

Vision-related quality of life and its related factors among older adults

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Abstract

Purpose

This study aimed to determine the vision-related quality of life (VRQoL) status and its related factors among older adults in Yazd city, Iran.

Methods

This cross-sectional study was conducted in 2023 with the participation of 250 elderly people ≥ 60 years of age covered by comprehensive health centers in Yazd city in central Iran, who were selected by multi-stage random sampling. The data collection tool included demographic information and the National Eye Institute-Visual Function Questionnaire (NEI VFQ-25) which was completed by interview. Data analysis was done using independent T-tests, one-way analysis of variance and hierarchical regression analysis using SPSS software.

Results

The most common visual impairment (VI) in the participants were hyperopia (38.2%), cataract (35.5%) and myopia (31.3%), respectively. Their average VRQoL score was 85.37 ± 15.24 from the range of 0 to 100. In univariate analysis, VRQoL score was significantly related to age, marital status, use of glasses, suffering from some diseases and VI ($p < 0.05$). In the multivariate analysis, diabetes ($\beta = -0.15$), hypertension ($\beta = -0.20$) and VI ($\beta = -0.62$) remained as significant predictors of VRQoL in the regression model.

Conclusion

The level of VRQoL in the studied elderly is favorable, and in the meantime, the dimensions of social functioning, driving and color vision are at the highest level, and the dimensions of general health and general vision are unfavorable and should be given special attention. VRQoL is influenced by various factors, of which diabetes, high blood pressure and VI were identified as the most important predictors.

Introduction

Visual impairment (VI) is a limitation in the function of the visual system [1], which is considered as the third most common physical disorder in the elderly [2], so that affects about 10% of people aged 65 to 75 and 20% of people aged ≥ 75 [3]. Many eye problems appear with old age, and when patients find out about their disease, their vision had decreased or destroyed. VI in old age is associated with changes in life habits and loss of independence and has many consequences [4]. Research shows that vision disorders greatly increase the risk of falls, hip fractures, depression, social isolation, and admission to

nursing homes [5, 6]. It can also lead to disappointment, confusion and fear [7]. Since visual function is the most important sensory function of the human body, VI is often detrimental to the daily life of affected individuals, leading to functional disabilities and other health problems. As a result, their quality of life may deteriorate significantly.

Vision-related quality of life (VRQoL) is a person's satisfaction with their visual performance and how visual ability affects their life [8]. Since this is a broad concept, it may be influenced by a person's physical health, mental state, level of independence, and social relationships [9].

Studies have shown the relationship between VI and reduced quality of life, independence, personal and social activities, and depression [10, 11], but VRQoL has been investigated less with specific tools and the studies are mainly conducted in developed countries, and the elderly were less addressed [12–16]. Although in European countries, VI has decreased in the last 20 years, this is not the case in developing countries, and caregivers should learn more about natural aging and its relationship with disease, as well as how to identify preventive factors and early indicators of diseases [17]. In different studies, age [18, 19], VI [18–22], gender [20, 23–25], marital status [24, 26], employment status [26], education level and income [26, 27] has been mentioned as one of the main predictors of VRQoL.

With the increase in life expectancy and as a result the increasing number of elderly people in developing countries, it is expected that the number of elderly people with visual disabilities will increase significantly in the coming years. Considering the vulnerability of this group, the quality of their life should be investigated [28]. Considering the importance of the role of visual function in maintaining the independence and quality of life of the elderly and the personal, social and economic consequences resulting from it, as well as the fact that the issue has not been given much attention in planning related to maintaining the health and quality of life of the elderly, this study was conducted with the aim of determining the VRQoL status and its related factors among the elderly of Yazd city, Iran.

Methods

Study design and participants

This cross-sectional study conducted on 250 elderly people covered by comprehensive health centers in Yazd city, Iran, in 2023. The number of elderly people registered in the SIB (Integrated Health System of Iran) was 47,631, which is 7.09% of the population of Yazd. The required sample size for this study was calculated 250 people, based on the standard deviation of the VRQoL score in a previous study (11.6) [29] and taking into account the precision of 1.5 and the type 1 error of 0.05. The sampling method was a multi-stage random sampling in which, first, 5 comprehensive health centers out of 25 active centers in Yazd city were randomly selected, and then 50 people were randomly selected in each center by referring to the SIB and entered the study. After selecting the participants, they were contacted and invited to participate in the study. If desired, the elderly referred to comprehensive health centers and through interviews, the questionnaires were completed, and otherwise, by obtaining permission and coordinating

with the elderly and their families, as well as by maintaining and following the health guidelines, a visit was made to the residence of the elderly and questionnaires were completed through interviews.

Age \geq 60 years, absence of hearing and speech impairment in such a way as not to be able to communicate, and absence of cognitive impairment using the AMTS questionnaire, as well as absence of debilitating chronic diseases were the eligibility criteria to participate in the study.

Instruments

Demographic information questionnaire and the National Eye Institute Visual Functioning Questionnaire-25 (NEI VFQ-25) [22] were used to measure the studied variables.

Demographic information questionnaire included age, sex, number of children, marital status, education, occupation, type of housing, living with whom, main source of income, common eye, physical and mental diseases and medicine usage status.

NEI VFQ-25, whose Persian version has been psychometrically tested and its validity and reliability have been confirmed [13], consisting 25 items that measure vision-related QoL and were grouped into 12 subscales as follows: general health (1 item), general vision (1 item), ocular pain (2 items), near-vision (3 items), distance vision (3 items), vision specific social functioning (2 items), vision specific mental health (4 items), vision specific role limitations (2 items), vision specific dependency (3 items), driving (2 items), color vision (1 item), and peripheral vision (1 item). Each subscale score is converted into a score between 0 and 100 and higher scores indicated better vision-specific health related quality of life.

Data analysis

In order to analyze the data, descriptive statistics including frequency and percentages for qualitative data, mean and standard deviation for quantitative data were used. Independent t-test was used to determine the average score of VRQoL according to two-state variables, ANOVA to determine the average score of VRQoL according to multi-state variables, and hierarchical regression was used to determine predictors of VRQoL. All analyzes were performed in SPSS software version 19, considering a significance level of 5%.

Results

The average age of the participants was 68.35 ± 8.21 . The majority of them were male (52.7%), married (76.6%), retired (42.8%) and lived with their spouses (75%). More than 60% of them used glasses.

The most common VI in the participants included hyperopia (38.2%), cataract (35.5%) and myopia (31.3%), respectively. The prevalence of VI was 27.8%. The most common diseases and health problems among them included high blood pressure (55%), diabetes (48.3%) and cardiovascular diseases (33.5%).

The average score of VRQoL in the participants was 85.37 ± 15.24 from the range of 0 to 100. The dimensions of, vision specific social functioning, with a mean score of 88.19, driving with a mean score

of 86.28 and color vision with a mean score of 82.06 obtained the highest scores among VRQoL dimensions. (Table 1)

Table 1
Distribution of mean and standard deviation of VRQoL and its dimensions in the participants

VRQoL and its dimensions	Mean	Standard deviation
General Health	64.83	18.16
General Vision	72.26	15.19
Ocular Pain	77.58	22
Near Vision	77.49	23.63
Distance Vision	81.38	23.37
Vision Specific Social Functioning	88.19	20.12
Vision Specific Mental Health	77.74	25.30
Vision Specific Role Limitations	73.29	29.04
Vision Specific Dependency	81.55	29.98
Driving	86.28	23.28
Color Vision	82.06	25
Peripheral Vision	80.39	21.33
VRQoL	85.37	15.24

VRQoL score had a statistically significant relationship with age, marital status, use of glasses, and whom does the elderly live with (Table 2).

Table 2
Distribution of mean and standard deviation of VRQoL according to demographic variables in the participants

Variables	Labels	N	%	Mean	SD	p
Gender	Male	129	52.7	85.06	15.11	0.685
	Female	116	47.3	86.84	16.27	
Age	60–69	162	65.6	88.02	13.51	0.001
	70–79	55	22.3	72.48	18.03	
	≥ 80	30	12.1	69.14	19.90	
Marriage Status	With Spouse	190	76.6	87.01	13.22	0.004
	Without Spouse	58	23.4	66.56	24.05	
Education Level	Illiterate	38	15.7	78.29		0.109
	Primary	88	36.4	84.37	13.86	
	Under High school Diploma	39	16.1	84.04	17.32	
	High school Diploma	38	15.7	80.38	19.02	
	Academic	39	16.1	91.96	7.55	
Occupation	Employed	46	18.9	87.72	14.58	0.120
	House wife	93	38.3	93.63	3.58	
	Retired	104	42.8	83.21	16.10	
Insurance	Yes	203	94	86.31	15.76	0.559
	No	13	6	82.64	15.02	
Use of Glasses	Yes	151	62.1	82.46	16.29	0.015
	No	92	37.9	90.97	11.09	
Living with whom	With Spouse	184	75.1	86.85	13.22	0.012
	With single children	15	6.1	71.12	35.10	
	With married children	13	5.3	57.31	29.67	
	Alone	33	13.5	79.33	16.14	

Also, the VRQoL score was associated with VI such as hyperopia, history of cataracts, history of glaucoma, diabetic retinopathy, age-related macular degeneration, myopia, astigmatism, corneal darkening, dry eyes, flying sensation, eyelid inflammation, drooping eyelids and color blindness in the participants ($p < 0.05$). (Table 3)

Table 3
Distribution of mean and standard deviation of VRQoL according to VI in the examined elderly

Visual impairment	Yes		No		p
	Mean	SD	Mean	SD	
Hyperopia	79.86	19.10	88.11	12	0.041
History of cataracts	69.83	18.28	89.98	10.63	0.001
History of glaucoma	60.84	1.79	86.25	14.76	0.004
Diabetic retinopathy	46.55	14.43	87.47	12.50	0.001
Age-related macular degeneration	63.12	12.26	88.27	12.12	0.001
Myopia	75.88	17.44	88.98	12.69	0.001
Astigmatism	70.44	10.78	87.31	14.69	0.001
Darkness of the cornea	55.17	32.70	86.17	14.40	0.015
Dry eyes	66.74	21.28	88.36	12.30	0.001
Feeling of flying flies in the eyes	65.84	18.70	89.11	11.22	0.001
Inflammation of the eyelids	56.68	34.84	86.04	14.25	0.006
Drooping eyelids	61.69	23.02	87.44	12.59	0.001
Color blind	64.05	24.26	86.50	14.15	0.013
Visual impairment	80.86	16.29	94.28	7.10	<0.001

In addition, VRQoL score had a statistically significant relationship with cardiovascular diseases, diabetes, depression, sleep disorder, hypertension, kidney disorders and headache ($p < 0.05$). (Table 4)

Table 4
Distribution of mean and standard deviation of VRQoL according to
common diseases in the examined elderly

Common diseases	Yes		No		P
	Mean	SD	Mean	SD	
Cardiovascular diseases	76.72	18.98	85.11	12.92	0.044
Diabetes	75.37	18	86.26	12.52	0.006
Depression	56.35	21.51	84.80	11.81	0.001
Respiratory diseases	72.06	14.88	83.48	15.69	0.050
Sleep problems	71.20	17.80	83.71	14.76	0.016
Kidney disease	69.94	21.62	83.04	14.60	0.041
High blood pressure	74.62	18.05	88.31	11.09	0.001
History of stroke	71.75	31.74	82.52	15.15	0.266
Digestive problems	77.74	19.31	81.83	16	0.516
Headache	67.07	19.92	85.85	11.71	0.001

In multivariate analysis and based on hierarchical regression, in the first step, demographic variables significantly explained about 25% of VRQoL changes. In the second step, when the common diseases of old age were added, the explanation rate reached 51% ($p < 0.001$). In the third step, by entering the VI variable, the predictive rate increased to 71%, which was statistically significant ($p < 0.001$). In the final model, diabetes ($\beta = -0.15$), hypertension ($\beta = -0.20$) and VI ($\beta = -0.62$) remained as significant predictors of VRQoL in the regression model.

Table 5
Hierarchical regression analysis to determine predictors of VRQoL in the examined elderly

Variable/model	Standard beta (significance level)		
	Stage 1	Stage 2	Stage 3
Age	-0.40 (0.001)	-0.29 (0.002)	-0.08 (0.30)
Sex	0.02 (0.82)	0.05 (0.55)	0.01 (0.80)
Level of Education	0.05 (0.59)	-0.06 (0.47)	-0.09 (0.15)
Employment status	-0.08 (0.41)	-0.10 (0.21)	-0.13 (0.52)
Life style	-0.05 (0.57)	-0.05 (0.48)	-0.07 (0.23)
Use of glasses	0.18 (0.07)	0.07 (0.37)	-0.055 (0.94)
Cardiovascular disease		-0.06 (0.57)	-0.03 (0.63)
Diabetes		-0.25 (0.007)	-0.15 (0.03)
Sleep problems		-0.17 (0.05)	0.02 (0.07)
High blood pressure		-0.27 (0.006)	-0.20 (0.009)
Visual impairment			-0.62 (0.001)
R ²	0.257	0.255	0.197
Cumulative R ²	0.257	0.513	0.710
p	< 0.001	< 0.001	< 0.001

Discussion

This study was conducted with the aim of determining the VRQoL status and its related factors among the elderly of Yazd city. The prevalence of VI in older adults was 27.8%, the most common of which were hyperopia, cataract and myopia, respectively. The prevalence of VI in the study of Man REK et al., [19] was 26.3%, and in the study of Vignesh et al., [30], 24.5% including cataract (50.7%), uncorrected refractive errors (36.8%) and In the Dev study [31], 60.7% were estimated, which included cataracts (9.8%), corneal opacity (8.33%), glaucoma (7.0%), macular scar (6.73%), retinal degeneration and dystrophy (5.41%). The results of Johansson et al.'s study [25] showed that the most common eye disorders among the elderly included cataracts (23.4%), age-related macular degeneration (4.7%), glaucoma (4.3%) and diabetic retinopathy (1.4%). The prevalence of VI and their types in the present study is almost similar to other studies. Since many eye problems appear with old age and when patients realize their disease that whom vision decreases [1], the results of most studies confirm the above issue. Most of these disorders are common due to changes caused by aging or due to a disease such as diabetes. Also, the main causes of

age-related visual impairment in the world include cataracts, macular degeneration, glaucoma, and diabetic retinopathy, but their distribution is slightly different in different countries [32].

The results showed that the studied elderly have a good VRQoL level. In some studies, VRQoL has been reported as moderate [12, 33–36], in some studies similar to the present study as well [20, 24, 25, 37, 38] and in some studies as poor [19]. Since VI increase with age and affect the quality and performance of people's vision, and the majority of the elderly studied were in the age group of 60–70 years, so their quality of life was better. Considering the relationship between VI and poor quality of life, since the prevalence of VI in the elderly was low, this itself can be a reason for their better quality of life. Other reasons for this variation in the results can be the difference in the lifestyle of the elderly, underlying diseases such as diabetes and hypertension, economic status, health care system and cultural values.

Based on the findings of the present study, the dimensions of vision specific social functioning, driving and color vision were favorable, but general health and general vision were not suitable. Although the participants have assessed the vision of both their eyes as generally inadequate, which seems normal, because with age and age-related changes, the power of vision decreases, but in different dimensions, such as seeing the reaction of people about the things said and the occurrence of problems in meeting people at home, parties or restaurants did not have much problem. The results of the present study are consistent with the study of Tavasoli et al. [36], Bigdeli et al. [39], Wu et al. [40], and Wolfram et al. [41]. In general, the elderly tend to present their health status as unfavorable and complain about the conditions and way of life, and for this reason, in the dimension of general health, which is mainly asked with one question, they express their status as unfavorable, which is also the case in other studies [36, 40, 42].

According to the findings of the present study, VRQoL was higher in the age group of 60–69 years and in married elderly people, but no significant relationship was observed between the VRQoL score and gender, education level, having insurance and type of employment. Since aging is one of the risk factors for causing eye problems and diseases, and the elderly are the most vulnerable group for VI, therefore, there is a significant relationship between increasing age and decreasing VRQoL, and this relationship seems logical. Due to the fact that the majority of the participants in this study were literate, had insurance and were retired, therefore, their quality of life scores did not have a statistically significant difference based on the above variables. Regarding gender, since there is no structural or genetic and biological difference between women and men in eyes, in addition, other factors such as education level and occupation were not significantly related to VRQoL, so, there was no significant difference between the quality of life of elderly men and women. The results of the previous studies are different, as in some studies quality of life was related to age, gender, occupation and education [12, 24, 25, 29, 43, 44] and in some studies, these relationships were not significant [20, 36, 45]. Therefore, wider investigations in this field seem necessary.

VRQoL was higher in the elderly who did not use glasses for all tasks. It is obvious that not using glasses to do all the work indicates that the severity of vision problems and disorders is not to the extent that the

elderly are forced to use glasses to do all their work and few of them to do things like driving, studying and watching TV had to wear glasses, and therefore VRQoL is favorable and better in them.

VRQoL was poor in elderly people with VI. This finding has been obtained in most studies conducted in the field of VRQoL (14, 20, 46–48). Many people with VI, complain about loss of independence and decrease in emotional well-being and social relationships [49]. VI leads to limitations in all areas of life, especially VRQOL, by reducing activities related to participation in society and religious practices, mobility, recreation, daily life, and visual tasks [31]. In addition, VI is associated with depression, despair and anxiety not only because of the defect but also because of the worry of worsening the condition or difficulty in adapting to reduced activity, and therefore it is possible that with reduced visual acuity, performing daily life activities may be disturbed and as a result affects the social and economic status, increasing dependence and ultimately poor well-being leading to weakening of VRQoL [50].

VRQoL was lower in the elderly with heart disease, diabetes, depression, sleep problems, kidney disease, high blood pressure, and headache. In the study of Crews et al., elderly people with cardiovascular diseases, diabetes and stroke had a poorer quality of life [51]. Co-occurrence of several chronic diseases can affect the VRQoL score [52]. The effect of coexistence on quality of life can be different from the additive effects of concurrent diseases. Social and economic factors undoubtedly affect the relationship between chronic diseases and quality of life, and this relationship refers to health inequalities among social and economic groups [53].

Based on multivariate analysis, the most important predictors of VRQOL were found to be suffering from diabetes and hypertension diseases as well as VI. VI has been identified as an important predictor of VRQOL in various studies [25, 31, 45]. Diabetes and high blood pressure diseases have always been identified as underlying diseases of VI, so it can be said that the key to improving VRQOL and, as a result, the general QoL of the elderly is the prevention of VI. Because VI reduces activities related to participation in society and religious practices, mobility, recreation, daily life, and visual tasks, leading to limitations in all areas of life, especially VRQOL (31).

Conclusion

VRQoL in the studied elderly is favorable, and in the meantime, the status of social functioning, driving and color vision are better than other dimensions. Therefore, it will be useful to identify the factors that lead to a favorable quality of life for exploitation. The dimensions of general health and the general vision were not favorable, which should be specially evaluated by the health authorities. VRQoL score is significantly related to age, marital status, use of glasses, some diseases and VI, as well as common diseases of old age. VRQoL is influenced by both visual and non-visual factors, and despite the timely diagnosis and treatment of VI, other factors must also be identified and intervened.

Considering that VI is common among the elderly population and the needs of the visually impaired elderly for eye care and vision rehabilitation are largely unmet, interventions that may increase the quality of life of the visually impaired elderly are valuable. There is a need for more research to refine strategies

as well as create, implement, maintain and evaluate community-based multidisciplinary programs aimed at improving health-related quality of life in visually impaired elderly.

Assessment of patient-reported QoL should be used in conjunction with other measures to assess the effectiveness, safety, and cost-effectiveness of treatments for VI. With longer life expectancies and the ever-increasing demands of modern lifestyles such as computer use and driving, it is imperative to popularize public education about VI and its impact on daily life, even for the general population who are reluctant to seek medical care. The lack of infrastructure and support, insurance, health and treatment systems makes the VRQoL of the elderly different compared to other age groups. Therefore, it is important to pay attention to this category.

Study limitations

This study had limitations, such as self-reporting of VI and lack of measurement by an Ophthalmologist, as well as the cross-sectional nature of the study design, from which causal inferences cannot be made. Therefore, in using the results, it is necessary to pay attention to these limitations, and it is suggested to carry out further studies with them in mind.

Declarations

Ethical considerations

Before conducting the study, the confidentiality of the information was assured and written consent was obtained from the study participants. This study was approved by the Research Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd. (Code of ethics: IR.SSU.SPH.REC.1401.001).

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Hassan Rezaeipandari, Mohammad Ali Morowatisharifabad, Leila Jafari, Esmaeil Babaei and Vali Bahrevar. The first draft of the manuscript was written by Hassan Rezaeipandari, Mohammad Ali Morowatisharifabad and Leila Jafari and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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