Use of Prescribed Optical Devices in Age-Related Macular Degeneration

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Abstract

Purpose—To evaluate prescribed optical device use in terms of frequency and perceived usefulness among people with age-related macular degeneration (AMD). We also sought to determine the tasks for which they were using their prescribed low vision device.

Methods—199 patients with AMD presenting for the first time to the low vision service were recruited from a university-based clinic. Prior to the low vision evaluation and device prescription, they completed the NEI-VFQ 25, Center for Epidemiological Studies Depression Scale, Short Portable Mental Status Questionnaire and a general health questionnaire. The low vision evaluation included best-corrected ETDRS visual acuity, MNRead testing, microperimetry, prescription and dispensing of optical low vision devices. Telephone follow-up interviews were conducted about device usage 1-week, 1-month and 3-months post-intervention.

Results—181 participants were prescribed low vision devices. 93% completed all 3 follow-up interviews. Intensive users ($\geq$1hour/day) of devices were similar in demographic and visual characteristics to non-intensive users (<1 hour/day) except for habitual reading acuity and speed as well as contrast sensitivity. Overall, device use increased slightly over 3 months of follow-up. Magnifiers were reported to be moderately to extremely useful by greater than 80% of participants at all time points except the 1 month follow-up for hand magnifiers (75%). High plus spectacles were the least frequently prescribed device and rated as moderately to extremely useful by 70%, 74% and 59% at 1 week, 1 month and 3 months, respectively. Most participants used their devices for leisure reading, followed by managing bills. Very few devices (n=3, <1%)were not used at any time point.

Conclusions—Patients with AMD who are provided with prescribed optical low vision devices do use them and perceive them as useful, especially for leisure reading activities. High rates of usage were maintained over 3 months.

Keywords

low vision; age-related macular degeneration; magnification; reading; low vision devices

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Age-related macular degeneration (AMD) is the leading cause of permanent visual impairment among the elderly in the developed world.[1–3] People with AMD are at increased risk of medical co-morbidities such as falls, hip fracture and depression,[4, 5] as well as driving cessation[6] and reduced vision-targeted, health-related quality of life.[7] Although medical therapies for AMD have been improving over the past decade, vision rehabilitation remains a mainstay of treatment for those with vision loss. A recent systematic review of the effectiveness of low vision service provision yielded only 58 studies that met inclusion criteria.[8] The authors concluded that among the 58 there was a paucity of studies that were well designed and adequately reported. A pre-post-rehabilitation design was the most commonly used; only 7 studies were randomized clinical trials. Most studies of vision rehabilitation include people with vision loss from many different causes rather than focusing on a single etiology, such as AMD. Some of the best-designed studies have taken place in the Veterans Administration setting, however these studies are largely limited to male participants.[9, 10]

There is good evidence that prescribed low vision devices are used and valued by the users. A study by Reeves, Harper and Russell[11] comparing different types of low vision service provision in the UK for people with AMD found that at 4 and 12 months respectively, 95% and 94% of participants reported using at least one low vision device. Unfortunately, the types of devices included were not described. In another study of low vision device use 12 to 24 months after discharge from a veterans administration in-patient rehabilitation program, 85.4% of prescribed devices were still in use.[12] Device use was not associated with visual acuity, age or diagnosis. However it was strongly correlated with the demographic characteristic of having a helper (typically a wife) living in the home. The authors postulate that the successful device use is likely related to the extensive training (typically >20 hours) the veterans received in device use. Likewise, Leat and colleagues[13] found that low vision device use was not associated with age, gender or visual acuity. The only recent study of device use surveyed patients of 4 university based clinics an average of 11 months after a low vision device was prescribed.[14] Only 6 patients with AMD were included in this study. Of the total 88 patients, 19 had abandoned at least one device. A total of 119 devices were prescribed, of which 19% had not been used in the past 3 months. Only 71% were reportedly used in the prior week. Reasons for abandonment were similar to those reported by veterans[12], including a different device was used for the task, the device was ineffective for the task or the patient's vision had worsened[14]. Device abandonment was not associated with age, gender, visual acuity, training, study center or diagnosis.

A nation-wide survey of agencies and clinics providing low vision rehabilitation services in the United States indicated that 85.9% of clients presenting for vision rehabilitation reported difficulties with reading and that optical aid fitting and basic device training was provided by 92% of the entities responding.[15] We therefore undertook a prospective cohort study to evaluate optical device use among people with the most common etiology for vision impairment, AMD. Since optical device prescription is a common treatment modality, it is important to know if these devices are used, how frequently they are used and for what purposes.

METHODS

Participants

Patients seen in the University of Alabama at Birmingham Center for Low Vision Rehabilitation for the first time whose primary diagnosis causing vision loss was AMD were approached for enrollment. The enrollment period was from May 2008 to January 2011 (n=199). Exclusion criteria included the inability to converse in English or decreased hearing such that telephone follow-up calls would not be possible, as well as previous low

vision evaluation and treatment. Patients using over-the-counter magnification were not excluded. Potential participants were informed of the nature and purpose of the study at the time they presented for low vision rehabilitation. Willing participants provided written informed consent. This research followed the tenets of the Declaration of Helsinki, and Institutional Review Board approval was obtained from University of Alabama at Birmingham.

Pre-Intervention Interview

The following instruments were administered by a trained research interviewer in person at baseline, prior to the low vision evaluation and prescription of optical devices. The National Eye Institute Visual Function Questionnaire (NEI VFQ-25) was administered to measure vision-targeted, health-related quality of life.[16] General health was measured using the General Health Questionnaire that asks "has a doctor ever told you that you have" any of 17 chronic conditions often observed in the geriatric population[17]. A co-morbidity score was defined as the number of chronic health conditions reported. The Short Portable Mental Status Questionnaire (SPMSQ)[18] was administered, which is a brief screener to estimate general cognitive status and scored by the original published method.[18] The Center for Epidemiological Studies-Depression (CES-D) Scale[19] was used to evaluate the number of depressive symptoms experienced over the previous week. Scores range from 0 to 60 with higher scores indicating more severe depressive symptoms. Patients with scores of 16 or greater are at significant risk for clinical depression.[20]

Clinical Low Vision Evaluation

Clinical evaluation and low vision device prescription were performed by licensed optometrists with residency training in vision rehabilitation. The optometrists were masked as to the data collected from the questionnaires described above. Best-corrected distance visual acuity was obtained after trial frame refraction. Visual acuity was measured OD and OS using a back-illuminated ETDRS style chart[21] (charts 1 and 2; Precision Vision, LaSalle, IL). Testing was performed at 2 meters in normal room illumination. If the subject was unable to read 4 letters on the top line, the chart was moved in to 1 meter, and the participant was again asked to read the top line. If the participant was still unable to read 4 of the 5 letters in the top line, the chart was moved in to 0.5 meter. Subjects continued to read the chart until 3 or more letters in the row were missed. Acuity was determined using the letter-by-letter scoring method.[21] Subjects unable to identify any optotypes were tested for hand motion vision and if negative, for light perception.

Near visual acuity was measured binocularly using the MNRead Acuity Chart.[22] Testing was performed using the patient's habitual near correction as well as with each prescribed near device. Contrast sensitivity was measured with best-correction in place using the Mars Contrast Sensitivity test (Mars Perceptrix, Chappaqua, NY).[23] The central visual field and fixation were evaluated using the Rodenstock Scanning Laser Ophthalmoscope (SLO) microperimetry program. Scotomas were mapped and fixation was rated by the examiner as: central and steady, central but unsteady, central within a scotoma, peripheral retinal locus developing or peripheral retinal locus established.

Device Prescription

Devices were prescribed by the attending optometrist. The prescribed devices were usually chosen from the standard clinic stock, however the optometrist was able to order any optical device they deemed appropriate, including stronger bifocals (> +3.50D) or custom high plus near spectacles. Other typical devices prescribed for near work included stand magnifiers, hand-held magnifiers, magnifying lamps, around the neck magnifiers, monocular telescopes and binocular spectacle telescopes. Electronic devices were not included and were not

prescribed until the study concluded. Participants received all prescribed devices at no cost, typically on the same day as the low vision evaluation. Devices in this clinic may be provided free of charge to financially needy patients, however most patients must purchase their devices. Free devices were a benefit of participation. Participants were given brief instructions by the optometrist on proper technique for using each prescribed device. Some participants were also referred for occupational therapy (OT) as would typically occur in this clinic. Referral or non-referral was determined by the presence or absence of ADL difficulties, a qualifying diagnosis and the willingness of the patient to return for therapy.

Follow-Up Telephone Interviews

Participants were telephoned by a trained research interviewer 1-week, 1-month and 3-months after their visit for the low vision intervention. Participants were asked about their low vision device usage including total time each day, tasks for which the device was used and how useful the device was to them (see Appendix – available at **[LWW insert link]**). A separate questionnaire was completed for each device prescribed. The interviewer described each device to the participant prior to beginning each device use questionnaire to be sure that for participants with more than one device, they were responding about the correct device.

Data Analysis

Participants were excluded from analyses if no devices were prescribed during their initial low vision evaluation. Those who were prescribed devices were divided into 2 groups based on their low vision device use at 1 month: intensive users (those who reported using at least one device for an hour or more per day) and non-intensive users (those who used a prescribed device at least weekly, but less than an hour per day). For the purposes of analysis, around the neck magnifiers and magnifying lamps were categorized as "hands-free magnifiers". Demographic and clinical characteristics were compared between the two groups using chi-square and t-tests for categorical and continuous variables, respectively Statistical significance was set at $\alpha=0.05$, two-tailed for all analyses.

RESULTS

One hundred ninety-nine patients were enrolled. Overall, our sample was largely white (98%), female (68%) not married (60%), with at least a high school education (82%), and a family income greater than $20,000 US per year (65%). Approximately 48% had received an injection of a vascular endothelial growth factor (VEGF) antagonist (ranibizumab, bevacizumab or pegaptanib) in at least one eye. Optical low vision devices were prescribed to 181 participants. The 18 not receiving optical devices were unable to use them for meaningful purposes primarily due to profoundly impaired vision (mean best-corrected visual acuity in the better seeing eye was 1.0 ± 0.5 logMAR (20/200) and 1.4 ± 0.4 logMAR (20/500) in the poorer seeing eye). Mean better eye visual acuity of those who were prescribed devices was 0.5 ± 0.3 logMAR (20/64) and mean worse eye visual acuity was 1.1 ± 0.5 logMAR (20/260). Of the 181 who were prescribed devices, 175 (96%), 174(96%), and 171(94%) were available for follow-up at 1 week, 1 month and 3 months respectively, and 169 (93%) participated in all 3 follow-up interviews. At 1 month, 171 (94%) of respondents reported using at least one prescribed device. There were 125 stand magnifiers, 156 hand-held magnifiers, 29 near spectacles and 35 hands-free magnifiers prescribed and dispensed. Participants were prescribed an average of 2 devices.

Baseline characteristics of participants using at least one device at least weekly at the one-month follow-up interview (n=171) were stratified by intensive versus non-intensive device use and are listed in Table 1. Intensive and non-intensive users were similar in most

measured characteristics. Baseline contrast sensitivity, reading acuity and maximum reading rate were significantly poorer for the infrequent users, although the differences are likely not clinically meaningfully different, except for the entering maximum reading rate using their habitual correction as measured by the MNRead. Those who went on to become intensive users at one month had on average at baseline a better reading acuity (minimum print size) and faster maximum reading speed by 20 words per minute than those who became non-intensive users. Device use was divided by device type, with use at one-week, one-month, and three months presented in Table 2 for those participants completing all 3 follow-up interviews. In general, the devices were reported to be useful for a variety of near tasks during the 1-month follow-up interview. With the exception of high-plus near spectacles at all time points and hand-held magnifiers at 1-week, over 80% of users reported that the devices were moderately-to-extremely useful. Additionally, for all near devices except high-plus near spectacles from the 1-month to 3-month follow-up, the proportion of users reporting an hour or more of use per day increased over time.

Table 3 describes the primary use reported for each device type. Participants most frequently reported that the device (regardless of type) was used for leisure reading. Stand magnifiers were used almost exclusively for leisure reading and reading mail. Hand-held magnifiers were the only devices reported by more than a couple of participants to be used out in the community as their primary use. Between 22% and 28% of those prescribed hand-held magnifiers, depending on follow-up time, reported spot reading in the community as their primary use for that device. High plus lenses were the least frequently prescribed treatment, however, proportionally they were most likely to be used daily for more than an hour. They were not reported to be used in the community. The purpose for which the devices were used was remarkably stable across the 3 months of follow-up. Although identifying medications was uncommon as a primary use, it was commonly cited as a secondary use, especially for hand and stand magnifiers. Magnifiers were rarely used for activities involved with food preparation or identification either as primary or secondary uses.

Reasons for device non-use are found in Table 4. The most common reasons for non-use at one week were having no need to use the device (30%) or having not had a chance to use it yet (30%). Only 14 devices were not being used at the one-month follow-up, with approximately half due to being unable to use the device successfully. The number not using a particular device increased again at the 3-month follow-up, but the number was still quite small. The participants not using a device at the 1-week visit were largely not the same as those not using them at the 3-month visit. Interestingly, there were only 3 devices reported to not be used at all 3 time-points.

In regards to training, 126 (63%) participants were offered OT. Only 40 (20%) elected to receive OT and averaged 11.2 +/− 11.6 treatment units (a unit is 15 minutes). Fewer intensive users had OT, but the difference was not statistically significant. The most common reason for non-referral to OT was lack of a qualifying diagnostic code accompanied by participant assurance that activities of daily living were not being impacted by their vision.

DISCUSSION

This study suggests that the vast majority of adults with AMD who seek low vision services do use their prescribed low vision devices in the three months after initially receiving them. Our findings are consistent with previous research on device use and persons with low vision.[11–14] We are not aware of any other published studies of device use among patients with AMD undertaken since anti-VEGF treatments came into widespread use. The patients enrolled in this study were seen since 2008, when those treatments were broadly available.

In fact, 48% of our sample did receive an anti-VEGF treatment in at least one eye. The patients in the current study had better vision than our sample of 130 AMD patients presenting for low vision rehabilitation in this same geographic location in a 2004 study of quality of life[7] (mean visual acuity in the better eye in the earlier study was 0.94 logMAR). Other characteristics such as age, race, gender and education were similar between studies. This implies that patients presenting for low vision rehabilitation in the anti-VEGF era may have better acuity on average. However, anti-VEGF therapy clearly does not eliminate the need for low vision rehabilitation as evidenced by the large proportion of our sample that found the devices useful.

The similarity at baseline between those who went on to become frequent users and those who became infrequent users suggests that standard clinical measures cannot predict device use. The finding that intensive users had greater reading rates at baseline with their habitual correction is interesting, especially given that the fixation status and the average best corrected visual acuity in the better eye at baseline was not statistically different between groups. Although the fixation status was similar, our analysis was based on categorizing fixation, not on eccentricity from the fovea, stability of the preferred retinal locus or other parameters that might affect reading. Future work will further explore the relationship of fixation, scotoma size and location to reading performance.

Other studies of device use among people with low vision have typically occurred at one[13, 14, 24, 25] or two[11, 26] time points from 1 month to 3 years after devices were prescribed. Here we followed people at 3 time points over a 3- month period and found relative stability in the time spent using devices and the perceived usefulness. Duration of use increased over time except for high plus adds and microscopes, which decreased between the 1-month and 3-month follow-ups. This may reflect self-training – the participant may have just become more comfortable and proficient with device use.

The most common use of the prescribed devices was reported to be leisure reading. Reading is an important avocation, and this study shows that older adults with AMD are willing to use a device to pursue that avocation. They also used the devices for important activities of daily living and instrumental activities of daily living. Although these devices were provided free of charge, the average total retail cost of devices was under $250 per participant. Optical magnification is a cost-effective way to enable people with AMD to continue to read.

In comparison to other studies,[13, 25] the proportion of participants in our sample receiving near spectacle magnification was low. High plus adds and microscopes are typically prescribed with the least amount of magnification that meets the person's needs in order to maximize the working distance from the object of interest (typically print). Hand and stand magnifiers, are not subject to the same limitations. Therefore, those devices may have been prescribed with a greater acuity reserve. The greater acuity reserve likely affords easier use and comfort. Ample acuity reserve at initial prescription may also enable the device to continue being used despite small decreases in visual ability. Studies are underway examining this relationship in our sample.

It is well known that depression is common among older adults with vision loss[27, 28]. Earlier studies found that nearly one-third of patients with macular degeneration were depressed.[4, 5] However, 2 more recent studies showed depression rates of 12.9% among individuals with AMD from a retina clinic[29] and 14.7% among a sample of patients from outpatient eye clinics in Australia.[30] Depressive symptoms were present in 17.2% of the participants in our sample, which is slightly higher than, but more similar to the recent studies. However, it is unlikely that depressive symptoms contributed to less frequent device use as the overall

score was not different between the intensive versus non-intensive user groups, and the percentage of those classified as depressed by the CES-D scale was higher for the intensive device users. Over one-fourth of those participants who were not prescribed a device scored greater than16 on the CES-D scale, but their depression status was not the reason a device was not prescribed. It makes sense that those participants with the most severe vision loss would be at greatest risk for depression.

Strengths of this study include its prospective design, large sample size, and excellent retention over three follow-up data collection time-points. Studying only one etiology for vision loss prevents bias from over or under-representation of etiologies. An additional strength is that we studied the use of simple, inexpensive magnification devices. Since devices are not covered under most insurance plans in the U.S., including Medicare, it is important to know that even optical devices can make significant improvements in some domains of quality of life. This is particularly important as over one-third of participants enrolled in this study had family incomes of less than $20,000 per year, making electronic magnification unobtainable for many. Limitations of this study were that the outcome measures were self-reports, and that the maintenance of device usage was not examined past three months of follow-up. Additionally, some might argue that the pre-post design is a study limitation, however, in the Low Vision Intervention Study[10] veterans in the wait-list control group experienced a decline in function whereas the treated group did not. The authors suggest that it is therefore not appropriate to use a delayed treatment group as a control.

In conclusion, patients with AMD who are provided with prescribed low vision devices do use them and perceive them as useful, especially for leisure reading activities. High rates of use were maintained over 3 months of follow-up, so the findings are not just an effect of the recent device prescription. Future work will investigate the role of reading speed, critical print size, reading acuity, scotoma size and location as well as acuity reserve on device use in older adults with vision impairment due to AMD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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APPENDIX

The Device Use Questionnaire is available as an Appendix at **[LWW insert link].**

Table 1

Baseline Characteristics of Participants.

	No device prescribed (N=18)	Intensive use† of prescribed device at 1 month (N=78)	Infrequent use‡ of prescribed device at 1 month (N=93)	p-value*
Age	81.6 +/− 9.3	82.2 +/− 6.8	82.8 +/− 8.2	0.6
White race %(n)	94.4% (17)	97.4% (76)	98.9% (92)	0.5
Female %(n)	77.8% (14)	73.1% (57)	64.5% (60)	0.2
Not Married %(n)	72.2% (13)	59.0% (46)	61.3% (57)	0.8
Less than High School Education	22.2% (4)	16.7% (13)	19.4% (18)	0.6
Less than $20,000 Family Income	33.3% (6)	36.0% (27)	34.8% (31)	0.9
General Health Questionnaire (mean, SD)	6.1 +/− 2.6	6.2 +/− 2.3	5.7 +/− 2.5	0.2
Center for Epidemiologic Studies Depression Scale Score 16%(n)	27.8% (5)	18.0% (14)	15.1% (14)	0.6
Short Portable Mental Status (mean, SD)	1.2 +/− 1.5	0.7 +/− 1.1	1.0 +/− 1.1	0.09
NEI-VFQ25 Composite Score (mean, SD)	44.8 +/− 18.8	59.6 +/− 14.3	57.1 +/− 16.5	0.3
Visual Acuity Better Eye logMAR (mean, SD)	1.0 +/− 0.5	0.5 +/− 0.3	0.5 +/− 0.3	0.4
Visual Acuity Worse Eye logMAR (mean, SD)	1.4 +/− 0.4	1.1 +/− 0.5	1.2 +/− 0.5	0.3
Contrast Sensitivity logCS (mean, SD)	0.9 +/− 0.4	1.1 +/− 0.2	1.0 +/−0.2	**0.03**
History of receiving Anti-VEGF therapy %(n)	27.8% (5)	48.7% (38)	47.3% (44)	0.9
Receiving occupational therapy during study follow-up %(n)	22.2% (4)	18.0% (14)	22.6% (21)	0.5
Fixation in the Better Eye				0.4
Foveal or with PRL %(n)	50.0% (9)	87.2% (68)	91.2% (83)	
Central, within scotoma %(n)	50.0% (9)	12.8% (10)	8.8% (8)	
Fixation in the Worse Eye				0.4

	No device prescribed (N=18)	Intensive use[†] of prescribed device at 1 month (N=78)	Infrequent use[‡] of prescribed device at 1 month (N=93)	p-value*
Foveal or with PRL %(n)	50.0% (9)	57.7% (45)	50.6% (44)	
Central, within scotoma %(n)	50.0% (9)	42.3% (33)	49.4% (43)	
MNRead wearing habitual correction				
Minimum Print Size (logMAR)	15 of 18 participants not prescribed a device were unable to read anything on the MNRead test	0.4 +/− 0.3	0.5 +/− 0.3	**0.02**
Critical Print Size (logMAR)		0.9 +/− 0.3	0.9 +/− 0.3	0.7
Maximum Reading Speed (words per minute)		127.6 +/− 39.8	107.1 +/− 50.7	**0.006**

[†]Intensive device use is defined as 1 hour or more per day.

[‡]Non-intensive device use is defined as use at least weekly, but less than 1 hour per day. *p-values are comparing intensive to non-intensive device users.

Table 2

Device use by device type among those who participated in all 3 follow-ups (n=169). Most participants were prescribed more than one device.

Device, N (%)	At 1 week	At 1 month	At 3 month
Stand Magnifier (n=117)			
No use	5 (4.3%)	3 (2.6%)	9 (7.7%)
<1 hour daily[†]	87 (74.4%)	83 (70.9%)	74 (63.3%)
Daily 1 hour	25 (21.4%)	31 (26.5%)	34 (29.1%)
User-rated usefulness			
Not or Somewhat	22 (18.8%)	15 (12.8%)	22 (18.8%)
Moderately to extremely	95 (81.2%)	102 (87.2%)	95 (81.2%)
Handheld Magnifier (n=144)[‡]			
No use	15 (10.5%)	6 (4.2%)	11 (7.6%)
<1 hour daily[†]	101 (70.6%)	101 (70.1%)	96 (66.7%)
Daily 1 hour	27 (18.9%)	37 (25.7%)	37 (25.7%)
User-rated usefulness			
Not or somewhat	36 (25.0%)	20 (13.9%)	28 (19.4%)
Moderately to extremely	108 (75.0%)	124 (86.1%)	116 (80.6%)
Near spectacles (n=27)			
No use	3 (11.1%)	3 (11.1%)	6 (22.2%)
<1 hour daily[†]	15 (55.6%)	10 (37.0%)	11 (40.7%)
Daily 1 hour	9 (33.3%)	14 (51.9%)	10 (37.0%)
User-rated usefulness			
Not or somewhat	8 (29.6%)	7 (25.9%)	11 (40.7%)
Moderately or extremely	19 (70.4%)	20 (74.1%)	16 (59.3%)
Hands-free Magnifier (n=35)			
No use	4 (11.4%)	0 (0.0%)	2 (5.7%)
<1 hour daily[†]	21 (60.0%)	23 (65.7%)	20 (57.1%)
Daily 1 hour	10 (28.6%)	12 (34.3%)	13 (37.1%)
User-rated usefulness			
Not or somewhat	6(17.1%)	4 (11.4%)	6 (17.1%)
Moderately or extremely	29(82.9%)	31 (88.6%)	29 (82.9%)

[†]< 1 hour daily category includes those used their devices less than daily.

[‡]use data missing for one participant at 1 week

Table 3

Primary Device Use (numbers may add to greater than the number of participants prescribed a particular device since a small percentage were unable to choose just one primary task).

Primary Use of Stand Magnifier

	1 week (n=112)	1 month (n=114)	3 months (n= 108)
No primary use, n (%)	7 (6)	8 (7)	12 (10)
Reading mail/paying bills, n (%)	26 (23)	17 (15)	21 (19)
Leisure reading, n (%)	81 (72)	82 (72)	72 (67)
Identifying medications, n (%)	0 (0)	6 (5)	3 (3)
Identifying foods/food preparation, n (%)	0 (0)	0 (0)	0 (0)
Spot-reading in the community, n (%)	1 (1)	2 (2)	1 (1)
Playing cards or other hobbies, n (%)	1 (1)	0 (0)	0 (0)

Primary Use of Hand Held Magnifier

	1 week (n=129)	1 month (n=138)	3 months (n= 133)
No primary use	18 (13)	10 (7)	14 (10)
Reading mail/paying bills	19 (15)	18 (13)	19 (14)
Leisure reading	61 (47)	67 (49)	60 (45)
Identifying medications	5 (4)	9 (7)	7 (5)
Identifying foods/food preparation	0 (0)	0 (0)	0 (0)
Spot-reading in the community	29 (22)	32 (23)	37 (28)
Playing cards or other hobbies	0 (0)	0 (0)	0 (0)

Primary Use of High Plus Lenses

	1 week (n=24)	1 month (n=24)	3 months (n=21)
No primary use	3 (11)	3 (11)	7 (26)
Reading mail/paying bills	3 (13)	3 (13)	2 (10)
Leisure reading	18 (75)	19 (79)	16 (76)
Identifying medications	1 (4)	2 (8)	0 (0)
Identifying foods/food preparation	0 (0)	0 (0)	0 (0)
Spot-reading in the community	0 (0)	0 (0)	0 (0)
Playing cards or other hobbies	0 (0)	0 (0)	0 (0)

Primary Use Of Hands-free Magnifier

	1 week (n=31)	1 month (n=35)	3 months (n= 33)
No primary use	5 (14)	0 (0)	2 (6)
Reading mail/paying bills	4 (13)	7 (20)	8 (24)
Leisure reading	21 (67)	19 (54)	20 (61)
Identifying medications	0 (0)	1 (3)	0 (0)
Identifying foods/food preparation	0 (0)	0 (0)	0 (0)
Spot-reading in the community	0 (0)	0 (0)	0 (0)
Playing cards or other hobbies	0 (0)	1 (1)	0 (0)

Table 4

Reasons for device non-use by device type at each follow-up, for all participants responding at that follow-up.

	Stand Magnifier (n)	Hand Held Magnifier (n)	High Plus Lenses (n)	Hands-free Magnifier (n)	Total n(%)
1 Week Follow-up					
Unable to use	1	4	1	0	6 (20)
Have not used yet	2	5	2	0	9 (30)
Device broken	1	1	0	1	3 (10)
No need to use	1	5	0	3	9 (30)
Other/not specified	0	3	0	0	3 (10)
Total	5	18	3	4	30(100)
1 Month Follow-up					
Unable to use	1	3	3	0	7 (50)
Device broken	0	1	0	0	1(7)
No need to use	0	3	0	0	3 (21)
Other/not specified	2	1	0	0	3 (21)
Total	3	8	3	0	14 (100)
3 Month Follow-up					
Unable to use	4	5	6	1	16 (55)
Device broken	0	4	0	0	4 (14)
No need to use	4	2	0	1	7 (24)
Other/not specified	1	1	0	0	2 (7)
Total	9	12	6	2	29 (100)