Effect of Refractive Error Correction on Health-Related Quality of Life and Depression in Older Nursing Home Residents

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Objective: To examine the effect of treating uncorrected refractive error through spectacle correction on vision-targeted health-related quality of life and depressive symptoms in nursing home residents.

Methods: Persons aged 55 years or older residing in nursing homes in Birmingham, Alabama, having uncorrected refractive error were randomly assigned to either immediate spectacle correction of uncorrected refractive error or delayed correction (after the 2-month follow-up visit).

Main Outcome Measures: Vision-targeted health-related quality of life (measured with the Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire and the VF-14) and depressive symptoms (measured with the Geriatric Depression Scale), assessed at baseline and at 2 months.

Results: At the 2-month follow-up, the immediate refractive error correction group as compared with the delayed correction group had higher scores on the Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire subscales of general vision, reading, psychological distress, activities and hobbies, and social interaction (all $P < .04$) and the VF-14 ($P < .001$) as well as fewer depressive symptoms on the Geriatric Depression Scale ($P = .003$), adjusting for mental status and baseline outcome variables.

Conclusions: Dispensing spectacles to treat uncorrected refractive error in nursing home residents leads to improved quality of life and decreased symptoms of depression.

Application to Clinical Practice: This study demonstrates that older adults residing in nursing homes can personally benefit from access to the most basic of eye care services.

Trial Registration: clinicaltrials.gov Identifier: NCT00347620

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NURSING HOME RESIDENTS in the United States and other industrialized countries have high rates of vision impairment, with estimates ranging from 3 to 15 times higher than corresponding rates for community-dwelling older adults.[1-11] Studies suggest that vision impairment in about one-third of nursing home residents could largely be reversed by treatment of uncorrected refractive error (myopia, hyperopia, presbyopia).[4,12] There are several factors that could be contributing to these high vision impairment rates. Persons with vision impairment are more likely to be admitted to nursing homes as compared with those with normal sight.[13] Those in need of eye care can lack transportation and escorts for trips to eye clinics.[14] There is a shortage of ophthalmologists and optometrists who offer services at nursing homes.[15-18] The National Nursing Home Survey found that only half of nursing homes in the United States report having contracts for vision and hearing services,[15] and the Medical Expenditure Panel Survey[16] estimates that only 12.6% of nursing homes have optometric services available on-site. Studies have estimated that more than 50% of nursing home residents have no evidence of having received eye care services in their medical records even though an eye care provider is on contract to the facility.[7,19] Another factor underlying high vision impairment rates in nursing homes is that there may be a pervasive attitude among the nursing home staff, family, and/or health care providers that many persons in nursing homes would not benefit from treatments to improve vision because of cognitive impairment and/or physical frailty. Research that could demonstrate that re-

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fractive error correction through spectacles improved health-related quality of life and psychological well-being among nursing home residents could serve as a strong impetus to increase the availability of these eye care services in nursing homes.

Here we describe a randomized controlled trial examining the effect of treating uncorrected refractive error through spectacle correction on vision-targeted health-related quality of life and depressive symptoms in nursing home residents.

METHODS

The institutional review board at the University of Alabama at Birmingham approved the study protocol. This study followed the tenets of the Declaration of Helsinki. Seventeen nursing homes in the Birmingham, Alabama, area were sites for the study. All of the 17 participating nursing homes had eye care services available to residents in that a licensed optometrist visited the facility on a routine basis to provide services. Written informed consent was obtained from each of the participants and also the resident's sponsor (a family member or state-appointed guardian) after explaining the nature and possible consequences of the study.

Persons were eligible for enrollment if they met the following criteria: (1) were identified by the unit charge nurse as a person who could answer simple questions about vision and daily activities; (2) were aged 55 years or older; (3) spoke English; (4) had a Mini-Mental State Examination (MMSE)[20] score of 13 or higher, since comprehension of simple requests and questionnaire items was critical to valid outcomes measurement; and (5) had uncorrected refractive error in 1 or both eyes for near or far test distances as determined in a routine eye examination performed by an optometrist within the past month. To be eligible for enrollment, correction of the uncorrected refractive error had to improve visual acuity by at least 1 line on a distance visual acuity chart for at least 1 eye according to the optometrist's records. Refractive error measurement and refraction for best distance and near correction were carried out by an optometrist using subjective refraction with trial lenses and frames, a portable autorefractor, and/or retinoscopy, with most enrollees receiving a combination of approaches.

Before randomization to either of the 2 arms of the study, a research staff member assessed distance and near visual acuity while the resident used habitual correction (or nothing if they had no correction) for each eye separately and together. Testing was carried out in either the resident's room or another private area with adequate lighting. Distance visual acuity was assessed with the ETDRS chart using its standard protocol and expressed as the logarithm of the minimum angle of resolution (logMAR).[21] Near visual acuity was assessed using the Lighthouse Near Visual Acuity Test (modified ETDRS) administered at 40 cm. The Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire (NHVQoL)[22,23] was used to assess vision-targeted health-related quality of life. The NHVQoL is an instrument specifically developed for the nursing home resident population and consists of 9 subscales focusing on general vision, reading, ocular symptoms, mobility, psychological stress, activities of daily living, activities and hobbies, adaptation and coping, and social interaction. Two other questionnaires were also administered, the Medical Outcomes Study Short-Form 36 (SF-36)[24] to assess generic health-related quality of life (both mental and physical components) and the VF-14[25] to assess the visual activities of daily living. Scoring on all of the 3 questionnaires is from 0 (severe disability) to 100 (no disability), and all of the questionnaires were interviewer-administered by trained personnel. The presence of depressive symptoms was assessed by the 15-item Geriatric Depression Scale (GDS),[26,27] a widely used screening instrument for estimating depressive symptoms in older adults, including those residing in nursing homes.[28] The screening version of the Hearing Handicap Inventory for the Elderly[29,30] was administered to assess hearing difficulty because the protocol relied on verbal communication with the participant. The medical record was abstracted to obtain information on demographic variables (age, sex, race/ethnicity, and education, which were also verified by interview), current chronic medical conditions, and length of stay in the nursing home.

Following the baseline assessment, each resident selected his or her own preferred style of spectacle frames from 22 choices presented in a portable display. Based on these selections, bifocal spectacles with each participant's best refractive correction were ordered from the participating optical shop. Spectacles were made at no cost to participants. Each participant was then randomly assigned (irrespective of which nursing home they resided in) to 1 of 2 groups as follows.

In the immediate refractive error correction group, the spectacles were immediately dispensed to the participant once the order was ready at the optical dispensary (within about 1 week). Research staff specifically trained in spectacle fitting made adjustments to the spectacles during dispensing to ensure a comfortable fit. Staff also emphasized to both the resident and the certified nursing assistant (CNA) primarily in charge of the resident's day care the importance of the resident's wearing the spectacles and how to care for the spectacles. Compliance in wearing the spectacles was formally monitored by separately interviewing both the resident and the CNA on a weekly basis during the 2-month follow-up period. The resident and the CNA reported how much time overall the resident wore his or her glasses during the last week; response options were all of the time, most of the time, about half of the time, some of the time, only once in a while, or never.

The other group was the delayed refractive error correction group whereby the spectacles were not dispensed until 2 months after baseline, after the follow-up outcomes assessment was administered. The dispensing process for participants in the delayed group was the same as for the immediate refractive error correction group (adjustment and fitting of spectacles, instruction in the appropriate care of spectacles) except that the spectacles were not dispensed until after the follow-up assessment.

Follow-up assessment for participants in both groups was at 2 months after their baseline assessment and consisted of administering the NHVQoL, SF-36, VF-14, and GDS and measurement of visual acuity.

The target sample size was 136 persons, providing a power of at least 80% for detecting small effects (5%-10% change in outcomes). The treatment groups were compared using χ^2 and t tests for categorical and continuous variables, respectively; where appropriate, Fisher exact test and the Wilcoxon test were used for these comparisons. For the comparison of 2-month outcomes in the 2 groups, analysis of covariance was used to calculate P values for treatment group differences that were adjusted for the MMSE score and baseline measures of the relevant outcome variable. For example, differences in the follow-up VF-14 score were adjusted for the MMSE score and the baseline VF-14 score. Adjustment for the MMSE score was done to account for observed differences between the treatment groups at baseline. Adjusting for baseline measures is the preferred technique with studies such as this because the treatment group comparison will be unaffected by baseline differences (significant or not) and regression to the mean.[31] $P \leq .05$ (2-sided) was considered statistically significant.

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Table 1. Baseline Demographic and Medical Characteristics

Variable	Immediate Refractive Error Correction Group (n = 78)	Delayed Refractive Error Correction Group (n = 64)	*P* Value
Age, mean (SD), y	79.2 (8.4)	78.0 (8.2)	.46
Race/ethnicity, No. (%)			
African American	29 (37.2)	16 (25.0)	.18
White, non-Hispanic	48 (61.5)	48 (75.0)	
Hispanic	1 (1.3)	0	
Sex, No. (%)			
Female	60 (76.9)	48 (75.0)	.79
Male	18 (23.1)	16 (25.0)	
Education, No. (%)			
Attended school but not a high school graduate	44 (56.4)	29 (45.3)	.53
High school graduate	21 (26.9)	23 (35.9)	
≥ Some college	11 (14.1)	9 (14.1)	
No information available	2 (2.6)	3 (4.7)	
MMSE score, mean (SD)	20.2 (4.4)	21.7 (4.5)	.05
Medical conditions, mean (SD), No.	5.2 (3.0)	5.7 (3.0)	.30
Eye conditions, No. (%)			
Glaucoma	1 (1.3)	4 (6.5)	.10
Age-related macular degeneration	13 (16.7)	9 (14.5)	.73
Cataract	53 (68.0)	38 (60.3)	.35
Diabetic retinopathy	3 (3.9)	6 (9.7)	.16
HHIE score, mean (SD)	7.7 (9.7)	7.9 (10.5)	.91
Length of nursing home stay, mean (SD), y	1.6 (1.5)	2.2 (2.5)	.12

Abbreviations: HHIE, Hearing Handicap Inventory for the Elderly; MMSE, Mini-Mental State Examination.

Table 2. Baseline Refractive Error

Variable	Immediate Refractive Error Correction Group (n = 78)	Delayed Refractive Error Correction Group (n = 64)	*P* Value
Right eye			
Spherical equivalent, mean (SD), D	+0.19 (1.32)	−0.19 (1.73)	.13
Spherical equivalent, No. (%)			
≥ +2.00 D	9 (11.5)	6 (9.5)	.23
≥ +0.50 D but < +2.00 D	23 (29.5)	19 (30.2)	
< +0.50 D but > −0.50 D	20 (25.6)	16 (25.4)	
≤ −0.50 D but > −2.00 D	23 (29.5)	13 (20.6)	
≤ −2.00 D	3 (3.9)	9 (14.3)	
Add for near vision, mean (SD), D	+2.64 (0.29)	+2.60 (0.18)	.29
Left eye			
Spherical equivalent, mean (SD), D	+0.15 (1.40)	−0.10 (1.61)	.26
Spherical equivalent, No. (%)			
≥ +2.00 D	6 (7.7)	5 (8.1)	.72
≥ +0.50 D but < +2.00 D	30 (38.5)	17 (27.4)	
< +0.50 D but > −0.50 D	19 (24.4)	17 (27.4)	
≤ −0.50 D but > −2.00 D	16 (20.5)	15 (24.2)	
≤ −2.00 D	7 (9.0)	8 (12.9)	
Add for near vision, mean (SD), D	+2.63 (0.32)	+2.60 (0.18)	.53

RESULTS

One hundred fifty-one persons were randomized to the 2 arms, 81 to the immediate refractive error correction group and 70 to the delayed correction group. After randomization, 3 persons in the immediate correction group were lost to follow-up (2 died, 1 declined further participation) and 6 persons in the delayed correction group were lost to follow-up (3 died, 1 became too ill to participate, 1 moved out of the nursing home, 1 declined further participation). Thus, results are based on a total of 78 persons in the immediate refractive error correction group and 64 persons in the delayed correction group who had completed the protocol.

At baseline, the 2 groups had similar distributions of demographic and medical characteristics (**Table 1**). The average age of enrollees was in the late 70s, three-quarters were female, approximately one-quarter were African American, and three-quarters were white of non-Hispanic origin. About half had attended school but were not high school graduates, with the other half being high school graduates and beyond. Participants had on average 5 to 6 chronic medical conditions, and about two-thirds had a diagnosis of cataract. The mean Hearing Handicap Inventory for the Elderly score in both groups was approximately 8, the borderline between no handicap and mild handicap.[32] The average duration of residence in the nursing home was approximately 2 years. The MMSE scores averaged 20.2 in the immediate group and 21.7 in the delayed group, which had borderline statistical significance ($P=.06$).

The distribution of baseline refractive error was not different in the 2 groups for either eye (**Table 2**). Regardless of group, about one-quarter of participants were approximate emmetropes (< +0.50 diopters [D] but > −0.50 D), half were modestly hyperopic (+0.50 to < +2.00 D) or myopic (−0.50 to > −2.00), and one-quarter were moderately to severely hyperopic (≥ +2.00) or myopic (≤ −2.00). The mean add needed for correction of presbyopia for near vision was approximately +2.50 D. The 2 groups were also similarly distributed with respect to the extent of refractive error that was uncorrected by spectacles at baseline (**Table 3**). At distance, about 33% had no or only minor uncorrected refractive error, about 50% had refractive error with an absolute value between 0.50 and 2.00 D, and 17% had refractive error with an absolute value of 2.00 or greater. Presbyopia was undercorrected by an average of +1.25 D.

Baseline visual acuity with habitual correction was similar in the 2 groups (**Table 4**). Monocular visual acuity for distance averaged approximately 0.5 logMAR (approximately 20/70), and monocular visual acuity for near was a little worse, averaging approximately 0.6 logMAR (approximately 20/85). Binocular visual acuity was on average better than monocular visual acuity by about 1 line on the ETDRS chart. Scores on the health-related quality-of-life questionnaires including their individual subscales and the GDS were not statistically different in the 2 groups (**Table 5**).

Compliance in spectacle wear as reported by the resident and the CNA is shown in the **Figure**. Data are av-

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Table 3. Refractive Error That Was Uncorrected at Baseline[a]

Variable	Immediate Refractive Error Correction Group (n = 78)	Delayed Refractive Error Correction Group (n = 64)	*P* Value
Right eye			
Spherical equivalent, mean (SD), D	−0.14 (1.10)	−0.53 (1.70)	.11
Spherical equivalent, No. (%)			
≥ +2.00 D	3 (3.9)	4 (6.4)	.18
≥ +0.50 D but < +2.00 D	22 (28.2)	9 (14.3)	
< +0.50 D but > −0.50 D	25 (32.1)	18 (28.6)	
≤ −0.50 D but > −2.00 D	22 (28.2)	22 (34.9)	
≤ −2.00 D	6 (7.7)	10 (15.9)	
Add for near vision, mean (SD), D	+1.42 (1.34)	+1.10 (1.28)	.16
Left eye			
Spherical equivalent, mean (SD), D	−0.18 (1.16)	−0.44 (1.55)	.24
Spherical equivalent			
≥ +2.00 D	1 (1.3)	3 (4.8)	.31
≥ +0.50 D but < +2.00 D	23 (29.5)	11 (17.7)	
< +0.50 D but > −0.50 D	26 (33.3)	24 (38.7)	
≤ −0.50 D but > −2.00 D	21 (26.9)	15 (24.2)	
≤ −2.00 D	7 (9.0)	7 (14.5)	
Add for near vision, mean (SD), D	+1.41 (1.32)	+1.17 (1.28)	.29

[a] Difference between refractive error and current spectacle correction at the baseline assessment.

Table 4. Baseline Visual Acuity Characteristics

Variable	Immediate Refractive Error Correction Group (n = 78)	Delayed Refractive Error Correction Group (n = 64)	*P* Value
Distance visual acuity, mean (SD), logMAR			
Right eye	0.52 (0.28)	0.51 (0.31)	.82
Left eye	0.50 (0.27)	0.55 (0.31)	.36
Both eyes	0.37 (0.20)	0.39 (0.27)	.70
Near visual acuity, mean (SD), logMAR			
Right eye	0.68 (0.29)	0.59 (0.31)	.08
Left eye	0.65 (0.26)	0.63 (0.34)	.64
Both eyes	0.52 (0.21)	0.50 (0.34)	.69

Abbreviation: logMAR, logarithm of the minimum angle of resolution.

eraged across the 8 weeks of compliance assessment because reported compliance did not change over time (resident, $P=.90$; CNA, $P=.58$). Compliance data were not available for 6 residents. Fifty of 72 residents (69.4%) reported wearing their spectacles at least half of the time or more often. The CNA reported that 49 of 72 residents (68.1%) wore their spectacles at least half of the time or more often. Visual acuity for distance improved from baseline to the 2-month follow-up by a mean (SD) of 0.06 (0.23) and 0.06 (0.19) logMAR for the right and left eye, respectively, for participants in the immediate refractive error correction group. Both of these improvements were statistically significant ($P=.02$ and .01, respectively). The improvement for near vision was a mean (SD) of 0.08 (0.25) and 0.07 (0.25) logMAR for the right and left eye, respectively, with both of these improvements being statistically significant ($P=.01$ and .02, respectively). The delayed refractive error correction group had no change in distance or near visual acuity during the 2-month period ($P>.05$).

Table 5. Health-Related Quality of Life and Depression at Baseline

Variable	Immediate Refractive Error Correction Group (n = 78)	Delayed Refractive Error Correction Group (n = 64)	*P* Value
NHVQoLsubscale score, mean (SD)			
General vision	65.0 (19.8)	63.2 (18.9)	.58
Reading	80.6 (21.3)	80.3 (22.8)	.93
Ocular symptoms	70.5 (29.3)	72.4 (30.5)	.71
Mobility	87.8 (12.8)	88.9 (10.4)	.59
Psychological distress	71.1 (20.5)	70.4 (22.7)	.83
Activities of daily living	98.4 (5.1)	97.4 (8.0)	.37
Activities and hobbies	91.7 (14.9)	89.7 (16.4)	.45
Adaptation and coping	83.8 (24.9)	87.3 (24.1)	.40
Social interaction	94.5 (12.5)	93.8 (12.6)	.75
VF-14 total score, mean (SD)	86.6 (13.9)	81.9 (21.9)	.13
SF-36 score, mean (SD)			
Mental component summary	80.1 (18.1)	78.8 (15.5)	.64
Physical component summary	44.4 (14.0)	46.3 (10.3)	.38
GDS score, mean (SD)	4.6 (3.4)	4.8 (3.4)	.68

Abbreviations: GDS, Geriatric Depression Scale; NHVQoL, Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire; SF-36, Medical Outcomes Study Short-Form 36.

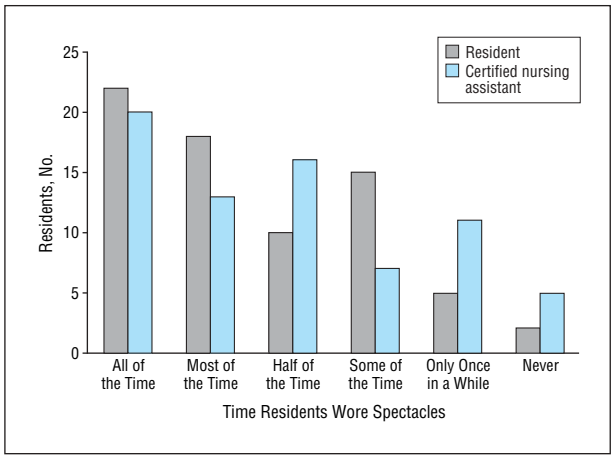


Figure. Spectacle-wear compliance in the refractive error correction group. Amount of time overall in the previous week residents reportedly wore spectacles as judged separately by the resident and the certified nursing assistant.

Table 6 shows the postintervention results. At the 2-month follow-up, the immediate refractive error correction group as compared with the delayed correction group had higher scores on the general vision, reading,

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Table 6. Health-Related Quality of Life, Visual Task Difficulty, and Depression at 2-Month Follow-up

Variable	Immediate Refractive Error Correction Group (n = 78)	Delayed Refractive Error Correction Group (n = 64)	*P* Value	
			Unadjusted	Adjusted[a]
NHVQoL subscale score, mean				
General vision	77.3	65.0	<.001	<.001
Reading	92.9	84.7	.004	<.001
Ocular symptoms	81.4	78.3	.49	.23
Mobility	91.5	90.0	.35	.24
Psychological distress	76.0	70.7	.08	.02
Activities of daily living	99.7	99.1	.24	.17
Activities and hobbies	98.0	94.0	.02	.04
Adaptation and coping	92.4	90.0	.39	.11
Social interaction	97.3	94.1	.04	.03
VF-14 total score, mean	95.7	83.1	<.001	<.001
SF-36 score, mean				
Mental component summary	81.9	80.8	.68	.96
Physical component summary	47.6	46.1	.53	.24
GDS score, mean	3.6	4.9	.02	.003

Abbreviations: GDS, Geriatric Depression Scale; NHVQoL, Nursing Home Vision-Targeted Health-Related Quality-of-Life Questionnaire; SF-36, Medical Outcomes Study Short-Form 36.

[a] Adjusted for the baseline value of outcome under evaluation and baseline mental status.

and activities and hobbies subscales of the NHVQoL as well as on the VF-14. Scores on the other NHVQoL subscales and on the SF-36 were not statistically different in the 2 groups. The immediate refractive error correction group had lower scores on the GDS than the delayed group. When comparisons were adjusted for the baseline value of the outcome measure under evaluation and baseline mental status, the immediate refractive error correction group had higher scores on the NHVQoL subscales of general vision, reading, psychological distress, activities and hobbies, and social interaction as well as on the VF-14, and they had lower scores on the GDS.

COMMENT

This study found that dispensing spectacles to treat uncorrected refractive error in nursing home residents leads to improved vision-targeted health-related quality of life, less reported difficulty in the visual activities of daily living, and decreased depressive symptoms. Compared with those who did not receive new spectacles, residents who received new spectacles not only rated the overall quality of general vision more highly but also reported less difficulty with reading (eg, newspaper, books, wall clock) and with the performance of instrumental activities and hobbies (eg, writing, using the telephone, watching TV, playing cards) at the 2-month follow-up. After intervention, scores on some NHVQoL subscales increased dramatically—about 12 points—following refractive error correction (general vision, reading), with others exhibiting more modest increases, on average about 5 points (psychological distress, activities and hobbies, social interaction). Because the average level of uncorrected refractive error at baseline was ±1.00 D for distance and +1.25 D for near, these results show that remediation of even modest to moderate levels of optical defocus can be helpful to the health and well-being of nursing home residents.

There were also psychological benefits accrued as a result of the spectacle intervention, including less reported psychological distress (eg, worry, frustration, upset), increased social interaction (eg, visiting with fellow residents in their rooms, participating in group activities), and fewer depressive symptoms. Thus, optical correction of myopia, hyperopia, and/or presbyopia goes further than improving vision in that it can enhance the psychological well-being of nursing home residents. Nursing home residents are at increased risk for depression,[33] which in turn increases their risk for mortality over 1 year.[34] With prevalence estimates in the nursing home for major depression ranging as high as 43%,[33] interventions that successfully reduce depressive symptoms in this population are practically significant. Because cognitive impairment is pervasive among nursing home residents, disruptive social behavior is also common,[35,36] which is personally disabling to the resident,[37] increases mortality risk,[38] and causes serious staffing challenges for nursing home facilities.[36,39] The fact that a spectacle intervention in this study increased self-reported participation in socially appropriate interactions illustrates the potential behavioral benefits of a spectacle intervention, an issue worthy of further investigation.

A generic measure of health-related quality of life (SF-36) did not reveal treatment benefits in this study. Our participants had serious medical conditions that prompted nursing home placement. It appears that improved vision through refractive error correction is unlikely to outweigh the negative implications of these serious medical problems for general health-related quality of life. Although the SF-36 has been correlated with certain aspects of eye conditions or vision impairment in the literature,[40,41] these associations are typically weaker than those between vision-targeted health-related quality-of-life instruments and eye conditions or vision impairment. In addition, generic measures such as the SF-36

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were not specifically constructed to tap key domains identified by visually impaired persons as important in contributing to their health and well-being.[42] The lack of responsiveness of the SF-36 in this study implies that future studies evaluating interventions to improve vision in the nursing home population should focus on vision-targeted quality-of-life outcome measures rather than generic measures. Also of note is that the activities of daily living subscale of the NHVQoL was at the ceiling at baseline, with scores averaging in the high 90s. At first this may seem paradoxical because nursing home residents typically have serious functional challenges that hamper their ability to independently carry out basic activities of daily living such as toileting, bathing, eating, and dressing. However, residents in nursing homes by design can heavily rely on nursing home staff for completion of these basic daily activities, which may reflect why the residents are not reporting any difficulty with these basic activities.

Strengths of this study include the use of a randomized, controlled design, thus permitting inferences about cause and effect. After the conclusion of the study, the delayed treatment group also received spectacles that reversed their uncorrected refractive error and improved their near and distance visual acuity ($P < .001$), which was ethically appropriate because the treatment had demonstrated efficacy with respect to several outcomes. The treatment group's compliance in wearing the spectacles was relatively high as reported by 2 independent sources. Primary outcome measures selected for the study were valid and reliable tools for assessment of their respective constructs. Limitations must also be acknowledged. The nature of the intervention itself (spectacle wear) did not allow the participant and interviewer to be masked to treatment assignment. Generalizability of conclusions beyond 2 months of follow-up and to nursing home residents in other geographic areas remains unknown. This study cannot address the efficacy of a spectacle intervention for nursing home residents with MMSE scores less than 13.

This study implies that there are significant, short-term quality-of-life and psychological benefits to providing the most basic of eye care services—namely, spectacle correction—to older adults residing in nursing homes. These findings underscore the need for a systematic evaluation of the factors underlying the pervasive unavailability of eye care to nursing home residents in the United States so that steps can be taken to improve service delivery and eye care utilization. Because most persons (68%) residing in nursing homes in the United States are covered by Medicaid or Medicaid plus Medicare[16] (which essentially cover most eye examination and spectacle expenses), it seems unlikely that cost alone is the major barrier. At least half of nursing home residents in the United States live at least 1 year in a nursing home, and 21% reside there for almost 5 years.[43] These are lengthy periods for a population to be without even the most rudimentary of eye care services given the high risk for vision impairment.[1-11]

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Additional Information: Dr Owsley is a Research to Prevent Blindness Senior Scientific Investigator.

REFERENCES

1. Whitmore WG. Eye disease in a geriatric nursing home population. *Ophthalmology*. 1989;96(3):393-398.
2. Klein R, Klein BEK, Linton KLP, De Mets DL. The Beaver Dam Eye Study: visual acuity. *Ophthalmology*. 1991;98(8):1310-1315.
3. Horowitz A. Vision impairment and functional disability among nursing home residents. *Gerontologist*. 1994;34(3):316-323.
4. Tielsch JM, Javitt JC, Coleman A, Katz J, Sommer A. The prevalence of blindness and visual impairment among nursing home residents in Baltimore. *N Engl J Med*. 1995;332(18):1205-1209.
5. West SK, Friedman D, Munoz B, et al. A randomized trial of visual impairment interventions for nursing home residents: study design, baseline characteristics, and visual loss. *Ophthalmic Epidemiol*. 2003;10(3):193-209.
6. Friedman DS, West SK, Munoz B, et al. Racial variations in causes of vision loss in nursing homes. *Arch Ophthalmol*. 2004;122(7):1019-1024.
7. Owsley C, McGwin G, Scilley K, Meek GC, McLacklin A, Seker D. The visual status of older persons residing in nursing homes. *Arch Ophthalmol*. 2007;125(7):925-930.
8. Mitchell P, Hayes P, Wang JJ. Visual impairment in nursing home residents: the Blue Mountains Eye Study. *Med J Aust*. 1997;166(2):73-76.
9. Taiel-Sartral M, Nounou P, Rea C, et al. Visual acuity and ocular disease in geriatric nursing homes: study in 219 elderly people in France. *J Fr Ophtalmol*. 1999;22(4):431-437.
10. VanNewkirk MR, Weih L, McCarty CA, Stanislavsky YL, Keefe JE, Taylor HR. Visual impairment and eye diseases in elderly institutionalized Australians. *Ophthalmology*. 2000;107(12):2203-2208.
11. de Winter LJ, Hoyng CB, Froeling PG, Meulendijks CF, van der Wilt GJ. Prevalence of remediable disability due to low vision among institutionalised elderly people. *Gerontology*. 2004;50(2):96-101.
12. Sturgess I, Rudd AG, Shilling J. Unrecognized problems amongst residents of part III homes. *Age Ageing*. 1994;23(1):54-56.
13. Wang JJ, Mitchell P, Smith W, Cumming RG, Leeder SR. Incidence of nursing home placement in a defined community. *Med J Aust*. 2001;174(6):271-275.
14. Friedman DS, Muñoz B, Roche KB, Massof R, Broman A, West SK. Poor uptake of cataract surgery in nursing home residents: the Salisbury Eye Evaluation in Nursing Home Groups study. *Arch Ophthalmol*. 2005;123(11):1581-1587.
15. National Center for Health Statistics. National Nursing Home Survey. http://www.cdc.gov/nchs/nnhs.htm. Accessed November 16, 2006.
16. Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey. http://www.meps.ahrq.gov/mepsweb/. Accessed November 16, 2006.
17. Keller BK, Hejkal T, Potter JF. Barriers to vision care for nursing home residents. *J Am Med Dir Assoc*. 2001;2(1):15-21.
18. Voytas JJ, Kowalski D, Wagner S, Carlson AM, Maddens M. Eye care in the skilled nursing facility: a pilot study of prevalence and treatment patterns of glaucoma. *J Am Med Dir Assoc*. 2004;5(3):156-160.
19. Snyder LH, Pyrek J, Smith KC. Vision and mental function of the elderly. *Gerontologist*. 1976;16(6):491-495.
20. Folstein MF, Folstein SW, McHugh PR. "Mini-Mental State": a practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12(3):189-198.
21. Ferris FL, Kassoff A, Bresnick GH, Bailey I. New visual acuity charts for clinical research. *Am J Ophthalmol*. 1982;94(1):91-96.
22. Dreer LE, McGwin G Jr, Scilley K, et al. Development of a nursing home vision-targeted health-related quality of life questionnaire. *Aging Ment Health*. In press.

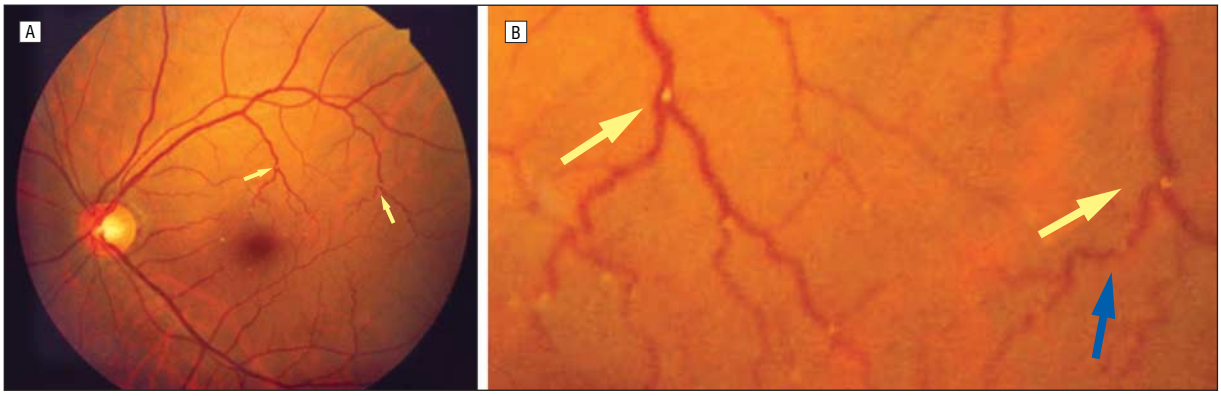
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23. Scilley K, Owsley C. Vision-specific health-related quality of life: content areas for nursing home residents. *Qual Life Res*. 2002;11(5):449-462.
24. Ware JE Jr, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36), I: conceptual framework and item selection. *Med Care*. 1992;30(6):473-483.
25. Steinberg EP, Tielsch JM, Schein OD, et al. The VF-14: an index of functional impairment in patients with cataract. *Arch Ophthalmol*. 1994;112(5):630-638.
26. Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res*. 1982;17(1):37-49.
27. Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. In: Brink TL, ed. *Clinical Gerontology: A Guide to Assessment and Intervention*. New York, NY: Haworth Press; 1986:165-173.
28. Aikman GG, Oehlert ME. Geriatric Depression Scale: long form vs short form. *Clin Gerontol*. 2001;22(3-4):63-70.
29. Ventry IM, Weinstein BE. The Hearing Handicap Inventory for the Elderly: a new tool. *Ear Hear*. 1982;3(3):128-134.
30. Weinstein BE, Ventry IM. Audiometric correlates of the Hearing Handicap inventory for the Elderly. *J Speech Hear Disord*. 1983;48(4):379-384.
31. Vickers AJ, Altman DG. Analysing controlled trials with baseline and follow up measurements. *BMJ*. 2001;323(7321):1123-1124.
32. American Speech-Language-Hearing Association. Guidelines for the identification of hearing impairment/handicap in adult/elderly persons. *ASHA*. 1989;31(8):59-63.
33. Abrams RC, Teresi JA, Butin DN. Depression in nursing home residents. *Clin Geriatr Med*. 1992;8(2):309-322.
34. Rovner BW, German PS, Brant LJ, Clark R, Burton L, Folstein MF. Depression and mortality in nursing homes. *JAMA*. 1991;265(8):993-996.
35. Cohen-Mansfield J, Marx MS, Rosenthal AS. A description of agitation in a nursing home. *J Gerontol*. 1989;44(3):M77-M82.
36. Cohen-Mansfield J, Marx MS, Werner P. Agitation in the elderly person: an integrated report of findings in a nursing home. *Int Psychogeriatr*. 1992;4:221-240.
37. Mungas D, Weiler P, Franzi C, Henry R. Assessment of disruptive behavior associated with dementia: the Disruptive Behavior Rating Scales. *J Geriatr Psychiatry Neurol*. 1989;2(4):196-202.
38. Cohen-Mansfield J, Marx MS, Lipson S, Werner P. Predictors of mortality in nursing home residents. *J Clin Epidemiol*. 1999;52(4):273-280.
39. Potts HW, Richie MF, Kass MJ. Resistance to care. *J Gerontol Nurs*. 1996;22(11):11-16.
40. Wilson MR, Coleman AL, Yu F, et al. Functional status and well-being in patients with glaucoma as measured by the Medical Outcomes Study Short Form-36 questionnaire. *Ophthalmology*. 1998;105(11):2112-2116.
41. Mangione CM, Lee PP, Pitts J, Gutierrez P, Berry S, Hays RD; NEI-VFQ Field Test Investigators. Psychometric properties of the National Eye Institute Visual Function Questionnaire (NEI-VFQ). *Arch Ophthalmol*. 1998;116(11):1496-1504.
42. Mangione CM, Berry S, Spritzer K, et al. Identifying the content area for the 51-item National Eye Institute Visual Function Questionnaire: results from focus groups with visually impaired persons. *Arch Ophthalmol*. 1998;116(2):227-233.
43. American Geriatrics Society Foundation for Health in Aging. Nursing Home Care. Aging in the Know Web site. http://www.healthinaging.org/aginginthenow/. Accessed December 11, 2006.

Archives Web Quiz Winner

Archives Web Quiz Winner

Congratulations to the winner of our June quiz, Damien Luviano, MD, Medical Retina Fellow,Vitreoretinal Consultants, Houston, Texas. The correct answer to our June challenge was talc retinopathy. For a complete discussion of this case, see the Photo Essay section in the July *Archives* (Zoumalan CI, Marmor MF. Revisiting talc retinopathy. *Arch Ophthalmol*. 2007;125[7]:988).



Be sure to visit the *Archives of Ophthalmology* Web site (http://www.archophthalmol.com) and try your hand at our Clinical Challenge Interactive Quiz. We invite visitors to make a diagnosis based on selected information from a case report or other feature scheduled to be published in the following month's print edition of the *Archives*. The first visitor to e-mail our Web editors with the correct answer will be recognized in the print journal and on our Web site and will also be able to choose one of the following books published by AMA Press: *Clinical Eye Atlas, Clinical Retina*, or *Users' Guides to the Medical Literature*.

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