



Published in final edited form as:

J Aging Health. 2010 June ; 22(4): 504–521. doi:10.1177/0898264310361368.

The Personal Burden of Decreased Vision-Targeted Health-Related Quality of Life in Nursing Home Residents

Amanda F. Elliott, PhD¹, Laura E. Dreer, PhD¹, Gerald McGwin Jr., PhD^{1,2,3}, Kay Scillely, PhD¹, and Cynthia Owsley, PhD¹

¹ Department of Ophthalmology, School of Medicine, University of Alabama at Birmingham

² Department of Epidemiology, School of Public Health, University of Alabama at Birmingham

³ Department of Surgery, School of Medicine, University of Alabama at Birmingham

Abstract

Objectives—To present the bother subscales of the Nursing Home Vision-Targeted Health-Related Quality of Life Questionnaire (NHVQoL) and to examine their relationship to the original NHVQoL subscales and objective measures of visual function.

Methods—395 Nursing home residents completed the bother subscales. Associations between bother subscales and original subscales and objectively measured vision were evaluated.

Results—Mean bother scores ranged from 1.97 to 2.30, reflecting an average rating of “a little” bother. For 20 NHVQoL items, > 50% of participants reported “a lot” of bother. All NHVQoL original subscale scores were moderately correlated with bother subscales ($p < 0.0001$). Bother subscales and visual acuity were not highly correlated.

Discussion—Nursing home residents are bothered by reductions in vision-targeted health-related quality of life. The NHVQoL bother subscales may probe the personal burden of visual problems in this population that is not captured by the original subscales or objectively measuring visual function.

Keywords

bother; health-related quality of life; aging; visual impairment

Introduction

The high rate of vision impairment among nursing home residents has been well documented through previous research finding that as many as 29 to 62% of residents experience significant impairments in their vision (Mitchell, Hayes, & Wang, 1997; Owsley et al., 2007a; Tielsch, Javitt, Coleman, Katz, & Sommer, 1995; West et al., 2003). Many aspects of a person's quality of life are affected by vision impairment. Vision impairment increases older adults' risk for impaired physical function and mobility, falls, hip fracture, impairments in mood and social relationships, decreased social engagement, and time spent in leisure activities (Crews & Campbell, 2004; Dreer et al., 2007; Resnick, Fries, & Verbrugge, 1997; West et al., 2002).

Several instruments exist for the measurement of vision-related quality of life, targeting quality of life domains that could be affected by visual impairment (de Boer et al., 2004). Vision-targeted quality of life questionnaires have been used as ways to measure the personal burden of eye disease and vision impairment. Personal burden refers to the impact or implications of vision impairment and eye disease on a person's overall well-being (Owsley & McGwin, 2007). One instrument which our group recently developed, the Nursing Home Vision-Targeted Health-Related Quality of Life Questionnaire (NHVQoL), was specifically designed

to assess the impact of vision impairment on nursing home residents' well-being (Dreer et al., 2007). In a previous paper examining the psychometric properties of the NHVQoL, we demonstrated that the questionnaire had good internal consistency reliability and validity, as well as good test-retest reliability, and was comparable to the psychometric properties of other questionnaires designed for the nursing home population (Dreer et al., 2007). The NHVQoL is also responsive to interventions to improve vision (Owsley et al., 2007b; Owsley et al., 2007c). The present study describes, for the first time, the bother subscales of the NHVQoL that address the personal burden nursing home residents attribute to vision-related decrements in quality of life. This is the only measure to our knowledge that specifically asks nursing home residents whether vision-targeted difficulties, issues, or situations actually bother them, thus providing information about what these challenges personally mean for that individual. For example, does having difficulty matching clothes actually bother the respondent, and if so, to what extent. It may be that although an individual reports difficulty in performing this vision-related task, this may not necessarily be experienced as distressing or have negative personal ramifications from the individual's point of view, especially as many activities related to everyday living are often performed largely by others in nursing homes (e.g., nursing staff; housekeeping). Examining the association between reported problems in vision-related task domains and the extent to which these problems bother an individual, could serve as a supplemental method to strengthen and/or expand the content validity of quality of life questionnaires, particularly as it has been shown that there is wide variability in the way in which persons adjust to a vision impairment (Dreer et al., 2008; Dreer, Elliott, Fletcher, & Swanson, 2005). Thereby, this type of approach could help provide additional information on the personal burden attributed to vision-related quality of life decrements among nursing home residents for a more meaningful assessment. Additionally, it would be valuable to ascertain the change in personal burden, if any, which would accompany interventions to improve vision-targeted health-related quality of life. We previously reported on the psychometric properties of the nine NHVQoL subscales: reading, ocular symptoms, general vision, activities of daily living (ADLs), mobility, social activities/hobbies, psychological distress, adaptation/coping, and social interaction (Dreer et al., 2007). These questionnaire items were generated based on content areas identified through structured interviews with nursing home residents as previously described (Scilley & Owsley, 2002). In the current study, we build on our previous work by describing a supplemental bother scale of the NHVQoL and its relationship to the original NHVQoL subscales and to objective measures of visual function.

Methods

Participants

The NHVQoL was administered to a sample of 395 older adults residing in nursing homes in and around the Birmingham, Alabama area. Of the 33 licensed nursing homes identified for potential recruitment, 17 participated as sites for this project. The balance were not used as sites because they were either greater than a 30 minute commute by car from the study coordinating center, there was already a large research study ongoing in the nursing facility, or the administrator declined participation on behalf of the facility. This study was approved by the Institutional Review Board at the University of Alabama at Birmingham and follows the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants and also the resident's sponsor (a family member or state-appointed guardian) after explaining the nature and possible consequences of the study. Eligible persons were: 1) identified by the unit charge nurse as being able to answer simple questions about vision and daily activities; 2) \geq 55 years old; 3) able to speak English; 4) able to obtain a Mini-Mental State Exam (MMSE) (Folstein, Folstein, & McHugh, 1975) score \geq 13, since comprehension of simple requests and questionnaire items was critical to valid outcomes measurement. Previous research has shown that persons with mild to intermediate levels of cognitive impairment can reliably report on

their health conditions, perceived care levels, and health-related quality of life when questionnaire items and responses are presented in a simple format (Brod, Sterwart, Sands, & Walton, 1999; Logsdon, Gibbons, McCurry, & Teri, 1999; Simmons & Schnelle, 1999).

Procedures

Demographic and medical information was obtained from participants' medical records. Average length of time for the administration of entire questionnaire (both subscales) was approximately 10 to 15 minutes, and it was conducted privately within residents' bedrooms. Visual function testing (as described below) was carried out in either resident rooms or in a designated, private area in the nursing home. To evaluate test-retest reliability of the supplemental bother item-stem subscale, the NHVQoL was administered a second time to a subset of residents (N=189) approximately two weeks after the first administration.

Assessment of Vision-Targeted Health Related Quality of Life

The content areas identified through structured interviews with nursing home residents (Scilley & Owsley, 2002) led to the construction of the NHVQoL as 9 vision-targeted subscales (hereafter called Part A) that address reading (3 items), ocular symptoms (9 items), general vision (6 items), activities of daily living (ADLs) (6 items), mobility (7 items), social activities/hobbies (8 items), psychological distress (10 items), adaptation/coping (2 items), and social interaction (6 items). The item structure and response options for Part A were similar to those used in the 51-item National Eye Institute Visual Function Questionnaire (NEI-VFQ) (Mangione et al., 2001) and included difficulty, frequency, and trueness of statement responses. Amount of difficulty response options were "no difficulty at all", "a little difficulty", "moderate difficulty", "extreme difficulty", and "stopped doing this because of your eyesight". For frequency of problem, options were "none of the time", "a little of the time", "some of the time", "most of the time", "all of the time", and "not sure". For trueness of statement, options were "definitely true", "mostly true", "not sure", "mostly false", and "definitely false". The NHVQoL with response options and scoring instructions is available at www.eyes.uab.edu/tools (University of Alabama at Birmingham).

Part A subscale scores were computed by scaling individual items from 0 to 100 where 100 represents the highest functional level and 0 the lowest, and then averaging the individual items. Besides these response options, many items had three additional options: "stopped doing this for other reasons or not interested in doing this", "could do this but not given the opportunity", or "not sure". If any of these responses were selected, the item was not used to compute the subscale score.

The supplemental item-stem bother subscales of the NHVQoL were designed to assess the extent to which deficits reported on the items described above *bothered* residents (hereafter called Part B). For example, if a resident reported difficulty in reading ordinary print in newspapers (Part A for item #5), the bother item (Part B) would then be asked: "How much does it bother you that you have difficulty reading ordinary print in newspapers" with the response options being "none", "a little", "a lot", and "not sure". The corresponding subscales for Part B reflected the same content domains as Part A (e.g., reading, ocular symptoms, mobility, etc.) with the exception of psychological symptoms. Bother scores were not calculated for the psychological symptoms subscale as Part A of this subscale itself addresses the degree of distress experienced by the resident. The Appendix describes which Part A responses trigger the bother item-stem. If the resident reported no difficulty in the Part A response, then the Part B bother item was not asked. An individual's average bother score for each of the 8 subscales for which bother was ascertained is calculated by 1) summing the bother scores for subscale items on which the resident reported a deficit on the item, and 2) then dividing the sum by the total number of subscale items for which the resident reported a deficit.

This provides an average bother score for only the subscale items on which a potentially bothersome deficit was reported rather than over the total number of items in a particular subscale. It is assumed in this process that if the resident reported no deficit for items, their associated bother score would be “none” and this is why the bother item-stem would not be asked or used in creating the average bother score. This scoring approach has been used with other widely used instruments (e.g., the reaction scale of the Revised Memory and Behavior Problems Checklist) (Roth et al, 2003; Teri et al, 1992).

Assessment of Objective Vision Variables

Distance and near visual acuity and contrast sensitivity were assessed for each eye separately and together and were administered by a research assistant trained in conducting visual acuity and contrast sensitivity measurements as appropriate for clinical and epidemiological research. The resident used whatever correction they would normally use for tasks at that distance in everyday life. Distance acuity was assessed using the ETDRS chart with its standard protocol and expressed as logMAR; higher logMAR scores are indicative of greater impairment (Ferris, Kassoff, Bresnick, & Bailey, 1982; Ferris & Sperduto, 1982). Near acuity was assessed using the Lighthouse Near Visual Acuity Test (modified ETDRS) administered at 40 cm according to its standard protocol. Contrast sensitivity was evaluated using the Pelli-Robson chart (Pelli, Robson, & Wilkins, 1988) and its standard protocol and scored by the letter-by-letter method (Elliott, Bullimore, & Bailey, 1991).

Data Analytic Plan

Association between the supplemental bother subscales and NHVQoL subscales and objective vision variables were assessed using Pearson correlations. Pearson correlations were also used to evaluate association between residents' test-retest ratings on the bother scale. *P*-values of $\leq .05$ (two-sided) were considered statistically significant.

Results

An average number of 11 participants ($SD = 9.02$) per facility participated in the study. Reported in Table 1 are the demographic and medical characteristics of the sample. Average age of participants was 80.8 years old ($SD = 8.1$), the majority of participants were female ($n = 320$, 81%), nearly three-fourths were Caucasian ($n = 289$, 73.2%), and approximately one-fourth was African-American ($n = 105$, 26.6%). Nearly half of the participants completed a high school level of education or greater ($n = 189$, 48%). Scores of general cognitive functioning on the MMSE ranged from 13 to 30 and were approximately evenly distributed across this range. The average length of stay in the nursing home was 1.9 years ($SD = 2.0$, range = <1 year to 12.4 years), and participants had approximately 5.6 co-morbid medical conditions on average.

In terms of vision, participants covered a wide range of visual acuity with a large proportion having distance or near acuity worse than 20/60, whether defined by the better or worse eye or binocularly (range = 28.6% to 76.3%) wearing habitual correction (if they used any correction), i.e., how ever they habitually viewed objects at that distance in everyday life (Table 2). Distance acuity for the better eye ranged in the sample from -0.06 to 1.10 logMAR (Snellen equivalent 20/17 to 20/250) and near acuity for the better eye ranged from -0.04 to 1.40 logMAR (Snellen equivalent 20/18 to 20/500). Contrast sensitivity also widely varied with better eye contrast sensitivity ranging from -0.15 to 1.65 logMAR (higher logMAR scores are indicative of greater impairment).

The means and standard deviations for each NHVQoL subscale and each subscale's corresponding bother score are listed in Table 3. Subscale means for Part A were in the 60's

(General Vision and Psychological Distress), 70's (Reading and Ocular Symptoms), 80's (Mobility, Activities/Hobbies, and Adaptation/Coping), and 90's (Activities of Daily Living and Social Interaction). High scores represent better functioning for all subscales. Mean bother scores for all subscales (Part B) ranged from 1.97 to 2.30, reflecting an average rating of "a little" bother (i.e., a score of 2 on the scale with a range of 1–3). Test-retest correlations of bother scores for each subscale ranged from $r = 0.27$ to 0.59 ($p < 0.05$) (Table 4).

We examined the average bother ratings for the 45 individual NHVQoL items for which bother scores were calculated (Table 5). For those participants who completed the bother item because they expressed difficulty in the Part A item, they more frequently rated having "a little" or "a lot" of bother as compared to no bother. In fact, on only 7 of the 45 NHVQoL items did greater than 25% of participants report no bother, whereas, for 20 of the 45 items, more than half of participants reported "a lot" of bother (from 50% to 63.6% depending on the specific item). The items on which more than half of participants reported a lot of bother tended to be on the subscales of Reading, Activities of Daily Living, Activities/Hobbies, Adaptation/Coping, and Social Interaction.

We examined the extent to which bother ratings (the Part B item) were related to degree of frequency, difficulty, or truthfulness of statement (the Part A item) for 8 of the 9 subscales, as no bother scores were calculated for the psychological symptoms subscale. Bother ratings for all NHVQoL subscales were moderately correlated with the frequency, difficulty, and truthfulness responses on subscales (all p 's < 0.0001) (Table 6). Higher reported intensity of deficit (frequency, difficulty, truthfulness) was related to higher levels of bother.

Table 7 displays correlation coefficients between bother ratings on each subscale and measures of visual acuity and contrast sensitivity for both the better and worse functioning eye. Correlations ranged from moderate to non-existent, depending on the specific subscale. Visual acuity was significantly associated with bother on the subscales of general vision, reading, ocular symptoms, ADLs, and adaptation/coping, but not with the subscales of mobility, activities/hobbies, or social interaction. A similar pattern emerged for contrast sensitivity, with the exception that adaptation/coping was not associated with contrast sensitivity. Associations between bother and contrast sensitivity tended to be weaker than those for acuity. Significant associations were all in the direction of greater bother being related to worse vision.

Discussion

The present study describes the bother item-stem portion (Part B) of the NHVQoL and its relationship to the Part A subscale scores and objectively measured visual acuity and contrast sensitivity in a large sample of older nursing home residents. Previously we have demonstrated that the NHVQoL is a valid, reliable and responsive tool for assessing vision-targeted health-related quality of life in older adults residing in nursing homes (Dreer, et al., 2007; Owsley et al. 2007b; Owsley et al. 2007c). By examining the bother stemming from difficulties, issues, and situations related to vision impairment, we are able to more fully understand the personal meaning these deficits have for nursing home residents.

We found that when nursing home residents are considered as a group, they were on average "a little" bothered by the deficits reported on each subscale domain addressed by the NHVQoL, an important distinction from not being bothered by these deficits at all. This gives strength to the conclusion that respondents are attributing bother to the QoL issue addressed in Part A and that their bother is a reflection of the personal burden associated with vision-targeted QoL deficits in this population. This was also demonstrated by our finding that the degree of frequency, difficulty, and truthfulness responses reported in Part A of the questionnaire was moderately correlated with the degree of bother reported in Part B, where the greater degree

of deficit residents' have with a specific item, the more they are bothered by this deficit. Additionally, ratings of bother provided at two points in time separated by 2 weeks, were low to moderately correlated, but not highly correlated, which could indicate that nursing home residents' appraisals of impact of vision impairment could vary, an area for further study.

By only examining the mean across subscales for bother, we would miss a more telling description of how bothered nursing home residents were by particular items on the NHVQoL. It is quite possible that some Part A items may not be as bothersome as others, and by examining each item we provide a clearer picture of the aspects of life in which visual deficits are particularly meaningful to nursing home residents. This method is akin to the way in which caregiver reaction ratings to resident behavior problems are examined on the Revised Memory and Behavior Problems Checklist (RMBPC) (Teri et al. 1992). When analyzed by item, we found that on nearly half of the items where respondents identified deficits, they indicated that these deficits engendered "a lot" of bother. The subscale domains where this was most apparent was on reading, activities/hobbies, and social interaction. The fact that residents did not tend to rate "a lot" of bother on items from the ADL or mobility subscale of the NHVQoL is consistent with these domains receiving relatively high scores on the Part A subscales. This is not surprising given that nursing home residents receive a great deal of assistance from the nursing home staff in performing these tasks if needed (Horowitz, 1994; Marx, Werner, Cohen-Mansfield, & Feldman, 1992; Paquay, et al., 2007), and thus do not view these as problem areas.

It is also important to note that Part B has weaker associations to objectively measured visual function than does Part A. In our previous report (Dreer et al., 2007), worse visual acuity and contrast sensitivity was associated with greater deficits on Part A of the questionnaire (r range= 0.20–0.58). These associations between vision and the bother item-stems were weaker (r range= 0.11–0.35), and for some subscales, there was no association with vision. This finding indicates that a person's acuity level is less effective at predicting the extent to which they will be bothered by difficulties in performing routine visual tasks. Other intra-personal factors are likely to influence feelings of bothersomeness such as: 1) an individual's deployment of compensatory, coping, and adaptational strategies when performing the task; 2) differences in the emphasis, prioritization, and values placed on various aspects of life; 3) cognitive appraisals of personal ability to tolerate vision loss; 4) perceived interference of vision loss on goal-directed behavior and expected activities; and 5) personality traits. All of these factors are relevant to understanding the personal burden of vision impairment in an individual rather, than relying solely on the severity of their vision impairment or eye disease (Dreer et al., 2008; Owsley & McGwin, 2007).

We have expanded the scope of the NHVQoL, a psychometrically sound measure of vision-related quality of life for nursing home residents, and the first measure specifically developed for this purpose in nursing home residents. This study demonstrates the unique contribution of personal burden information obtained through eliciting bother judgments in a vision-targeted health-related quality of life questionnaire. Because the Part B subscale bother scores are moderately correlated with the Part A subscale scores, some might argue that the Part B bother score does not add substantial new information to understanding quality of life. However, the Part A score accounts for less than half the variance of the Part B bother scores on each subscale. Furthermore, it is important to emphasize that the Part B bother scores had relatively weak correlations to visual function, unlike the moderately strong correlations that Part A scores exhibited to vision. This implies that the bother scores are probing personal or intraindividual factors not captured by objectively measuring visual function itself, factors such as an individual's tolerance to stress, personality, coping strategies, and cognitive appraisal of an individual's own situation. This is an area warranting further study.

Limitations to this study must also be acknowledged. Residents scoring below 13 on the MMSE were ineligible for participation and thus the psychometric properties of the NHVQoL are unknown in those with MMSE scores less than 13. Another limitation is the relatively narrow, 3-point scale on which bother was rated on the NHVQoL, and it remains to be determined that a wider scale would have been more useful in assessing bother. Other tools assessing similar constructs have employed a 5-item response scale ranging from not at all bothered to extremely bothered (Teri et al., 1992).

In summary, this study provides information about the characteristics of a bother item-stem component (Part B) of the NHVQoL. Our results show that although bother ratings are moderately associated with the ratings of difficulty, frequency, and truthfulness in the original NHVQoL, they provide information about the personal burden of vision impairment not adequately captured by difficulty, frequency, and truthfulness response scales and by measuring visual function through the standard clinical tests of visual acuity or contrast sensitivity.

Acknowledgments

This research was supported by the Retirement Research Foundation, the EyeSight Foundation of Alabama, the Pearle Vision Foundation, National Institutes of Health grants R21-EY014071, and Research to Prevent Blindness, Inc.

References

- Brod M, Stewart AL, Sands L, Walton P. Conceptualization and measurement of quality of life in dementia: The dementia quality of life instrument (DQOL). *Gerontologist* 1999;39:25–35. [PubMed: 10028768]
- Crews J, Campbell V. Vision impairment and hearing loss among community-dwelling older americans: Implications for health and functioning. *American Journal of Public Health* 2004;94(5):823–829. [PubMed: 15117707]
- de Boer MR, Moll AC, de Vet HC, Terwee CB, Volker-Dieben HJ, van Rens GH. Psychometric properties of vision-related quality of life questionnaires: A systematic review. *Ophthalmic and Physiological Optics* 2004;24:257–273. [PubMed: 15228503]
- Dreer L, Elliott T, Berry J, Fletcher D, Swanson M, McNeal J. Cognitive appraisals, distress and disability among persons in low vision rehabilitation. *British Journal of Health Psychology* 2008;13:449–461. [PubMed: 17535505]
- Dreer L, Elliott T, Fletcher D, Swanson M. Social problem-solving abilities and psychological adjustment of persons in low vision rehabilitation. *Rehabilitation Psychology* 2005;50:232–238.
- Dreer L, McGwin G, Scilley K, Meek G, McLacklin A, Owsley C. Development of a nursing home vision-targeted health-related quality of life questionnaire for older adults. *Aging & Mental Health* 2007;11(6):722–733. [PubMed: 18074260]
- Elliott D, Bullimore M, Bailey I. Improving the reliability of the Pelli-Robson contrast sensitivity test. *Clinical Vision Sciences* 1991;6:471–475.
- Ferris F, Kassoff A, Bresnick G, Bailey I. New visual acuity charts for clinical research. *American Journal of Ophthalmology* 1982;94:91–96.
- Ferris F, Sperduto R. Standardized illumination for visual acuity testing in clinical research. *American Journal of Ophthalmology* 1982;94:97–98.
- Folstein M, Folstein S, McHugh P. “Mini-mental state”: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* 1975;12:189–198. [PubMed: 1202204]
- Horowitz A. Vision impairment and functional disability among nursing home residents. *The Gerontologist* 1994;34(3):316–323. [PubMed: 8076872]
- Logsdon R, Gibbons L, McCurry S, Teri L. Quality of life in Alzheimer’s disease: Patient and caregiver reports. *Journal of Mental Health and Aging* 1999;5:21–32.

- Mangione C, Lee PP, Gutierrez P, Spritzer K, Berry S, Hays R, et al. Development of the 25-item National Eye Institute Visual Function Questionnaire. *Archives of Ophthalmology* 2001;119(7):1050–1058. [PubMed: 11448327]
- Marx M, Werner P, Cohen-Mansfield J, Feldman R. The relationship between low vision and performance of activities of daily living in nursing home residents. *Journal of the American Geriatrics Society* 1992;40(10):1018–1020. [PubMed: 1401674]
- Mitchell P, Hayes P, Wang J. Visual impairment in nursing home residents: The Blue Mountains Eye Study. *The Medical Journal of Australia* 1997;166:73–76. [PubMed: 9033561]
- Owsley C, McGwin G. Measuring the personal burden of eye disease and vision impairment. *Ophthalmic Epidemiology* 2007;14:188–191. [PubMed: 17896296]
- Owsley C, McGwin G, Scilley K, Meek GC, Dyer A, Seker D. The visual status of older persons residing in nursing homes. *Archives of Ophthalmology* 2007a;125:925–930. [PubMed: 17620572]
- Owsley C, McGwin G, Scilley K, Meek GC, Dyer A, Seker D. Effect of refractive error correction on health-related quality of life and depression in older nursing home residents. *Archives of Ophthalmology* 2007b;125:1471–1477.
- Owsley C, McGwin G, Scilley K, Meek GC, Dyer A, Seker D. Impact of cataract surgery on health-related quality of life in nursing home residents. *British Journal of Ophthalmology* 2007c;91:1359–1363. [PubMed: 17522143]
- Paquay L, De Lepeleire J, Milisen K, Ylief M, Fontaine O, Buntinx F. Tasks performance by registered nurses and care assistants in nursing homes: A quantitative comparison of survey data. *International Journal of Nursing Studies* 2007;44:1459–1467. [PubMed: 17397849]
- Pelli D, Robson J, Wilkins A. The design of a new letter chart for measuring contrast sensitivity. *Clinical Vision Sciences* 1988;2:187–199.
- Resnick H, Fries B, Verbrugge L. Windows to their world: The effect of sensory impairments on social engagement and activity time in nursing home residents. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences* 1997;52B(3):S135–S144.
- Roth D, Burgio L, Gitlin L, Gallagher-Thompson D, Coon D, Belle S, et al. Psychometric analysis of the Revised Memory and Behavior Problems Checklist: Factor structure of occurrence and reaction ratings. *Psychology and Aging* 2003;18(4):906–915. [PubMed: 14692875]
- Scilley K, Owsley C. Vision-specific health-related quality of life: Content areas for nursing home residents. *Quality of Life Research* 2002;11:449–462. [PubMed: 12113392]
- Simmons S, Schnelle J. Strategies to measure nursing home residents' satisfaction and preferences related to incontinence and mobility care: Implications for evaluating intervention effects. *Gerontologist* 1999;39:345–355. [PubMed: 10396892]
- Teri, I; Truax, P.; Logdson, R.; Uomoto, J.; Zarit, S.; Vitaliano, P. Assessment of behavioral problems in dementia: The Revised Memory and Behavior Problems Checklist. *Psychology and Aging* 1992;7(4):622–631. [PubMed: 1466831]
- Tielsch J, Javitt J, Coleman A, Katz J, Sommer A. The prevalence of blindness and visual impairment among nursing home residents in Baltimore. *The New England Journal of Medicine* 1995;332(18):1205–1209. [PubMed: 7700315]
- Trigg R, Jones R, Skevington S. Can people with mild to moderate dementia provide reliable answers about their quality of life? *Age and Ageing* 2007;36:1–7. [PubMed: 17264134]
- West C, Gildengorin G, Haegerstrom-Portnoy G, Schneck M, Lott L, Brabyn J. Is vision function related to physical functional ability in older adults? *Journal of the American Geriatrics Society* 2002;50:136–145. [PubMed: 12028258]
- West S, Friedman D, Munoz B, Roche K, Park W, Deremeik J, et al. A randomized trial of visual impairment interventions for nursing home residents: Study design, baseline characteristics, and visual loss. *Ophthalmic Epidemiology* 2003;10(3):193–209.

Appendix

Guide for NHVQoL Part A responses which trigger the assessment of the bother item-stem (Part B).

Q 4: responses 2–5 (Mild to Very Severe) go on to answer the bother question

Q 5–17, 27–40: responses 2–5 (A little difficulty to extreme difficulty) go on to answer the bother question

Q 18–21, 41–43: responses 1–4 (All of the time ... A little of the time) go on to answer the bother question

Q 25, 46, 49, 50: responses 1–2 (Definitely true + Mostly true) go on to answer the bother question

Q 51–57: response 1 (Yes) go on to answer the bother question.

Q 3, 22–24, 26, 44, 45, 47, 48, 50: Bother score is not calculated (i.e., psychological symptoms subscale)

Table 1

Sample demographic and medical characteristics.

Characteristic	
Age, n (%)	
60 to 69 years	39 (9.9)
70 to 79 years	127 (32.2)
80 to 89 years	168 (42.5)
90 to 99 years	59 (14.9)
≥ 100 years	2 (0.5)
Race/Ethnicity, n (%)	
African American	105 (26.6)
White, non-Hispanic	289 (73.2)
Gender, n (%)	
Female	320 (81.0)
Male	75 (19.0)
Education, n (%)	
Grade school	106 (26.8)
Some high school	88 (22.3)
High school graduate	122 (30.9)
Some college	52 (13.2)
College graduate	12 (3.0)
Graduate or professional degree	3 (0.8)
Mental Status (MMSE Score), n (%)	
27 to 30	51 (12.9)
24 to 26	83 (21.1)
20 to 23	103 (26.1)
16 to 19	86 (21.8)
13 to 15	71 (18.0)
Number of Medical Conditions, <i>M (SD)</i>	5.6 (3.0)
Length of Stay in Nursing Home, years, <i>M (SD)</i>	1.9 (2.0)

Table 2

Visual function characteristics of the study sample.

Characteristic	Binocular	Better Eye	Worse Eye
Distance Visual Acuity, n (%)			
20/25 or better	17 (4.3)	43 (11.0)	6 (1.5)
Worse than 20/25 to 20/60	191 (48.7)	224 (57.1)	151 (38.5)
Worse than 20/60 but better than 20/200	151 (38.5)	101 (25.8)	142 (36.2)
20/200 or worse	33 (8.4)	24 (6.1)	93 (23.7)
Distance Visual Acuity, logMAR, <i>M</i> (<i>SD</i>)	0.41 (0.28)	0.43 (0.29)	0.65 (0.33)
Near Visual Acuity, n (%)			
20/25 or better	38 (9.7)	9 (2.3)	2 (0.5)
Worse than 20/25 to 20/60	241 (61.6)	179 (45.7)	91 (23.2)
Worse than 20/60 but better than 20/200	90 (23.0)	164 (41.8)	182 (46.4)
20/200 or worse	22 (5.6)	40 (10.2)	117 (29.9)
Near Visual Acuity, logMAR, <i>M</i> (<i>SD</i>)	0.55 (0.33)	0.57 (0.32)	0.81 (0.37)
Contrast Sensitivity, n (%)			
≥ 1.80	2 (0.5)	----	----
≥ 1.50 but < 1.80	89 (22.8)	36 (9.2)	7 (1.8)
≥ 1.20 but < 1.50	171 (43.9)	192 (49.2)	117 (30.0)
≥ 0.90 but < 1.20	71 (18.2)	92 (23.6)	111 (28.5)
≥ 0.60 but < 0.90	32 (8.2)	40 (10.3)	54 (13.9)
≥ 0.30 but < 0.60	11 (2.8)	15 (3.9)	26 (6.7)
< 0.30	14 (3.6)	15 (3.9)	75 (19.2)
Contrast Sensitivity, log sensitivity, <i>M</i> (<i>SD</i>)	1.2 (0.38)	1.1 (0.36)	0.82 (0.52)

Table 3

Means for quality of life deficits (Part A) and bother (Part B) on NHVQoL subscales

Subscale	Deficits (Part A)	Bother (Part B)
	M (SD)	M (SD)
General Vision	63.78 (20.74)	2.11 (0.68)
Reading	77.84 (25.85)	2.19 (0.79)
Ocular symptoms	70.32 (29.26)	1.97 (0.64)
ADLs	95.28 (13.38)	2.23 (0.76)
Mobility	86.60 (14.98)	2.07 (0.76)
Activities/Hobbies	87.81 (19.88)	2.21 (0.70)
Psychological distress	68.00 (22.70)	NA*
Adaptation/Coping	85.13 (24.22)	2.30 (0.67)
Social interaction	90.92 (16.03)	2.14 (0.77)

* Bother scores were not calculated for this subscale

Table 4

Test- retest correlations for the NHVQoL bother scale scores (Part B) by subscale

Subscale	<i>r</i>
General Vision	0.39***
Reading	0.47***
Ocular Symptoms	0.46***
ADLs	0.53*
Mobility	0.43**
Activities/Hobbies	0.27*
Adaptation/Coping	0.59***
Social Interaction	0.30**

*
 $p \leq .05$ **
 $p \leq .01$ ***
 $p \leq .0001$

Table 5

Bother ratings by item on the NHVQoL

Subscale Item number and description	Residents reporting <i>n</i> (%)	Bother rating among those reporting any difficulty <i>n</i> (%)		
		None	A little	A lot
General Vision				
18. Do less	175 (45.0)	33 (19.2)	63 (36.6)	76 (44.2)
19. Limited in activity length	150 (38.7)	26 (17.5)	51 (34.2)	72 (48.3)
25. Needs a lot of help	85 (22.0)	14 (16.5)	29 (34.1)	40 (47.1)
42. Limited in activity scope	158 (40.5)	26 (16.5)	63 (39.9)	67 (42.4)
Reading				
5. Difficulty reading ordinary print	213 (54.8)	55 (26.8)	47 (22.9)	103 (50.4)
8. Difficulty reading distance	121 (69.0)	30 (24.8)	34 (28.1)	57 (47.1)
17. Difficulty reading large print	52 (13.4)	9 (18.0)	14 (28.0)	27 (54.0)
Ocular Symptoms				
4. Pain/discomfort in eyes presence	169 (43.3)	26 (15.4)	80 (47.3)	61 (36.1)
20. Pain/discomfort in eyes interference	78 (20.0)	3 (3.9)	38 (48.7)	37 (47.4)
51. Tearing	212 (54.5)	53 (25.1)	94 (44.6)	64 (30.3)
52. Dryness	134 (34.5)	34 (25.6)	59 (44.4)	40 (30.1)
53. Double Vision	73 (18.8)	11 (15.3)	23 (31.9)	38 (52.8)
54. Blurry Vision	131 (33.7)	20 (15.4)	52 (40.0)	58 (44.6)
55. Tiredness	145 (37.3)	31 (21.4)	58 (40.0)	56 (38.6)
56. Headache related to vision	67 (17.3)	12 (17.9)	21 (31.3)	34 (50.8)
57. Objects jump around	141 (36.3)	43 (30.9)	48 (34.5)	48 (34.5)
Activities of Daily Living				
12. Difficulty matching clothes	31 (8.0)	8 (25.8)	6 (19.4)	17 (54.8)
30. Difficulty eating	38 (9.8)	7 (18.4)	12 (31.6)	19 (50.0)
31. Difficulty grooming	41 (10.5)	4 (9.8)	15 (36.6)	21 (51.2)
32. Difficulty bathing	27 (6.9)	2 (7.4)	12 (44.4)	13 (48.2)
33. Difficulty dressing	31 (8.0)	4 (12.9)	12 (38.7)	15 (48.4)
34. Difficulty toileting	35 (9.0)	4 (14.3)	11 (39.3)	13 (46.4)
Mobility				
9. Difficulty on steps in dim light	10 (2.6)	4 (40.0)	2 (20.0)	4 (40.0)
10. Difficulty with side vision while walking	96 (24.7)	20 (21.1)	29 (30.5)	46 (48.4)
27. Difficulty moving in own room in bright light	52 (13.3)	10 (19.2)	18 (34.6)	24 (46.2)
28. Difficulty moving in own room in dim light	91 (23.4)	19 (20.9)	32 (35.2)	39 (42.9)
29. Difficulty moving in facility in daytime	36 (9.2)	5 (13.9)	10 (27.8)	20 (55.6)
35. Difficulty transferring	28 (7.2)	4 (14.3)	6 (21.4)	17 (60.7)
46. Can't go out of room alone	48 (12.3)	10 (16.4)	13 (21.3)	25 (41.0)
Activities/Hobbies				
6. Difficulty with crafts	93 (24.0)	14 (15.1)	36 (38.7)	43 (46.2)
7. Difficulty locating objects in a crowded space	90 (23.1)	18 (20.0)	34 (37.8)	38 (42.2)
14. Difficulty getting to social events	45 (11.6)	8 (18.2)	13 (29.6)	23 (52.3)

Subscale Item number and description	Residents reporting <i>n</i> (%)	Bother rating among those reporting any difficulty <i>n</i> (%)		
		None	A little	A lot
15. Difficulty writing letters	73 (18.7)	14 (20.6)	16 (23.5)	38 (55.9)
16. Difficulty dialing phone numbers	70 (17.9)	16 (23.2)	16 (23.2)	37 (53.6)
37. Difficulty participating in activities	44 (11.3)	2 (4.6)	14 (31.8)	28 (63.6)
38. Difficulty seeing the television	65 (16.7)	7 (10.8)	21 (32.3)	37 (56.9)
40. Difficulty playing cards	51 (13.1)	8 (15.7)	11 (21.6)	28 (54.9)
Adaptation/Coping				
41. Require more help from others	99 (25.5)	13 (13.1)	35 (35.4)	51 (51.5)
43. Think about ways to adapt/cope	106 (27.3)	15 (14.2)	43 (40.6)	47 (44.3)
Social Interaction				
11. Difficulty seeing reactions	54 (13.8)	14 (25.9)	13 (24.1)	27 (50.0)
13. Difficulty visiting others	48 (12.3)	9 (18.8)	13 (27.1)	26 (54.2)
21. Stay in room most of the time	70 (18.1)	14 (20.0)	23 (32.9)	33 (47.1)
36. Difficulty recognizing people at a distance	96 (24.6)	23 (24.0)	21 (21.9)	51 (53.1)
39. Difficulty entertaining in room	27 (6.9)	4 (20.0)	4 (20.0)	12 (60.0)
49. Choose not to attend activities at times	61 (15.6)	6 (6.8)	18 (20.5)	37 (42.1)

Notes: Items 3, 22–24, 26, 44, 45, 47, 48, 50 are not listed as these comprise the psychological symptoms subscale for which bother is not calculated. In instances where the *n* for the bother rating among those reporting any difficulty does not add up to the residents reporting *n*, the remaining respondents selected “not sure” as their response which is not shown in this table.

Table 6

Correlations between NHVQoL Part A subscale scores and the Part B bother scores.

Subscale	r	p
General Vision	-0.47	<0.0001
Reading	-0.34	<0.0001
Ocular Symptoms	-0.90	<0.0001
Activities of Daily Living	-0.48	<0.0001
Mobility	-0.40	<0.0001
Activities/Hobbies	-0.42	<0.0001
Adaptation/Coping	-0.45	<0.0001
Social Interaction	-0.50	<0.0001

Table 7

Pearson correlation coefficients between resident NHVQoL bother (Part B) subscales, visual acuity, and contrast sensitivity.

Vision Function	NHVQoL Subscales							
	General Vision	Reading	Ocular Symptoms	ADLs	Mobility	Activities/Hobbies	Adaptation/Coping	Social Interaction
Distance visual acuity								
Better eye	0.12	0.06	0.16**	0.22	-0.01	0	0.05	0.05
Worse eye	0.18**	0.17**	0.15**	0.25*	0.01	0.06	0.18*	0.04
Near visual acuity								
Better eye	0.17**	0.08	0.15**	0.24*	0.06	0.07	0.14	0.11
Worse eye	0.21**	0.18**	0.14*	0.35***	0.09	0.14	0.18*	0.13
Contrast sensitivity								
Better eye	-0.16*	-0.08	-0.11*	-0.18	-0.05	-0.02	0	-0.02
Worse eye	-0.15*	-0.13*	-0.08	-0.21	-0.08	-0.02	-0.05	-0.07

* $p \leq .05$

** $p \leq .01$