

Bringing low-vision assessments and interventions to underserved seniors affected by age-related eye disease

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Abstract

General knowledge of eye health and low-vision services is poorly understood by the public, particularly those in underserved and minority communities. A program, funded by the Florida Blue Foundation with leveraged funding from the Peacock Foundation, Inc. and the James Deering Charitable Trust primarily for functional assessment and intervention services, was implemented by the Miami Lighthouse for the Blind and Visually Impaired (MLB) over a 3-year period (2016, 2017, and 2018) with three goals: (1) educate community-dwelling seniors about low vision; (2) provide assessment and intervention services to identified seniors living with low vision; and (3) educate healthcare professionals about best practices in serving this population. In this program, community sites serving seniors were identified and educational and screening programs implemented by a low-vision-certified occupational therapist. Seniors with an identified need received low-vision intervention. Pre- and post-program evaluation determined outcomes of educational and interventional services with the seniors. Professional education workshops were implemented annually and evaluated professional learning from low-vision services. This program served 1552 community-dwelling seniors who attended educational sessions on vision health. Participants averaged 76 years and were primarily identified as Hispanic (64%). The Low Vision Independence Measure and the Visual Function Index were used to measure functional performance outcomes. All scores indicated improved performance of functional tasks following the interventions. Three years of annual “Engaging the Low Vision Community Through Education, Research, and Service” workshops (attended by 108 healthcare professionals and students) demonstrated an interest in and improved knowledge of low vision among healthcare professionals and students. The MLB community-based program demonstrated success in increasing knowledge among community-dwelling seniors and healthcare professionals about low vision and the provision of effective low-vision services.

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Overview of need and purpose

It is estimated that there are 12 million blind or visually impaired individuals in the United States (Centers for Disease Control and Prevention, 2017). It is further estimated that individuals with low vision (LV), a type of visual impairment (VI), account for more than 3 million, a number expected to double by 2050 (Varma, et al., 2016). LV is defined as a best corrected visual acuity in the better-seeing eye as less than 20/40. VI due to LV is permanent vision loss that interferes with daily functioning and cannot be improved by corrective lenses or surgical intervention (National Eye Institute, 2016). Uncorrected refractive errors, glaucoma, macular degeneration, and cataracts are among the leading contributory factors of severe VI (Seth et al., 2017). Individuals with LV can experience significant challenges in completing activities of daily living (ADLs), and LV has been associated with decreased quality of health, depression, anxiety, and increased risk of falls and injuries (Kempen et al., 2012; Li et al., 2011).

LV rehabilitation is an emerging subspecialty practice area in several fields of rehabilitation therapy and is usually multidisciplinary, involving, for example, optometry, LV specialties, and occupational therapy. The focus of LV rehabilitation is often to help individuals maximize the use of any residual vision and compensate for lost vision using adaptive devices or task/environmental adaptations (Dagnelie, 2013). For individuals living with LV, engaging in the ADLs, such as cooking, walking, or bathing, becomes increasingly difficult. Occupational therapy practitioners can create interventions to prevent accidents and injuries, teach new skills, modify the task and/or environment, and promote a healthy lifestyle for those with LV (American Occupational Therapy Association, 2013). For example, by implementing a home-safety assessment and modification program in community-dwelling elders with LV, occupational therapy practitioners successfully reduced falls in their target population by 41% (Campbell et al., 2005). Other evidence suggests that occupational therapists, working in concert with optometrists, LV specialists, and social workers, were able to document improvement in objective and subjective measures of function following vision rehabilitation (McCabe et al., 2000).

As the population ages, it is estimated that VI and the need for vision rehabilitation will increase (Chan et al., 2018; Seth et al., 2017). Varma et al. (2016) estimated that,

the highest prevalence of VI among minorities will shift from African American individuals (15.2% in 2015 to 16.3% in 2050) to Hispanic individuals (9.9% in 2015 to 20.3% in 2050). From 2015 to 2050, the states projected to have the highest per-capita prevalence of VI are Florida (2.56% in 2015 to 3.98% in 2050) and Hawaii (2.35% in 2015 and 3.93% in 2050).

Estimates indicate that 32.5% of Florida's population will be 60 years and older by the year 2030, an increase of 34% from 2012 (Substance Abuse and Mental Health Services Administration, 2012). Miami-Dade County is the most populous county in Florida, where 68.6% of the population identified as Hispanic or Latino (United States Census Bureau, 2018).

Racial and ethnic health disparities are well documented (Bell & Lee, 2011; Zambelli-Weiner et al., 2012). Outcomes for individuals of minority status with a disability such as LV and part of an aging population face a trifecta of risk that can result in an inability to achieve healthy outcomes. In the area of LV, general knowledge of eye health and LV services is poorly understood by the

public, particularly those in underserved and minority communities (National Eye Institute, 2016; Pollard et al., 2003; Zambelli-Weiner et al., 2012). These factors create barriers to vision care and rehabilitation and contribute to less than optimal vision outcomes.

It is also known that minority populations are underserved across the continuum of healthcare services. South Florida is in a unique position to create demonstration projects about how to reach community-dwelling elderly and minority populations.

Grant purpose

The purpose of the grant-funded program was to (1) educate community-dwelling seniors about LV; (2) provide assessment and intervention services to identified seniors living with LV; and (3) educate healthcare professionals about best practices in serving this population. The program was implemented over a 3-year period in South Florida (2016, 2017 and 2018).

Program partners

Miami Lighthouse for the Blind and Visually Impaired (MLB) collaborated with the Florida International University (FIU) Occupational Therapy Department and the Alliance for Aging.

FIU supported the program in a variety of ways: (1) development of survey instruments and identification of evaluation tools to guide program components and assess program effectiveness; (2) aggregate and analyze collected program data; (3) facilitate the offering of an annual continuing education workshop at MLB titled “Engaging the Low Vision Community Through Education, Research, and Service” for occupational therapists, physical therapists, and nurses, to better equip them to work with the growing number of seniors with age-related eye disease; and (4) assign FIU graduate students to complete fieldwork experiences at MLB to enhance professional preparation to work with the LV population.

In collaboration with the Alliance for Aging and Miami-Dade Senior Services, sites were identified that offered a variety of services for the senior population. These were primarily sites where community-dwelling, well-elderly individuals could access day programs, meals, recreational/social activities, and so on. Once the sites were identified, they were contacted regarding the opportunity to provide an educational program regarding LV to the population being served. If a site was willing to host an educational session on LV, then arrangements were made for a date and time.

The educational program

The LV occupational therapist identified and scheduled community-based presentations about LV in senior and community centers. Prior to viewing the presentation, seniors were invited to complete knowledge pre-survey on LV consisting of five questions. The questions were as follows: (1) LV is an eye condition that cannot be corrected by regular eyeglasses; (2) there are many age-related eye conditions that result in LV; (3) a magnifier could help a person with LV to read their medication labels; (4) an annual eye exam could prevent the development of eye diseases; (5) people can remain independent even with their diagnosis of LV. For each question, attendees circled “yes,” “no,” or “do not know.” In addition, attendees provided demographic data on age, ethnicity, gender, education, whether they had insurance, type of insurance, and whether it covered vision care. No personally identifying information was collected, and all tests were assigned a unique number for tracking purposes. The seniors then re-took the knowledge test of eye health after the educational session. The test forms were available in Spanish, English, and Haitian Creole. The presentation was given in either English or Spanish, depending on the site and population being served. Following the

completion of the presentation, attendees would complete the same knowledge survey and the occupational therapist would collect the pre- and post-survey information.

At the end of the presentation and after collecting the knowledge survey, the occupational therapist would ask attendees if they have been diagnosed with an eye or vision condition that was discussed in the presentation. Individuals in the audience identified themselves by a raise of the hand and were screened by the LV therapist. The individuals who were screened and found to have an eye condition which led them to have LV or no correctable condition were offered an intervention with a LV optometrist and occupational therapist in the community center at a later, agreed upon, date.

LV community-based intervention

People with an identified need received a LV examination from a LV optometrist and, when indicated, intervention with a LV occupational therapist. The optometrist performed a LV assessment and the occupational therapist offered intervention, when indicated, to help mitigate the effects of LV. The occupational therapist offered additional services to those interested individuals through a home visit. The grant paid for all services and any devices that were provided as a part of the intervention.

The occupational therapist collected pre- and post-intervention data to assess the effectiveness of the intervention on visual function and participation in everyday activities. Two assessments were utilized: (1) the Visual Function Index (VF-14) pre- and post-intervention with the LV occupational therapist asking the individual to identify how difficult 14 tasks are to perform, such as reading a newspaper or cooking; and (2) the Low Vision Independence Measure (LVIM) was administered following any additional occupational therapy intervention. The LVIM is 52 items in 8 categories: self-care, food preparation, home management, communication, financial management, leisure, shopping, and mobility. The level of difficulty was rated from "unable to do" to "not difficult." Interventions primarily were in the form of assistive aides such as solar shields and handheld magnifiers, and education and practice of compensatory strategies to improve function in ADLs.

All data (knowledge survey results, VF-14, and the LVIM) were collected and inputted into an Excel file. Demographic information was analyzed using descriptive statistical methods. Knowledge surveys compared pre- and post-intervention and the overall number of attendees who demonstrated an improved level of knowledge of vision and LV. Paired-sample *t*-tests were conducted to compare pre- and post-intervention scores on the VF-14 and the LVIM to determine whether or not there was a significant difference following intervention.

Program outcomes

The program participants who completed the surveys ranged in age from 55 to 101 (average age: 76.6) years and 275 (31.4%) were male, 572 (65.6%) female, and 28 (3.2%) were missing information on their gender.

Demographics of program participants completing surveys.

	<i>n</i>	%
White non-Hispanic	174	20
African American	79	9
Hispanic	563	64.3
Other	39	4.5
Missing	20	2.2
Total	875	100

Over 3 years, 1552 seniors attended 32 LV information sessions at their local senior's center. Of the attendees, 875 completed eye health knowledge surveys. Over a 3-year period, there was significant improvement in outcomes when assessing knowledge on LV in community-dwelling seniors. For Year 1, 64% of seniors reported increased knowledge of LV. Since the program did not meet the 85% benchmark, staff met to evaluate and make changes in survey administration. For Year 2, additional staff was sent to provide individualized one-on-one assistance in administering surveys and answering additional questions which resulted in 84% of seniors reporting increased knowledge of LV. By Year 3, this number rose to 100% because the process had been refined and program staff was better able to anticipate the needs of seniors and therefore prepared accordingly, for example, providing translators for multiple languages such as Creole for the Haitian community.

The LV optometrist and occupational therapist provided follow-up services and interventions to 176 people who had a screening confirming their self-identified LV, which included meeting with the LV optometrist and occupational therapist, completing a pre-function assessment, participating in an intervention of education, practice and the use of an assistive aide, and the post-intervention assessment.

The VF-14 asked participants ($n=176$) to identify how difficult 14 tasks were to complete (i.e., reading small print, reading a newspaper, cooking). Items were rated on the level of difficulty from *no difficulty* (score=4) to *unable to do* (score=0). Higher scores indicated higher levels of function, with the highest score of 56 indicating no difficulty with any of the 14 activities. Score improvement ranged from zero improvement to a 27-point improvement. The pre-intervention average score was 25.77, and the post-intervention score was 33.32. This represented an average improvement in score following intervention of 7.54 ($SD = 5.45$) points.

A paired sample *t*-test was conducted and the change of score represented a significant positive change following the intervention ($p < .000$). Participants who demonstrated larger gains in function achieved a clinically significant benefit – a notable effect on their ability to engage in everyday activities.

For example, Mrs. X, an 87-year-old client with macular degeneration, had “moderate” difficulties reading the small print on her medication's labels and a “great deal” of difficulty writing a check, as she reported on the pre-VF-14 assessment. After she received a 4X handheld magnifier with a light and the proper training to use it, Mrs. X was able to read the small print on her medications, reporting “no” difficulties on the post-VF-14 assessment. In the area of writing a check, she improved from having a “great deal” to only a “little” difficulty. She was also provided resources on how to request big print checks from her bank.

Of the 176 persons receiving services, 61 were offered and accepted an additional home visit by the occupational therapist to assess competencies and strategies to improve function at home. The occupational therapist used the LVIM to determine levels of function before and after the intervention.

The assessment was completed by the LV occupational therapist asking the individual to demonstrate or self-report (depending on the item) their level of function on each item being assessed prior to and after the intervention. Higher scores indicated higher levels of reported function.

All scores were recorded and entered into an excel program. Scores on pre- and post-intervention were recorded and differences were calculated. A paired-sample *t*-test was performed to determine whether the mean difference in each category and in total was significant. Table 1 shows the average pre- and post-assessment scores, average difference in score, and standard deviation. All changes of scores were significant at the $p < .000$ for each subtest and the total score.

Following the additional intervention, participants reported improved function and knowledge of strategies to improve in home safety and occupational performance.

Table 1. LVIM pre- and post-intervention results.

Subtests	Pre-test (M)	Post-test (M)	Change of score, M (SD)	t-value
Self-care	27.84	29.26	1.42 (1.34)	8.27*
Food preparation	26.75	29.74	2.98 (2.92)	7.99*
Home management	17.49	18.52	1.03 (1.86)	4.33*
Communication	21.67	25.75	4.08 (2.34)	13.62*
Financial management	11.59	13.08	1.49 (1.85)	6.30*
Leisure	13.49	14.80	1.31 (1.62)	6.33*
Shopping	14.28	16.82	2.54 (2.35)	8.42*
Mobility	11.02	11.61	0.59 (1.31)	4.07*
Total	144.13	159.59	15.46 (9.07)	13.31*

* $p < .000$.

For example, Mr. Y was a 77-year-old client with glaucoma. In the pretest-LVIM, he reported that some ADLs were “very difficult” to perform due to glare sensitivity. He received a yellow-tinted pair of glasses that allowed him to decrease the glare and enhance contrast, particularly in indoor environments, such as home. Mr. Y improved his ability to watch TV; play cards; locate objects, counters, and edges; use stairs; and cut food on a plate with contrast color. Following this intervention, he reported on his post-test LVIM “moderately difficult” and “not difficult” to perform these activities. He was also provided recommendations to improve lighting in the home to increase occupational participation.

The LVIM is 52 items in 8 categories: self-care, food preparation, home management, communication, financial management, leisure, shopping, and mobility.

	Average score improvement
Self-care	0.21
Food preparation	0.36
Home management	0.19
Communication	0.59
Financial management	0.42
Leisure	0.33
Shopping	0.50
Mobility	0.13
Total	2.75

Low Vision Independence Measure $N = 61$ (pre- and post-difference). A higher score indicates a higher level of function following intervention.

Individual total change scores ranged from 0.17 to 9.63 for reported improvement in function. Over the 3-year grant, 100% of seniors who received occupational therapy improved their independence.

Educating healthcare professionals

For the professional education component, 108 healthcare professionals and students attended the annual workshops over the 3-year period. In total, 41 of those in attendance were students enrolled

in professional healthcare programs. On workshop evaluations, attendees expressed that they were “very satisfied” with the program. In addition, participants completed a pre- and post-test answering 36 questions about their knowledge of LV. Participants, on average, improved their knowledge of LV practice.

Healthcare professional feedback on workshop.

How would you rate:	Very satisfied
Relevance of the topics chosen	100%
Content of this course matched the announced objectives	100%
Extent to which you have acquired information	97%
Expertise of presenters	95%
Usefulness of the information that you have acquired	97%
Your ability to work more effectively with low-vision clients	92%
The venue and its facilities	100%

Occupational therapy students from FIU were assigned to complete assignments and fieldwork experiences at MLB. In each of the 3-year grant cycles, a small group of occupational therapy students (6–8) interviewed the occupational therapist and toured MLB as part of a course. The students then presented a report to their peers about LV practice. Occupational therapy students must complete two levels of fieldwork placement. The Level-1 placements are 2 or 4 weeks long, full-time. During the grant, there were nine occupational therapy students assigned to MLB for a Level-1 experience. The Level-2 placement is a full-time, 3-month experience with a goal of preparing the student for entry-level practice. The Level-2 placements are the final requirements of the FIU master’s program. During the grant, eight occupational therapy students completed the 3-month experience. Of those students, one went on to complete requirements for a certified LV therapist.

Summary and implications

Community-based programs can successfully increase education about and access to LV services. Current findings in literature indicate that occupational therapists play a key role in the rehabilitation of VIs (Butler & Hollestelle, 2017). Assessment and intervention frequently focus on education, use of devices, and compensatory strategies. Access to these LV services and training improves function in important everyday tasks and has the capacity to improve overall health outcomes and reduce healthcare costs. South Florida’s seniors would benefit from increased access to visual health services to enhance health and well-being. MLB is uniquely positioned to offer these services in an accessible, community-based model of care.

Dagnelie (2013) makes a compelling argument for the need for healthcare professionals to be prepared to serve persons with LV when she writes:

As these assistive devices and environmental adaptations become more sophisticated, the role of low vision rehabilitation experts, that is, teachers of the visually impaired, occupational therapists with training in low vision rehab, and orientation and mobility (O&M) trainers, will become increasingly important and demanding. This is true particularly if most of their clients will be in their 70s and beyond. Even the most ergonomic and user-friendly hi-tech device will require a carefully tailored instruction and practice program if it is to be accepted by this population. For the rehab experts themselves, the availability of continuing education courses covering the newly developed devices and their optimal use already has become crucial, and this trend is only expected to accelerate. (p. 91)

MLB, in partnership with FIU Occupational Therapy Department, demonstrated the capacity to provide effective education and training to assist healthcare professionals meet the needs of community-dwelling seniors.

Minority and underserved communities need a community-based approach and outreach to access services. MLB successfully provided education and the provision of services to effectively serve this population and improve functional outcomes for individuals with LV.

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