive Impairment. (Under the direction of DR. MEREDITH TROUTMAN-JORDAN)

Millions of survivors are living following treatment of breast cancer. Survivors commonly experience cancer-related cognitive impairment (CRCI), which is associated with decreased quality of life. Occupational therapists (OT) assess and treat CRCI, yet are under-utilized. A barrier to utilization may be related to clinicians’ lack of education related to OT for CRCI. This project compared clinicians’ knowledge, skills, and attitudes regarding the use of OT for CRCI and the number of referrals to OT before and after an educational intervention.

A pre-test and post-test comparative exploratory design using a 17-item survey was used. Session content included interventions for CRCI focused on OT, and logistical information needed to support OT referrals. OT referral rates were extracted from the electronic medical record. The sample was a convenience sample of 9 clinicians from a suburban oncology clinic.

Significant differences were noted between pre- and post-survey scores in 7 of 8 slider scale items. Clinicians reported greater frequency in assessing for CRCI, comfort in assessing and suggesting interventions for CRCI and knowledge about OT following the educational intervention. More providers identified OT as an intervention for CRCI and fewer clinicians were unaware of available interventions for CRCI. The number of OT referrals for CRCI significantly increased in the post-intervention period.

This pilot study demonstrates the feasibility of an educational intervention to improve knowledge, skills, and attitudes of clinicians who care for breast cancer survivors with CRCI. Increase in OT referrals suggests that education led to increased awareness and management of CRCI, which may improve quality of life among breast cancer survivors. This intervention has potential to be broadly replicated, positively impacting oncology clinicians and their patients experiencing CRCI.

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DEDICATION

This work is dedicated to women with breast cancer – the many patients I have cared for, the millions of others, my mom. I hope this work makes a difference and I am grateful to do work that might better the life of someone with cancer, even in a small way.

I also dedicate this work to my family. To my husband, Rob, for always hearing me out when I put a big idea in front of you, and for always reminding me I'm on the right path when I'm second-guessing things. You have also put in a lot of hard work to help me be successful in this project. We make a great team and I love you always. To my children, Lee and Violet, nothing makes me happier or prouder than you. I can't wait to see the people you become and help you find what you are passionate about. I already know you'll be amazing.

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LIST OF ABBREVIATIONS

ACS	American Cancer Society
ANOVA	analysis of variance
APP	Advanced Practice Provider
ASCO	American Society of Clinical Oncology
CBT	cognitive behavioral therapy
CINAHL	Cumulated Index to Nursing and Allied Health Literature
CMA	certified medical assistant
CRCI	cancer-related cognitive impairment
DWCCR	Duke Women's Cancer Center Raleigh
EMR	electronic medical record
ICD	International Classification of Diseases
IRB	institutional review board
IT	information technology
MD	doctor of medicine, physician
NA	nursing assistant
NCCN	National Comprehensive Cancer Network
OT	occupational therapist, occupational therapy
PSA	patient service associate
RN	registered nurse
SEER	Surveillance, Epidemiology, and End Results Program
U.S.	United States

CHAPTER 1: INTRODUCTION

Breast cancer is the most common type of cancer in the United States (U.S.). The five-year relative survival rate of breast cancer is high at 90.8%, translating to over 3.8 million women living with breast cancer in the U.S. in 2020 (National Cancer Institute [NCI], n.d.). One common complaint from those undergoing therapy is decreased cognitive performance, termed “brain fog” or “chemo brain” (Kovalchuk & Kolb, 2017). Cancer-related cognitive impairment (CRCI) is described as cognitive impairment in one or more of seven domains, most commonly in the domains of learning, memory, processing speed, and executive function (Wesevich et al., 2021). This CRCI is experienced by up to 35% of breast cancer patients in survivorship and may be related to toxicity from cancer treatments or from the cancer itself (Wesevich et al.). More importantly, CRCI influences quality of life.

Occupational therapists (OT) both assess and treat patients with CRCI, offering remedial and compensatory strategies as well as cognitive behavioral therapy that may improve patient perceived quality of life and objectively improve certain domains of function (Green et al., 2018; Pergolotti et al., 2016; Wolf et al., 2016). Despite the benefits of OT for CRCI, utilization of this support service in women with breast cancer is low. A major barrier to utilization may be related to clinicians who care for patients with breast cancer and who often do not assess for CRCI or offer intervention. This lack of intervention may be associated with decreased knowledge, skills, and attitudes related to OT for CRCI.

At the site of this scholarly project, the project lead had noted many women who report or show signs of cognitive impairment, yet clinicians at the site appeared unaware of the potential benefits of OT for CRCI. Broadly, the scholarly project is a quality improvement initiative focused on an educational intervention. The goal of this scholarly project was to examine clinicians' knowledge, skills, and attitudes regarding the use of OT for CRCI. The secondary goal of the project was to examine the number of referrals to OT with the indication of CRCI before and after the educational intervention.

1.1 Background

To best understand the need for and the framework of this project, it is important to understand the history of cancer-related cognitive impairment in breast cancer and the use of OT for this indication. CRCI is a widespread, often enduring problem that may present in various different ways. There are many potential causes of CRCI and occupational therapists have many strategies that may be helpful for these symptoms.

Scope of the Problem

When the project began in 2022, current statistics from the NCI's Surveillance, Epidemiology and End Results Program (SEER) indicated that in 2023, nearly 300,000 people would be diagnosed with breast cancer (NCI, n.d). Among those with breast cancer, CRCI is common, though determining precise incidence is difficult, as population samples vary by treatment received, time assessed, and definition of cognitive impairment (Wesevich et al., 2021). During and soon after the acute treatment phase, which typically includes multiple modes of therapy, the incidence of CRCI may be as high as 75% (Wesevich et al.). While some women's symptoms return to baseline, up to 35% of women will experience persisting CRCI even years after completing treatment (Wesevich et al.).

The National Comprehensive Cancer Network's (NCCN) 2023 Survivorship Guidelines, intended for use by survivors of all types of cancer, recognize the growing body of evidence to support the burden of CRCI, the difficulties surrounding assessment of CRCI, and the many possible contributing factors (NCCN, 2023). First-line interventions highlighted in the NCCN

Guidelines include occupational therapy to focus on improvement of cognitive functioning and neuropsychological evaluation, which may be helpful for those pursuing disability benefits due to the limiting effect of cognitive impairment on the ability to work (NCCN, 2023).

Guidelines jointly published by the American Society of Clinical Oncology (ASCO) and the American Cancer Society (ACS) in 2016 focus on the survivorship care of breast cancer patients and address cognitive impairment. These guidelines state that "primary care clinicians should ask patients if they are experiencing cognitive difficulties […] and refer patients with signs of cognitive impairment for neurocognitive assessment and rehabilitation, including group cognitive training if available" (Runowicz et al., 2016, p. 47). Potential barriers to implementation of these guidelines include the lack of awareness of guidelines, availability of interventions, and patient adherence or compliance to the intervention (Binarelli et al., 2021). Some women may be unaware of the potential for cognitive changes, or providers may not acknowledge or respond to patients' reports of cognitive changes (Van Dyk & Ganz, 2021).

These guidelines differ from those set forth by the International Cognition and Cancer Task Force, which broadly recommends neuroimaging in this patient population (Deprez et al., 2018). The challenges of assessing and managing CRCI are highlighted by the fact that there is a lack of consensus among guidelines that attempt to direct care of these patients. At the site of this project, there is no specific guideline or recommendation for the assessment or management of CRCI, though specialized survivorship services are offered.

Defining CRCI

For many decades, there has been awareness of the cognitive effects of cancer therapy, with research on the topic dating back to 1980 (Oxman & Silberfarb, 1980). The phenomenon gained attention, and research increased in the late 1990s as more women were treated with chemotherapy for breast cancer (Wefel et al., 2014). Soon after, CRCI was shown in prospective trials, and the long-lasting cognitive changes were demonstrated (Ahles et al., 2002; Wefel et al., 2004). In the last two decades, a growing understanding and appreciation for cognitive changes in cancer patients has been noted and research continues.

CRCI describes any level of cognitive impairment resulting from cancer or cancer therapies (Janelsins et al., 2014; Van Dyk & Ganz 2021). The presentation and trajectory of CRCI varies significantly. Deficits may occur in any of the seven cognitive domains: executive function, attention and concentration, mental flexibility, information processing, memory, verbal and mental fluency, and motor function (Wesevich et al., 2021). While research is variable, the domains that seem most affected include memory, learning, processing speed, and executive function. Deficits in the domains of attention and psychomotor speed are also commonly cited (Janlesins et al., 2014; Schagen & Wefel, 2013; Wesevich et al., 2021). The magnitude of symptoms also varies with some patients only noting mild changes and others significantly impaired. Further, some changes recover in the years following therapy while others are lasting or even progressive (Ahles et al., 2012; Janlesins et al., 2014). Neuropsychological testing is the highest standard for assessing cognitive changes in cancer patients, though in some cases cognitive testing does not show change, but patients report significant cognitive changes (Lange et al., 2019; Pendergrass et al., 2018).

Regardless of presentation or trajectory, CRCI is an important issue to address because of its association with declines in mental and social functioning and patients' ability to return to their pre-cancer roles. Cognitive decline is linked to decreased productivity, problems with both driving and reading, lack of engagement with the community, and decreased functioning in occupational, familial, and social roles. Ultimately, CRCI contributes to a decrease in quality of life (Bradley et al., 2005; Myers, 2012; Reid-Arndt et al., 2009; Schagen et al., 2002; Wefel et al., 2004).

Causes of CRCI

There are many potential contributing factors to the development of CRCI. While patients and providers alike often use the term “chemo brain,” the literature suggests that it is not just chemotherapy that can cause cognitive changes. Some studies show that cognitive decline may exist prior to any cancer treatment (Ahles et al., 2007 & Wefel et al., 2004). In fact, up to 30% of breast cancer patients may experience cognitive decline prior to treatment (Wesevich et al., 2021). It is unclear whether cognitive changes occur because of the cancer itself, cancer treatments, psychological factors, or genetic predispositions.

Though it may not be easy to discern what drives each individual patient’s cognitive decline, it is well established that chemotherapy in breast cancer patients has the potential to negatively impact cognitive function (Collins et al., 2013; Hodgson et al., 2013; Lange et al., 2019). The mechanism of action is less clear. Most chemotherapy does not cross the blood brain barrier, though it is known to increase levels of pro-inflammatory cytokines. Elevated cytokines throughout the body increase blood brain barrier permeability and oxidative stress. Increased inflammation triggers a cascade that leads to downstream effects including decreased neurogenesis, mitochondrial dysfunction and disruption in the function of the cells that produce myelin (Lange et al., 2019). While many women will recover from cognitive deficits in the year following treatment with chemotherapy, specifically in the domain of memory, about one third of women will show persistent deficits (Collins et al., 2013). Longer duration of chemotherapy treatment was associated with greater cognitive impairment (Hodgson et al., 2013).

Treatment for breast cancer is often multimodal, with endocrine therapy used in more than 70% of women with breast cancer and even more commonly than chemotherapy (Bender et al., 2015). Estrogen and testosterone support brain function, so it is not surprising that hormone-blocking therapy might negatively affect cognition, though not all studies show this association (Bender et al., 2015; Ganz et al., 2014; Lange et al., 2019; Van Dyk et al., 2019). Radiation therapy is also commonly administered to breast cancer patients and has been associated with cognitive changes (Van Dyk, 2021). Despite localized treatment to the breast, systemic effects of radiation therapy are thought to be linked to inflammation and also confounded by multimodal therapy and other comorbid conditions (Carvalho & Villar, 2018; Kohli et al., 2016). Newer cancer therapies such as immunotherapy have been associated with cognitive impairment in certain cancer populations, though systemic studies that evaluate the effect on cognitive function in breast cancer patients are lacking (Rogiers et al., 2020). Immunotherapy agents may cause neuroinflammation and are often given in combination with chemotherapy or other therapies, all of which are associated with a risk of CRCI (Schagen et al., 2022).

In addition to the cancer therapies themselves, a number of comorbid conditions and side effects from cancer therapy may contribute to CRCI. Breast cancer is a disease of the aging, with the mean age of diagnosis at 63 years old (NCI, n.d.). Similarly, age is a risk factor for cognitive impairment, confounding the ability to distinguish the effect of cancer therapies on cognition from the effect of natural aging (Harada, Love & Triebel, 2013; Hurria et al., 2006). Side effects from cancer therapy, such as fatigue, anemia, nutritional deficiencies, endocrinopathies, and sleep alterations may increase risk for cognitive decline (Lange et al., 2019; Wesevich, et al., 2021), as can certain psychological and sociodemographic conditions. These include anxiety, depression, physical inactivity, education level, and cognitive reserve (Ahles & Root, 2018;

Janelsins et al., 2014; Janelsins et al., 2017; Lange et al., 2019; Wesevich et al., 2021). In fact, psychological distress may continue to negatively impact cognition throughout survivorship (Pang et al., 2023). Research also suggests a genetic predisposition to CRCI, specifically among APOE*E4 carriers, a gene also associated with Alzheimer disease (Janelsins et al., 2014; Van Dyk, 2021). Given the coinciding nature of many of these conditions with cognitive decline, the NCCN Guidelines on Cognitive Function suggest assessing and optimizing management of contributing factors (NCCN, 2023).

Occupational Therapy as a Treatment for CRCI

Cognitive rehabilitation, often performed by OTs, is a first-line intervention recommended for management of CRCI by the NCCN Survivorship Guidelines (NCCN, 2023). OTs focus on improving health and function of patients through various strategies. OT has been shown to increase functional status, improve social engagement and quality of life (Clark et al., 1997; Pergolotti et al., 2016). OTs are versed in techniques of cognitive rehabilitation, including cognitive behavioral therapy (CBT), which have been shown to be helpful in cancer survivors with CRCI (Lange et al., 2019; Pergolotti et al., 2016; Von Ah & Crouch, 2020; Wesevich et al., 2021). CBT encompasses a wide range of strategies and activities that are behavior-focused and aim to improve mental function. Strategies include establishing goals, problem solving, coping, psychoeducation, relaxation, mindfulness, or compensatory and re-training programs. Other cognitive training exercises might include repetitive, problem-oriented tasks that target specific cognitive domains (Von Ah & Crouch).

1.2 Clinical Question

For clinicians who care for women with non-metastatic breast cancer (P), does focused education for clinicians on the management of CRCI (use of occupational therapy) (I), compared with no education (C), affect the knowledge, skills and attitudes regarding management of CRCI (O)?

1.3 Project Aims and Objectives

The goal of this project was to assess clinicians’ knowledge, skills, and attitudes as they relate to the utilization of OT for treatment of CRCI. Processes involved in this project included identifying the target population, evaluating the knowledge, skills, and attitudes of clinicians via survey, educating clinicians on the role of OT in assessing and intervening in CRCI, implementing OT services, and then re-assessing clinicians’ knowledge, skills, and attitudes.

The main project outcome, to improve the knowledge, skills and attitudes of clinicians as these relate to using OT for CRCI, was assessed by comparison of pre- and post- intervention surveys. Surveys included an open-ended question that allowed clinicians to give feedback on the assessment and interventions related to CRCI, which provided qualitative data to comprehensively understand participants’ perceptions of the educational intervention. A secondary outcome was to increase the number of breast cancer patients referred to OT for CRCI.

The following objectives were important in reaching this outcome: that clinicians caring for breast cancer patients would participate in the education intervention, and an OT would be available in the breast cancer clinic to increase ease of access. Long-term goals that are beyond the scope of this project included improving the patient experience of CRCI and the quality of life of breast cancer patients. This project has potential to be replicated and applied across the healthcare system to address the goal of increased assessment and intervention targeting CRCI in cancer clinics.

1.4 Conclusion

While there is still much to learn regarding the nature, driving forces, trajectory, and assessments of CRCI, the scope of the problem is undeniable. It is predicted that over 310,000 women will be diagnosed with breast cancer in 2024 and up to 75% of them will experience cognitive changes during treatment (Siegel, Giaquinto, & Jemal, 2023). Though the survival rates for breast cancer are high, many women will live with cognitive changes even years after their diagnosis (Wesevich et al., 2021). Strategies implemented by occupational therapists can help women suffering with cognitive changes, yet are widely underutilized. Broadly, guidelines on assessment and management of CRCI do not have consensus and are not easily translated into practice. Locally, at the Duke Women's Cancer Center Raleigh, there was a lack of attention to CRCI. This project was intended to highlight the utility of OT as a management solution for CRCI through education to breast cancer clinicians. Ultimately, through the increasing knowledge, skills, and attitudes of breast cancer clinicians surrounding OT for CRCI, this project was aimed to address CRCI in breast cancer survivors with the ultimate goal of improving their overall health and quality of life.

CHAPTER 2: LITERATURE REVIEW

A comprehensive literature review was completed using PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. The reference lists and similar articles of relevant studies were also evaluated for appropriateness. Search terms were combined as follows: *breast cancer* AND *cognitive impairment* AND *occupational therapy; occupational therapy* AND *breast cancer* AND *cognitive* AND *treatment; education* AND *oncology* AND *occupational therapy* AND *cognitive impairment; barriers* AND *breast cancer* AND *provider* AND *awareness* AND *cognitive.* In addition, the terms *knowledge, skills,* and *attitudes* were individually added to the terms *occupational therapy* AND *breast cancer* AND *cognitive impairment*, with no relevant results yielded in each search. The search was limited to full-text articles published in English after the year 2000. A total of 125 articles were generated, 91 from PubMed and 34 from CINAHL. Articles that discussed OT as an intervention were excluded if they did not relate to patients with breast cancer. Case studies were excluded. Articles were included if they discussed the experience or management of CRCI. Thirteen articles were selected for comprehensive review and fall into one of the following categories: The Patient Perspective; Barriers to the Management of CRCI; OT as an Intervention for CRCI; A Multi-Disciplinary Approach.

2.1 The Patient Perspective

Breast cancer patients identify cognitive impairments in themselves and want recognition of this problem, symptom assessment by their health care providers, and to be offered intervention(s) (Munir et al., 2011; Selemat et al., 2014). A qualitative phenomenological study examining the experiences of women with CRCI (n=9) found that many did not feel their cognitive symptoms were validated by their healthcare provider (Player et al., 2014). Some women reported frustration, feeling that their doctors did not assess cognitive changes because they were too busy or more focused on physical symptoms. They wanted a care team who would "accept and value their individual complaints about changes in cognitive function" (Player et al., 2014, p.237). Women identified their providers as support but often felt their concerns were not taken seriously or that providers were insensitive to their concerns (Selemat et al., 2014).

In addition to validation and engagement surrounding the symptoms of CRCI, oncology patients identify a need for increased education on the interventions available. Supportive services may be underutilized when oncology patients are unaware of the services that are available (Eakin & Strycker, 2001; Slight & Stein Duker, 2016). A qualitative needs assessment found that women reported lack of education on cognitive function during chemotherapy and wanted "activities to manage cognitive problems" (Munir et al., 2011, p.390), yet none were discussed. In the qualitative study by Player et al. (2014) describing the experience of women with cognitive changes, many reported sharing strategies for management with other survivors and coming up with their own strategies to cope with changes; none of the women received professional intervention focused on cognitive changes.

2.2 Barriers to the Management of CRCI

As trusted partners throughout the cancer journey, the health care team is counted on to be the main source for identifying and educating patients on cognitive changes. There are a number of tools available to assess cognition in cancer patients, especially geriatric patients. In fact, in older adult patients, routine cognitive assessment is a recommended part of geriatric assessment (Pergolotti et al., 2020). Occupational therapists are often trained in such assessments, while oncology clinicians do not commonly perform these assessments.

As previously discussed, oncology clinicians are often disengaged from the experience of CRCI in their patients. Education to clinicians regarding the experience of CRCI is lacking, as evidenced by insensitive comments, disregard for cognitive complaints, and more (Selemat et al., 2014).

Lack of awareness of available services or lack of awareness of the providers that offer the service are also known barriers to the use of support services (Baxter et al., 2017; Eakin & Strycker, 2001). Physicians were shown to have a negative perception on psychosocial interventions due to perceived lack of validity. Health care providers reported needing information to support patients regarding their reported cognitive changes (Munir et al., 2011).

2.3 OT as an Intervention for CRCI

OT is one promising intervention for CRCI in women with breast cancer. OT providers are skilled in many different interventions that could potentially benefit patients with CRCI, including cognitive behavioral therapies and compensatory strategies (Hopkins et al, 2017; Rodomski et al., 2021; Wolf et al., 2016). These interventions may be effective in a group setting (Green et al., 2017) and among older adult patients (Pergolotti et al., 2020).

Two randomized controlled trials showed improvement in cognitive measures after an OT-delivered intervention. One study (n=21) showed that cognitive scores improved after six weeks of community-based occupational therapy focusing on meaningful activities (Petruseviciene et al., 2018). Another compared use of a mobile health application alone to use of the application along with OT (n=40) and found a greater benefit with the multi-modal approach, suggesting the additional benefits of OT to improve cognitive impairment (Lozano-Lozano et al., 2023).

Two review articles, examining sixteen total articles, evaluated CRCI in breast cancer patients. One review sought to evaluate all effective therapies for CRCI in breast cancer patients. Only randomized controlled trials were considered. Cognitive therapy, such as memory and attention adaptation training, accompanied only by meditative therapies, was shown to have a promising effect, though all studies were limited by small sample size (Zhang et al., 2020). The other aimed to evaluate existing cognitive rehabilitation programs targeting the same general population. Interventions utilizing cognitive training and compensatory strategies, both often performed by occupational therapists, demonstrated improvement in memory, processing, attention and more (Syed Alwi et al., 2021).

2.4 A Multi-Disciplinary Approach

As with many aspects of holistic patient care, an interdisciplinary approach is likely the most effective. A cross-sectional survey examining the perspective of the OT practicing in oncology found that the multidisciplinary team approach is an effective facilitator to the use of OT services in the oncology population. Health care clinicians who understand and value the role of the OT can communicate, support, and advocate for OT services and provide necessary referrals (Stein Duker & Sleight, 2019; Sleight & Duker 2016). Opportunities to discuss CRCI and consider possible interventions can arise from trusting relationships between patients and the health care team, suggesting the importance of nurses, OTs, and advanced practitioners, in addition to physicians, in managing CRCI (Player et al., 2014). Nurses are especially poised to support women as they desire assistance coping with cognitive changes, education throughout their treatment regarding cognition, and someone who will give care, attention and individualized recommendations (Munir et al., 2011; Myers, J.S., 2012).

In summary, literature clearly defines the problem of CRCI and the potential for OT to be beneficial. There is support for increased education on the benefits of OT in those with CRCI for both clinicians and patients. However, we do not know if education will increase clinicians' knowledge, skills and attitudes regarding the use of OT in those with CRCI.

2.5 Theoretical Framework

Theoretical or conceptual frameworks are an important part of a clinical project; they provide structure and organization to the plans for change (Bonnel & Smith, 2022). This project utilized Kurt Lewin's Three-Step Change Theory. Lewin recognized the complexities of change and the driving and restraining forces that affect those involved. Driving forces are those that help shift behavior away from the status quo. Conversely, restraining forces are those that negatively affect the move towards change (Kritsonis, 2005). Both driving and restraining forces must be addressed when bringing about change. The three steps in Lewin's change theory include unfreezing, moving and refreezing (Mitchell, 2013).

The first step, unfreezing, involves examining the equilibrium state and the forces needed to overcome resistance and allow change (Kritsonis, 2005; Mitchell, 2013). As it relates to this project, unfreezing involved exploring the current practices surrounding the assessment of CRCI and interventions recommended for CRCI by clinicians who care for breast cancer patients, engaging and motivating stakeholders, and communicating the need and plan for change to all involved.

In the moving stage, actions begin to bring about change (Mitchell, 2013). For this stage, OT staff were brought to the site of the project so they were accessible to cancer survivors with CRCI. Clinicians participated in the planned education intervention which provided information about the potential benefits of OT for CRCI. In the months following, re-assessment of practices of assessment and interventions for CRCI were performed.

The purpose of the third and final stage, refreezing, is to integrate the changed behavior into everyday practice. Strategies for refreezing include reinforcing new behaviors and rewarding desired outcomes (Kritsonis, 2005; Mitchell, 2013). Clinicians were provided a one-page tip sheet highlighting key points presented in the educational intervention. This promoted ease of use regarding identifying CRCI and referral points. Clinicians could then refer to this document following the educational sessions and the project lead predicts that this will encourage OT referrals from clinicians.

CHAPTER 3: METHODS

This quality improvement project involved focused live education directed at clinicians who care for breast cancer patients. Effectiveness of education was evaluated by pre- and post-test surveys. Qualitative and quantitative data analysis strategies were utilized.

3.1 Project Design

For this pilot study, a pre-test and post-test comparative exploratory study was used to evaluate the impact of an educational intervention on clinicians' knowledge, skills, and attitudes surrounding the assessment and use of OT to manage CRCI among early-stage breast cancer patients. An evaluation of the OT referral rates pre- and post- intervention was completed to examine the effect of the intervention.

3.2 Sample

The population for this scholarly project consisted of a convenience sample of nine clinicians who practice at the Duke Women's Cancer Care Raleigh in North Carolina and care for breast cancer patients. Inclusion criteria were Registered Nurses (RN), Advanced Practice Providers (APPs; including Physician Assistants and Nurse Practitioners), or physicians (MD) who have direct contact with breast cancer patients. Of the APPs, one works alongside a physician in the clinic seeing patients at any point in their breast cancer journey. Another APP sees patients in the Survivorship Clinic, typically when patients are three or more years post-diagnosis. Of the RNs, three are embedded into the clinics, each supporting a different physician/APP team, and one is a Nurse Navigator who supports all teams and interacts with the patients throughout their cancer journey. All three physicians are medical oncologists who care primarily for patients with breast cancer.

Exclusion criteria include other ancillary staff, including Certified Medical Assistants (CMAs), Nursing Assistants (NAs), Patient Service Associates (PSAs) research nurses, palliative care providers, and other clinicians. Despite the importance of their role in the holistic care of breast cancer patients, other roles did not have enough ability to assess or recommend interventions for CRCI. Other exclusion criteria included non-English speaking clinicians and clinicians who cannot utilize electronic surveys, of which none were anticipated. The final sample population included: four Registered Nurses, two Advanced Practice Providers, and three physicians.

3.3 Setting

This scholarly project was implemented at the Duke Women's Cancer Care Raleigh (DWCCR), a suburban clinic in Raleigh, North Carolina. This site is affiliated with Duke Cancer Institute, a National Cancer Institute-designated comprehensive cancer center. In efforts to increase access to supportive care services, an occupational therapist was integrated into this clinic beginning in July 2023. This site was strategically chosen to both engage the clinicians who care for breast cancer patients and coincided with the arrival of the new OT provider. Prior to project implementation, OT had only been available as a referral to another health system entity.

3.4 Intervention

Live educational sessions were delivered to the clinicians by this investigator alongside the OT who was soon-after integrated into the clinic. Since clinicians were in the office on different weekdays, this investigator anticipated two or more separate sessions would be needed to accommodate varying schedules and increase attendance. This investigator used email communication with RNs who managed clinic schedules to query the best possible times to meet. After gathering responses, the lead sent two electronic calendar invites to all nine participants requesting attendance at one of two planned sessions. An email reminder was sent to all participants the week prior to planned sessions.

Sessions were held on June 21 and June 23, 2023. Sessions incorporated education on the prevalence, assessment, and available interventions for CRCI, focusing on the research and real-world experience to support the use of OT as an intervention. Education also included logistical information needed to support patient referrals to OT, including OT name, location, time available in clinic, detailed instructions on how to enter OT referral, OT plan of care, cost of OT, and common methods of therapy used in OT sessions. At the educational session, all attendees received a handout which outlined information relayed in the verbal education session (see Appendix C). The handout was printed on colored cardstock paper with images in color. Notably, it was clarified during project planning that nurses were allowed to enter referrals to OT; during educational sessions, nurses were empowered to enter OT referrals as they saw fit. Snacks were provided to participants (light breakfast on June 21 as the session occurred at 7:00 a.m. and cookies on June 23 as the session occurred at 3:30 p.m.).

The education was informal, with questions and discussion encouraged throughout. Approximately 15 minutes were devoted to the presentation and approximately 15 minutes to an informal question and answer session. The educational handout (Appendix C) was used to guide the presentation.

3.5 Measurement Tools

An email was sent to clinicians with a link to complete the pre-intervention survey via Qualtrics, an online survey platform.

One measurement tool used for data collection was a survey created by this investigator. The survey consisted of 17 items, including 7 multiple choice questions, 8 slider scale questions and 2 free-text questions. Slider scale questions allow interaction from respondents, who slide a bar along a numerical scale from 0 to 100 with overlying descriptive labels to indicate their preference. Two questions gathered demographic data; others aimed to assess the knowledge, skills and attitudes of clinicians surrounding the assessment of CRCI and the use of OT for this indication (see Appendices A and B). The same survey was delivered in the pre- and post-intervention setting, with a slight change of wording in the instructions. The survey was anticipated to take about 10 minutes to complete. The survey was delivered via Qualtrics, an online software designed for creating surveys that allowed this investigator to create a visually appealing electronic survey formatted logically to facilitate use, track responses, and export raw data. This was deemed a feasible and practical way to gather data given that the population of interest is adept at using technology. The survey was delivered to clinicians via email with a link to Qualtrics. The first item on each survey prompted participants to create a unique code, allowing survey responses to be paired while maintaining anonymity. The tool was tested to evaluate clarity of questions, ease of use, and to estimate the time needed for completion.

The second measurement tool involved extraction of referral data from the electronic medical record (EMR) utilizing the Slicer Dicer tool, which presents de-identified information in response to custom searches on large populations (Saini et al., 2021). Referral data was captured from a three-month period prior to the educational intervention (March - May, 2023) and a three-month period following the educational intervention (July - September, 2023). It may be that discussion of the anticipated OT arrival and awareness of this project related to OT for CRCI may contribute to providers referring more patients to OT, thus introducing bias. To account for this, this investigator also queried referral data from October - December 2022 to ensure similar pre-intervention data prior to data analysis.

3.6 Data Collection Procedure

Data collection involved two processes. The first process was gathering responses from the pre- and post- intervention survey. The survey was delivered to the sample population via email link, and respondents completed it using Qualtrics Survey software. This software gathered responses in real time. The pre-intervention survey was delivered about 1 week prior to education sessions and the post-intervention survey was delivered about 3 months after education sessions. A three-month period was chosen to allow for time to process and integrate the learned information. Once data was collected, it was exported for analysis.

In addition to collecting pre- and post- intervention survey responses, data was gathered reflecting the number of referrals to OT for the problem of CRCI entered by providers in the sample population. Data was extracted from the electronic medical record (EMR), EPIC®, using the Slicer Dicer electronic query tool. OT referrals were first filtered by provider, which included the five APP and physician clinicians included in the program. While RNs can place OT referrals, they are required to enter a physician or APP co-signature with each order. It is assumed that any RN referral placed was captured under the physician or APP provided in the co-signature. This was an efficient way to gather data, but was limited by the fact that referrals placed cannot directly translate to the number of patients who receive OT, as patients may not have followed through with scheduling and attending the OT sessions.

3.7 Data Management

This investigator cleaned the data prior to analyzing survey responses. There were a few discrepancies between the pre- and post- intervention survey unique codes, which were used to pair data. When prompted to enter the first three letters of their street name, one respondent answered "1st" in pre- intervention survey and "FIR" in post- intervention survey. Roles and years of experience matched. Similarly, in creating a unique identifying code using the last four digits of their cell phone number, two respondents reported numbers that differed by one digit. The other two components of the identifying code, as well as the role and years of experience, matched. Another respondent, whose unique identifying code matched in pre- and post-intervention surveys, answered "6-10 years" of experience in the pre-intervention survey and ">10 years" in the post-intervention survey. This investigator defaulted to pre-intervention survey responses when analyzing data, so considered this respondent in the "6-10 years" of experience category. Similarly, another respondent reported two different answers for the first component of the unique identifying code. The second and third components matched. However, years of experience was reported as "1-5 years" in the pre-intervention survey and "6-10 years" in the post-intervention survey. Again, this was considered "1-5 years" for analysis. Table 1 reflects this. Finally, another respondent had different responses for all three components of the unique identifying code. The role and years of experience matched. Given the relative consistency between all other eight responses, this investigator was confident in pairing these pre- and post-intervention survey responses.

3.8 Data Analysis

This investigator compared pre- and post- intervention survey results to assess for changes in the knowledge, skills, and attitudes of clinicians over time. Survey responses were paired using a unique identifying code created by each participant. Descriptive statistics and a two-tailed t-test were used to compare pre- and post- intervention responses using R4.3 software, $p < .05$ significance (R Core Team, 2023). An Analysis of Variance (ANOVA) test was used to determine if there was a difference by roles or years of experience. Free text responses were analyzed by content analysis. Using a qualitative approach, key statements were extracted from each free text response. Statements were reviewed for commonalities. Themes were generated and each statement was assigned a theme. The goal of data analysis from survey responses was to determine if significant changes occurred in the knowledge, skills, and attitudes of the sample population following delivery of the educational intervention.

The EMR was used to extract data on the number of OT referrals entered by the breast clinicians in a three-month period prior to intervention and a three-month period following intervention. Referral numbers were compared across time periods using descriptive statistics. Referral numbers were analyzed according to which provider made the referral.

3.9 Ethical Considerations

This project was first reviewed by Duke Health Institutional Review Board (IRB). On May 13, 2023, communication was received that the IRB determined the project exempt as it does not meet the definition of research. The project was next reviewed by the University of North Carolina Charlotte's Office of Research Protections and Integrity. Communication was received on May 24, 2023 stating that the activity was not research and did not require IRB approval. No changes were made following IRB approval that required re-submission.

No personal health information was collected in this scholarly project. Qualtrics software requires password and multi-factor authentication, minimizing the risk that data can be accessed by anyone other than this investigator. Data exported from Qualtrics was stored in DukeBox, a cloud-based storage service associated with Duke University that also requires password and multi-factor authentication for access. Data will be deleted from the secure platform at completion of the project.

CHAPTER 4: RESULTS

This project was designed to examine the knowledge, skills, and attitudes of clinicians who care for women with breast cancer as they relate to the use of OT for CRCI. Project implementation and data collection took place between June and October 2023.

4.1 Sample Size and Demographic Information

Nine clinicians participated in the study. Participants were identified by this investigator during project planning and all agreed to participate. Demographic data was collected from project participants on the following items: role and years of experience. Among the nine participants, two (22.2%) were Advanced Practice Providers, three (33.3%) were physicians and four (44.4%) were Registered Nurses. No participants had less than one year of experience. Most (five clinicians, 55.6%) had 1-5 years of experience. Two clinicians had 6-10 years of experience and two had more than 10 years of experience. Participant information summarized in Table 1.

Table 1

Sample Characteristics (N=9)

Demographic	n	%
Role		
Registered Nurse	4	44.4
Advanced Practice Provider	2	22.2
Physician	3	33.3
Years of Experience		
<1 year	0	0
1-5 years	5	55.6
6-10 years	2	22.2
Greater than 10 years	2	22.2

4.2 Data Analysis

The pre- and post- intervention survey included eight slider scale items that assessed the knowledge, skills, and attitudes of clinicians regarding OT for CRCI. Significant differences were determined between pre- and post-scores in 7 out of 8 questions. Post-test scores were higher for experience cognitive impairment (t = 3.08, p = .015), frequency in assessing cognitive impairment (t = 2.71, p = .027), comfort in assessing cognitive impairment (t = 2.57, p = .033), suggest intervention for cognitive impairment (t = 3.12, p = .017), comfort in suggesting intervention (t = 3.38, p = .012), knowledge about occupational therapy (t = 7.60, p < .001), and comfort in describing occupational therapy (t = 2.98, p = .018). There was no statistical significance for changes in pre- and post- survey responses for report cognitive impairment (p = .129). Table 2 summarizes the pre- and post- test scores for each slider scale item.

Table 2

Pretest and Posttest Comparison for Slider Scale Items

Question	**Pretest M (SD)**	**Posttest M (SD)**	***p*-value**	***t*-value**
Experience cognitive impairment, %	54.56 (18.76)	71.78 (17.20)	0.015	3.08
Report cognitive impairment, %	32.89 (17.15)	41.67 (10.62)	0.129	n/a
Frequency in assessing cognitive impairment, %	52.44 (31.62)	71.33 (28.30)	0.027	2.71
Comfort in assessing cognitive impairment, *M*	57.67 (37.66)	77.11 (24.80)	0.033	2.57
Suggest intervention for cognitive impairment, %	34.25 (26.19)	74.00 (35.42)	0.017	3.12
Comfort in suggesting intervention, *M*	51.25 (23.05)	84.00 (19.27)	0.012	3.38
Knowledge about occupational therapy, *M*	28.33 (20.63)	84.11 (19.74)	0	7.6
Comfort in describing occupational therapy, *M*	51.22 (31.15)	82.89 (19.76)	0.018	2.98

Note. M= mean; SD= standard deviation. The p-value for testing difference was based on paired t-test.

Each variable was tested for relation to demographic variables: role and years of experience. There was no significant difference according to the role for all questions (*ps* > .126) except for report cognitive impairment (*F[2,6]* = 5.63, *p* = 0.42). Registered Nurses had greater pre- to post-test score difference than the Advanced Practice Provider, *p* = .036. There was no significant difference due to the years of experience for all slider scale items (*ps* > .207).

Excluding demographic questions, the pre- and post- intervention survey included five multiple choice questions. Tables 3-5 present pre-post intervention responses, role, and years of experience. Table 3 compares overall response frequency between pre- and post- intervention surveys. Table 4 compares pre- and post- intervention survey responses by role and Table 5 compares pre- and post- intervention survey responses by years of experience.

In assessing for cognitive impairment in their patients when compared to pre-intervention responses, fewer nurses utilized the NCCN distress tool (*n*=3 in pre-intervention versus *n*=1 in post-intervention) and more clinicians asked follow-up questions when cognitive changes were noted (*n*=4 in pre-intervention versus *n*=7) in the post-intervention responses. More clinicians identified being unaware that cognitive impairment is an issue as a barrier to assessing cognitive impairment in their patients when comparing pre- and post- intervention responses (*n*=3 in pre-intervention versus *n*=1 in post-intervention). Overall, not having time in a clinic visit to assess for cognitive impairment was the most common barrier identified. Clinicians with less experience (1-5 years) noted time as a barrier more often than clinicians with >5 years of experience.

Physicians did not find cognitive changes the most pressing issue to address (*n*=2) when compared to APPs and RNs. There was not a notable difference in how clinicians identified the presentation of cognitive impairment in their patients when comparing pre- and post-intervention survey responses. Following the educational intervention, more physicians and APPs identified OT as an intervention to suggest to patients to address cognitive impairment (*n*=2 clinicians in pre-intervention versus *n*=5 in post-intervention survey). Fewer clinicians reported that they were unaware of available interventions for cognitive impairment following the educational intervention (*n*=3 in pre-intervention versus *n*=0 in post-intervention).

For barriers to suggesting interventions for cognitive impairment, fewer clinicians reported being unaware of interventions to suggest for CRCI (*n*=3 in pre-intervention versus *n*=1 in post-intervention) and fewer clinicians noted that therapists were not readily available or accessible (*n*=4 in pre-intervention versus *n*=2 in post-intervention) when comparing pre- and post- intervention responses. The educational intervention had no effect on the cost of the interventions as a barrier to clinicians.

The final question of the pre- and post- intervention survey was a free text response question that asked respondents to share any other thoughts or suggestions they may have regarding the care of breast cancer patients with cognitive impairment. Table 6 summarizes the statements extracted from responses to this question. In the pre-intervention survey, there were two responses. Statements identified in these responses were labeled under the theme *Barriers to addressing CRCI*. The response, written by an RN with 6-10 years of experience, noted that the "cost of OT is high, scheduling is challenging." The other response, "Assessment and interventions (including those outside of OT)" may have been suggesting the need for assessment and interventions for CRCI and was excluded as it did not align with any theme.

There were six responses in the post-intervention survey. Two new themes were identified: *Positive Clinician Response to Educational Intervention,* and *Effect of Educational Intervention on Patients with CRCI.* The theme *Barriers to Addressing CRCI* was again noted.

Clinicians reported increased awareness of CRCI and of OT intervention. They reported increased patient referrals and patient hesitancy to be referred to OT.

Table 3

Frequency of Responses to Multiple Choice Questions

Question	**Pre-Intervention Survey TOTAL**	**Post-Intervention Survey TOTAL**
How do you assess for cognitive impairment in your patients? (Select all that apply)		
NCCN Distress Thermometer	5	4
A specific cognitive assessment tool such as the Mini Mental State Exam, clock drawing, handwriting assessment or other. (Please write the tool below)	1 “MMS”	0
I usually inquire about cognitive changes when taking the patient’s history	6	7
If cognitive changes are noted, I ask follow up questions	4	7
If the patient mentions cognitive symptoms, I ask follow up questions	7	8
Other:	0	0
What are the *barriers* to assessing cognitive impairment in your patients? (Select all that apply.)		
Unaware that cognitive impairment is an issue	1	3
Not enough time in a clinic visit to assess cognitive impairment	6	4
Not sure of how to assess cognitive impairment	2	1
The assessments that I am aware of for cognitive impairment are too involved	1	1
Cognitive changes are typically not the most pressing issue to address	3	2
I do not perceive cognitive changes to be a problem	0	1

Table 3

Frequency of Responses to Multiple Choice Questions (continued)

I do not perceive assessment of cognitive impairment to be within my role	2	2
Other:	1 “also unaware of interventions”	0
Cognitive impairment typically presents in my patients as: (Select all that apply.)		
Changes in short- or long-term memory	8	8
Changes in motor function, including fine motor movements	4	6
Difficulty processing information	6	6
Difficulty with executive function (Ex. Planning ahead, following multi-step directions)	6	7
Difficulty with attention and concentration	7	8
Difficulty with verbal or mental fluency (Ex. Word-finding)	5	6
Difficulty adapting to changed or unplanned events	4	3
Other:	0	0
What interventions do you suggest to your patients to address cognitive impairment? (Select all that apply).		
Comprehensive neurocognitive testing	4	5
Pharmacotherapy (Please specify the medications you might suggest)	2 “Adderall”	2
Occupational Therapy	5	9
Speech Therapy	3	1
Community Program (Please specify the program you might suggest).	1 “YMCA”	2

Table 3

Frequency of Responses to Multiple Choice Questions (continued)

Online Program (Ex. Brain teasers; please specify the program you might suggest)	2 “word search, sudoku” “Brain games or other word games”	2
I am unaware of available interventions for cognitive impairment	3	0
Not applicable (I do not suggest interventions for cognitive impairment)	1	0
Other:	1 “word games / puzzles”	0
What are the barriers to suggesting interventions for cognitive impairment? (Select all that apply)		
I am unaware that cognitive changes are a problem	0	5
I am unaware of interventions to suggest for this problem	4	1
Therapists / interventionists are not readily available or accessible	4	2
Interventions are costly	3	3
Other:	0	0

Table 4

Frequency of Responses to Multiple Choice Questions, by Role

Question	**Pre-Intervention Survey**			**Post-Intervention Survey**		
	RN	**APP**	**MD**	**RN**	**APP**	**MD**
How do you assess for cognitive impairment in your patients? (Select all that apply)						
NCCN Distress Thermometer	3	1	2	1	1	2
A specific cognitive assessment tool such as the Mini Mental State Exam, clock drawing, handwriting assessment or other. (Please write the tool below)	0	0	1	0	0	0
I usually inquire about cognitive changes when taking the patient's history	3	1	2	3	1	3
If cognitive changes are noted, I ask follow up questions	2	1	1	3	2	2
If the patient mentions cognitive symptoms, I ask follow up questions	3	2	2	4	2	2
Other:	0	0	0	0	0	0
What are the *barriers* to assessing cognitive impairment in your patients? (Select all that apply.)						
Unaware that cognitive impairment is an issue	1	0	0	1	1	1
Not enough time in a clinic visit to assess cognitive impairment	2	1	3	0	1	3

Table 4

Frequency of Responses to Multiple Choice Questions, by Role (continued)

Not sure of how to assess cognitive impairment	1	1	0	0	1	0
The assessments that I am aware of for cognitive impairment are too involved	0	0	1	0	1	0
Cognitive changes are typically not the most pressing issue to address	0	1	2	0	0	2
I do not perceive cognitive changes to be a problem	0	0	0	1	0	0
I do not perceive assessment of cognitive impairment to be within my role	1	1	0	2	0	0
Other:	0	1	0	0	0	0
Cognitive impairment typically presents in my patients as: (Select all that apply.)						
Changes in short- or long-term memory	3	2	3	3	2	3
Changes in motor function, including fine motor movements	2	0	2	3	0	3
Difficulty processing information	2	2	2	3	1	2
Difficulty with executive function (Ex. Planning ahead, following multi-step directions)	1	2	3	2	2	3
Difficulty with attention and concentration	2	2	3	3	2	3
Difficulty with verbal or mental fluency (Ex. Word-finding)	1	2	2	3	1	2
Difficulty adapting to changed or unplanned events	0	2	2	1	0	2

Table 4

Frequency of Responses to Multiple Choice Questions, by Role (continued)

Other:	0	0	0	0	0	0
What interventions do you suggest to your patients to address cognitive impairment? (Select all that apply).						
Comprehensive neurocognitive testing	1	2	1	2	1	2
Pharmacotherapy (Please specify the medications you might suggest)	0	0	2	1	0	1
Occupational Therapy	3	0	2	4	2	3
Speech Therapy	1	1	1	1	0	0
Community Program (Please specify the program you might suggest).	0	0	1	1	0	1
Online Program (Ex. Brain teasers; please specify the program you might suggest)	1	1	0	0	1	1
I am unaware of available interventions for cognitive impairment	1	1	1	0	0	0
Not applicable (I do not suggest interventions for cognitive impairment)	1	0	0	0	0	0
Other:	0	0	1	0	0	0
What are the barriers to suggesting interventions for cognitive impairment? (Select all that apply)						
I am unaware that cognitive changes are a problem	0	0	0	3	1	1

Table 4

Frequency of Responses to Multiple Choice Questions, by Role (continued)

I am unaware of interventions to suggest for this problem	2	1	1	0	0	1
Therapists / interventionists are not readily available or accessible	1	0	3	0	1	1
Interventions are costly	1	1	1	1	1	1
Other:	0	0	0	0	0	0

Table 5

Frequency of Responses to Multiple Choice Questions, by Years of Experience

	Pre-Intervention Survey			**Post-Intervention Survey**		
Question	**1-5 Years**	**6-10 Years**	**> 10 Years**	**1-5 Years**	**6-10 Years**	**> 10 Years**
How do you assess for cognitive impairment in your patients? (Select all that apply)						
NCCN Distress Thermometer	3	1	2	2	2	0
A specific cognitive assessment tool such as the Mini Mental State Exam, clock drawing, handwriting assessment or other. (Please write the tool below)	1	0	0	0	0	0
I usually inquire about cognitive changes when taking the patient's history	2	2	2	3	2	2
If cognitive changes are noted, I ask follow up questions	2	1	1	3	2	2
If the patient mentions cognitive symptoms, I ask follow up questions	5	1	1	4	2	2
Other:	0	0	0	0	0	0
What are the *barriers* to assessing cognitive impairment in your patients? (Select all that apply.)						
Unaware that cognitive impairment is an issue	1	0	0	2	1	0
Not enough time in a clinic visit to asess cognitive impairment	3	1	2	3	1	0

Table 5

Frequency of Responses to Multiple Choice Questions, by Years of Experience (continued)

Not sure of how to assess cognitive impairment	2	0	0	1	0	0
The assessments that I am aware of for cognitive impairment are too involved	1	0	0	1	0	0
Cognitive changes are typically not the most pressing issue to address	3	0	0	1	1	0
I do not perceive cognitive changes to be a problem	0	0	0	0	1	0
I do not perceive assessment of cognitive impairment to be within my role	2	0	0	0	0	2
Other:	1	0	0	0	0	0
Cognitive impairment typically presents in my patients as: (Select all that apply.)						
Changes in short- or long-term memory	5	2	1	5	2	1
Changes in motor function, including fine motor movements	1	2	1	3	2	1
Difficulty processing information	3	2	1	3	2	1
Difficulty with executive function (Ex. Planning ahead, following multi-step directions)	4	1	1	5	1	1
Difficulty with attention and concentration	5	1	1	5	2	1
Difficulty with verbal or mental fluency (Ex. Word-finding)	3	1	1	3	2	1

Table 5

Frequency of Responses to Multiple Choice Questions, by Years of Experience (continued)

Difficulty adapting to changed or unplanned events	3	1	0	2	1	0
Other:	0	0	0	0	0	0
What interventions do you suggest to your patients to address cognitive impairment? (Select all that apply).						
Comprehensive neurocognitive testing	2	2	0	2	2	1
Pharmacotherapy (Please specify the medications you might suggest)	1	1	0	0	1	1
Occupational Therapy	1	2	2	5	2	2
Speech Therapy	2	0	1	0	0	1
Community Program (Please specify the program you might suggest).	0	1	0	0	1	1
Online Program (Ex. Brain teasers; please specify the program you might suggest)	1	0	1	2	0	0
I am unaware of available interventions for cognitive impairment	3	0	0	0	0	0
Not applicable (I do not suggest interventions for cognitive impairment)	1	0	0	0	0	0
Other:	1	0	0	0	0	0
What are the barriers to suggesting interventions for cognitive impairment? (Select all that apply)						

Table 5

Frequency of Responses to Multiple Choice Questions, by Years of Experience (continued)

I am unaware that cognitive changes are a problem	0	0	0	2	2	1
I am unaware of interventions to suggest for this problem	3	1	0	1	0	0
Therapists / interventionists are not readily available or accessible	2	1	1	2	0	0
Interventions are costly	2	0	1	2	0	1
Other:	0	0	0	0	0	0

Table 6

Qualitative Analysis of Question 17: "Please share any other thoughts or suggestions you may have surrounding the care of breast cancer patients with cognitive impairment"

	Theme	**Statements**				
Pre-Intervention Survey	*Barriers to Addressing CRCI*	Cost is high	Scheduling is challenging			
Post-Intervention Survey	*Positive Clinician Response to Intervention*	Appreciative of project implementation	Great option for patients	Increased awareness of CRCI	Increased referrals to OT	Clearer understanding of OT
	Effect of Intervention on Patients	Increased OT referrals	Patients excited	Patients validated		
	Barriers to Addressing CRCI	Patients hesitant to be referred				

4.3 Referral Rate Analysis

The number of referrals to OT were assessed in the pre- and post-intervention periods. Two pre-intervention time periods were queried: 10/1/2022 - 12/31/2022 and 3/1/2023 - 5/31/2023. Total OT referrals during these times were 15 and 13, respectively. In the post-intervention period, 7/1/2023 - 9/30/2023, there were a total of 60 OT referrals (see Figure 1). It is important to note that these referral numbers include all referrals for OT, for any indication.

Referral rates were compared by provider type. MDs were more likely than APPs to refer to OT in both the pre- and post- intervention time periods. Of the 3 participating MDs, an average of 5.75 total referrals to OT were placed in the pre-intervention period and an average of 17.33 referrals to OT were placed in post-intervention period. Of the 2 participating APPs, an average of 1.25 referrals to OT were placed in the pre-intervention period and an average of 4 referrals were placed in the post-intervention period.

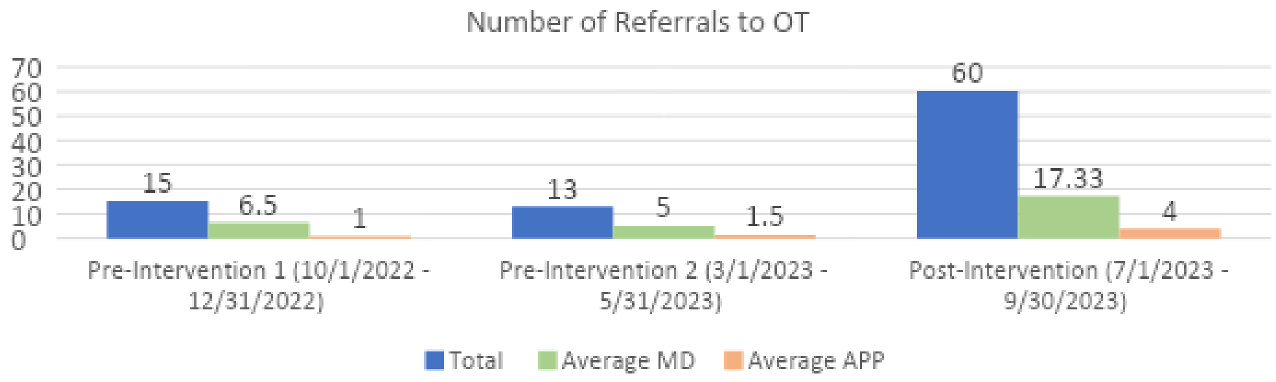

Figure 1

Number of Referrals to OT, by Provider Type

The number of OT referrals was then further filtered by referral diagnosis in attempts to understand how many referrals to OT specifically for CRCI were placed during each time period. Diagnosis filters included: CRCI, lymphedema, peripheral neuropathy, weakness/fatigue, breast cancer/history of breast cancer, and none of the above. Each filter listed above consisted of a group of similar International Classification of Disease (ICD) -10 diagnoses. In the pre-intervention periods, 10/1/2022 - 12/31/2022 and 3/1/2023 - 5/31/2023, 3 and 1 OT referrals to CRCI were noted, respectively. In the post-intervention period, 28 referrals to OT for CRCI were placed (see Figure 2).

The diagnosis filter “breast cancer/history of breast cancer” likely represents referrals in which the provider did not further specify the reason for OT referral and utilized the clinic visit diagnosis, which is typically breast cancer or history of breast cancer. The diagnosis filter “none of the above” captures referrals that did not fit in any of the other categories. It is possible that referrals under these categories may still represent referrals for CRCI. When referrals under these two numbers were combined and compared across time periods, an average of 8.5 referrals were placed in the pre-intervention periods and 46 referrals were placed in the post-intervention period.

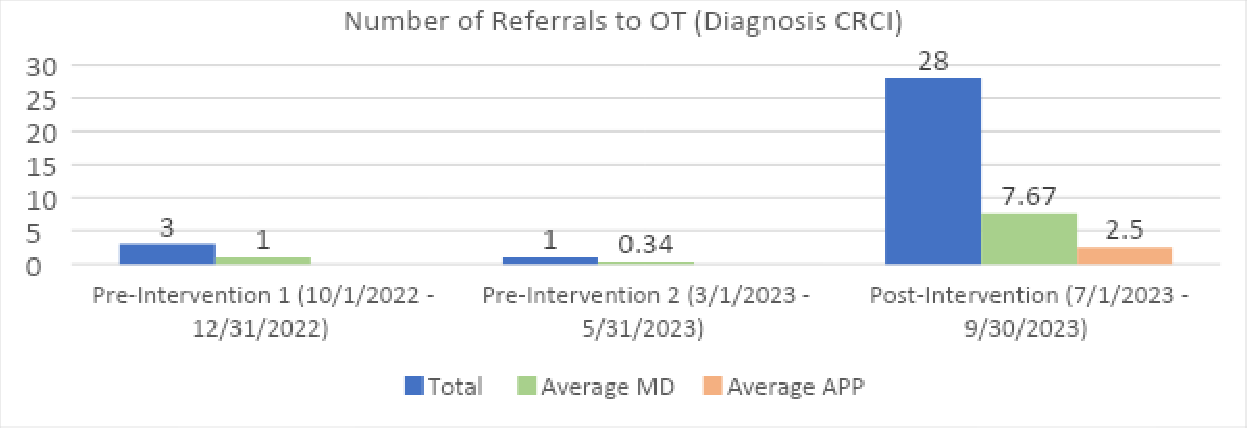

Figure 2

Number of Referrals to OT, by Provider Type and CRCI Diagnosis

4.4 Summary

When compared to pre-test scores, post-test scores showed improvement in seven of eight slider questions without any significant difference due to years of experience or role, except for in one question. Multiple choice responses indicated differences in knowledge, skills, and attitudes towards OT when pre- and post- test responses were compared. Free-text responses highlighted barriers to assessment of CRCI, positive response to the program from clinicians and the effect of the education on patients. Referral rates showed significant increase in referrals to OT in the post-intervention period.

CHAPTER 5: DISCUSSION

CRCI is a prevalent condition among breast cancer survivors which is important to address given its potential to negatively impact quality of life (Bradley et al., 2005; Myers, 2012; Reid-Arndt et al., 2009; Schagen et al., 2002; Wefel et al., 2004; Wesevich et al., 2021). Strategies used by OT have been shown to be helpful in addressing CRCI, yet are often underutilized (Lange et al., 2019; Pergolotti et al., 2016; Von Ah & Crouch, 2020; Wesevich et al., 2021). The primary goal of implementing this pilot study was to evaluate the knowledge, skills, and attitudes of clinicians who care for women with breast cancer as they relate to the use of OT for CRCI. Following an educational intervention highlighting the use of OT for CRCI, improvements in knowledge, skills, and attitudes, as well as in referral rates to OT, were noted.

5.1 Significance and Implications

The educational intervention focused on OT referrals for CRCI management successfully improved clinicians' knowledge, skills, and attitudes and led to an increase in OT referrals over time. Knowledge improved in seven of eight survey items between pre- and post- intervention assessment. These findings are similar to those of education interventions aimed at symptom recognition and management (Brown et al., 2009; Ruiz, R.O.S., 2023; Wiwaranukool et al., 2023). Prior to implementation, assessment and referral for CRCI was not routinely being performed in the clinic, nor was CRCI the focus of the assessments during treatment visits. Post-implementation, patient-centered care incorporates treatment-related symptom discussion, inclusive of CRCI discussion. Given the high prevalence of CRCI reported in the literature (Wesevich et al., 2021), one would expect patients to frequently report CRCI. In this clinic, patients have the opportunity to report cognitive changes via the written NCCN Distress Thermometer tool, which is transcribed into the EMR. The rate of CRCI reporting from this tool could have been queried in the EMR, though many patients will report subjective cognitive complaints without a diagnosis of CRCI six months following the start of treatment (Lycke et al., 2017).

The clinicians' skills related to assessing CRCI and describing and offering OT as an intervention to patients also improved from pre- to post- intervention assessment. Eight out of eight items in the survey assessed the skills of clinicians and improved from pre- to post-intervention, indicating that the educational intervention was successful in improving skills necessary for providers to engage their patients in action surrounding the management of CRCI. Such items queried the frequency of and comfort with assessing and suggesting intervention for CRCI. A study examining the perceptions of oncology health providers related to CRCI showed that providers generally did not discuss CRCI unless the topic was brought up by the patients and providers desired more education on CRCI to increase their confidence in having discussions with their patients (He et al., 2022). The increased education provided by this project with improvement in assessment skills should increase and improve interactions with patients on this important topic.

Finally, the attitudes of clinicians related to the use of OT for CRCI were improved from pre- to post- intervention assessment. Attitudes were assessed in three survey items. Free text responses revealed that clinicians were thankful for the education received and more aware of CRCI and proactive in managing CRCI following the educational intervention. The improvement in knowledge, skills, and attitudes is directly reflected in the increase in referrals to OT demonstrated between the pre- and post-educational intervention. Referral rates in the pre-intervention period averaged 16 referrals, a significant contrast to the 86 referrals seen in a comparable amount of time in the post-intervention period. Improvements in knowledge, skills, and attitudes of clinicians were also reflected in qualitative responses as clinicians reported increased awareness of CRCI, clearer understanding of the role of OT, and increased referrals to OT. While no example of education focusing specifically on OT for CRCI was found in the literature, oncology clinician-focused education on other topics showed similar increase in knowledge and referral rates (Akhtar et al., 2022; Cueva et al., 2018; Olazagasti et al., 2023).

The project findings align with the themes identified in the literature, which highlights the patients' preferences for increased validation of CRCI and education on interventions available for CRCI (Munir et al., 2011; Player et al., 2014; Selemat et al., 2014). Education for clinicians highlighted the need to validate women's cognitive symptoms. Further, education conveyed to clinicians that comprehensive assessment of cognitive symptoms is not necessary to validate and address a patient's cognitive concerns. Rather, simply identifying a cognitive concern and referring to OT, where the OT could tailor the assessment to the patients' specific concerns, should fulfill patients' need for validation of symptoms. Increase in knowledge surrounding OT for CRCI should translate into increased education of CRCI by clinicians towards patients experiencing CRCI.

Another theme noted in the literature was "barriers to the management of CRCI." The literature showed that lack of awareness of services to manage CRCI was a notable barrier (Baxter et al., 2017; Eakin & Strycker, 2001). In the present study, fewer clinicians were unaware of interventions for CRCI in the post-intervention as compared to the pre-intervention period, indicating that the educational session was successful in educating clinicians about the benefits of OT. Survey results also showed that clinicians were more likely to ask further questions if cognitive changes were noted following the educational intervention. Lack of time was a barrier to assessment of CRCI regardless of education and this was more common in clinicians with fewer years of experience. This barrier somewhat contradicts survey results discussed previously which indicated that clinicians seemed to understand that they did not need to spend time performing a comprehensive assessment themselves; rather they should identify any cognitive change and refer to OT for a thorough and focused assessment.

This project empowered nurses to take an active role in assessing, advocating, and intervening to assist patients with CRCI. Nurse-led interventions have been shown to improve specific oncology-specific symptoms (Kelly et al., 2022; Lai et al., 2019). Clinic nurses and nurse navigators were included in the multidisciplinary education sessions, in which the ability of nurses to enter a referral to OT independently was discussed. Providers were able to validate this during these sessions, further empowering nurses to take leadership in this initiative. Pre-survey results showed that nurses (*n*=2) were not aware of suggested interventions for CRCI and clinicians overall were less comfortable assessing CRCI. This was addressed in the educational sessions by both this investigator and the OT, clarifying that a complete assessment of CRCI does not preclude a referral to OT. Rather, any indication that the patient is negatively impacted by CRCI, such as the patient making an off-hand comment about memory or concentration, should precipitate further questions and a referral to OT, if appropriate. Education also included information about OT and other interventions for CRCI. During the initial OT assessment, specialized assessment techniques, dependent on the specific symptoms reported by the patient, are utilized to objectify the symptom and guide the plan for intervention. The nurses were empowered to simply recognize signs of CRCI, validate the patient’s concerns, and identify OT as a possible intervention, and then place the referral. As Stein Duker (2016) and Sleight (2019) conveyed, clinicians who understand the value of the OT are poised to advocate and refer, aligning patients with the necessary resources to address CRCI.

The multi-disciplinary approach was also considered in planning the educational intervention. Both sessions not only included the multiple disciplines who were the focus of the education (RN, APP, MD), but also included the OT who would be embedded in the clinic. This allowed for informal, organic discussion in which each discipline could question and learn from the other. This investigator witnessed many unplanned questions and clarifications requested from the clinicians toward the OT. Having the OT available to immediately answer questions appeared to instill confidence in the clinicians surrounding the potential impact of OT. Further, this interaction between the clinicians and the OT is likely to bring an element of familiarity to the clinicians. It is predicted that this will enhance the ability of clinicians to confidently educate on and recommend OT services to patients.

5.2 Limitations

This pilot project was intended to assess the feasibility of an educational intervention to highlight the potential use of OT to manage CRCI in women with breast cancer. While results showed that this was, in fact, a feasible project, limitations are noted. One limitation of the project is the inability to discern the impact of the OT being brought to the site of the project. The OT was brought to the site to facilitate access to services around the time of surveying and education on CRCI. However, it is unclear if the increase in OT referrals is driven solely by the positive effect of education or if referrals increased primarily because of the increased access to the OT.

Patterns of referrals to OT were assessed using the program that is embedded within the EMR in which the OT referrals are placed. This investigator was able to filter referrals to OT by diagnosis, allowing for visibility to the referrals made with a CRCI-related diagnosis and with other commonly considered diagnoses for which patients would be referred to OT. However, not all referrals placed to OT were accounted for within the diagnoses categories created. There were 46 referrals that were not accounted for (categorized under “breast cancer” or “history of breast cancer” diagnoses or not fitting into any of the defined diagnoses categories) in the post-intervention assessment period and it remains unknown if the patients were referred for CRCI or another reason. Despite this limitation, the overall number of referrals to OT increased significantly, so, regardless of the specific symptom leading to a referral, the awareness of OT as a valuable intervention is demonstrated. Further, the program used yielded mild discrepancies between layers of filtering. An increase in total number of referrals was noted when filtered by referral diagnosis. This is likely explained by some referrals being counted under multiple diagnoses. For example, a clinician may link the OT referral to the visit encounter (typically “breast cancer”) and then also link to a specific symptom (such as “CRCI” or “lymphedema”).

While the number of referrals to OT increased significantly, it is unknown if the number of referrals translated into patient visits with the OT or with any improvement in symptoms related to CRCI or quality of life. Intervention by OT might not improve patients’ perception of CRCI. Hopefully, if this is the case, patients will at least feel the validation from clinicians, as has been known to be important to patients (Munir et al., 2011; Player et al., 2014; Selemat et al., 2014).

This investigator was embedded into the site of the project during planning and implementation phases, but left the clinic before post-intervention analysis began. This may have affected project outcomes as this investigator would have attempted to maintain momentum and discussion about CRCI if working within the clinic. However, the positive results of the project despite the presence of this investigator throughout all aspects of the project speak to the importance of CRCI in the eyes of clinicians. The success of the project despite a consistent champion is dissimilar to the literature, where it is well-documented that clinical champions facilitate implementation of evidence into practice by motivating and helping overcome barriers (Morena et al., 2022; Powell et al., 2015; Wood et al., 2020).

5.3 Recommendations

The logistics surrounding the educational intervention, including low cost and low time commitment are widely reproducible and could be replicated or scaled to larger groups of participants in other oncology clinics. Specifically, future work could include educating clinicians in other breast cancer clinics, both within this institution and beyond. The project could also expand to include other cancer types. While breast cancer patients are the most widely studied when it comes to CRCI, people with other cancer types experience CRCI as well (Scherwath et al., 2013; Vardy et al., 2015). Expansion of this project could also consider educating clinicians who care for other types of cancer. Given the placement of the OT within DWCCR, the cross-talk that likely occurs among clinicians at a site, and the similarities between breast and gynecologic oncology patients, an obvious consideration would be to educate the clinicians who care for women with gynecologic cancers at that same office.

During project implementation, in the days leading up to and in between the educational sessions, there was discussion about the events around the clinic. This generated interest to the extent that nurses who were not part of the study asked to listen to the educational session. These nurses primarily included infusion nurses who had contact with breast cancer patients during their chemotherapy and other infusion therapy appointments. They were not initially included in the study as they were not considered members of the primary care team. Often, they have a relatively short, yet impactful and important, presence in a patient's care journey and do not see patients routinely in the survivorship period. They may never encounter patients who receive only endocrine therapy, a population that is at high risk for CRCI. In the second educational session, six or more infusion nurses joined for the majority of the session. These nurses perform nursing assessments on breast cancer patients and may communicate symptoms or side effects to the primary team. They can even place OT referral orders as other nurses do, with a prescribing provider named to co-sign the order. For these reasons, they are important members of the care team as it relates to identification and management of CRCI and should be considered in future education. Perhaps widening the scope of education provided would further the awareness of CRCI and the collective efforts of the care team to address this important symptom. Other clinicians who could be included are triage nurses, radiation nurses, and surgical nurses.

In addition to widening the scope of education to the broader care team, future iterations and expansions of this project could include identifying a champion within each clinic. This clinician could be empowered to take leadership within the initiative and tasked to keep discussion and momentum going on management of CRCI. The hope is that such a champion would keep the momentum created by education strong. However, it may also be beneficial to query clinicians and analyze referral rates at another time point further from the educational intervention. With or without a clinic champion, it would be important to note if the education produced a lasting change among clinicians or if further work should be done to re-educate clinicians following the initial sessions.

Further research should also focus on distinguishing between the effects of educating clinicians on OT for CRCI and the impact of increasing access to OT services. It seems likely that both play an important role in improving the management of CRCI for breast cancer patients. An initial follow-up study might reproduce the current project in a clinic in which an

OT is already embedded. It would be interesting to assess the effects of education and difference in referral rates following education in a clinic with satisfactory access to an OT.

Given the limitations in analysis of OT referral rates through the EMR, further research should include a more precise method for discerning the indication for OT referral. Perhaps through partnership with Information Technology (IT), a radio button for CRCI could be created within the referral order. By simplifying the process of linking an order to a diagnosis, it is predicted that more referrals will be placed with an accurate diagnosis linked. Also utilizing the EMR, a hard stop could be placed at the OT referral before it can be signed to require linking to a diagnosis that is treated by OT. This would eliminate referrals linked to the visit diagnosis.

Initially, this investigator wanted to create an educational tool designed for patients, with the goal of posting it in the medical oncology exam room. This aligns with the literature review findings suggesting that patients want validation of CRCI symptoms (Munir et al., 2011; Selemat et al., 2014). Due to approval requirements at the institution and other reasons, this was not completed during the time frame of the project. However, it could be an important aspect of similar projects moving forward.

While the results of this project show positive changes among clinicians who care for breast cancer patients and an increase in the number of patients who receive OT as an intervention for CRCI, further work is needed to determine if this change translates into an improvement in the patient’s experience of CRCI. Prior literature showed that women desired validation of their cognitive symptoms (Munir et al., 2011; Selemat et al., 2014). It is suspected that increasing options for management of CRCI among patients would increase validation. Given the broad range of symptoms associated with cognitive impairment and the many factors that affect quality of life, further research should investigate the impact of OT interventions on overall quality of life.

5.4 Conclusion

Breast cancer is a prevalent disease associated with high rates of CRCI. There are many potential causes of CRCI, which may present in many different ways and have the potential to be long-lasting and negatively affect quality of life among breast cancer survivors. OTs are well-versed in many strategies to manage CRCI. Though many patients experience CRCI, this symptom was not consistently addressed. The intention guiding this project was to convey the benefits of OT for CRCI via education to breast cancer clinicians.

This education not only increased the knowledge, skills and attitudes of clinicians involving OT for comprehensive assessment and management of CRCI, but also led to a substantial increase in referrals to OT. This suggests that the identification and management of CRCI among breast cancer patients has improved. Magnifying attention on CRCI has the potential to increase the experience of breast cancer for survivors and to potentially improve overall health outcomes and quality of life for the many women who are living as breast cancer survivors.

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APPENDIX A: PRE- AND POST-INTERVENTION SURVEY

Cancer-Related Cognitive Impairment Survey

Start of Block: Block 1

Q1 In order to pair survey responses and maintain anonymity, please create a unique code using the prompts below. You will be asked the same questions in the follow up survey.

e.g. FAR-1725-ATH

What are the first 3 letters of your street name? (1)

____

○ What are the last 4 digits of your cell phone number? (2)

____

○ What are the first 3 letters of your high school? (3)

____

Page Break

Instructions The purpose of this survey is to understand your recognition and management of cognitive issues in your breast cancer patients.

This information will be used to guide education needs for clinicians regarding cognitive issues and to optimize the care of cancer patients who may be experiencing or at risk for experiencing cognitive issues during their cancer trajectory.

Your participation is voluntary and anonymous. All responses will be kept confidential and only reported in aggregate. Your participation will not be reported to leadership or affect your employment.

Participation should take no longer than 10 minutes. You may skip any item you wish and opt to stop participating in the survey at any time.

End of Block: Block 1

Start of Block: Block 2

Q2 What is your role?

○ Registered Nurse (1)

○ Advanced Practice Provider (2)

○ Physician (3)

Q3 How long have you been caring for breast cancer patients?

○ < 1 year (1)

○ 1-5 years (2)

○ 6-10 years (3)

○ >10 years (4)

End of Block: Block 2

Start of Block: Block 3

Instructions Please answer all items based on your experiences with your non-metastatic breast cancer patients over the past 6 months.

End of Block: Block 3

Start of Block: Block 4

Q4 How many of your patients do you think *experience* cognitive impairment as a result of their cancer or cancer treatments?

	0	10	20	30	40	50	60	70	80	90	100
Percentage of patients ()											

Q5 How many of your patients do you think *report* cognitive impairment as a result of their cancer or cancer treatments?

	0	10	20	30	40	50	60	70	80	90	100
Percentage of patients ()											

End of Block: Block 4

Start of Block: Block 5

Q6 How *often* do you assess for cognitive impairment in your patients?

	0	10	20	30	40	50	60	70	80	90	100
Percentage of time ()											

Q7 How *comfortable* are you assessing for cognitive impairment in your patients?

Extremely uncomfortable	Somewhat uncomfortable	Neither comfortable nor uncomfortable	Somewhat comfortable	Extremely comfortable

	0	10	20	30	40	50	60	70	80	90	100
Level of Comfort ()											

End of Block: Block 5

Start of Block: Block 6

Q8 How do you assess for cognitive impairment in your patients? (Select all that apply.)

☐ NCCN Distress Thermometer (1)

☐ A specific cognitive assessment tool such as Mini Mental State Exam, clock drawing, handwriting assessment, or other. (Please write the tool below) (2)

____

☐ I usually inquire about cognitive changes when taking the patient's history (3)

☐ If cognitive changes are noted, I ask follow up questions (4)

☐ If the patient mentions cognitive symptoms, I ask follow up questions (5)

☐ Other: (6) ____

Q9 What are the *barriers* to assessing cognitive impairment in your patients? (Select all that apply.)

☐ Unaware that cognitive impairment is an issue (1)

☐ Not enough time in a clinic visit to assess cognitive impairment (2)

☐ Not sure of how to assess cognitive impairment (3)

☐ The assessments that I am aware of for cognitive impairment are too involved (4)

☐ Cognitive changes are typically not the most pressing issue to address (5)

☐ I do not perceive cognitive changes to be a problem (6)

☐ I do not perceive assessment of cognitive impairment to be within my role (7)

☐ Other: (8) ____

Q10 Cognitive impairment typically presents in my patients as: (Select all that apply)

☐ Changes in short- or long-term memory (1)

☐ Changes in motor function, including fine motor movements (2)

☐ Difficulty processing information (3)

☐ Difficulty with executive function (Ex. planning ahead, following multi-step directions) (4)

☐ Difficulty with attention and concentration (5)

☐ Difficulty with verbal or mental fluency (Ex. word-finding) (6)

☐ Difficulty adapting to change or unplanned events (7)

☐ Other: (8) ____

End of Block: Block 6

Start of Block: Block 7

Q11 How *often* do you suggest an intervention to address cognitive impairment?

	0	10	20	30	40	50	60	70	80	90	100
Percentage of time ()											

Q12 How *comfortable* are you suggesting interventions for cognitive impairment to your patients?

	Extremely uncomfortable	Somewhat uncomfortable	Neither comfortable nor uncomfortable	Somewhat comfortable	Extremely comfortable

	0	10	20	30	40	50	60	70	80	90	100
Level of Comfort ()											

End of Block: Block 7

Start of Block: Block 8

Q13 What interventions do you suggest to your patients to address cognitive impairment? (Select all that apply.)

☐ Comprehensive Neurocognitive Testing (1)

☐ Pharmacotherapy (Please specify the medications you might suggest) (2) ____

☐ Occupational Therapy (3)

☐ Speech Therapy (4)

☐ Community Program (Please specify the program you might suggest) (5) ____

☐ Online Program (Ex. Brain Teasers; Please specify the program you might suggest) (6) ____

☐ I am unaware of available interventions for cognitive impairment (7)

☐ Not applicable (I do not suggest interventions for cognitive impairment) (8)

☐ Other: (9) ____

Q14 What are the barriers to suggesting interventions for cognitive impairment? (Select all that apply.)

☐ I am unaware that cognitive changes are a problem (1)

☐ I am unaware of interventions to suggest for this problem (2)

☐ Therapists / Interventionists are not readily available or accessible (3)

☐ Interventions are costly (4)

☐ Other: (5) ____

End of Block: Block 8

Start of Block: Block 9

Q15 Please rate your knowledge about how occupational therapy may be utilized as an intervention for cognitive impairment in cancer patients.

0 10 20 30 40 50 60 70 80 90 100

Knowledge level ()	

Q16 How comfortable are you describing the services that occupational therapy can provide for patients with cognitive impairment?

	Extremely uncomfortable	Somewhat uncomfortable	Neither comfortable nor uncomfortable	Somewhat comfortable	Extremely comfortable

0	10	20	30	40	50	60	70	80	90	100

Level of Comfort ()	

End of Block: Block 9

Start of Block: Block 10

Q17 Please share any other thoughts or suggestions you may have surrounding the care of breast cancer patients with cognitive impairment

____

____

____

____

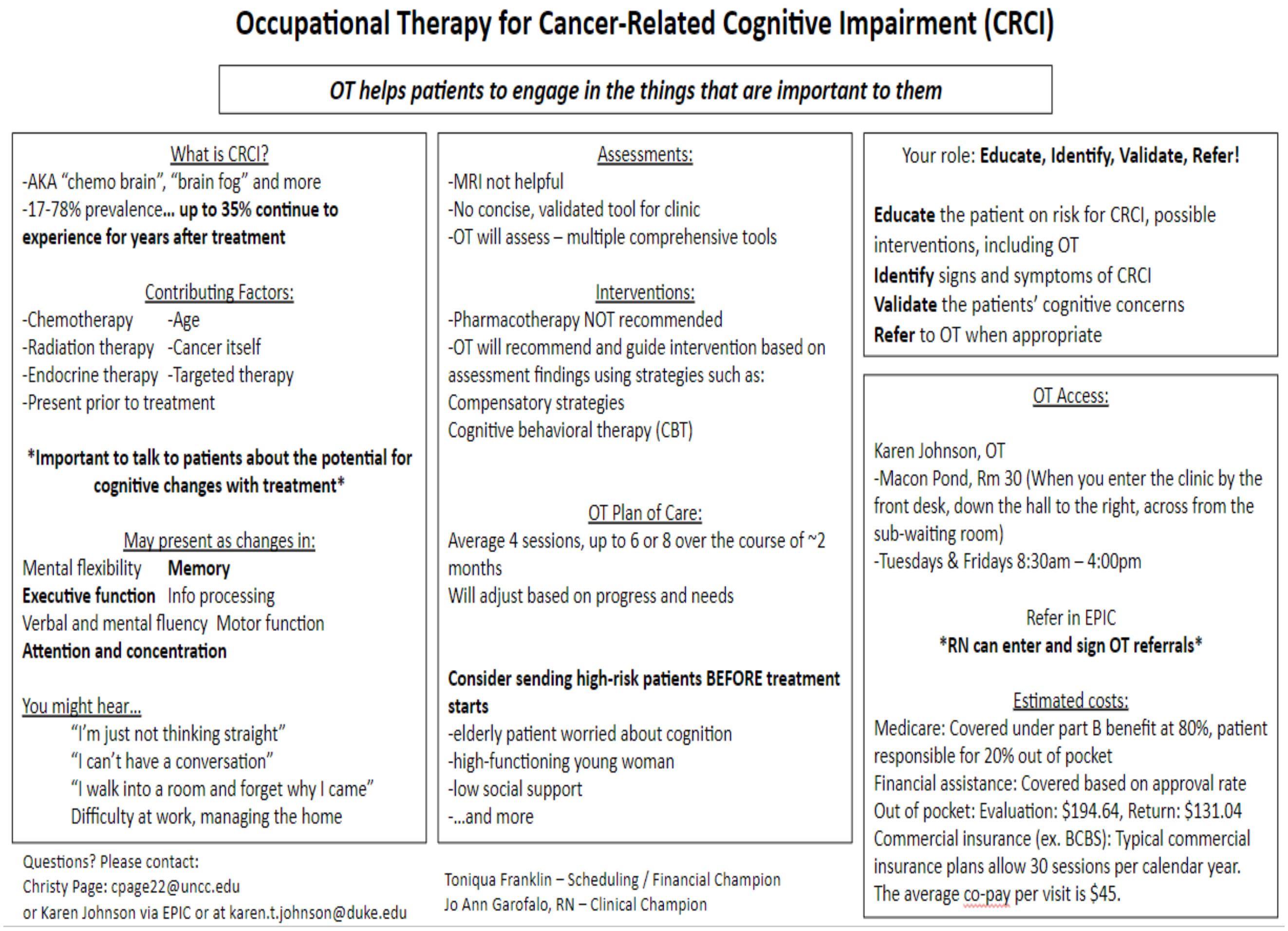
____

End of Block: Block 10

APPENDIX B: SURVEY QUESTIONS: TYPE AND PURPOSE

Question Number	Question Type	Question Purpose
1	Free Text	Unique Code to Pair Surveys
2	Multiple Choice	Demographics
3	Multiple Choice	Demographics
4	Slider	Knowledge
5	Slider	Knowledge
6	Slider	Skills
7	Slider	Skills
8	Multiple Choice	Skills
9	Multiple Choice	Knowledge, Skills & Attitudes
10	Multiple Choice	Knowledge
11	Slider	Skills & Attitudes
12	Slider	Skills
13	Multiple Choice	Knowledge
14	Multiple Choice	Knowledge
15	Slider	Knowledge
16	Slider	Skills
17	Free Text	Knowledge, Skills, or Attitudes

APPENDIX C: CRCI EDUCATION SESSION – EDUCATIONAL REFERENCE / HANDOUT GIVEN TO PARTICIPANTS



Occupational Therapy for Cancer-Related Cognitive Impairment (CRCI)

OT helps patients to engage in the things that are important to them

What is CRCI?

-AKA "chemo brain", "brain fog" and more

-17-78% prevalence**... up to 35% continue to experience for years after treatment**

Contributing Factors:

-Chemotherapy	-Age
-Radiation therapy	-Cancer itself
-Endocrine therapy	-Targeted therapy
-Present prior to treatment	

Important to talk to patients about the potential for cognitive changes with treatment

May present as changes in:

Mental flexibility	**Memory**
Executive function	Info processing
Verbal and mental fluency	Motor function
Attention and concentration	

You might hear...

"I'm just not thinking straight"
"I can't have a conversation"
"I walk into a room and forget why I came"
Difficulty at work, managing the home

Assessments:

-MRI not helpful

-No concise, validated tool for clinic

-OT will assess – multiple comprehensive tools

Interventions:

-Pharmacotherapy NOT recommended

-OT will recommend and guide intervention based on assessment findings using strategies such as:

Compensatory strategies

Cognitive behavioral therapy (CBT)

OT Plan of Care:

Average 4 sessions, up to 6 or 8 over the course of ~2 months

Will adjust based on progress and needs

Consider sending high-risk patients BEFORE treatment starts

-elderly patient worried about cognition

-high-functioning young woman

-low social support

-...and more

Your role: **Educate, Identify, Validate, Refer!**

Educate the patient on risk for CRCI, possible interventions, including OT

Identify signs and symptoms of CRCI

Validate the patients' cognitive concerns

Refer to OT when appropriate

OT Access:

Karen Johnson, OT

-Macon Pond, Rm 30 (When you enter the clinic by the front desk, down the hall to the right, across from the sub-waiting room)

-Tuesdays & Fridays 8:30am – 4:00pm

Refer in EPIC

RN can enter and sign OT referrals

Estimated costs:

Medicare: Covered under part B benefit at 80%, patient responsible for 20% out of pocket

Financial assistance: Covered based on approval rate

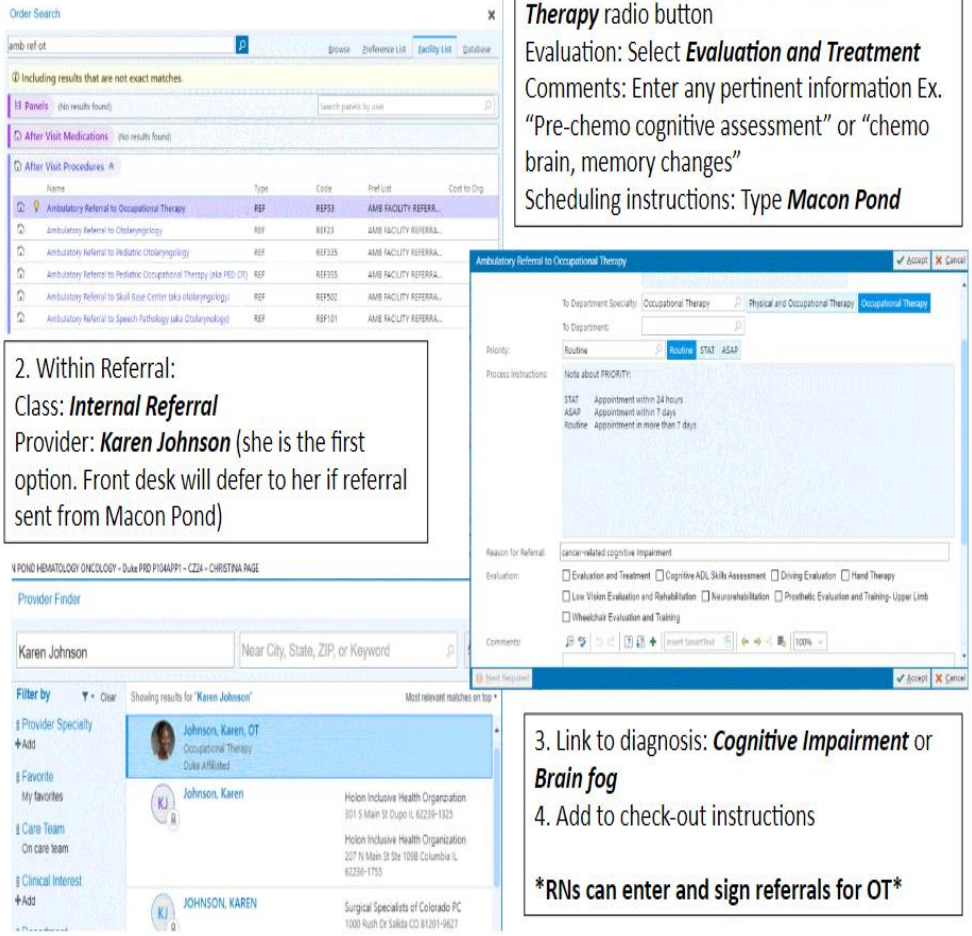
Out of pocket: Evaluation: $194.64, Return: $131.04

Commercial insurance (ex. BCBS): Typical commercial insurance plans allow 30 sessions per calendar year. The average co-pay per visit is $45.

Questions? Please contact:
Christy Page: cpage22@uncc.edu
or Karen Johnson via EPIC or at karen.t.johnson@duke.edu

Toniqua Franklin – Scheduling / Financial Champion
Jo Ann Garofalo, RN – Clinical Champion

1. In Order Entry, Type **AMB REF TO OT**



Order Search

amb ref ot

ⓘ Including results that are not exact matches.

Panels (No results found)

After Visit Medications (No results found)

After Visit Procedures

Name	Type	Code	Pref List	Cost to Org
Ambulatory Referral to Occupational Therapy	REF	REF53	AMB FACILITY REFERR...	
Ambulatory Referral to Otolaryngology	REF	REF23	AMB FACILITY REFERRA...	
Ambulatory Referral to Pediatric Otolaryngology	REF	REF335	AMB FACILITY REFERRA...	
Ambulatory Referral to Pediatric Occupational Therapy (aka PED OT)	REF	REF355	AMB FACILITY REFERRA...	
Ambulatory Referral to Skull Base Center (aka otolaryngology)	REF	REF502	AMB FACILITY REFERRA...	
Ambulatory Referral to Speech Pathology (aka Otolaryngology)	REF	REF101	AMB FACILITY REFERRA...	

2. Within Referral:
Class: ***Internal Referral***
Provider: ***Karen Johnson*** (she is the first option. Front desk will defer to her if referral sent from Macon Pond)

N POND HEMATOLOGY ONCOLOGY - Duke PRD P104APP1 - CZ24 - CHRISTINA PAGE

Provider Finder

Karen Johnson

Showing results for "Karen Johnson"

Johnson, Karen, OT
Occupational Therapy
Duke Affiliated

Johnson, Karen
Holon Inclusive Health Organization
301 S Main St Dupo IL 62239-1325
Holon Inclusive Health Organization
207 N Main St Ste 109B Columbia IL 62236-1755

JOHNSON, KAREN
Surgical Specialists of Colorado PC
1000 Rush Dr Salida CO 81201-9627

Department Specialty: Click ***Occupational Therapy*** radio button
Evaluation: Select ***Evaluation and Treatment***
Comments: Enter any pertinent information Ex. "Pre-chemo cognitive assessment" or "chemo brain, memory changes"
Scheduling instructions: Type ***Macon Pond***

Ambulatory Referral to Occupational Therapy

To Department Specialty: Occupational Therapy [Physical and Occupational Therapy] [Occupational Therapy]

To Department:

Priority: Routine [Routine] [STAT] [ASAP]

Process Instructions: Note about PRIORITY:

STAT Appointment within 24 hours
ASAP Appointment within 7 days
Routine Appointment in more than 7 days

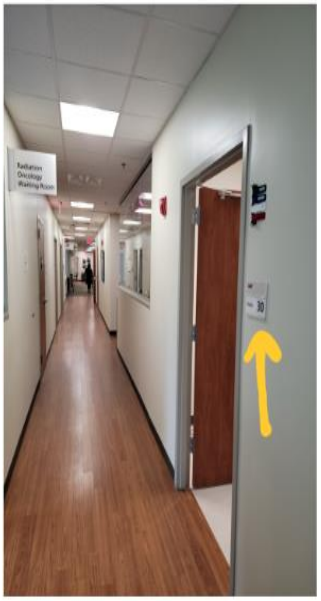
Reason for Referral: cancer-related cognitive impairment

Evaluation: ☐ Evaluation and Treatment ☐ Cognitive ADL Skills Assessment ☐ Driving Evaluation ☐ Hand Therapy ☐ Low Vision Evaluation and Rehabilitation ☐ Neurorehabilitation ☐ Prosthetic Evaluation and Training- Upper Limb ☐ Wheelchair Evaluation and Training

Comments:

3. Link to diagnosis: ***Cognitive Impairment*** or ***Brain fog***
4. Add to check-out instructions

RNs can enter and sign referrals for OT



Karen Johnson, OT
Tuesdays & Fridays at Macon Pond
Room 30