

The Psychological Impact of Visual Impairment in Patients of Different Age

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Abstract. *Objective:* To examine discrepancies and similarities regarding the psychological impact of visual impairment in patients of different age. *Design:* 424 consecutive patients observed at the Center of Ophthalmology, University Hospital Essen, FRG were interviewed in person using the National Eye Institute Visual Function Questionnaire (NEI-VFQ) and the SF-36. *Patients:* Participants had to have one of the following eye conditions: diabetic retinopathy, age-related macular degeneration, age-related cataract, primary open-angle glaucoma, cytomegalovirus retinitis, and low vision from multiple causes. Patients were divided into age-related quintiles: group I (mean age 37 ± 7 years, $n=51$, 35% female), group II (56 ± 3 years, $n=53$, 38% female), group III (64 ± 3 years, 63% female), group IV (74 ± 3 years, 66% female), group V (85 ± 4 years, 75% female). *Results:* According to age, comorbidity increased and visual acuity decreased. Especially in groups IV and V visual acuity, global physical quality of life and vision-dependent quality of life decreased on a statistical significant level. *Conclusion:* The psychological impact of visual impairment in patients depends mainly on visual acuity. Elderly patients between 70 and 79 years and very old patients between 80 and 93 years suffered the most from low global and vision-specific quality of life. In conclusion, attention has to be drawn to a marked decrease in global and vision-specific quality of life in old and very old patients.

Visual function is important for an optimal orientation in functional and social life and has an effect on physical and emotional well-being [1, 2, 3, 4, 5]. Therefore, loss of vision leads to restrictions in all areas of health-related quality of life (QOL) [6]. In ophthalmology traditional measures, such as retinal photographs, and performance-based examinations like Snellen visual acuity predominate. Recently the construct of QOL has gained increasing importance in medical research [7, 8, 9, 10]. In ophthalmology QOL was first studied in patients with cataract [11, 12, 13, 14, 15], possible due to the frequency of cataract operations. Therefore, questionnaires were developed that were specifically designed for this group of patients [16, 17, 18, 19, 20, 21]. However, they may not fully describe the range of disability and functional impairment experienced by persons with other ocular diseases. To remove these limitations a survey entitled the National Eye Institute Visual Function Questionnaire (NEI-VFQ) [22, 23] was developed, which allows a comparison between groups of patients under different ocular conditions. This questionnaire was derived from an analysis of the transcript-content of 26 focus-groups

with different ocular diseases; and its usefulness was demonstrated in several studies [24, 25, 26, 27].

The major goal of the present study was to investigate the social and psychological effects of mild to severe visual loss in patients of different age. The second aim was to detect the most important influencing factors: is age a stable predictor, that means: do older people suffer the most from vision dependent decreasing quality of life? Or is the visual capacity itself the main predictor, that means: do severely visually impaired people suffer more than mildly visually impaired people?

Methods

Study population

Case patients consisted of 424 consecutive in- and out-patients observed at the Department of Ophthalmology, University Hospital Essen, FRG. We excluded patients already in other clinical trials, no other exclusion criteria were used. Participants had to have one of the following eye conditions: diabetic retinopathy, age-related macular degeneration, age-related cataracts, primary open-angle glaucoma, cytomegalovirus retinitis, and low vision from multiple causes.

Questionnaires

The SF-36 Health Survey [28] includes one multi-item scale that assesses eight health concepts:

- (1) Physical Functioning: limitations in performing all physical activities including bathing or dressing,
- (2) Role Physical: problems with work or other daily activities as a result of physical health,
- (3) Bodily Pain: limiting pain,
- (4) General Health: evaluation of personal health,
- (5) Vitality: energy and fatigue,
- (6) Social Functioning: interference with normal social activities due to physical and emotional problems,
- (7) Role Emotional: problems with work or other daily activities as a result of emotional problems,
- (8) Mental Health: feelings of nervousness and depression.

The first four scales were added and called global Physical Health: limitations in self-care, physical, social, and role activities, severe bodily pain, frequent tiredness.

The last four scales were added and called global Mental Health: frequent psychological distress, social and role disability due to emotional problems.

This instrument was chosen to assess global health-related QOL because of its demonstrated validity and reliability. The official German version of the SF-36 was used [29].

A short version of the 51-item field test version of the NEI-VFQ, the NEI-VFQ-25 with 25 item-groups and 42 items was used. The NEI-VFQ was designed to evaluate patients' perceptions of the effect of ocular disease on daily functioning and QOL. It assesses patients' ability to perform a broader range of tasks and was designed for ophthalmologic patients in general. It consists of the following twelve subscales,

- (1) General Health: global physical health,
- (2) General Vision: global vision with glasses or contact lenses,

- (3) Ocular Pain:
 - (4) Near Vision stitching, finding some
 - (5) Distance Vision room, recognizing some
 - (6) Vision-Specific friends, talking with friends
 - (7) Vision-Specific
 - (8) Vision-Specific staying at home because
 - (9) Vision-Specific
 - (10) Driving: vision
 - (11) Color Vision.
 - (12) Peripheral Vision
- Upon receipt the and responses were translated with excellent knowledge of the common version of the modification of the form other native German: performance and clarity backtranslated into English knowledge of German. All translators then modified the questionnaire [29].

Procedures

The study was approved in FRG, and informed consent questions, the NEI-VFQ conducted by a single in Psychology, University conducted numerous psychological 95% (lack of time was were unaware of the ophthalmologic examination the same day before diagnosis were extracted

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Analysis

Patients were divided into group I (50-59 years), group II (50-59 years), group III (60-69 years).

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- (3) Ocular Pain: limiting eye pain, itching, burning of the eyes,
- (4) Near Vision: vision-dependent limitations in reading newspaper, cooking, stitching, finding something
- (5) Distance Vision: vision-dependent limitations in recognizing a friend in a large room, recognizing something across the street or viewing television,
- (6) Vision-Specific Social Functioning: vision-dependent limitations in visiting friends, talking with friends, and recognizing the responses of others,
- (7) Vision-Specific Emotion/Well-Being: vision-dependent fear, restriction
- (8) Vision-Specific Role Difficulties: vision-dependent limitations in working, staying at home because of low vision,
- (9) Vision-Specific Dependency: needing too much assistance,
- (10) Driving: vision-specific problems in driving a car at night, in unknown areas,
- (11) Color Vision, and
- (12) Peripheral Vision.

Upon receipt the original American NEI-VFQ questionnaire, the instructions, items and responses were translated into German by two independent native German speakers with excellent knowledge of English. The translators then met to discuss and agree upon a common version of the questionnaire, keeping all alternative translations for further modification of the form if necessary. The common version was then evaluated by two other native German-speaking raters in terms of conceptual equivalence, linguistic performance and clarity. The German version approved by this procedure was then backtranslated into English by two independent native English translators with excellent knowledge of German. These translators had to agree on a common backtranslated version. All translators then met to discuss and agree upon a common German version of the questionnaire [29].

Procedures

The study was approved by the Center of Ophthalmology, University Hospital Essen, FRG, and informed consent was obtained from each study participant. Demographic questions, the NEI-VFQ, and SF-36 were administered in this order by a personal interview conducted by a single interviewer. This interviewer was trained in the Institute of Medical Psychology, University Hospital Essen, FRG, by one of the authors (G.H.F.) who has conducted numerous psychodiagnostic studies. The participation rate for the interviews was 95% (lack of time was the main reason for rejecting participation). Ophthalmologists who were unaware of the patients' NEI-VFQ, and SF-36 scores performed complete ophthalmologic examinations on all case patients. Best-corrected visual acuity (measured at the same day before or after the psychodiagnostic investigation) and primary ocular diagnosis were extracted from patients' medical record.

To assess nonophthalmic comorbidities, the Karnofsky Index [30] was used.

Monocular Snellen visual acuity [31, 32, 33] was measured while patients were wearing their current "walking about" correction.

Analysis

Patients were divided into age-related quintiles: group I (age range: 24-49 years), group II (50-59 years), group III (60-69 years), group IV (70-79 years), and group V (70-93 years).

The statistical analysis was designed to explore the psychological impact of visual impairment in patients of different age. All data were presented as mean \pm standard deviation for scales of frequencies for questions. Univariate analyses of variance (ANOVA,

five age-related groups) were performed. To examine if the group differences were independent from the demographic and clinical variables (gender, comorbidity, visual acuity) additional sets of analyses of variance with these demographic variables as covariates were performed. Conclusion of statistical significance was done by Bonferroni adjustment for multiple testing.

Table 1: Characteristics of Patients*

Groups	40s (n=51)	50s (n=53)	60s (n=104)	70s (n=169)	80s (n=47)	P
Mean \pm age (range)	37 \pm 7 (24-39)	56 \pm 3 (50-59)	64 \pm 3 (60-69)	74 \pm 3 (70-79)	85 \pm 4 (80-93)	
Female	18 (35%)	20 (38%)	65 (63%)	111 (66%)	35 (75%)	.0001 ¹
Retired	11 (22%)	18 (34%)	77 (77%)	136 (81%)	45 (96%)	.0001 ¹
Mean \pm Comorbidity ²	74 \pm 18	79 \pm 16	78 \pm 11	74 \pm 13	73 \pm 11	.03 ³
Mean \pm Snellen visual acuity ⁴						
Better eye	77 \pm 32	51 \pm 33	54 \pm 29	36 \pm 27	30 \pm 24	.0001 ³
Worse eye	54 \pm 38	29 \pm 31	29 \pm 26	18 \pm 20	14 \pm 13	.0001 ³
Snellen visual acuity, median (range)						
Better eye	20/20 (100-16)	20/50 (500-20)	20/40 (500-20)	20/63 (500-20)	20/80 (500-20)	.0001 ³
Worse eye	20/25 (NLP ⁵ -16)	20/100 (NLP-20)	20/100 (NLP-20)	20/200 (NLP-20)	20/200 (NLP-40)	.0001 ³
Basic eye disease						
DR (n=69)	11	14	22	22	0	
ARM D (n=51)	0	4	18	23	6	
Cataract (n=137)	6	13	32	64	22	
Glaucoma (n=38)	8	7	16	7	0	
CMV (n=21)	19	2	0	0	0	
Low Vision (n=108)	7	13	16	53	19	

* All data are presented as number (percentage) unless otherwise indicated. NLP indicates no light perception; DR, diabetic retinopathy; ARM D, age-related macular degeneration; and CMV, cytomegalovirus retinitis.

¹ χ^2 Test

² Comorbidity score indicates the Karnofsky-Index (100=best, 0=worst)

³ Analysis of variance

⁴ Decimal fraction * 100 (range 0-125)

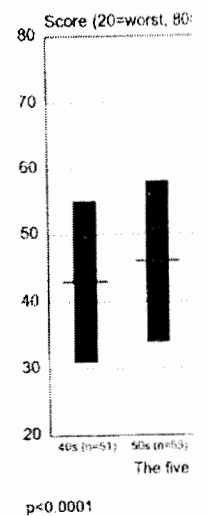
⁵ NLP indicates no light perception

Results

Summary statistics

Table 1 provides clinical characteristics of the first group of patients – ca 35% were female, a recent diagnosis of cytomegalovirus retinitis. The 40s (mean age 37 years, 38% female), the 50s (mean age 56 years, 38% female), the 60s (mean age 64 \pm 3 years, 63% female), the 70s (mean age 74 \pm 3 years, 66% female), and the 80s (mean age 85 \pm 4 years, 75% female) suffered from cataract or low vision from cataract or low vision (ca 35% female). Visual acuity decreased with age.

Figure 1: Global Physical Functioning



Global Quality of Life

The main result is that the 40s (mean score 55) and the 50s (mean score 58) had a better Global Quality of Life than the 60s (mean score 45) and the 70s (mean score 48). The 80s suffered from cataract or low vision from cataract or low vision (ca 35% female). Functioning, Role Physical Functioning, Role Psychological Functioning, and Role Social Functioning score did not differ statistically between the age groups.

group differences were under comorbidity, visual demographic variables as was done by Bonferroni

80s (n=47)	P
85 ± 4 (80-93)	
35 (75%)	.0001 ¹
45 (96%)	.0001 ¹
73 ± 11	.03 ³
30 ± 24	.0001 ²
14 ± 13	.0001 ³
20/80 (500-20)	.0001 ¹
20/200 (NLP-40)	.0001 ³
0	
6	
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19	

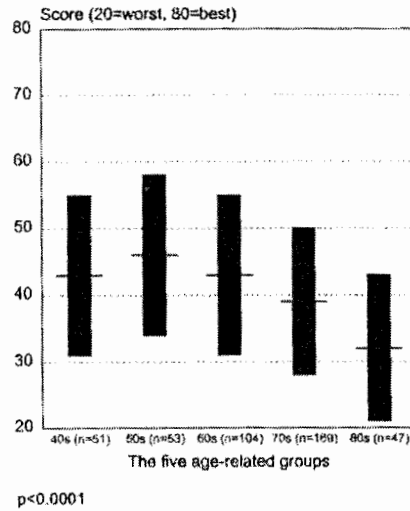
LP indicates no light perception; V, cytomegalovirus retinitis.

Results

Summary statistics

Table 1 provides clinical and demographic characteristics of the 424 participants. The first group of patients – called the 40s – comprised 51 patients (mean age 37 ± 7 years) only 35% were female, a remarkable proportion suffered from diabetic retinopathy and cytomegalovirus retinitis. The second group – called the 50s – comprised 53 patients (56 ± 3 years, 38% female), they suffered from diabetic retinopathy, cataract or low vision from multiple causes. The 60s suffered from diabetic retinopathy, cataract or glaucoma (n=104, 64 ± 3 years, 63% female). The 70s suffered from age related macular degeneration, cataract or low vision from multiple causes (n=169, 74 ± 3 years, 66% female), and the 80s suffered from cataract or low vision from multiple causes (n=47, 85 ± 4 years, 75% female). Visual acuity decreased across the age groups.

Figure 1: Global Physical Health (SF-36 Health Survey) regarding the five age-related groups



Global Quality of Life

The main result is presented in figure 1 (T-Scores: 20 indicates worst quality of life, 80 reflects the best, 50 ± 20 demonstrates the distribution of 2/3 of the normative collective). Beside a little decrease in the youngest group (due to the high proportion of HIV-infected patients) the global Physical Health decreased according to age. Even the 70s and the 80s suffered from low physical quality of life (SF-36 subscales: Physical Functioning, Role Physical, Bodily Pain, and General Health). The global Mental Health score did not differ statistically between the five groups.

Figure 2: General Vision (NEI-VFQ)

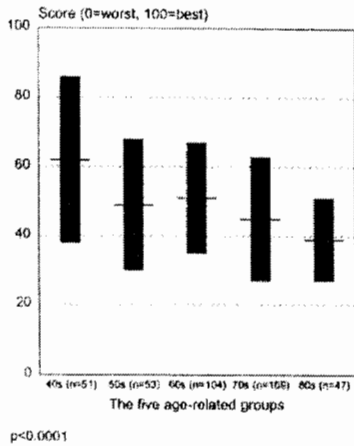
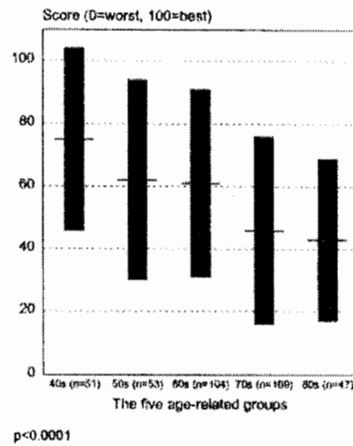


Figure 3: Near Vision (NEI-VFQ)



Further statistical analysis

In a second step analyzed. Regarding the (SF-36), age explained 4% of the variance, that means the

Regarding the sea possible influencing covariates, the acuity of the better eye explained 1.1 to 8.7% of the variance, which is unimportant.

Conclusion

QOL assessment showed a possibility to obtain the emotional and functional evaluation.

The psychological impact is mainly on visual acuity. Patients suffered the most from a decrease in specific quality of life. It is not sufficiently with „walking“ independent limitations in (Near Vision), they suffer from a large room, recognizing (Vision), and they suffer from difficulties with friends, and recognition has to be drawn in old and very old patients.

The statistical analysis showed that visual acuity more strongly influences QOL. Most of the scores are influenced by visual acuity. Analyses of variance showed a substantial variance (explained by the worse eye) and a minor important role in patients with low visual acuity.

We conclude that the SF-36 inventory, assessing visual acuity, is a good tool for studies on QOL of visually impaired patients.

Vision targeted QOL

Regarding the results of the NEI-VFQ (0 means the worst and 100 the best vision specific quality of life), five out of twelve subscales demonstrated statistically significant ($p < 0.004$ adjusted for twelve comparisons) differences between the five different age-groups. No statistical significant results were found regarding the NEI-VFQ subscales Ocular Pain, Vision-Specific Emotion/Well-Being, Vision-Specific Role Difficulties, Vision-Specific Dependency, Driving, Color Vision, and Peripheral Vision.

The 70s and 80s suffered the most from low General Health ($p < 0.004$); this result duplicated the results of the SF-36.

The quality of life due to General Vision decreased (Figure 2; $p < 0.0001$); this result corresponded to the visual acuity of the groups. There was a threshold between the patients aged 40 and the rest. Near Vision demonstrated a threshold between the two old groups and the rest (Figure 3, $p < 0.0001$). Distance Vision (Figure 4, $p < 0.0001$) and Social Functioning ($p < 0.0001$) were difficult for the old and very old, too.

Figure 4: Distance Vision (NEI-VFQ)

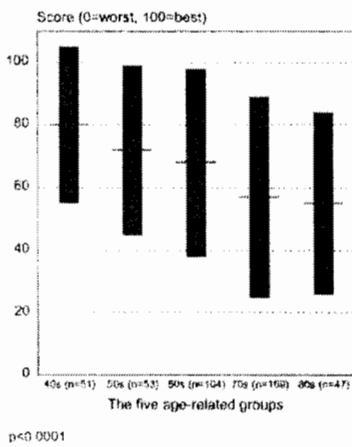
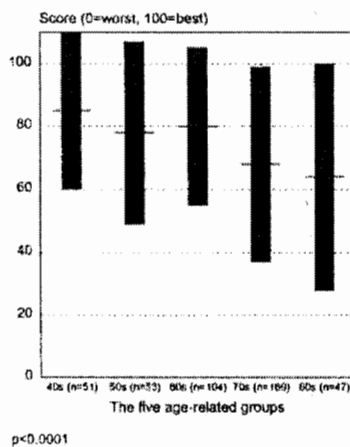
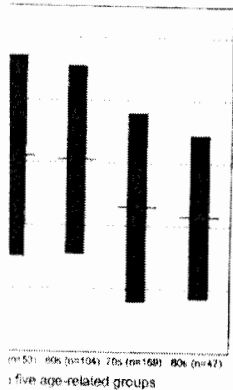


Figure 5: Social Functioning (NEI-VFQ)



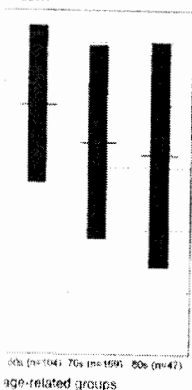
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Further statistical analysis

In a second step the influence of sociodemographic and clinical variables was analyzed. Regarding the simple analysis of variance in the global Physical Health scale (SF-36), age explained 9.5% of variance, that means the older the patients, the more they suffer from low physical quality of life. After evaluating possible covariates, age still remained important (explanation of variance 5.6%), but comorbidity explained 15.7% of variance, that means the ill patients suffered more from low physical quality of life.

Regarding the scales of the NEI-VFQ, age explained 5.6 to 12%. After evaluating possible influencing covariates, age disappeared as a statistically significant factor. Visual acuity of the better eye explained 5.5 to 17.3% of variance; visual acuity of the worse eye explained 1.1 to 8.7% of variance. Comorbidity was less important, and gender was unimportant.

Conclusion

QOL assessment is an important outcome criterion for ophthalmology. The possibility to obtain the patient's account of his situation not only in physical, but also in emotional and functional aspects enhances the potential of medical-psychological evaluation.

The psychological impact of visual impairment in patients of different age depends mainly on visual acuity. Elderly patients (70-79 years) and very old patients (80-93 years) suffered the most from low visual acuity, low global physical health, and low vision-specific quality of life. For the old and very old patients it was generally difficult to see sufficiently with „walking about“ correction (General Vision), they suffered from vision-dependent limitations in reading newspaper, cooking, stitching and finding something (Near Vision), they suffered from vision-specific limitations in recognizing a friend in a large room, recognizing something across the street or viewing television (Distance Vision), and they suffered from vision-dependent limitations in visiting friends, talking with friends, and recognizing the responses of others (Social Functioning). In conclusion, attention has to be drawn to a marked decrease in global and vision-specific quality of life in old and very old patients.

The statistical analyses demonstrated that the SF-36 physical component score is more strongly influenced by poorer general health than by limitations in vision-targeted QOL. Most of the scores of the NEI-VFQ are mainly associated with the level of visual acuity. Analyses of variance revealed that the visual acuity of the better eye explained substantial variance (explanation of variance between 5.5% to 17.3%) and the visual acuity of the worse eye explained variance too (1.1 to 8.7%). Despite these two sources of explanation of variance, sociodemographic variables like gender and comorbidity played a minor important role in predicting vision related QOL.

We conclude the NEI-VFQ to be a very useful and reliable psychodiagnostic inventory, assessing vision-specific QOL. We suggest the use of this instrument in future studies on QOL of visually impaired patients especially in evaluating rehabilitation efforts.

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On the Special Needs of Blind and Low Vision Seniors

Research and Practice Concepts

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