

VISUAL ASSESSMENT PROTOCOL IN ACUTE STROKE

1

Implementation of a Visual Assessment Protocol in the Acute Care Stroke Population

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Table of Contents

Introduction.....	4
<i>Literature Review</i>	5
Prevalence and Types of Visual Impairment Following Stroke.....	5
Effect of Visual Impairment on Outcomes and Quality of Life.....	8
Occupational Therapy's Role.....	9
Visual Assessment Tools	11
Barriers to Implementing Visual Assessment	14
Conceptual Foundations of Visual Assessment	16
Summary	16
Capstone Plan and Process	17
Project Description.....	17
Setting/Capstone Site	17
Population/Participants	18
Project Focus Area	18
Needs Assessment.....	19
Capstone Project/Experience Objectives	20
Model/Theory	22
Planning and Development.....	23

Review of Current Process and Structures (Weeks 1-4)	23
Protocol Development (Weeks 3-9).....	24
Development of Structural Supports (Weeks 5-9)	25
Education and Outcomes (Weeks 10-14).....	25
Sustainability Planning (Weeks 12-14).....	25
Evaluation Plan	26
Outcomes	27
Project Summary.....	27
Project Outcome and Analysis	28
Discussion.....	30
Interpretation of Results.....	30
Dissemination	31
Limitations	31
Implications for Profession.....	32
Future Directions	32
Conclusion	33
References.....	35
Appendices.....	40

Introduction

Stroke is one of the leading causes of long-term disability worldwide (Centers for Disease Control and Prevention, 2024), leaving survivors to navigate a range of physical, cognitive, and neurological challenges. Among these, visual impairment is one of the most prevalent, yet often overlooked stroke-related symptoms, affecting over half of stroke survivors (Hepworth et al., 2016). Stroke-related visual deficits present in various ways (Herron, 2015), significantly impacting a person's ability to engage in daily activities and safely navigate their environment. These impairments not only pose challenges to basic self-care and functional independence but also influence rehabilitation outcomes, hospital length of stay, and overall quality of life (Bould et al., 2022; Hepworth & Rowe, 2016; Rowe et al., 2019). Despite the clear impact of post-stroke visual deficits, visual screening and assessment are not routinely conducted in acute care settings, leading to missed or delayed diagnoses that may hinder or prolong recovery (Vancleef et al., 2020).

Occupational therapists play a valuable role in evaluating and addressing visual impairments following a stroke, as they directly affect engagement in meaningful occupations, mobility, and safety (Hildebrand et al., 2023). However, several barriers prevent occupational therapists from consistently integrating visual assessments into acute care practice. Limited resources, lack of training in visual assessment, and absence of uniform screening protocols create significant obstacles to identifying visual impairments early in the rehabilitation process (Rowe et al., 2020; Vancleef et al., 2020). Without proper identification, visual deficits may go unrecognized, leading to ineffective therapeutic interventions that fail to address the root cause of functional difficulties (Bould et al., 2022; Smith et al., 2018).

The failure to assess vision in acute care settings has far-reaching implications, affecting not only rehabilitation outcomes but also discharge planning and long-term safety (McGwin, 2016). If stroke survivors return home without ever having their vision formally evaluated, they are at increased risk for falls, difficulty performing daily activities, and challenges with community mobility, including driving (McGwin, 2016 & Rowe et al., 2019). A lack of early intervention means that patients may not receive the necessary referrals to vision specialists, adaptive strategies, or rehabilitative support needed to maximize recovery. Addressing this gap requires a shift in acute care practice, ensuring that occupational therapists have the tools, knowledge, and support to incorporate visual screening into their assessments. By recognizing the importance of vision in stroke rehabilitation, healthcare providers can improve patient outcomes, promote greater functional independence, and enhance stroke survivors' overall quality of life (Rowe et al., 2019).

Literature Review

Prevalence and Types of Visual Impairment Following Stroke

Visual impairment following stroke is highly prevalent, affecting approximately 65% of stroke survivors, with many individuals presenting with more than one visual impairment (Hepworth et al., 2016). Visual impairments can manifest in many forms depending on the severity and location of the stroke (Herron, 2015). Some visual impairments that are common in stroke survivors include visual field cuts, oculomotor dysfunction, visual perception impairment, and loss of visual acuity.

One of the most common post-stroke visual deficits is visual field loss, which affects about 20-57% of stroke survivors (Rowe et al., 2008). This condition occurs when one or more areas of a person's visual field are impaired, often due to damage along the visual pathways in

the brain. A common form of visual field loss, homonymous hemianopia, results in the loss of vision on the same side in both eyes. Loss of visual fields can make tasks that require full-field vision, such as driving, particularly challenging (Hepworth et al., 2016). It can also lead to increased fall risk, as individuals may have difficulty detecting obstacles in their environment, further limiting mobility and independence. Among those with visual field impairment, research suggests that 94% of cases are associated with cortical strokes, particularly in the occipital and parietal lobes (Rowe et al., 2008).

Research indicates that many stroke survivors with homonymous visual field loss are unaware of their impairment, with one study finding that 62% of affected individuals did not recognize their deficit (Rowe et al., 2019). Another study reported that less than half of individuals with visual field loss acknowledged symptoms of their condition (Hepworth et al., 2021). This lack of awareness suggests that self-reported symptoms may underestimate the true prevalence of visual impairments in stroke survivors, leading to potential misrepresentation in clinical assessments and underdiagnosis. Given that patients cannot always accurately report their visual deficits, uniform screening protocols are essential for ensuring early detection and appropriate intervention.

Another commonly occurring deficit is oculomotor dysfunction, which affects eye movements and coordination. Conditions such as strabismus (misalignment of the eyes), diplopia (double vision), and difficulties with gaze stabilization impact approximately 34-68% of stroke survivors (Rowe et al., 2019). Diplopia can make activities like reading and driving difficult, often requiring compensatory strategies or corrective interventions, such as prism lenses. Oculomotor dysfunctions are closely linked to cortical strokes, with 83% of cases occurring due to lesions in these brain regions (Rowe et al., 2008). These impairments can lead to challenges

with depth perception, visual tracking, and balance, further complicating daily tasks and overall safety in mobility.

Visual perceptual deficits are also common after neurological injury. Visual perception is a complex and dynamic process that allows individuals to interpret their surroundings by processing sensory inputs. This processing translates stimuli into meaningful concepts that contribute to their understanding of the environment (Vancleef et al., 2020). Visual perception depends not only on sensory processing but also on the ability to attend to visual stimuli, either intentionally or through involuntary reactions to stimuli, such as sudden changes in light (Poth, 2024). Stroke survivors may experience visual perceptual difficulties that interfere with object recognition, spatial awareness, and reading comprehension. Research suggests that between 20-40% of stroke survivors have impairments in visual perception, including difficulties with figure-ground discrimination (distinguishing objects from their background), depth perception, and object recognition (Smith et al., 2018). Additionally, visual neglect occurs in approximately 30-50% of individuals with right-hemisphere strokes (Vancleef et al., 2020). This condition causes individuals to be unaware of one side of their visual space, leading to difficulties in detecting objects, people, or even parts of their own body on the affected side. As a result, individuals with visual neglect are at higher risk for safety concerns such as collisions, falls, and difficulties with activities of daily living, including dressing, grooming, and eating.

It is also important to note that a subset of individuals with post-stroke visual impairment experience low vision, defined as a significant reduction in visual acuity that cannot be fully corrected with standard glasses. In approximately 31% of cases, low vision results from pre-existing ocular conditions rather than the stroke itself (Rowe et al., 2008). This underscores the

importance of assessing visual history to ensure that visual deficits are not misattributed to stroke.

Given the high prevalence of these impairments, early identification and targeted rehabilitation strategies are essential to optimize and improve recovery and quality of life. While some visual deficits may resolve spontaneously within the first few months post-stroke, many persist and require specialized interventions (Hepworth et al., 2016). Furthermore, because visual impairments often go unrecognized by both patients and clinicians, routine visual assessments should be integrated into stroke care to improve diagnosis and treatment outcomes.

Understanding the nature and impact of these impairments is crucial for developing effective assessment and treatment strategies to enhance functional independence and overall well-being.

Effect of Visual Impairment on Outcomes and Quality of Life

Stroke survivors with visual impairments often experience significantly longer hospital stays compared to those without visual deficits. Rowe et al. (2019) found that patients with normal visual assessments were discharged from the stroke unit approximately 36 days before individuals with visual deficits. This substantial difference highlights the impact of visual deficits on overall function and the ability to regain independence. Visual impairments can hinder mobility, self-care, and participation in rehabilitation, which ultimately delays recovery and increases the need for extended and costly inpatient care.

Furthermore, research by Bould et al. (2022) highlights the significant impact of visual impairments on cognitive assessments among those who have experienced a stroke. Their findings indicate that individuals experiencing visual symptoms performed significantly worse on nearly all tasks of the Oxford Cognitive Screen (OCS), with the exception of executive functioning and recall tasks. These findings highlight the importance of considering visual

impairment when interpreting cognitive assessment results, especially those that require visual function to complete.

With regards to patient outcomes, research consistently demonstrates that post-stroke visual impairment negatively impacts quality of life (Hepworth & Rowe, 2016). Stroke survivors with visual deficits often experience challenges in daily activities, mobility, and social participation, contributing to decreased independence and emotional distress. However, vision-related quality of life tends to improve over time following a stroke, regardless of the severity of the visual deficit or the patient's age at the time of the stroke (Dogra et al., 2024). These findings emphasize the importance of early diagnosis and intervention, as timely treatment and targeted compensatory techniques can help accelerate improvements in vision-related quality of life, ultimately enhancing a patient's overall well-being and functional independence.

Driving safety is another critical concern post-stroke. Individuals with visual field loss, including homonymous hemianopia and quadrantanopia (loss of one-fourth of the visual field), experience significantly higher motor vehicle crash (MVC) rates compared to those with normal vision. Research indicates that drivers with these visual impairments have 2.45 times more MVCs than similarly aged individuals without visual deficits (McGwin, 2016). Additionally, stroke survivors with visual field loss demonstrate greater difficulty maintaining control while driving, with notable impairments in vehicle and speed control, reaction time to unexpected events, and execution of safe driving maneuvers (Elgin et al., 2010). These deficits present a major safety concern not only for the affected individual but also for pedestrians and other drivers. Given the level of independence associated with driving, addressing visual impairments is essential in determining fitness to drive and implementing appropriate rehabilitation strategies.

Occupational Therapy's Role

Occupational therapists play an important role in assessing and addressing visual impairments following a stroke across the continuum of care, but especially in the identification of visual impairments in acute care. Research emphasizes that the most rapid visual recovery occurs within the first 30 days post-stroke, highlighting the need for early and accurate assessment to facilitate appropriate interventions (Herron, 2015). Occupational therapists are uniquely positioned to integrate early visual assessments into acute care by evaluating how visual deficits affect functional independence in occupations and their ability to return home safely (Hildebrand et al., 2023).

Occupational therapy assessment and intervention for visual impairments encompass remediation, compensation, prevention, and health promotion, aligning with the Occupational Therapy Practice Framework (Hildebrand et al., 2023). Through comprehensive evaluation, occupational therapists identify the impact of visuospatial deficits, such as hemianopsia, diplopia, and neglect, on daily function and quality of life (Gillen & Hreha, 2021). Evidence-based interventions, including scanning techniques, environmental modifications, and adaptive equipment, can then be implemented to enhance independence and improve functional outcomes. To address these visual deficits, occupational therapists must play a role in early identification to then apply tailored interventions, increase independence, and promote overall recovery.

Collaboration with vision specialists is also a key component of occupational therapy's role in vision rehabilitation. Studies confirm that occupational therapists effectively identify visual deficits through functional screenings, with a strong correlation between occupational therapy-identified symptoms and diagnoses made by optometrists (Herron, 2015). These findings support the accuracy of occupational therapy-led visual assessments and highlight their essential role in multidisciplinary stroke care. However, while occupational therapists can identify and

implement compensatory strategies for visual deficits, collaboration with optometrists or neuro-optometrists is necessary for diagnosing and treating conditions such as acuity impairments, visual field deficits, oculomotor dysfunction, and cortical visual impairment (Herron, 2015).

Occupational therapy practitioners are integral members of stroke rehabilitation teams across all care settings, with a valuable opportunity in the acute care setting to identify visual impairments that may affect a patient's functional independence and quality of life. Given that vision influences nearly every aspect of rehabilitation, including mobility, cognition, self-care, driving, and social interaction, early identification of deficits is critical for the patient's rehabilitation journey (Herron, 2015). Occupational therapists' ability to address both functional and impairment-based outcomes ensures that stroke survivors receive comprehensive care to maximize independence, safety, and overall quality of life (Hildebrand et al., 2023).

Visual Assessment Tools

To address the high prevalence of stroke-related visual deficits, compounded with low self-reported symptoms, several visual assessment tools have been developed to identify visual impairments following a stroke. The following assessments have been created for implementation across many clinical settings and differ in depth of evaluation and administration time. Each assessment has valuable components that have the potential to inform the development of a visual assessment protocol tailored to the acute care setting.

The Visual Symptoms and Signs Screen (V-SASS) is feasible for clinical use in stroke rehabilitation settings, with acute care clinicians favoring the assessment more than other settings (Roberts et al., 2024). The initial part of the V-SASS collects a brief history of age-related vision conditions and determines whether the patient uses corrective lenses or glasses. The tool is then structured into three sections: visual complaints, static observations, and functional observations.

The visual complaints portion involves a series of yes/no questions about the patient's current visual status. The static observation section evaluates eye alignment, movement, pupil size, eyelid drooping or inability to close, eye discharge, redness, involuntary movements, excessive blinking, and any noticeable head tilting or turning. The functional observation section assesses potential difficulties with light sensitivity, trouble looking in certain directions, excessive eye rubbing when focusing on objects, dizziness triggered by head movements or environmental motion, and discomfort during position changes. If the answer is “yes” to any of the above, the tool suggests a referral for further visual assessment. The validity of the V-SASS tool was confirmed by Wertheimer et al. (2022); however, further research is needed to determine the reliability and feasibility of the screening tool.

A commonly used tool by occupational therapists is the Brain Injury Visual Assessment Battery for Adults (biVABA). This assessment evaluates multiple aspects of visual processing, including contrast sensitivity, visual fields, oculomotor function, visual attention, and visual scanning (Warren, 2006). In addition to standardized testing, the biVABA manual provides detailed guidance on interpreting assessment results, linking visual impairments to functional limitations, and planning effective interventions. It also offers alternative methods for evaluating individuals with limited cognitive or communication abilities. Further, the biVABA provides explanation within its manual to aid therapists in communicating findings to clients, families, interdisciplinary team members, and stakeholders such as insurance providers. The time required for administration can vary widely, some subtests take only a few minutes, while completing the entire battery can be time-consuming (Warren, 2006). However, despite its clinical relevance, there is limited research on the tool's reliability and validity.

Another widely used tool is the Motor-Free Visual Perception Test (MVPT), designed to assess visual perception without requiring motor responses. The MVPT evaluates five key areas: visual discrimination, figure-ground perception, visual memory, visual closure, and spatial awareness (Zeltzer, 2008). It consists of 36 items and is administered using a test booklet and pencil, typically taking 10–15 minutes to complete and 5 minutes to score. The MVPT has demonstrated adequate reliability and validity (Brown & Peres, 2018), with moderate to excellent test-retest reliability (Chiu et al., 2020).

The Vision Impairment Screening Assessment (VISA) tool has demonstrated high diagnostic accuracy in detecting visual deficits among stroke survivors (Rowe et al., 2020). The VISA tool is divided into five sections. The first section collects patient history by asking questions and noting any visible signs of visual deficits. If the patient is unable to provide information, input from family members or caregivers is recommended. The second section evaluates near and distance visual acuity using the LogMAR chart. If a patient has difficulty naming letters, a matching card is available for them to point to the correct symbols. The third section examines eye alignment by assessing the corneal light reflex in each eye. The clinician's observations can be compared to reference images showing normal alignment. Eye movement is assessed by tracking smooth pursuits in upward, downward, left, and right directions. Observations can be compared to reference images showing full ocular rotations. The fourth section evaluates visual fields, and the fifth section assesses visual inattention using tasks such as line bisection and clock drawing. Inter-rater reliability was found to be substantial by Rowe et al. (2020); however, more research is needed to determine its feasibility within the acute care setting specifically.

Although the above assessments give occupational therapists structured tools to assess stroke-related visual deficits, there are challenges to implementation in the acute care setting. The lack of clinical implementation highlights the need to understand barriers that hinder occupational therapists from applying assessments in clinical practice. Understanding these barriers will also better inform the development of a practical visual assessment protocol tailored for acute care implementation.

Barriers to Implementing Visual Assessment

Despite the impact of visual impairment on stroke recovery, several obstacles hinder the routine implementation of comprehensive visual assessments in acute care settings. One significant challenge is the absence of uniform screening protocols for detecting visual deficits after a stroke (Rowe et al., 2020). Without a consistent framework for assessment, visual impairments may go undiagnosed or be addressed inconsistently, limiting the effectiveness of early intervention (Rowe et al., 2020).

Another critical barrier is healthcare professionals' limited awareness and training regarding post-stroke visual impairments. Many providers are not adequately educated on the prevalence, presentation, and functional impact of these deficits, leading to missed or inaccurate diagnoses (Vancleef et al., 2020). Increasing education and interdisciplinary collaboration are essential to improving visual assessment practices within stroke care, so that clinicians may better understand how to assess and address visual deficits (Herron, 2015).

Resource constraints, including time limitations and competing clinical priorities, further complicate the integration of visual screening into standard stroke care. In fast-paced acute care environments, healthcare providers may prioritize other pressing medical concerns, leaving visual deficits undetected or unaddressed (Vancleef et al., 2020). Addressing these challenges

requires streamlined screening tools that can be efficiently administered without significantly increasing provider workload.

In addition to systemic barriers, stroke-related impairments such as aphasia and cognitive deficits pose situational challenges to conducting visual assessments. Aphasia, a disorder that affects an individual's ability to comprehend or express speech, can make it difficult for patients to articulate visual symptoms or follow assessment instructions. Similarly, cognitive deficits may impair a patient's ability to participate fully in screening procedures, leading to incomplete or inaccurate evaluations (Vancleef et al., 2020). Aphasia affects approximately 62% of acute patients who have experienced stroke, and cognitive deficits affect approximately 76% (Ghoreyshi et al., 2021). With aphasia and cognitive deficits having such a high incidence within the stroke population, developing assessment strategies that accommodate these limitations is essential to obtaining an accurate understanding of a patient's visual status.

Stroke survivors may also have difficulty recognizing their visual deficits, contributing to an underreporting of visual concerns. Research suggests that many individuals with post-stroke visual impairments are unaware of their condition, which can delay diagnosis and appropriate intervention (Smith et al., 2018). This highlights the importance of proactive screening rather than relying on self-reported symptoms alone.

Finally, inconsistency among stroke-care providers in assessing visual function further exacerbates gaps in recognition and treatment. The lack of a uniform approach to visual assessment results in variability in clinical practices, thereby reducing the likelihood that visual impairments will be consistently identified and addressed. Establishing uniform screening protocols across stroke care settings would help bridge these gaps and improve outcomes for stroke survivors with visual deficits (Roberts et al., 2024).

Conceptual Foundations of Visual Assessment

Visual function can be conceptualized by using Mary Warren's widely accepted visual hierarchy, which describes visual skills as a progression of interrelated levels (Warren, 1993). Within this hierarchy, lower-level visual skills such as visual acuity, visual fields, oculomotor control, and visual attention are necessary to provide the foundation for higher-level visual skills such as visual memory and visual perception (Warren, 1993). As an interrelated system, when lower-level visual components are disrupted, higher-level performance may also be negatively impacted (see hierarchy illustration in Appendix D).

Warren's hierarchical framework offers a clinically meaningful structure for visual assessment following stroke in the acute care setting. With barriers to visual assessment, including time constraints, medication-related symptoms, and stroke-related symptoms, such as cognition, communication, and fatigue, this hierarchy highlights key foundational visual components to prioritize in assessment. Early identification of impairments in foundational visual skills may provide important information that could guide further visual assessment and intervention across the continuum of care.

Summary

Visual impairments are a common but frequently underrecognized consequence of stroke, with significant implications for safety, functional independence, and quality of life. Despite the high prevalence of visual deficits among stroke survivors (Hepworth et al., 2016), routine visual screening and assessment are not consistently implemented in acute care settings. This gap in care often results in delayed or missed diagnoses, leading to inadequate or misdirected therapeutic interventions (Vancleef et al., 2020). When visual impairments go undetected, patients may be inaccurately assessed, their needs misunderstood, and their recovery hindered.

The purpose of this capstone project was to address this gap by promoting early identification of visual impairments within acute care through the implementation of uniform visual assessments. By implementing early visual assessments and detecting visual deficits, clinicians may be able to apply appropriate rehabilitation strategies and initiate referrals to relevant services sooner. This approach has the potential to improve functional outcomes, reduce hospital length of stay, and facilitate a quicker and safer return home. Furthermore, addressing visual impairments early on can prevent the misinterpretation of functional or cognitive challenges that may stem from vision-related issues, as this misinterpretation could lead to ineffective rehabilitation strategies, prolonged recovery, and failure to provide appropriate support for the patient's actual needs (Bould et al., 2022; Smith et al., 2018).

This project also emphasizes the importance of occupational therapy in visual screening and intervention. Occupational therapists are uniquely positioned to evaluate how visual deficits affect everyday function and to implement compensatory techniques that enhance safety and independence (Hildebrand et al., 2023). Early identification and intervention may help improve compensatory techniques, allowing individuals to regain essential skills while minimizing risks to themselves and others. Overall, this capstone project emphasizes the critical role of visual assessment in comprehensive stroke care and aims to empower occupational therapists in acute care settings to lead the charge in closing this gap.

Capstone Plan and Process

Project Description

Setting/Capstone Site

This capstone project was implemented in the neuro-acute unit at ECU Health-Greenville Hospital. This unit specializes in the care of patients with a range of neurological diagnoses,

including stroke. The unit consists of 24 intensive care unit (ICU) beds and 58 intermediate care beds, serving a patient population with intensive medical and rehabilitation needs. Occupational therapy services are provided by one occupational therapist and one certified occupational therapy assistant who exclusively provide services to the neuro-acute care setting. Additionally, the broader acute care department includes eleven other occupational therapists and five occupational therapy assistants who provide services across various other acute care settings.

Population/Participants

The primary participants involved in this capstone project were occupational therapists working in the acute care setting at the project site. These practitioners are responsible for evaluating and treating patients with complex neurological conditions, including those recovering from stroke. All participating therapists were employed at ECU Health and worked primarily in acute care, as confirmed through survey responses. The majority of occupational therapists (67%) reported having 0-5 years of experience, while 33% had 6-10 years of experience, indicating a mix of early- and mid-career clinicians. These occupational therapists served as the target population for this capstone project's program development and educational components. Their insights and participation were critical to shaping and refining a feasible, time-sensitive visual assessment protocol appropriate for the acute care setting.

Project Focus Area

The primary focus of this capstone project was program development through the creation and implementation of a structured visual assessment protocol for occupational therapists to complete in the acute care setting with patients who have experienced neurological injury, such as stroke. This initiative aimed to address the gap in early identification of post-stroke visual impairments, which often go unrecognized due to the absence of uniform

procedures. The program was designed to be evidence-based, feasible for use in a fast-paced hospital environment, and aligned with the occupational therapy scope of practice.

A secondary focus of the capstone project centered on education, specifically targeting the professional development of occupational therapy staff within the acute care setting. Educational efforts were designed to ensure that staff were equipped with the necessary knowledge and skills to implement the newly developed visual assessment protocol effectively. Training materials, including presentations, handouts, and implementation guides, were created and distributed to support learning. A training session was organized to deliver this content, and participants completed pre- and post-training assessments to evaluate changes in knowledge, perceptions of feasibility, and overall confidence. This educational component aimed to promote consistency in assessment practices, foster interdisciplinary communication, and ultimately enhance patient care by increasing awareness of visual impairments following neurological injury.

Needs Assessment

A comprehensive needs assessment was done through interviews, direct observation, and a survey of occupational therapy staff working in the acute care setting at the capstone site. The data highlighted several key challenges related to visual assessment in patients with acute neurological conditions. Interviews and responses from survey questions by occupational therapy staff revealed that while vision-related issues are often observed, no uniform or routine visual assessments are currently integrated into their evaluation process. Most occupational therapists reported relying on informal clinical observations, such as noting visual field cuts, neglect, or diplopia, and occasional questioning of family or caregivers about prior vision history. Current visual assessment tools that are available within the department include the Motor-Free Visual

Perception Test (MVPT) and the Brain Injury Visual Assessment Battery for Adults (BIVABA), but are rarely used due to time restraints in the acute care setting.

The survey of occupational therapists further supported these findings. 83% of occupational therapists reported they do not incorporate visual assessments during acute evaluations. Additionally, all respondents indicated they could only dedicate 1-5 minutes to such assessments during evaluations that typically last 20-30 minutes. Additionally, 50% of respondents reported feeling only “somewhat confident” in their ability to assess vision, and the remaining 50% reported lacking confidence. Staff expressed a need for quick, reliable visual assessments that could be feasibly integrated into their workflow, as well as training resources to build competence and consistency. There was also interest in better understanding the referral process following the identification of visual impairment, as well as in improved access to community vision resources. Collectively, these findings informed the direction of the capstone project by highlighting the need for a brief, uniform visual screening protocol accompanied by staff education and guidance on post-assessment referral (see Appendix A).

Capstone Project/Experience Objectives

The overarching goal of this capstone project was to develop a structured visual assessment protocol for patients who have experienced neurological injury in the acute phase of recovery, improve early identification of visual impairments, and educate occupational therapists on the implementation of said protocol. To achieve this goal, a series of targeted goals and objectives was established to guide the project’s development and implementation (see Appendix B).

Goal 1 was to develop a structured visual assessment protocol for patients who had experienced a stroke in the acute care setting to improve early identification of visual

impairments. Objective 1.1 involved collaborating with occupational therapists and interdisciplinary team members to identify current barriers and needs for visual assessment implementation in acute care. This objective was informed by both formal and informal needs assessment methods, including staff interviews, surveys, and direct observation. Completion of this objective was foundational in ensuring that protocol development was aligned with clinical needs. Objective 1.2 focused on conducting a literature review and gathering data on the type and prevalence of visual deficits, functional impacts, occupational therapy's role in visual assessment, and relevant visual assessment tools. These existing assessment tools were reviewed to inform a visual assessment protocol that aligns with productivity demands while also remaining within the acute care context. Objective 1.3 was the final step, which included implementing the visual assessment protocol within the clinical setting to evaluate its clinical feasibility and effectiveness. This was measured through therapist feedback and observation of clinical application, which then informed protocol refinement.

Goal 2 focused on building clinician competence by holding an occupational therapy staff training on the implementation of the visual assessment protocol. To meet this goal, Objective 2.1 involved developing educational materials, including a training presentation, implementation handouts, quick reference badge cards, and pre- and post-surveys. Objective 2.2 centered on the actual scheduling and facilitation of at least one formal training session for occupational therapy staff, ensuring that the educational content is accessible and relevant to the demands of the acute care clinical setting. Lastly, Objective 2.3 focused on assessing changes in clinicians' overall knowledge, confidence levels, and perceived feasibility through pre- and post-training surveys to inform final protocol refinements and future sustainability.

Goal 3 focused on the application of the visual assessment protocol with a patient caseload to evaluate clinical feasibility while advancing professional competency in the neuro acute care setting. Objective 3.1 involved collaborating with the site mentor to determine an appropriate and manageable caseload that enabled the integration of the visual assessment protocol within routine evaluations. Objective 3.2 included meeting with the site mentor to reflect on treatment efficiency, opportunities for protocol integration, and address integration barriers encountered with the patient caseload. These regular discussions helped monitor progress, troubleshoot challenges, and support ongoing professional growth.

Model/Theory

The Donabedian Model served as the guiding framework for the development and implementation of this capstone project (Donabedian & Attwood, 1963). Widely accepted in healthcare quality assessment, the model evaluates care through three interrelated components: structure, process, and outcome (Ayanian & Markel, 2016). These elements provided a structured lens through which the quality and impact of the visual assessment program could be examined and enhanced (See Appendix E).

The structure component referred to the foundational elements required to implement the visual assessment protocol, including access to screening tools, educational materials, and collaboration with trained professionals such as occupational therapists and ophthalmology services. This phase also encompassed the physical space and resources within the acute care setting that made it possible to implement the new visual assessment protocol.

The process component represented the actions taken throughout the capstone process. Specifically, this project involved the integration of the visual assessment protocol into clinical routines, the training of occupational therapy staff, and the actual administration of the visual

screenings. The processes addressed also included interdisciplinary communication and workflow modifications necessary for successful implementation.

The outcome component focused on evaluating the impact of the program, including enhanced staff knowledge, perceived feasibility, confidence in performing visual assessments, and ultimately, informed discharge planning, and functional outcomes for patients.

By applying Donabedian's Model, the project emphasized the importance of establishing a solid foundation (structure) to support effective clinical implementation (process), thereby increasing the likelihood of meaningful improvements in patient care and recovery (outcome).

Planning and Development

The development of this capstone project followed a structured approach guided by the Donabedian Model (Donabedian & Attwood, 1963), primarily targeting improvements in clinical processes related to early identification of visual impairments in the neuro-acute care population. Structural supports were intentionally and concurrently developed to facilitate sustainable clinical integration of the protocol and measurable outcomes.

The development process occurred over six iterative and interrelated phases, including a needs assessment, structural review, protocol development, development of structural supports, education and outcomes, and sustainability planning.

Review of Current Process and Structures (Weeks 1-4)

The development of this capstone project began with identifying a gap in practice related to the early detection of visual deficits in patients who have experienced neurological injury in the acute care phase of recovery. Initial discussions with occupational therapists and interdisciplinary team members highlighted barriers such as limited time, lack of uniform protocols, lack of confidence in assessing vision, and limited knowledge of referral pathways.

These findings indicated a primary gap at the process level, specifically in the consistent identification of visual deficits during acute care admissions. This was further confirmed by observation of occupational therapy evaluations and weekly discussions with the site mentor.

Concurrent with the review of existing processes, existing structural supports were reviewed. This included available assessment tools, documentation templates, interdisciplinary communication, time limitations, and established referral pathways for patients presenting with visual deficits.

Observation of occupational therapy evaluations, vision rehabilitation services, and ophthalmology consultations provided insight into how visual deficits were currently identified and managed across disciplines. Informal communication with providers supported an understanding of referral processes to neuro-ophthalmology, outpatient vision rehabilitation, and community-based low vision resources.

Protocol Development (Weeks 3-9)

An evidence-based visual assessment protocol was drafted, piloted, and finalized in alignment with the identified needs and structural considerations of the capstone site. The development of the protocol was supported by communication across professions, including the expertise of ophthalmologists and a visual rehabilitation specialist. Components of the protocol were selected based on current literature, expert opinion, and further guided by Mary Warren's Visual Hierarchy Model (Warren, 1993). Emphasis was placed on foundational visual domains most relevant to functional performance, including visual acuity, visual fields, oculomotor control, visual attention, and scanning.

During this time, the protocol was piloted with a patient caseload to ensure alignment with existing structural resources and clinical feasibility. Refinements were made throughout to ensure timely administration while maintaining the protocol's effectiveness.

Development of Structural Supports (Weeks 5-9)

To strengthen the structural framework supporting the implementation of the visual assessment protocol, targeted supports were developed during weeks 5 through 9. These supports included badge-sized reference cards to improve point of care recall (Appendix H), an EPIC (Epic Systems Corporation, 2025) “SmartPhrase” to assist clinical documentation, and educational materials outlining administration procedures. These supports aimed to reduce cognitive load and increase clinician confidence in administration and documentation. During this time, the educational training date was also scheduled and communicated to occupational therapy staff.

Education and Outcomes (Weeks 10-14)

Educational materials were finalized, and a formal educational training was delivered to occupational therapy staff. The training session reviewed evidence, site needs, demonstrated visual assessment procedures, introduced documentation workflows, and provided insight into patient interventions, education strategies, and relevant referral pathways. Pre- and post-training surveys were administered to assess overall clinician knowledge, confidence, and perceived feasibility of integrating and sustaining the visual assessment protocol in acute care practice.

Sustainability Planning (Weeks 12-14)

During the final weeks of the capstone experience, outcome data were collected through staff surveys and implementation feedback. This information provided insight into the feasibility and sustainability in the acute care setting. This information also informed final revisions to the

protocol and supporting materials. Weekly meetings with the site mentor supported evaluation and efforts for continued implementation beyond the capstone experience.

Evaluation Plan

Evaluation of this capstone project included both ongoing and final assessments to ensure that each goal and objective was achieved and effectively contributed to the enhancement of visual assessment in the acute care setting. Goal 1, the development of a structured visual assessment protocol, was evaluated through multiple stages. Initial efforts to identify barriers and needs (Objective 1.1) were assessed by documentation of meetings and collecting feedback from interdisciplinary team members through informal surveys or interviews. The thoroughness of the literature review and selection of evidence-based tools (Objective 1.2) was evaluated through a complete literature review, reviewed and approved by ECU faculty. After the protocol was developed and implemented (Objective 1.3), staff perceptions of feasibility and effectiveness were gathered through pre- and post-training surveys and brief interviews. This feedback informed refinements and determined the protocol's readiness for continued use. The overarching goal was evaluated based on all these factors, with a final evaluation of the complete visual assessment protocol by the site mentor.

For Goal 2, the training and education of occupational therapy staff were evaluated by reviewing the clarity, accuracy, and applicability of all developed materials, including handouts, badge cards, presentation slides, and pre-/post-tests (Objective 2.1). Training sessions (Objective 2.2) were evaluated by tracking participation through sign-in sheets and observing engagement during the sessions. To assess the effectiveness of the training (Objective 2.3), pre- and post-training surveys were distributed to staff to measure changes in overall knowledge, confidence,

and perceived feasibility of the protocol. Qualitative comments were also collected to inform future improvements.

Lastly, Goal 3, which involved managing a small caseload and applying visual assessments, was evaluated through ongoing collaboration with the site mentor. Together, the student and mentor determined an appropriate caseload (Objective 3.1) and frequency of meetings. Meeting with the site mentor weekly (Objective 3.2) provided opportunities for feedback and clinical reflection, which were integral in the overall development of the protocol. The site mentor used weekly time logs, mid-term evaluations, and final evaluations to provide further feedback and evaluation.

Overall, this evaluation plan ensured that the capstone project was grounded in evidence-based practice, supported interdisciplinary collaboration, and promoted professional development through structured feedback and measurable outcomes (See Appendix B).

Outcomes

Project Summary

This capstone project addressed a gap in acute care clinical practice in the early identification of visual deficits following neurological injury. Findings from the capstone needs assessment revealed that occupational therapists frequently observed visual impairments in the neuro-acute care setting. However, the absence of a uniform visual assessment approach, combined with time constraints and variability in clinician confidence and knowledge, contributed to inconsistent assessment practices.

These findings informed the development and implementation of a structured, evidence-based visual assessment protocol tailored to the acute care environment. Guided by the Donabedian Model, this project primarily targeted improvements in clinical processes through

the implementation of a uniform visual assessment protocol to address the previously identified needs of the capstone site. To support process changes, structural elements were strengthened through the development of educational materials, documentation templates, access to screening tools, and collaboration with occupational therapists and vision specialists. Outcomes were then measured through changes in clinician knowledge, confidence, and perceived feasibility of clinical implementation.

Through program development and education, this capstone project strengthened the perceived clinical competence of occupational therapists in visual assessment practices at the capstone site. By embedding a structured assessment approach into routine evaluations, this project also supported long-term sustainability in practice. Collectively, this project demonstrated that structured visual assessment is both feasible and valuable within the acute care setting, reinforcing occupational therapy's role in the early identification of visual impairments and holistic, patient-centered care.

Project Outcome and Analysis

Pre- and post-training surveys were administered to fourteen participating clinicians to assess these outcomes. All survey items used a five-point Likert scale to assess changes in occupational therapists' perceived knowledge, confidence, and feasibility of implementing the visual assessment protocol within the acute care setting (Appendix G).

Pre-training survey results indicated varying levels of knowledge and confidence relating to visual assessment among attending clinicians. Specifically, 14.3% of therapists reported gaps in knowledge (disagree) regarding the common types and prevalence of visual impairment following neurological injury. In addition, 35.7% of therapists reported a lack of confidence (disagree/strongly disagree) in their ability to identify common visual impairments. More than

half (57.1%) of therapists reported low confidence (disagree/strongly disagree) in their ability to differentiate between common visual deficits, including visual fields, oculomotor control, and visual/spatial attention. Confidence in integrating a visual assessment into typical acute care evaluations was also limited, with 64.3% of therapists reporting low confidence (disagree/strongly disagree).

Following the educational training, clinicians demonstrated improvements in both knowledge and confidence in visual assessment. Post-training survey results indicated that 100% of therapists reported being knowledgeable (agree/strongly agree) of common types and prevalence of visual impairments following neurological injury. 100% of therapists also reported feeling either confident or strongly confident (agree/strongly agree) in their ability to identify visual impairments. Similarly, the majority of therapists (93.3%) reported feeling confident in their ability to differentiate between common types of visual impairments. Confidence also increased substantially (93.3%) in therapists' perceived ability to incorporate visual assessment in their acute care evaluations (agree/strongly agree).

In addition to an increase in overall knowledge and confidence, 100% of therapists also reported that they believe the visual assessment protocol is feasible for use in the acute care environment (agree/strongly agree). Further, 100% of therapists reported that they believe this visual assessment protocol can be sustained for long-term use in their acute care practice (agree/strongly agree). Qualitative feedback supported these outcomes, with clinicians reporting that they felt the protocol was "succinct" and "very helpful", as well as feeling that the supporting resources, such as the badge reference card, were "invaluable" to their point-of-care recall.

Collectively, these results suggest that implementation of a structured visual assessment protocol positively influenced occupational therapists' perceived knowledge, confidence, and overall feasibility at the capstone site.

Discussion

Interpretation of Results

Findings from the initial needs assessment highlighted inconsistencies in visual assessment practices across clinicians, including limited knowledge and confidence in the identification of visual impairments following neurological injury. These gaps were consistent with existing literature, which highlights the prevalence of visual impairments and the under-identification of said impairments due to lack of uniform processes and decreased training/awareness (Rowe et al., & Vancleef et al. 2020). Pre-training survey results further supported these findings, with clinicians reporting varying levels of knowledge on the common types and prevalence of visual impairment, varying confidence levels in identifying visual impairments, low confidence in differentiating between common visual impairments, and low confidence in the integration of a visual assessment protocol in the acute care environment.

The outcomes of this capstone project directly address the identified gaps in practice. Following the educational training, clinicians reported improvements across all domains, including knowledge, confidence, and perceived feasibility (Appendix F). The shift between low confidence levels (45%) pre-training and high confidence levels (95%) post-training reflects a meaningful improvement in perceived clinical competence. When considered alongside the needs assessment and relevant literature (Vancleef et al., 2020 & Herron, 2015), this outcome is particularly notable, as it demonstrates that targeted education, paired with structural supports, can address previously identified barriers.

At the systems level, these findings could have meaningful implications for ECU Health Medical Center and the broader health system. Improved clinician competence, paired with a feasible visual assessment protocol, has the potential for a positive effect on the early identification of visual impairments, facilitation of early intervention, more appropriate referrals, and more comprehensive care. By improving clinicians' ability and clinical confidence to assess visual deficits, this project supports more comprehensive care while also highlighting the role of occupational therapy in the functional evaluation of visual deficits.

Dissemination

This capstone was disseminated as an oral presentation at East Carolina University's College of Allied Health Sciences Research Day, as a poster presentation accepted to the American Occupational Therapy Association (AOTA) annual conference, and in this capstone paper. This paper, along with presentations, shared the procedures and outcomes of this capstone project and contributed to broader discussions regarding occupational therapy's role in the early identification of visual impairment following neurological injury. Discussions at the presentations helped to guide future directions for this project.

Limitations

Several limitations should be considered when interpreting this capstone project. The sample size was limited to fourteen participating occupational therapists within a single acute care facility, limiting the generalizability to other facilities. Additionally, outcome measures relied on self-reported survey data, which could be subject to response bias (Althubaiti, 2016). This capstone project was also limited to 14 weeks, which limits the evaluation of long-term sustainability and further iteration. Finally, patient functional outcomes were not measured, so conclusions cannot be generalized to the direct impact on patient recovery or discharge.

Implications for Profession

This capstone project highlights the unique role of occupational therapy in the early detection of visual impairment following neurological injury in the acute care phase of recovery. By demonstrating that a structured, time-efficient screening protocol can be integrated into existing acute-care workflows, this project supports the role of occupational therapy in vision-related assessment and interdisciplinary collaboration.

Further, this capstone project emphasizes the importance of aligning clinical process change with appropriate structural supports to support clinical practice. While the introduction of a visual assessment protocol has meaningful impacts, the sustainability of visual assessment practices relies on supporting factors such as ongoing education and orientation, accessibility to resources, and continued integration into documentation practices. Together, these elements highlight that sustainable change in occupational therapy practice relies on intentional consideration of the systems and environments in which change is implemented.

Future Directions

Future capstone projects and research should focus on the evaluation of the generalizability and long-term sustainability of similar visual assessment protocols. Expanding the sample to include multiple acute care facilities would be key for generalization of results across the broader healthcare system. Further, the incorporation of objective patient outcome measures could provide further insight into the impact of early visual assessment on comprehensive patient care.

It may also be beneficial to examine acute care intervention strategies that address visual deficits while remaining feasible within the acute care setting's environmental constraints. Development of feasible, functionally oriented intervention strategies could allow occupational

therapists to begin effectively addressing visual deficits earlier in the rehabilitation process.

However, as with evaluation, acute care occupational therapy has time constraints that warrant investigation of intervention feasibility.

Finally, further exploration of interdisciplinary collaboration and referral pathways is also warranted. Strengthening the professional connection between occupational therapy, ophthalmology, optometry, and vision rehabilitation services may improve access to early intervention options. Interdisciplinary awareness of community visual resources may support more effective discharge planning and positively affect long-term visual recovery.

Conclusion

This capstone project addressed an identified gap in acute care occupational therapy visual assessment practices through the development and implementation of a visual assessment protocol tailored to the needs of clinicians at the capstone site. Findings from the needs assessment highlighted variability in clinicians' confidence in assessing vision, paired with a lack of uniform assessment practices and time to conduct assessments. Guided by these findings, the implementation of a uniform visual assessment, along with targeted education and structural supports, resulted in meaningful improvements in clinicians' perceived knowledge, confidence, and overall feasibility of clinical use.

These outcomes suggest that a targeted visual assessment protocol can support meaningful changes in clinical practice when appropriately addressing identified needs and supported by structural components. By increasing occupational therapists' perceived clinical competence and providing a practical clinical tool, this capstone project contributed to more comprehensive and functionally focused patient care.

While limitations related to sample size, duration of the project, and reliance on self-reported survey data should be considered, this capstone project provides a foundation for future research on the sustainability and functional outcomes of similar initiatives. Overall, this capstone project reinforces the role of occupational therapy in early identification of visual deficits and highlights the importance of combining evidence, education, uniform processes, and structural supports to promote meaningful change.

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Appendices

Appendix A

Visual of Needs Assessment Process at Capstone Site

NEEDS ASSESSMENT VISUAL ASSESSMENT IMPLEMENTATION IN THE ACUTE CARE STROKE POPULATION By: Brianna Baysek, ECU OTDS

01. The Gap in Acute Stroke Care

Stroke survivors frequently experience visual impairments that can significantly impact their recovery and overall quality of life. Despite this, standardized visual assessments are not consistently implemented in the acute care setting..



03. Barriers to Implementation

- OT staff report limited time due to high patient loads and productivity demands.
- Current visual assessment tools are not appropriate for the acute care setting.
- OT staff report limited knowledge of visual assessments, affecting their confidence in implementation.



02. Acute Care

- The acute care team is comprised of various health professionals with the common goal of stabilizing the patient and addressing urgent medical needs. A key part of this process involves developing a personalized care plan that may include referrals to specialists.
- Early identification of visual impairment allows for timely referrals, ensuring comprehensive care.

04. Creating Change

- Development of a practical, time efficient visual assessment protocol for OT staff.
- Provide education and training for OT staff to ensure understanding and uniformity in implementation.

Appendix B

Capstone Goals, Objectives, and Evaluation

Goals	Objectives	Evaluation (Evidence of Achievement)
Goal 1: Develop a structured visual assessment protocol for patients who have had a stroke in the acute care setting to improve early identification of visual impairments.	Objective 1.1: Collaborate with occupational therapists and other interdisciplinary team members to identify current barriers and needs for visual assessment implementation in acute care by the end of the Spring 2025 semester. Objective 1.2: Conduct an exhaustive literature review and gather evidence-based visual assessment tools to integrate into the visual assessment protocol by the first month of the capstone experience. Objective 1.3: Implement the visual assessment protocol and assess staff perceptions of feasibility and effectiveness by the end of the capstone experience.	- Fully completed visual assessment protocol, ready for immediate implementation in the acute care setting.
Goal 2: Train occupational therapy staff in the acute care setting on how to implement the visual assessment protocol.	Objective 2.1: Develop educational materials including a presentation, a handout on how to implement the visual assessment protocol, and a pre-/post-test for assessment of training outcomes Objective 2.2: Schedule and organize at least one education/training session for occupational therapists on the steps for implementation of the visual assessment protocol. Objective 2.3: Assess staff knowledge and confidence in implementation of the visual assessment protocol by giving pre- and post-surveys on the educational/training session by the end of the capstone experience.	- Training session materials including PowerPoints, handouts, and recordings of training sessions. - Pre- and post-surveys completed by participating staff. - Continuing Education sign in sheet and documented feedback from participants.

Goal 3: Manage a small caseload of patients throughout my capstone to apply visual assessments and enhance my clinical skills/knowledge.	Objective 3.1: Collaborate with my site mentor to determine an appropriate caseload for the entirety of my capstone experience. Objective 3.2: Meet with my site mentor to discuss my caseload and ensure that I am treating efficiently and incorporating visual assessments with patients.	- Documented feedback from site mentor including size of caseload and performance.
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Appendix C

Visual of Capstone Timeline

CAPSTONE TIMELINE



Weeks 5-9

- Finalize visual assessment protocol.
- Begin piloting visual assessment protocol with patient caseload.
- Finalize training dates and share with staff.
- Begin drafting training materials.
- Meet weekly with site mentor to discuss patient caseload.

Weeks 12-14

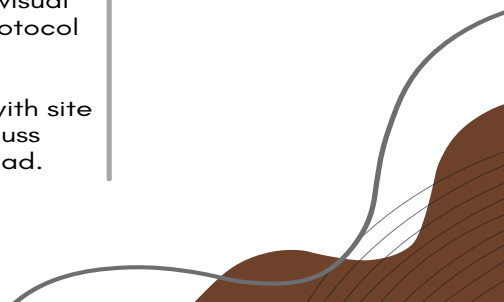
- Collect data from pre- and post-surveys.
- Collect data on visual assessment protocol feasibility.
- Continue implementing visual assessment protocol with patient caseload.
- Meet weekly with site mentor to discuss patient caseload.

Weeks 1-4

- Collaborate with site mentor to determine an appropriate caseload, orient to setting, and begin drafting visual assessment protocol.
- Shadow OT evaluations and Ophthalmology services as needed to inform project.
- Meet weekly with site mentor to discuss patient caseload.

Weeks 10 & 11

- Finalize all training materials.
- Hold training session(s) for OT staff on visual assessment protocol.
- Administer pre- and post-surveys to measure training effectiveness.
- Meet weekly with site mentor to discuss patient caseload.



Appendix D

Mary Warren's Visual Hierarchy

Mary Warren's Visual Hierarchy of Visual Perceptual Skills from Warren (1993)

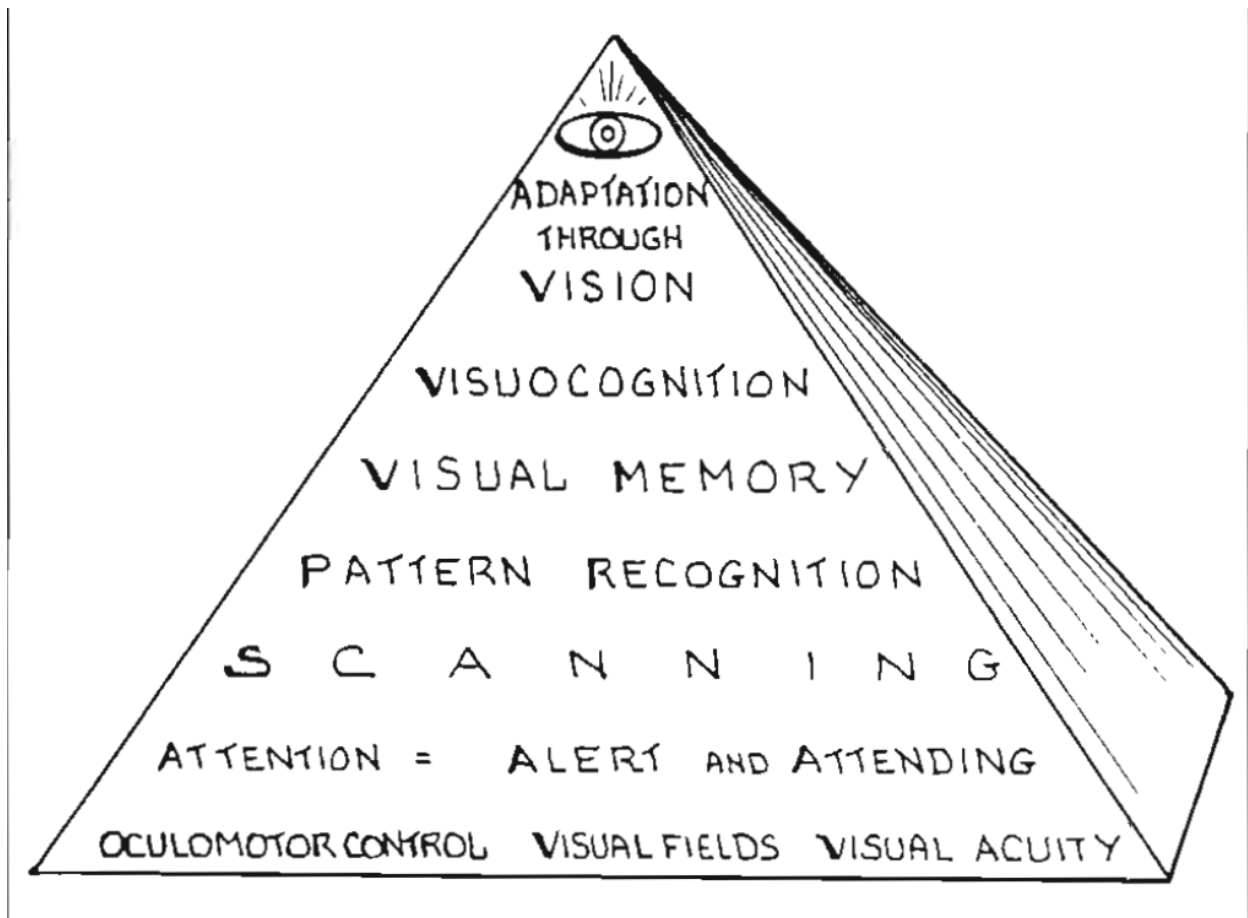
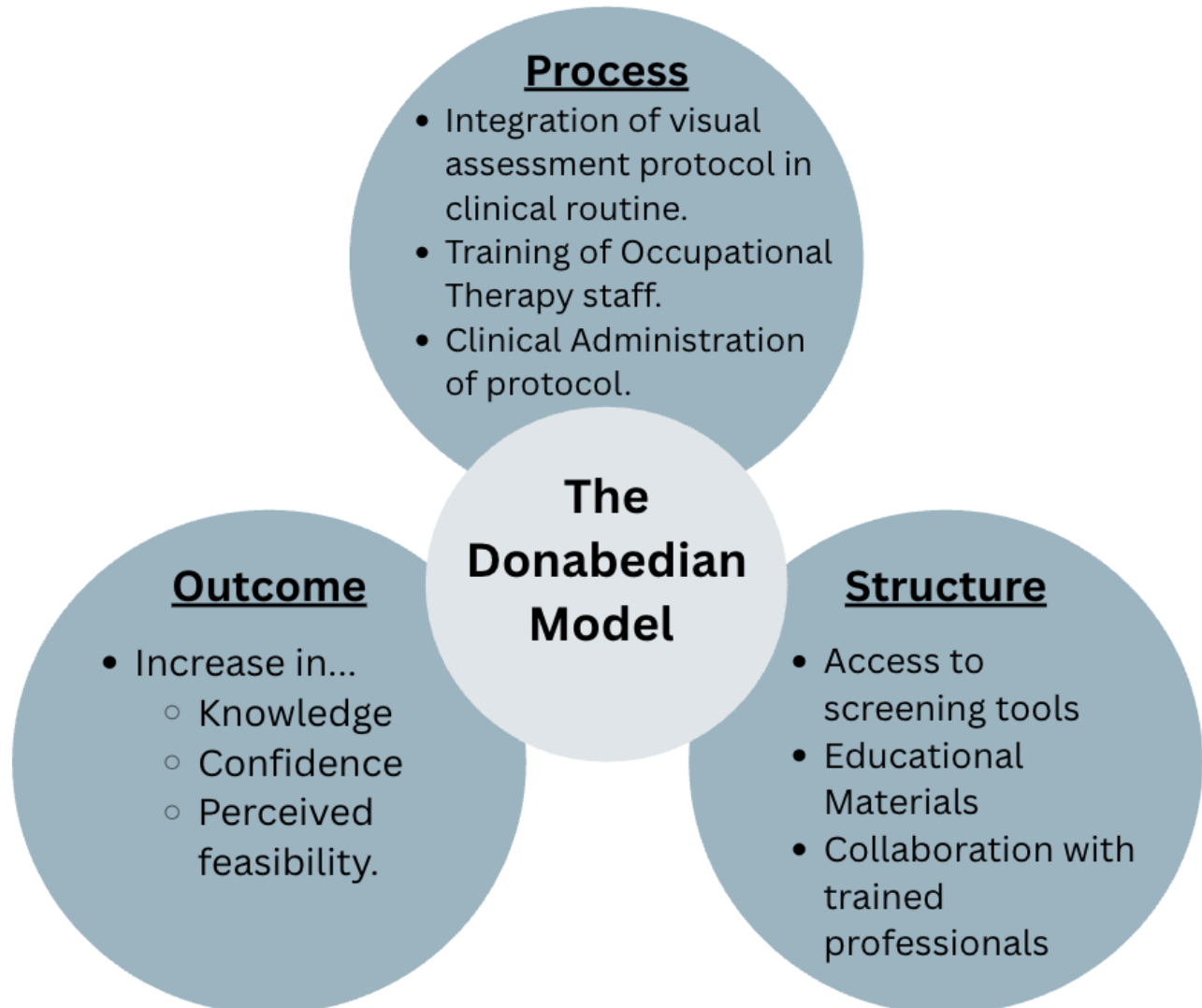
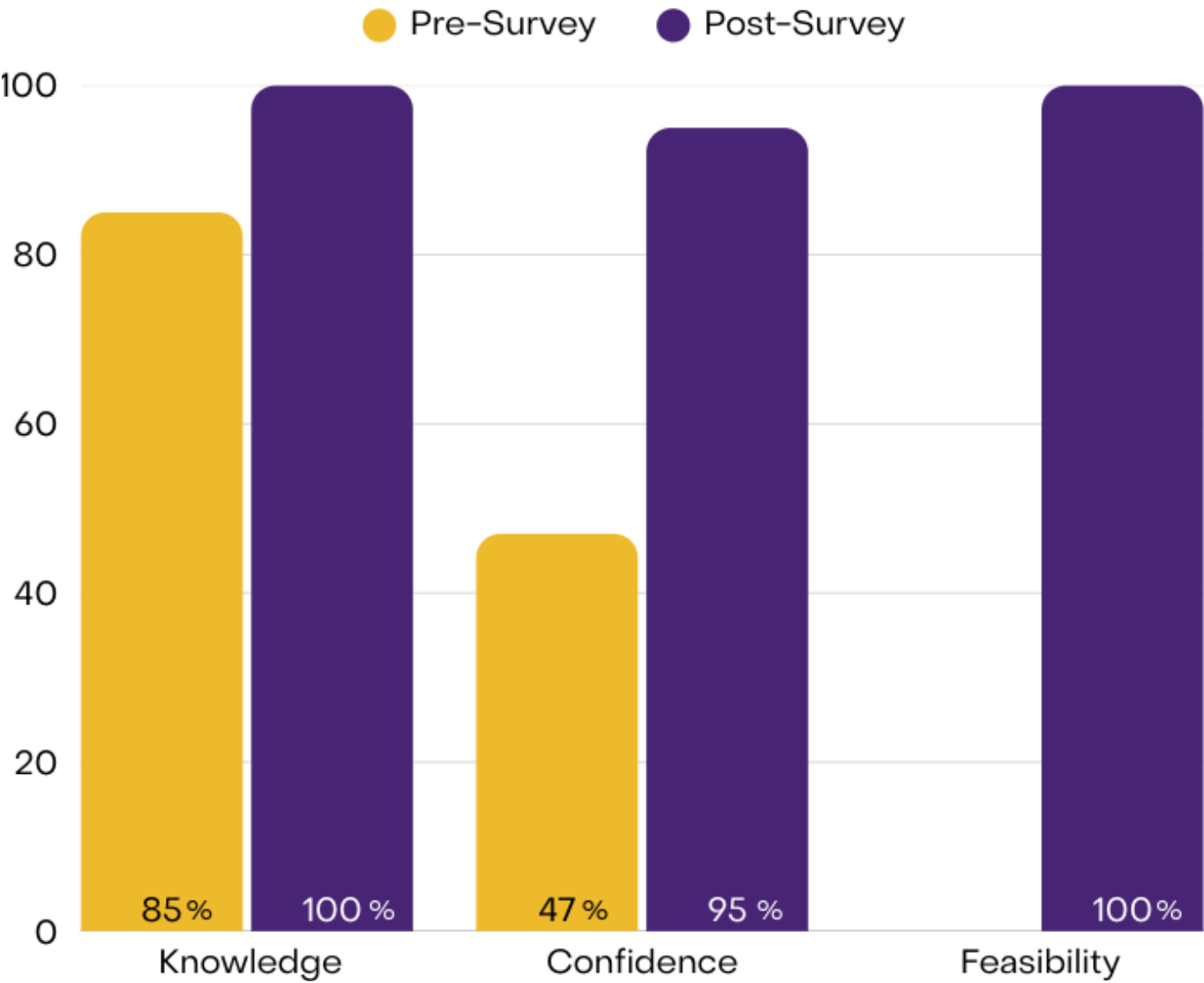


Figure 1. Hierarchy of visual perceptual skill development in the central nervous system. Drawing courtesy of Josephine C. Moore, PhD, OTR.

Appendix E**The Application of the Donabedian Model**

Appendix F
Capstone Pre- and Post-Survey Outcomes



Appendix G

Pre- and Post-training Survey Questions and Outcomes

Survey Question	Pre-training Survey	Post-training Survey
1. I am knowledgeable about the common types and prevalence of visual impairments following neurological injury.	85.7% Agree 14.3% Disagree	33.3% Strongly Agree 33.7% Agree
2. I understand the clinical significance of early identification of visual deficits in the acute phase of recovery.	28.6% Strongly Agree 64.3% Agree 7.1% Disagree	66.7% Strongly agree 33.3% Agree
3. I feel confident in my ability to identify common visual impairments following neurological injury.	64.3% Agree 35.7% Disagree	40% Strongly Agree 60% Agree
4. I feel confident in differentiating between visual field deficits, oculomotor impairments, and visual attention deficits.	42.9% Agree 50% Disagree 7.1% Strongly Disagree	40% Strongly agree 53.3% Agree 6.7% Disagree
5. I feel confident integrating visual assessment into a typical acute care evaluation	35.7% Agree 50% Disagree 14.3% Strongly Disagree	33.3% Strongly Agree 60% Agree 6.7% Disagree
6. This visual assessment protocol can realistically be completed within typical acute care time constraints.		40% Strongly Agree 60% Agree
7. I believe this visual assessment protocol could be sustained in routine acute care practice.		46.7% Strongly Agree 53.3% Agree

Appendix H

Visual Screening Badge Reference Card

eye AM FAR Neuro-Visual Screen	
A Acuity	Mini Snellen Patient Report
M Motor	Smooth Pursuits Convergence/Divergence Saccades
F Fields	Confrontation Quadrants
A Attention	Observation Functional Scanning Clock Draw
R Reflex	Head Turn Gaze Stability Symptom Provocation