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Occupational Therapy Curricula Patterns for Acquired Brain Injury-Related Vision Disorders for Entry-Level Programs: A Survey

Laura Schmeiser

Salus University - USA, laura.schmeiser21@gmail.com

Alicia Reiser

A Rise Above Occupational Therapy Services - USA, ariseaboveot@gmail.com

Caitlyn Foy

Salus University - USA, cfoy@salus.edu

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Abstract

Occupational therapists are among the first providers to encounter individuals after an acquired brain injury (ABI). Evidence suggests that most occupational therapists learn about ABI-related vision disorders from continuing education and on-the-job training. A better understanding of entry-level curricula patterns for ABI-related vision disorders is important because of their high prevalence and impact on occupational performance. A descriptive online survey was administered to occupational therapy educators at ACOTE-accredited entry-level programs to explore curricula patterns for ABI-related vision disorders. Of 1,391 occupational therapy educators invited to participate, 71 (5%) began the survey, and 66 met the inclusion criteria. Vision screening methods were taught by most educators and were found to be a strength of entry-level curricula. Other curricula patterns were inconsistent with reported barriers, including limited time resources, few fieldwork sites with vision services, and a lack of agreement among educators on the value of teaching vision rehabilitation in entry-level programs. Data revealed that entry-level occupational therapy students are taught more about ABI-related vision disorders than what practice patterns suggest, which indicates a new phenomenon and/or a need to use teaching methods that improve student comprehension. The results suggest improving interprofessional education and curricula standardization.

Comments

The authors declare that they have no competing financial, professional, or personal interest that might have influenced the performance or presentation of the work described in this manuscript.

Keywords

education, interprofessional, optometry, remediation, role, vision rehabilitation

Cover Page Footnote

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Credentials Display

Laura Schmeiser, OTD, MOT, OTR/L; Alicia Reiser, OTD, MS, OTR/L; Caitlyn Foy, DOT, MOTR/L, CLA

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Individuals of all ages, from infancy to late adulthood, frequently suffer from visual impairments after an acquired brain injury (ABI) (Berthold-Lindstedt et al., 2020; Master et al., 2015). The visual pathways of the brain are expansive, traveling from the anterior to posterior lobes of the brain; therefore, disruptions in the visual system occur in 90% of traumatic brain injuries (TBI) and 86.7% of cerebral vascular accidents (Ciuffreda et al., 2007; Singman, 2013). Any interruption to the visual system can be detrimental because of its role as the primary sensory system used for learning, making decisions, interacting with others, and safely navigating the environment (Warren, 1993). Individuals with ABI-related vision disorders experience difficulty returning to full activity, such as school, work, play, and driving (Ali et al., 2013; Swanson et al., 2017; Wagener, 2021; Wagener & Krieger, 2019).

Because of the negative functional implications associated with ABI-related vision impairments, occupational therapists are crucial health care providers that can identify and assist in managing visual deficits early in the continuum of care (Aravich & Toxell, 2021; Ripley et al., 2010). Vision is also defined as a key client factor that impacts occupations, performance skills and patterns, and the context and environment, as outlined in the profession's foundational document, *Occupational Therapy Practice Framework: Domain and Process* (American Occupational Therapy Association [AOTA], 2020). However, past literature has shown that many occupational therapists are unprepared to screen, make appropriate eye care referrals, and assist in managing ABI-related vision disorders on an interdisciplinary team (Reiser et al., 2020; Yoo et al., 2020).

In a recent survey, many occupational therapists in the United States attributed their knowledge of ABI-related vision disorders to continuing education courses and on-the-job training while only 30% attributed their knowledge to their entry-level education (Reiser et al., 2020). This finding suggests a need for more emphasis on the education of ABI-related disorders in entry-level curricula. The Accreditation Council for Occupational Therapy Education (ACOTE) and the *Blueprint for Entry-level Education* (Baum et al., 2010) outline the content necessary for entry-level occupational therapy and occupational therapy assistant programs. Other than vision being identified as a key client factor in the scope of occupational therapy, little is known about the specific vision content required for students to transition to entry-level occupational therapists successfully. Some insights could be gained from recent research efforts to provide "best practice" guidelines for occupational therapists to screen and manage prevalent ABI-related vision disorders.

Interdisciplinary Screening and Referrals for ABI-Related Vision Disorders

Occupational therapists assess client factors, such as vision, through an occupational profile, observations of clients performing everyday activities, and occupation-based outcomes, such as the Canadian Occupational Performance Measure (Phipps & Richardson, 2007). To ensure that vision impairments are not missed, existing literature and an interdisciplinary expert panel of optometrists and occupational therapists recommend pairing occupation-based measures with individual screens for saccades, pursuits, vergence, accommodation, and visual information processing (Aravich & Toxell, 2021; Radomski et al., 2014; Scheiman, 2011). Despite the high prevalence of visual impairments impacting function, individual vision screens appear to be underused by practicing occupational therapists (Reiser et al., 2020).

Once identified, ABI-related vision impairments need to be managed by interdisciplinary teams and are included in the scope of practice for optometry and neuro ophthalmology (Ripley et al., 2010). Both professions address overall eye health and refraction, and timely referrals are warranted because many individuals experience a cessation or reduction of brain injury-related symptoms with the use of

corrective lenses alone (Peters & Price, 2015). Unlike other eye care professionals, optometry provides additional advantages in managing ABI-related disorders by using a three-component model of vision that addresses highly prevalent visual efficiency and visual perception issues (Scheiman, 2011). Therefore, optometry is often considered a leader in diagnosing and managing ABI-related disorders on a rehabilitation team. Referral pathways can be challenging to establish and are complicated by many eye care providers being offsite, inconsistent recommendations, and months-long wait times for referrals. Other optometrists prefer to manage ABI-related vision disorders immediately (Aravich & Troxell, 2021). Likely because of these issues, occupational therapists have been shown to refer to neurologists for ABI-related vision disorders more often than optometrists and neuro-ophthalmologists despite their inherent strengths in managing visual issues (Reiser et al., 2020).

Interdisciplinary Management of ABI-Related Vision Disorders

There is a gap in the literature regarding occupational therapy's role in managing ABI-related vision disorders. To date, existing literature on occupational therapy curricula patterns for vision interventions has only focused on low vision rehabilitation, consisting of adaptive/compensatory interventions commonly effective for aging adults suffering from macular degeneration, glaucoma, diabetic retinopathy, cataracts, and other eye diseases (Deacy et al., 2012). Specific compensatory/adaptive approaches for vision include but are not limited to providing accommodations for work or school, assistive technology assessment, enlarged font, magnification, and hypersensitivity management education, such as light modifications, brimmed hats, or tinted glasses (Warren & Barstow, 2011).

Rehabilitation for people with ABIs can also rely on remedial, neuroplasticity-based frames of reference with the understanding that the brain forms new pathways and skills after a brain injury, such as the Motor Control Frame of Reference (Khan, 2016). Occupational therapists use neuroplasticity-based models to improve the function of other client factors, such as affected upper extremities (Chang et al., 2016). However, remedial vision rehabilitation is often completed by optometry and requires specialized training. There is supporting literature on interdisciplinary teams with occupational therapy pairing occupation-based and neuroplasticity-based vision approaches with optometrist collaboration (Berryman et al., 2019; Ripley et al., 2010; Scheiman, 2011). Although entry-level occupational therapists may not be a part of these interdisciplinary vision teams, they should know who these skilled providers are in their community and when to refer to them.

This research study aimed to explore the current curricula teaching patterns for the screening and comprehensive management (both compensatory and remedial methods) of ABI-related vision disorders by entry-level occupational therapy programs in the United States. The study objectives included:

1. What components of an ABI visual screening, assessments, and treatments are covered in entry-level occupational therapy curriculums?
2. Are entry-level occupational therapy students exposed in their academic programs to referral criteria and interdisciplinary guidelines for interacting with other vision specialists, such as optometrists and ophthalmologists? If so, to what level of detail and exposure?
3. How do occupational therapy educators describe any curricular needs regarding content about ABI-related vision disorders?

Method

We obtained approval from the Salus University Institutional Review Board before conducting this survey research study. Informed consent was obtained from all survey participants. The researchers declared no conflicts of interest related to this study.

Instrument Design

This descriptive study used a study specific, non-standardized survey consisting of 25 closed-ended and one open-ended question. A survey design was chosen to explore curricula patterns for entry-level occupational therapy programs to collect data from educators who teach ABI-related vision disorders at ACOTE-accredited entry-level occupational therapy programs (n = 183). The survey was developed by two occupational therapy clinicians specializing in remedial vision rehabilitation, an entry-level occupational therapy program faculty member, and received input from an optometrist researcher. The closed-ended questions asked participating educators to report on their demographics, academic program, and course structure for ABI-related vision disorders, including the number of hours, resources, and methods used to assess student comprehension.

Sampling Selection

The participants consisted of occupational therapy educators who teach or have taught ABI-related vision disorder curricula in the last 5 years at an ACOTE-accredited, entry-level occupational therapy program. The participants received an email invitation to complete the survey with contact information obtained from a list of ACOTE-accredited entry-level occupational therapy programs published on the AOTA website.

Exclusion Criteria

All of the respondents were included in this study except for those who met any of the following exclusion criteria: did not teach ABI-related vision disorders to entry-level occupational therapy students, did not teach at an ACOTE-accredited entry-level program, and/or did not meet both of these criteria in the last 5 years.

Data Collection

The survey was intentionally kept short to encourage participation and posted on an online survey website platform (Alchemer, Boulder, CO), which provided a URL for the survey. An email was sent with the survey URL and a cover letter explaining the purpose of the study to all faculty listed on the program websites of the 183 accredited entry-level occupational therapy programs. The survey was open for two weeks, from late January through early February 2022.

Data Analysis

The closed-ended survey questions were analyzed using the statistical software IBM SPSS Statistics for Windows, version 28.0.1.8 (IBM Corp., Armonk, N.Y., USA). The frequencies of the participant/program demographics and curricula topics taught were provided in percentages. To explore influences on curricula patterns, cross-tabulations and Fisher's exact tests were used with a 2-sided significance level of .05. The open-ended responses were used to create codes and a concept map that summarized the descriptive qualitative data.

Results

Quantitative Data

Of the 1,391 occupational therapy faculty who were sent emails inviting them to participate in the study "Occupational therapy curricula patterns for acquired brain injury (ABI) related vision disorders," 71 (5%) participated in the survey. Fifty-four emails were undeliverable (36 invalid emails; 18

resigned/retired automated messages) after multiple attempts. Four of the 71 participants were ineligible because they had not taught at an ACOTE-accredited program in the last 5 years. One of the 67 eligible participants provided unusable data and was not included in the data analysis. This study sample consisted of participants ($n = 66$) who varied in demographics, title, experience, and education, with representation from all six regions across the United States. Table 1 describes the respondents' academic backgrounds and credentials.

Table 1
Background and Characteristics of Occupational Therapy Educators

Characteristic		N	%
Title	Faculty (Part or Full Time)	56	84.8
	Adjunct faculty	9	13.6
	Lab instructor	1	1.5
Years of Experience	1 – 3	21	31.8
	4 – 6	17	25.8
	7 – 9	14	21.2
	10 – 15	8	12.1
	16 – 20	4	6.1
	21+	2	3
Level of Education	Bachelor's degree	1	1.5
	Masters's degree	21	31.8
	Entry-level OTD	4	6.1
	Post-professional OTD	31	47
	EdD	3	4.5
	PhD	6	9.1
Certificates	Certified Brain Injury Specialist (CBIS)	8	12.1
	AOTA's Specialty Certification in Vision (SCLV)	5	7.6
	Certified Low Vision Therapist (CLVT)	3	4.5
	Certified Stroke Rehabilitation Specialist (CSRS)	1	1.5
	Other (i.e., vestibular certification, low-vision post-graduate certification)	13	19.7
	None	36	54.5
Type of Program	Entry-level MOT	48	73.8
	Entry-level OTD	4	6.2%
	Both	13	20%
Region of United States Primarily Teaching in:	Southeast Region (AL, AR, FL, GA, LA, KY, MS, NC, SC, TN, VA, WV)	14	21.2%
	Midwest Region (IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI)	12	18.2%
	Southwest Region (AZ, NM, OK, TX)	6	9.1%
	Rocky Mountain Region (CO, ID, MT, NV, UT, WY)	4	6.1%
	Pacific Region (AK, CA, HI, WA)	3	4.5%

Note. $N = 66$ participants.

The respondents also provided insights about the number of approximate hours that are devoted to ABI-related vision disorders in the curricula, ranging from 1–3 hr (26%), 4–6 hr (36%), 7–9 hr (17%), and 10+ hr (21%). When the educators were asked whether their program offers additional sources or training regarding vision, 9% reported vision-specific elective courses as part of degree fulfillment, 3% reported post-professional certificates, 3% reported continuing education courses, and 6% reported vision therapy. Sixty-nine percent of the educators reported no additional vision-specific opportunities, such as additional elective courses, certificates, or vision therapy training.

Screening Curricula

The results demonstrated that educators emphasize teaching functional task screens and objective measures to assess vision. All of the participants ($n = 66$) reported teaching at least one ABI-related vision screen for acuity and visual fields. Most of the educators (> 80%) taught objective screens for the other

visual efficiency skills, including oculomotor skills and visual information processing, except accommodation skills, which were only taught by 23%. Table 2 provides additional details on the screening frequencies.

Table 2

Visual Screening Methods Taught to Entry-level Occupational Therapy Students: Frequency n (%)

Visual Efficiency and Visual Information Processing Skill	Does not Teach	Interview / Questionnaire	Functional Task Observation	Objective Measure
Acuity	0 (0%)	59 (89%)	62 (94%)	60 (91%)
Visual fields	0 (0%)	54 (82%)	62 (94%)	60 (91%)
Pursuits	1 (2%)	48 (73%)	60 (91%)	59 (89%)
Vergence	1 (2%)	48 (73%)	54 (82%)	64 (97%)
Accommodation	6 (9%)	48 (73%)	58 (88%)	15 (23%)
Saccades	3 (5%)	40 (70%)	54 (82%)	47 (80%)
Visual information processing	1 (2%)	50 (76%)	57 (86%)	60 (91%)

Note. N = 66 participants.

The respondents reported teaching both non-standardized and standardized visual screens in entry-level occupational therapy programs. Non-standardized vision screens that were taught by the educators included 88% confrontation visual field testing, 35% field of vision angles (horizontal and vertical), 21% visual perceptual midline shift screen, 70% standard H for pursuits, 53% cancellation tasks for saccades, 88% near-point convergence break, 65% near-point convergence recovery, and 23% accommodative rule.

Standardized vision screens that are non-specific to ABI were taught by many of the respondents. Of these, 88% were found to use the Snellen chart, 35% the Lea Symbol chart, and 3% the Chronister Pocket Acuity Chart (CPAC) for acuity. There were 5% that used the Northeastern State University College of Optometry Eye Movement test (NSUCO) for general oculomotor skills, 15.2% that used the King-Devick test, 9% that used the Developmental Eye Movement test (DEM/A-DEM) for saccades, 11% that used the Convergence Insufficiency Symptom Survey (CISS) for binocularity, and 2% that used the Fixi-Tic with lenses for accommodative facility. For visual information processing and visual motor integration, 91% taught the Motor-Free Visual Perceptual Testing (MVPT), 56% the Test of Visual Processing Test (TVPS), and 36% the Developmental Test of Visual Processing (DTVP).

The educators were asked about standardized screens specific to ABI-related vision disorders, such as the Brain Injury Visual Assessment Battery for Adults (biVABA), to assess individual visual skills (acuity, visual fields, pursuits, and vergence). Overall, 41 out of 66 (62%) of the participants used one or more of the biVABA subtests. The educators varied in their frequency of teaching each subtest, with 59% using it for acuity, 61% for visual fields, 55% for pursuits, and 44% for vergence. The Brain Injury Visual Symptom Survey (BIVSS) that specifically targets visual symptoms associated with ABI was taught only by 11% of the educators to screen for vergence and 55% for saccades (Laukkanen et al., 2017). Of the 22 standardized vision-related assessments included in the study's survey, the educators were found to teach a median of six standardized vision-related assessments with a range of two to 15 assessments.

In this study, the educators reported teaching entry-level occupational therapy students multiple occupation-based measures to screen for occupational performance following an ABI, including the Canadian Occupational Performance Measure (97%), the Work Environment Impact Scale (18.2%), and the School Setting Interview (15.2%). Of the six occupation-based measures surveyed, including the functional tasks observations and an occupational profile, a median of four measures were taught to students with a minimum of two and a maximum of six measures, as reported by the occupational therapy educators.

Vision Treatment Curricula

The educators were found to teach a median of six types of vision treatment with a range of 0–12 treatments. Additional frequency information on treatment curricula can be found in Table 3, with treatment types listed in descending order of most taught.

Table 3

Vision Interventions Taught to Entry-level Occupational Therapy Students

Vision Interventions	N	%
IADL training (money management, homemaking, community mobility)	61	94%
ADL training (bathing, dressing, grooming, etc.)	60	92%
Accommodations for work or school	48	74%
Pursuit Tasks	41	63%
Assistive technology assessment	40	62%
Fitness to drive/driver rehabilitation	38	59%
Reading/eye movement tasks	38	59%
Hypersensitivity education/management	28	43%
Introduction to vision specialists' tools (Brock string, aperture ruler, barrel card, eccentric circles, lifesaver card, red-green glasses, vectograms, etc.)	23	35%
Dynavision	23	35%
Board-to-table tasks	15	23%
Bioness Integrated Therapy Systems (BITS)	11	17%

Note. N = 66 participants.

Occupational Therapy Models taught with ABI-Related Vision Disorders

When the educators were asked which occupational therapy models are referenced when teaching ABI-related vision disorders, 79% reported rehabilitation, 79% reported Person-Environment (PEO), 57% reported Model of Human Occupation (MOHO), 43% reported motor control, 32% reported biomechanical, 38% reported Canadian Model of Occupational Performance and Engagement (CMOP-E), and 2% reported none. For ABI-related vision disorder curricula, the educators were found to reference a median of three models with a minimum of 0 and a maximum of seven models.

Resources for ABI-Related Vision Disorders

There were multiple vision resources (textbooks, simulated patients, and a visual model) inquired about in the study's survey, with additional details listed in Table 4. The educators were found to use a median of three resources to supplement the curricula ranging from 1–6 resources.

Table 4

ABI-Related Vision Resources Used by Occupational Therapy Educators in Entry-level Programs

Vision Resource	N	%
<i>Occupational Therapy for Physical Dysfunction</i> (Radomski & Latham, 2014)	40	61
<i>Vision, Perception, and Cognition: A Manual for the Evaluation and Treatment of the Adult with Acquired Brain Injury</i> (Zoltan, 2007)	36	55
<i>Occupational Therapy Intervention for Adults with Low Vision</i> (Warren & Barstow, 2011).	29	44
<i>Understanding and Managing Vision Deficits: A Guide for Occupational Therapists</i> (Scheiman, 2011)	20	30
Simulated patients	19	29
“Three-Component Model of Vision” model (Scheiman, 2011)	9	14
<i>Pedretti's Occupational Therapy: Practice Skills for Physical Dysfunction</i> (Pendleton & Schultz-Krohn, 2018).	8	12

Note. N = 66 participants

Interprofessional Collaboration

When asked which vision referral recommendations are taught to entry-level occupational therapy students, 86% disclosed teaching about optometrists, 85% disclosed teaching about ophthalmologists, 84% disclosed teaching about neuro-ophthalmologists, and 50% disclosed teaching about neurologists.

Regarding therapy referrals, 64% of the educators taught about certified low vision specialists (CLVT), 62% taught about occupational therapists specializing in remedial vision rehabilitation, 47% taught about orientation and mobility specialists, and 29% taught about physical therapists specializing in vestibular therapy. In this sample, a median of six disciplines was taught to entry-level occupational therapy students ranging from 1 to 10 disciplines, depending on the educator.

Of the sample ($n = 66$), 100% reported using at least one teaching method to educate entry-level occupational therapy students about other allied health care professionals. The results demonstrated that 96% of educators specifically used lectures, 60% used assigned readings, 44% used case studies, 44% used guest lecturers or panelists, 35% used fieldwork, 6% used clinic tours, and 2% indicated other. A median of five interprofessional collaboration methods was used by occupational therapy educators, with a minimum of one and a maximum of seven.

Methods to Assess Student Comprehension

The educators that taught ABI-related vision disorders to entry-level occupational therapists reported using multiple methods to assess student comprehension. “Applied” methods appeared to be some of the most used methods as seen by the frequencies listed in descending order: lab exercise (91%), quiz or exam question (82%), case study (70%), clinical competency (43%), fieldwork (36%), discussion post (30%), written paper (20%), and other (3%). Of the seven student comprehension methods listed on the survey, there was a median of four methods used by educators with a range of one through seven.

Educator’s Perception of Curricula Needs

Eight categories of ABI-related vision curricula were rated by educators on a 4-point Likert scale to determine the perceived needs of their program in the following areas of ABI-related vision disorders. The 4-points of the Likert scale consisted of *no needs* as defined as the topic being fully taught with applied learning opportunities, *minimal needs* for the topic taught but lacking applied learning opportunities, *moderate needs* for the topic partially taught and will be learned during fieldwork, and *significant needs* for the topic absent and will be learned during fieldwork. For statistical analysis, categorical data were combined into two categories to describe the perceived needs: “no-minimum” and “moderate-significant.”

Most of the educators reported *minimal needs* with the curricula categories except for “interdisciplinary collaboration for patients with vision issues,” which was most rated as a moderate need at 45%. “Vision treatment methods” was equally rated as *minimal need* and *moderate need* by the respondents, also at 45%. Descriptive frequencies are included in Table 5.

Table 5

Perceived Entry-level Curricula Needs, as Reported by Occupational Therapy Educators

Curricula Areas	1. No needs (%)	2. Minimal Needs (%)	3. Moderate Needs (%)	4. Significant Needs (%)	Median
Vision screen methods	25%	59%	15%	2%	2.0
Vision-focused standardized assessments	14%	51%	34%	2%	2.0
Vision-focused non-standardized assessments	17%	66%	15%	2%	2.0
Vision treatment methods	8%	45%	45%	3%	2.0
Vision referral recommendations	19%	48%	31%	3%	2.0
Interdisciplinary collaboration for patients with vision issues	12%	34%	45%	9%	3.0
Assessment of student’s ABI-related vision concept comprehension	11%	46%	35%	8%	2.0
Vision resources	14%	48%	34%	5%	2.0

Note. $N = 65$ participants. One participant did not provide data for the Likert Scales.

Influences on Curricula Taught and Perception of Needs for ABI-related Vision Disorders

When considering influences on teaching patterns, this study's sample of educators did not appear to differ significantly based on their education, region, and type of program.

Influences of Teaching Experience in Years

The occupational therapy educators with at least 7 years of teaching experience or greater were significantly more likely to reference the motor control model (57% with vs. 32% without, $p = .047$) and teach specific ABI-related vision topics. In regard to standardized vision screens, these educators were more likely to teach the CISS (21% with vs. 3% without, $p = .04$); Lea Symbol (54% with vs. 21% without, $p = .009$); and King Devick (29% with vs. 5% without, $p = .01$). Significant differences in vision treatments taught by educators included hypersensitivity education (57% with vs. 32% without, $p = .047$); board to table tasks (36% with vs. 13% without, $p = .04$); BITS (29% with vs. 8% without, $p = .04$), and Dynavision (50% with vs. 24% without, $p = .04$). Referral recommendations for occupational therapists specializing in remedial vision rehabilitation (82% with vs. 47% without, $p = .005$) and assigned readings about other professions (79% with vs. 47% without, $p = .01$) were provided significantly more often with educators that have at least 7 years of teaching experience.

Influence of Educators' Neurological-Specific Certifications

Teaching patterns differed for the educators with neurological-specific certifications compared to the educators without neuro certifications. Neuro certifications included Certified Brain Injury Specialist (CBIS), Certified Stroke Rehabilitation Specialist (CSRS), Lee Silverman Voice Treatment (LSVT) for Parkinson's Disease, ImPact for concussion, Neuro-Developmental Treatment (NDT), AOTA Board Certification in Physical Rehab, and vestibular. These educators were significantly more likely to teach the Brain Injury Vision Symptom Survey (BIVSS) (29% with vs. 6% without, $p = .03$) and an introduction to vision therapy tools like the brock string, eccentric circles, aperture ruler, etc. (64% with vs. 27% without, $p = .01$).

Influence of Teaching Hours, Methods, and Resources

The educators who taught ABI-related vision disorders for at least 7 hr or greater were more likely to use applied teaching strategies, such as simulated patients (44% with vs. 19% without, $p = .05$) and guest lecturers or panelists from an allied health care profession (60% with vs. 34% without, $p = .046$). The use of applied teaching methods was found to improve the educators' perception of curricula taught, particularly with lab exercises. The educators who used lab exercises were significantly less likely to report moderate-significant curricula needs for standardized vision evaluations (31% with vs. 83% without, $p = .02$); interdisciplinary collaboration (49% with, 100% without, $p = .03$); and vision resources (32% with vs. 100% without, $p = .002$). Case studies resulted in the educators being significantly less likely to report moderate-significant needs for standardized assessments (27% with vs. 55% without, $p = .048$).

In regard to textbook resources, the educators were significantly less likely to perceive moderate-significant needs for teaching referral criteria for other disciplines when using *Understanding and Managing Vision Deficits: A Guide for Occupational Therapists* (Scheiman, 2011), (10% with vs. 44% without, $p = .01$).

Qualitative Data

Of the open-ended responses provided, two contrasting themes emerged to describe the perceived value of teaching ABI-related vision disorders to entry-level occupational therapy students. Many of the educators in this study were identified as highly valuing curricula emphasis on ABI-related vision disorders. For example, entry-level courses with a primary focus on vision were supported by Respondent

12, “All schools should have a vision course,” and Respondent 9, “We [already] have a specific 2-credit course on vision.” In addition to valuing vision-specific courses, the respondents discussed the value of courses with a primary focus on brain injury and neuroplasticity models. Respondent 53 stated, “A whole course related to acquired brain injury and related evaluations and treatments, referrals, etc., would be beneficial with the high TBI incidence and prevalence rates.” Similarly, Respondent 23 highlighted the discrepancy between vision intervention types taught to students: “Focus in curricula tends to be on low vision, neuro visual rehab interventions and strategies should be improved.” This dichotomy will be explored more in the discussion section.

In contrast, some of the respondents expressed that curricula emphasis on ABI-related vision disorders is beyond the scope of entry-level occupational therapists and placed lower emphasis on teaching the topic in the classroom. Respondent 46 stated, “With so much basic knowledge and skill to cover, students must learn more application and practice of the skills in Fieldwork Level II. We cannot make entry-level practitioners into specialists.” Further illustrating this theme, Respondent 13 reported:

Students who are interested in learning more have the option to continue their studies at the post-professional level. It’s time, more than anything, that prohibits learning more, there is so much to cover in a short time in the entry-level program.

The barrier of limited time was the third theme in this study and was frequently discussed among the respondents who did not value curricula emphasis on ABI-related vision disorders for entry-level programs. In addition to limited time constraints, a fourth theme described a lack of applied fieldwork opportunities for entry-level students. The educators voiced this concern whether they valued ABI-related vision disorders education highly or felt that it was beyond the scope of entry-level curricula. Respondent 48 stated, “I have very few fieldwork locations that do neuro-type interventions, which is disappointing.” Several of the themes were expressed simultaneously by Respondent 64:

I think this topic should be taught 1–2 semesters. It’s difficult to only teach 1–2 lectures about vision-related issues and hard for students to have enough time to thoroughly process the information unless the students are placed in a setting where they have opportunities to observe OTs who specialize in low vision.

This educator appeared to highly value curricula for ABI-related vision disorders by planning multiple learning opportunities over the length of the program to combat curricula barriers. Yet, the other educators depended on fieldwork sites or post-graduate education alone to fill in the gaps despite the acknowledgment that there were limited fieldwork sites with specialists in ABI-related vision disorders. It was evident that the occupational therapy educators were inconsistent in how they approached curricula barriers in this study sample.

Discussion

Strengths and Supports of ABI-Related Vision Disorder Curricula

The results of this study are promising for the occupational therapy profession because it demonstrates that many entry-level students are equipped with knowledge of evidence-based vision screening methods that are occupation-based, ABI-specific, and target individual visual efficiency and processing skills. Competently screening for ABI-related vision disorders is a valuable skill for entry-level practice and appears to be a curricula strength. Entry-level students are taught more about ABI-

related vision screening and referral patterns than what is being used by practicing occupational therapists (Reiser et al., 2020). For example, at least 90% of the educators reported teaching screening methods for each visual efficiency skill, while only 29% of practicing occupational therapists regularly screen for ABI-related vision disorders. Regarding referrals, 86% of the educators taught about referring to optometrists, which contrasted with the 15% of practicing occupational therapists making referrals to optometrists.

Despite the high frequency of occupational therapy educators teaching vision screening and referral recommendations, it is unclear the reason(s) for fewer occupational therapists regularly screening and referring in their own practice. It is acknowledged that this study was targeted at educators that specifically teach ABI-related vision disorders at entry-level occupational therapy programs; therefore, reported frequencies of teaching vision-related topics would be expected to be higher. The study completed by Reiser et al. (2020) also focused on vision disorders specifically related to concussions with occupational therapists that varied in years of experience. It is probable that practicing occupational therapists that graduated within the last 5–10 years received more education on both brain injury rehabilitation and vision disorders because of emerging literature emphasizing its impact on daily activities (Finn, 2019)

The discrepancy between the curricula patterns and practice patterns may also suggest difficulties with student comprehension and carry-over of skills from the classroom to clinical practice. The most influential supports for improved teaching outcomes (i.e., more content taught and less reported needs) were educators having at least 7 years of experience, and additional ABI-related vision training often earned through certifications. Because of the nature of the survey design, the researchers of this study were unable to directly follow up with these experienced educators to gain further understanding and possible explanations for their superior teaching outcomes. However, the occupational therapy educators who used evidence-based teaching practices consisting of a variety of multimodal learning methods relevant to real-life practice (i.e., kinesthetic labs, applied case studies) were also shown to report fewer curricula needs. Evidence-based teaching practices are a hallmark of experienced educators because it requires time, mentorship, and an understanding of one's teaching roles and responsibilities to implement well and consistently (Lockhart-Keene & Potvin, 2018).

The educators who dedicated at least 7 hr or more to ABI-related vision disorders were more likely to incorporate lab exercises and case studies into the curricula. The additional time required for applied teaching methods appears to be warranted by another study demonstrating that case studies significantly improved students' scores on Fieldwork Placement Evaluations because they provided an opportunity to use clinical reasoning skills in a client-centered "real-life" scenario while "thinking on their feet" (O'Brien & McNeil, 2013, p. 1–7). Despite applied learning methods proving to be strong supports in curricula, only 44% of the educators used case studies for interprofessional collaboration, 44% for guest lecturers, 43% for clinical competencies, and 6% for clinic tours. Therefore, more educators would benefit from using applied learning in their ABI-related vision disorder curricula.

Barriers and Areas of Improvement for Teaching ABI-Related Vision Disorders

Primary curricula needs for ABI-related vision disorders include interdisciplinary collaboration and treatment strategies, as reported by the educators. Although entry-level students likely know to whom to refer if needed, it is unclear whether students are adequately prepared to collaborate and manage shared patients with ABI-related vision disorders. A strong emphasis on interprofessional education (IPE) has the potential to address these needs with minimal financial and time resources. Occupational therapy is a part of the Interprofessional Education Collaborative (IPEC) with the commitment to prepare future

practitioners for team-based care (IPEC, 2016; McMorrow et al., 2017). ACOTE provides support for IPE and IPEC initiatives by stating that entry-level occupational therapy students should “Be prepared to effectively communicate and work interprofessionally with all who provide services and programs for persons, groups, and populations” (ACOTE, 2018, p. 2). The formation of faculty learning communities (FLC) is recommended for universities that provide entry-level programs for occupational therapy, optometry, and ophthalmology at the same institution. Faculty from these FLCs would be able to coordinate interdisciplinary learning activities and guest lectures that would facilitate effective entry-level collaboration (McMorrow et al., 2017).

Regarding curricula on ABI-related vision treatment, both compensatory and remedial interventions were taught inconsistently to entry-level occupational therapy students. Most of the educators report referencing the rehabilitation model indicating a strong preference to teach compensatory and adaptive strategies. However, only 43% of the educators reported teaching hypersensitivity management, 63% on assistive technology assessments, and 74% on instruction on accommodations for work or school. These compensatory strategies are often necessary modifications for many clients to return to everyday activities after a brain injury and are easily considered entry-level skills. This area could be strengthened through IPE with disciplines involved in low vision rehabilitation, such as ophthalmology, CLVTs, and orientation and mobility specialists.

Only 35% of the educators taught an introduction to remedial vision specialist tools despite the occurrence and support of occupational therapists providing remedial vision interventions on an interdisciplinary team with an optometrist. Education on remedial vision interventions and the development of clear post-graduate specialization tracks would benefit the most from IPE with optometrists. IPE would provide a mutual opportunity for future occupational therapists and optometrists to work together prior to entering clinical practice fostering relationships in regions that have less-developed vision services and fieldwork site opportunities over time.

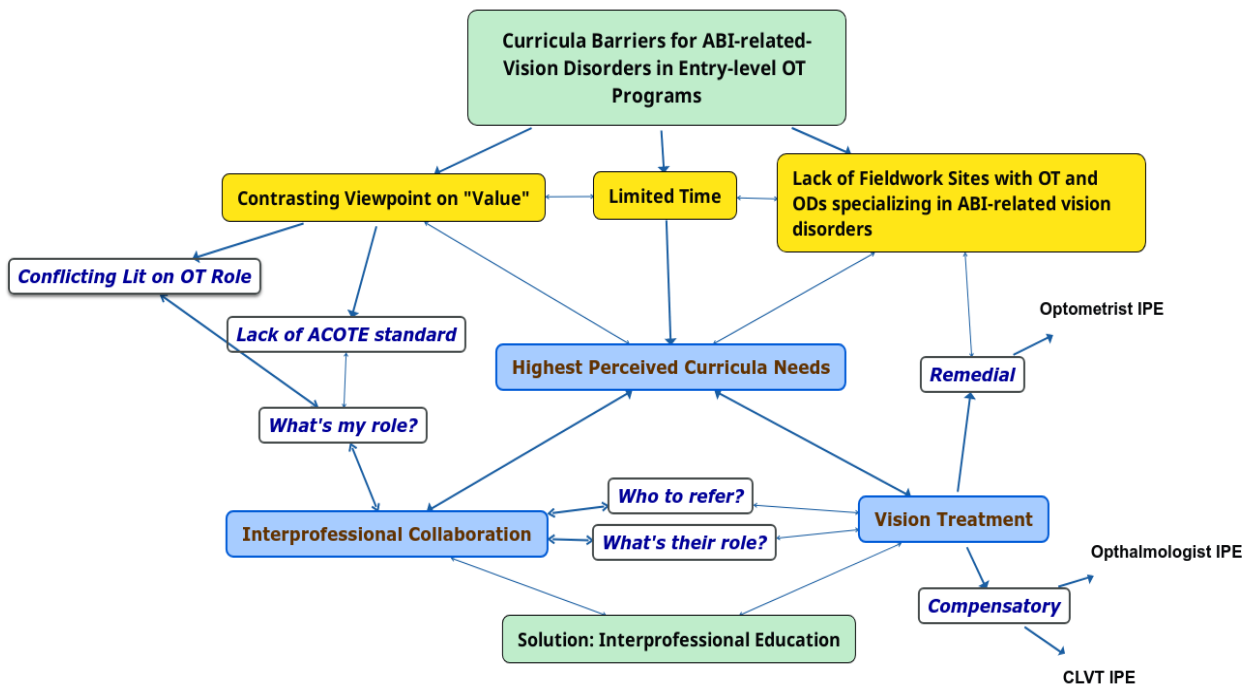
Finally, many of the educators highlighted the challenges of determining and prioritizing the necessary entry-level education in the time allotted and limited fieldwork sites with occupational therapists specializing in remedial vision. Some of the educators found it beneficial to spread ABI-related vision content multiple times over the length of the program. AOTA recommends such a scaffolding strategy when designing curricula for specific topics (2021). However, there continue to be differing opinions among educators on the vision content necessary for entry-level programs without an ACOTE standard guiding ABI-related vision disorder curricula. Figure 1 summarizes the interaction between the curricula barriers, perceived needs, and the potential role of interprofessional education.

Limitations

The study targeted a small population in higher education; therefore, the participant number is smaller, and the results may be less generalizable. The survey had a 5% response rate, with data representing approximately 36% (66/183) of the ACOTE-accredited occupational therapy programs in the United States. It is possible that there are occupational therapy programs that do not teach, or minimally teach, ABI-related vision disorders and are not represented because they did not respond to the survey. Some potential trends with demographics were not examined because of respondent over-representation from the east coast and the educational background of a master’s or doctorate degree in occupational therapy.

Figure 1

Interprofessional Education Solutions for Curricula Barriers to ABI-Related Vision Disorders



Note: Definitions: CLVT-Certified Low Vision Therapist; IPE-Interprofessional Education; Lit-Literature.

Implications for Occupational Therapy Curricula

Prior to the completion of this study, curricula patterns for ABI-related vision disorders were not identified. Primary curricula needs include interdisciplinary collaboration guidelines and intervention strategies for managing patients with ABI-related vision issues. It is proposed that curricula needs would be addressed through increased emphasis on interprofessional education with optometrists, ophthalmologists, and other providers of ABI-related vision disorders. Factors that appeared to strengthen curricula included occupational therapy educators having 7 years or more of teaching experience, obtaining a certification specific to vision and/or the ABI diagnosis, dedicating at least 7 hours to the topic, and using applied teaching methods over the length of the program for adequate student comprehension. To ensure the standardization of care provided by occupational therapists, position papers on curricula standards for highly prevalent ABI-related vision disorders can now begin with the Accreditation Council for Occupational Therapy Education.

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