




## Original Article

# Association between Rehabilitation Needs and Quality of Life of the Elderly Patients with Visual Impairment

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## ABSTRACT

### Article history

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**Introduction:** Given to the high prevalence of impaired vision in aging population and importance of their quality of life, this study was aimed to evaluate the association between quality of life and vision rehabilitation needs in elderly patients with low vision referring to Bu Ali Sina Hospital, Qazvin, Iran.

**Methods:** A total of 94 elderly patients with visual acuity less than 6/18 participated in this cross-sectional study. Visual functioning questionnaire -25 and vision rehabilitation needs questionnaire were used to assess the quality of life and rehabilitation needs, respectively. Data were analyzed using Pearson and Spearman correlations, Independent t, and ANOVA tests.

**Results:** The prevalence of rehabilitation needs ranged from 29.8% (telling time with a watch or clock) to 76.4% (reading). The results also showed significant associations between the quality of life, age, marital status, and total rehabilitation needs ( $p < 0.05$ ).

**Conclusion:** These results highlight that addressing the rehabilitation needs of elderly patients with a visual impairment may be an effective means to improve their quality of life.

**Keywords:** Quality of Life, Rehabilitation, Aging, Visual Acuity

## Introduction

Aging population has become a global phenomenon (1). Like other countries, population aging in Iran is rapidly growing as a result of declining fertility and mortality rates, increasing life expectancy, and improvements in the health systems (2). Aging is associated with changes in various systems of the body including vision (3). Visual impairment is recognized as a global significant health problem. It is the third most prevalent physical impairment among elderly people (4). Generally, blindness and visual impairment increase by advancing age (5). According to the World Health Organization,

there are approximately 161 million visually impaired people (visual acuity lower than 6/18) around the world (6). It is estimated that 253 million people live with visual impairment, amongst which, 36 million are blind and 217 million suffer from moderate to severe vision impairment (7). More than 90 percent of these people live in developing countries (8).

Poor vision is one of the ten most common causes of disability (9). The effects of poor vision in older people are widespread. Poor vision is related to falls (10), reduced capacity to perform daily activities (11), nursing home admission

(12), and it is one of the most important risk factors of functional health and independence in community-living elderly people (13). Furthermore, untreated eye disorders can lead to social isolation, physical decline, and cognitive impairments which may eventually require a transition into an assisted living center (14, 15).

Low vision rehabilitation services that promote residual vision are important to help the visually impaired people to be independent in their daily living activities (16). Rehabilitation can be defined as a process that is constructed based on the individuals' needs and demands, considering their current health condition, interests, circumstances and expectations. Arrangements in rehabilitation should include the support of a multispecialty team in order to provide appropriate and complete support to individuals with visual impairments (17). According to previous experiences (18-20), the rehabilitation of the visual impairment has shown to be effective in the improvement of the quality of life among patients with visual impairment. However, in many countries including Iran, vision rehabilitation services are provided less than expected and are not ideal. The results of a study recently conducted in 70 countries showed that about 37% of visually impaired people in high-income countries used eye care; however it was only 10% in low-income countries (14). In such situations, knowing their determinants of medical treatment and rehabilitation needs to improve the quality of life of this vulnerable group will be very useful. However, the majority of the previous studies has been limited to the prevalence of visual impairment and blindness but little focused on vision-related quality of life. To the best of our knowledge, such study has not been done in Iran so far. The purpose of this study was to determine the relationship between vision-specific quality of life and rehabilitation needs among the elderly with visual impairment.

## Methods

### *Study design and participants*

The cross-sectional study was conducted on a total of 94 older patients who were selected via convenience sampling referred to the ophthalmology clinic of Bu-Ali Sina Hospital Qazvin, Iran from April to October 2016. The inclusion criteria for the study were 60 years of age or older, a medical record that documented treatment at the clinic for a diagnosis of vision impairment, and a visual acuity  $\leq 6/18$  (visual acuity  $\leq 6/18$  means that the person can read a line of letters at 6 meters that a person with normal vision can read at 18 meters). The exclusion criteria included diagnosis with mental disorders,

inability to communicate, serious physical disability (bedridden, using wheelchair), terminally ill, congenital vision problems, no light perception, and nerve-related vision disorder. The ability of participants to complete the questionnaires was assessed by interviewers before recruitment. The questionnaires were interviewer-administered by a trained and experienced interviewer.

### *Instruments*

The quality of life of visually impaired elderly people was assessed by the Visual Functioning Questionnaire (VFQ)-25 in 10 different aspects of life, including general health status, eye pain, difficulty with near vision, difficulty with distant vision, limitations in social activities, cognitive functioning, daily activities difficulties, independence, driving difficulties, and limitations with peripheral and color vision. The VFQ-25 is a 25-item version of the 51-item National Eye Institute Visual Function Questionnaire (NEI VFQ), which gives a self-reported measure of visual function. This study used the validated Persian language version of VFQ-25 (21). The questions were on a five-point Likert scale from very good to very bad or from not at all a problem to having a serious problem. The psychometric properties of this questionnaire were checked by Mohammadiannia et al. (22). In the present study, the reliability of the questionnaire was confirmed by Alpha Cronbach equal 0.94 and test-retest of ICC = 0.99 on the 20 elders aged 60 years or over.

Rehabilitation needs were assessed by a 9 - item questionnaire. The yes/no items were as follows: because of your vision, do you have trouble with: reading regular size printed materials, signing your name on a document, making a phone call without operator assistance, telling time with a watch or clock, managing your personal affairs, recognizing people, doing the activities of daily living, driving, and independent traveling at home or in the community. The scores were ranging from 0 to 9. Rehabilitation needs were classified as mild (scores 0 to 2), moderate (scores 3 to 6) and high (scores 7 to 9). To assess the content validity, the questionnaire was sent to a panel of 10 academic members consisting of experts in the fields of gerontology, rehabilitation, and ophthalmology. Cronbach's alpha test (0.80) was used to determine the internal reliability of the questionnaire.

### *Ethical Considerations*

The study was conducted in accordance with the Helsinki Declaration and ethical approval was obtained from the ethics committee of Qazvin university medical sciences (IR. QUMS.REC.1395.105). Written informed consent was obtained from each participant before the interview.

### Data Analysis

Data analyses were conducted using the SPSS statistical software version 20 (IBM, Armonk, NY, USA). Descriptive statistics were used to report the characteristics of the respondents and rehabilitation needs. Continuous variables were presented as mean and (SD), whereas categorical data were reported as absolute (n) and frequencies (%). The associations between vision-related quality of life, demographic characteristics of respondents, and rehabilitation needs were examined using Pearson and Spearman correlations. Independent T and ANOVA tests were used to compare rehabilitation needs based on the socio-demographic characteristics. The data were distributed normally because the skewness and kurtosis values were in acceptable range for all variables.

### Results

The mean age of the respondents was 73.16 (SD = 8.16) ranging from 60 to 92 years. More than half (59.6%) were female and married (59.6%). The majority of participants were illiterate (41.5%) or had primary education (36.2%). Approximately half were retired (46.8%) and just 8.5% had a job. The prevalence of rehabilitation needs ranged from 29.8% (telling time with a watch or clock) to 94.7% (driving). As depicted in table 1, the first and second most rehabilitation needs of visually impaired people had trouble with reading (76.4%) and doing the activities of daily living (67.0%). Approximately, half of them had trouble with signing their name on a document (55.3%), making a phone call without assistance (46.8%), managing the personal affairs (55.3%), recognizing people (46.8%), and independent travel at home or in the community (54.3%). (Table 1)

**Table 1. Prevalence of rehabilitation needs among visual impaired elderly patients (n = 94)**

Rehabilitation needs	N	%
Reading (n= 55)	42	76.4
Signing	52	55.3
Making a phone call	44	46.8
Telling time with a watch or clock	28	29.8
Managing the personal affairs	52	55.3
Recognizing people	44	46.8
Activities of daily living	63	67.0
Driving (n= 20)	9	45.0
Independent traveling at home or in the community	51	54.3

Table 2 shows scores in each NEI VFQ-25 subscales and the composite score. The mean of overall NEI VFQ-25 score was 53.24. The highest mean scores were related to driving (10.71) and near vision (7.76) subscales. The participants received the lowest scores for daily activities, cognitive, general health, and independence.

Sixty-nine percent of the respondents had moderate rehabilitation needs, 17% had low rehabilitation needs and 14% had high rehabilitation needs. The results also showed significant associations between rehabilitation needs and gender, employment status, and marital status. As, women, unmarried, and housewives compared to other groups reported more rehabilitation needs. (Table 3)

Total quality of life was related to age ( $p < 0.05$ ) and marital status ( $p < 0.001$ ) (Table 4). The quality of life reduced by advancing age and among unmarried elderly compared to their younger and married counterparts. Pearson correlation revealed a significant and negative association between the quality of life and rehabilitation needs ( $p < 0.001$ ), meaning the total quality of life is poorer as rehabilitation needs increases.

**Table 2. Mean score of NEI VFQ-25 questionnaire and its each subscales (n=94)**

Variable	Mean	SD	Minimum	Maximum	Range
General health	3.37	1.24	1	6	5
Eye pain	5.37	1.68	2	8	6
Near vision	7.76	2.86	3	12	9
Distance vision	5.64	1.81	3	9	6
Social activities	5.62	2.12	2	10	8
Cognitive	3.09	2.15	0	9	9
Daily activities	1.67	1.39	0	4	4
Independency	4.09	2.82	0	9	9
Driving (n= 20)	10.71	2.80	3	13	10
Visual quality	5.94	1.26	2	8	6
Total	53.24	10.84	32	79	47

Note: SD = Standard Deviation

**Table 3. The rehabilitation needs based on patients' socio-demographic characteristics**

Variable	Low N (%)	Moderate N (%)	High N (%)	p
<b>Age group</b>				
60-69	8 (8.51)	24 (25.53)	1 (1.06)	0.17
70-79	4 (4.25)	26 (27.66)	7 (7.45)	
80+	4(4.25)	15 (15.96)	5 (5.32)	
<b>Gender</b>				
Male	9 (9.57)	28 (29.79)	1 (1.06)	0.02
Female	7 (7.45)	37 (39.36)	12 (12.77)	
<b>Marital status</b>				
Unmarried	4 (4.25)	22 (23.40)	12 (12.77)	0.00
Married	489 (38.2)	279 (21.8)	1 (1.06)	
<b>Education level</b>				
Illiterate	4 (4.25)	29 (30.85)	6 (6.38)	0.58
Primary and secondary education	8 (8.51)	28 (29.79)	5 (5.32)	
Diploma and above	4 (4.25)	8 (8.51)	2 (2.13)	
<b>Employment status</b>				
Employed	3 (3.19)	5 (5.32)	0 (0.00)	0.02
Retired	8 (8.51)	34 (36.17)	2 (2.13)	
Housewife	5 (5.32)	26 (27.66)	11 (11.70)	
<b>Total</b>	16 (17.00)	65 (69.10)	13 (13.80)	

**Table 4. The relationship between demographic characteristics and rehabilitation needs with quality of life among visual impaired people**

Demographic characteristics	Quality of life	
	r	p
<b>Age</b>	-0.22	0.03
<b>Gender</b>	-0.15	0.16
<b>Marital status</b>	-0.32	0.00
<b>Education level</b>	-0.06	0.55
<b>Job</b>	-0.14	0.18
<b>Financial status</b>	-0.01	0.92
<b>Rehabilitation needs</b>	-0.63	0.00

## Discussion

Visual impairment is an important global health issue (23), which has a serious impact on the personal, economic, and social life of an individual (24, 25). The present study provided insight into rehabilitation needs and their relationship with quality of life among elderly people with visual impairment. The findings showed that reading difficulty was by far the most common rehabilitation need, characterized in the complaint statement of 3/4 of literate elderly patients. The literature also describes a strong association between visual acuity and reading ability (26 - 28). Indeed, the term reading covers a wide range of activities including reading a book, magazine, or computer versus spot reading of medicine bottles, bills, or food labels. The overwhelming prevalence of reading-related concern of literate older patients

in this study supports the idea that improving reading ability should be the main objective of low vision rehabilitation services. In this line, results of Margrain's study (29) showed that aids such as magnifiers, reading glasses, reading telescopes and video magnifiers are effective visual rehabilitation services for helping elderly patients with impaired vision to read.

The majority of the visual impaired elderly people reported a need for performing daily activities. Likewise, Qiu, Wang (30) reported that severe visual field defects were 2 to 3 times as probably to have difficulty with activities of daily living, instrumental activities of daily living, leisure and social activities. Visual impairment often leads to functional disabilities and affects people's ability to perform tasks necessary for physical self-care (31), especially for older adults (32). So, vision loss has been ranked third (after arthritis and heart disease) among the most common chronic disorders that impair the ability to perform daily activities among elderly people aged 70 years or over (5). However, Deremeik, Broman (33) did not find daily activities performance as a rehabilitation need of institutionalized elderly with visual impairment. This discrepancy may be related to the different source of the sample. Institutionalized elderly with low vision ignore this issue, as they are highly dependent on the help of the staff.

It was surprising that less than half of older driver's complaint of driving difficulty. However, most of them self-restricted their driving practices. As visual acuity decline, cessation of driving occurred, and adjusting to becoming a non-driver might reduce the importance of driving as a concern. As a result of modifications in driving behavior, many patients may feel that their driving activities are manageable and then not a concern that needs to be addressed.

Regarding the quality of life, many of the questionnaires used in the previous studies were very time consuming, and so their application would place a significant burden on visually impaired patients (34). However, we applied the vision-specific questionnaires that took 5 to 10 minutes to complete and would, therefore, appear not to put too much strain on older people with low vision. According to the results, age was associated with quality of life in such a way that the higher the age, the poorer quality of life. This finding is consistent with the results of some previous studies (35, 36). For example, Gyawali, Paudel, & Adhikari (2012) showed that quality of life tends to decline with age among Nepalese patients with low vision and with a mean age of  $47.68 \pm 24.51$  (35). The association between age and quality of life may be explained by the importance placed on a reduction in visual acuity by advancing age.

The results of this study showed that married elderly patients answered with higher scores on quality of life questionnaire than subjects of other studies. Likewise, Khorrami-Nejad, Sarabandi (37) observed that marital status was one of the related factors for poor quality of life among 121 low vision patients from Sistan and Baluchistan province, Iran. However, Habibi Sula et al. (38) could not show this relationship among 410 of elderly people from the west of Tehran, Iran. This discrepancy may be related to the source of the sample and the instruments used for measuring the quality of life.

Our findings showed a negative and significant relationship between the quality of life and visual rehabilitation needs among elderly people with visual impairment. This result supports the findings of previous studies that showed the efficacy of using visual rehabilitation services on the quality of life among patients with visual impairment (18). As, Sarabandi et al. (39) showed that using rehabilitation services by 121 blind or visual impairment patients improved different components of quality of life significantly. Kuyk et al. (40) also observed significant improvement in quality of life after 6 months using rehabilitation services among elderly people with visual impairment. Increasing in rehabilitation needs can reduce the quality of life of elderly patients through activity restrictions, reduced social networks and increasing mental and psychological stress. Activity restrictions play an important role in explanation for reductions in quality of life among people with visual impairments (41). Furthermore, many visually impaired older adults reduce their social networks due to their limited capacity to participate in social activities that impact on their quality of life (15). So, to increase remaining vision acuity, low-vision rehabilitation service is considered as one of the important factors in assisting patients to regain their independence level, taking care of personal needs, and social activities engagement. However, only 10% of visually impaired people in low-income countries use these services (42). So, meeting the rehabilitation needs of visual impaired elderly patients is still a major challenge for developing countries (5).

## Conclusions

The findings of this study provide the need for visual rehabilitation needs and demographic characteristics on the quality of life among elderly patients with visual impairment. In order to increase individual autonomy and the quality of life, it is important to use visual rehabilitation services for older patients and make them have a good quality of life.

## Study limitations

One limitation of the present study was the adoption of a convenience sampling procedure, which may make it difficult to generalize the research findings. Another limitation of the study was self-report questionnaires that the accuracy of responses is relying on the honesty of the participants.

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## Conflict of interests

There are no conflicts of interest.

## Authors' contribution

Conception and design: Zohreh Tavasoli Tazkere, Fatemeh Mohammadi, Hamid Merat

Collection and assembly of data: Zohreh Tavasoli Tazkere

Analysis and interstation of the data: Seyede Ameneh Motalebi

Drafting of the article: Fatemeh Mohammadi, Seyede Ameneh Motalebi, Jamileh Amirzadeh Iranagh, Zohreh Tavasoli Tazkere

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## References

1. Sonneg A, Faul JD, Ofstedal MB, Langa KM, Phillips JW, Weir DR. Cohort profile: the health and retirement study (HRS). *International Journal of Epidemiology*. 2014; 43(2): 576-85.
2. Roudi F, Azadi P, Mesgaran M. Iran's population dynamics and demographic window of opportunity. Working Paper 4, Stanford Iran 2040 Project, Stanford University; 2017.
3. Laliberte Rudman D, Egan MY, McGrath CE, Kessler D, Gardner P, King J, et al. Low vision rehabilitation, age-related vision loss, and risk: a critical interpretive synthesis. *The Gerontologist*. 2016; 56(3): 32-45.

4. Ribeiro MV, HN Júnior H-R, Ribeiro EA, Jucá MJ, Barbosa FT, Sousa-Rodrigues CF. Association between visual impairment and depression in the elderly: a systematic review. *Arquivos Brasileiros De Oftalmologia*. 2015; 78(3): 197-201.
5. Wang C-W, Chan CL, Chi I. Overview of quality of life research in older people with visual impairment. *Advances in Aging Research*. 2014; 3(2): 79-94.
6. Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, Pokharel GP, et al. Global data on visual impairment in the year 2002. *Bulletin of the World Health Organization*. 2004; 82(11): 844-51.
7. Ackland P, Resnikoff S, Bourne R. World blindness and visual impairment: despite many successes, the problem is growing. *Community Eye Health Journal*. 2017; 30(100): 71-3.
8. Hashemi H, Khabazkhoob M, Saatchi M, Ostadimoghaddam H, Yekta A. Visual impairment and blindness in a population-based study of Mashhad, Iran. *Journal of Current Ophthalmology*. 2017; 30(2): 161-68.
9. Olcayüstü OO, Kivanc SA, Altun A, Cinici E, Altinkaynak H, Ceylan E. Causes of disability, low vision and blindness in old age. *Türkisch Journal of Geriatrics*. 2014; 17(1): 44-9.
10. Brundle C, Waterman HA, Ballinger C, Olleveant N, Skelton DA, Stanford P, et al. The causes of falls: views of older people with visual impairment. *Health Expectations*. 2015; 18(6): 2021-31.
11. Pérès K, Matharan F, Daien V, Nael V, Edjolo A, Bourdel-Marchasson I, et al. Visual loss and subsequent activity limitations in the elderly: the French Three-City cohort. *American Journal of Public Health*. 2017; 107(4): 564-9.
12. Evans JR, Smeeth L, Fletcher AE. Risk of admission to a nursing home among older people with visual impairment in Great Britain. *Archives of Ophthalmology*. 2008; 126(10): 1428-33.
13. Talarska D, Kropińska S, Strugała M, Szwczyczak M, Tobis S, Wiczorowska-Tobis K. The most common factors hindering the independent functioning of the elderly at home by age and sex. *European Review for Medical and Pharmacological Sciences*. 2017; 21(4): 775-85.
14. Ong SY, Cheung CY, Li X, Lamoureux EL, Ikram MK, Ding J, et al. Visual impairment, age-related eye diseases, and cognitive function: the Singapore Malay eye study. *Archives of Ophthalmology*. 2012; 130(7): 895-900.
15. Wang C-W, Chan CL, Ho AH, Xiong Z. Social networks and health-related quality of life among Chinese older adults with vision impairment. *Journal of Aging and Health*. 2008; 20(7): 804-23.
16. Goldstein JE, Jackson ML, Fox SM, Deremeik JT, Massof RW. Clinically meaningful rehabilitation outcomes of low vision patients served by outpatient clinical centers. *JAMA Ophthalmology*. 2015; 133(7): 762-9.
17. Silva MRd, Nobre MIRdS, Carvalho KMd, Montilha RdCI. Visual impairment, rehabilitation and International Classification of Functioning, Disability and Health. *Revista Brasileira de Oftalmologia*. 2014; 73(5): 291-301.
18. Feridooni F, Ghassemi Broumand M, Tabatabaee SM. The rate of satisfaction of low vision aids and quality of life in low visions referring to the Red-crescent's low vision center of Tehran since 21 June 2011 till 21 June 2012. *The Scientific Journal of Rehabilitation Medicine*. 2013; 2(1): 15-22. [Persian]
19. Lamoureux EL, Pallant JF, Pesudovs K, Rees G, Hassell JB, Keeffe JE. The effectiveness of low-vision rehabilitation on participation in daily living and quality of life. *Investigative Ophthalmology & Visual Science*. 2007; 48(4): 1476-82.
20. Sahlin KB, Lexell J. Impact of organized sports on activity, participation, and quality of life in people with neurologic disabilities. *The Journal of Injury, Function, and Rehabilitation*. 2015; 7(10): 1081-8.
21. Stelmack JA, Stelmack TR, Massof RW. Measuring low-vision rehabilitation outcomes with the NEI VFQ-25. *Investigative Ophthalmology & Visual Science*. 2002; 43(9): 2859-68.
22. Mohammadiannia M, Foroughan M, Rassafiani M, hosseinzadeh S. Visual functioning and its relations with quality of life in the older people using governmental outpatient clinics services in the city of Boushehr. *Salmand Iranian Journal of Ageing*. 2013; 7(4): 16-26. [Persian]
23. Bhadada SV, Bhadada VJ, Goyal RK. Preventive effect of Tephrosia purpurea on selenite-induced experimental cataract. *Current Eye Research*. 2016; 41(2): 222-31.
24. Rafaely L, Carmel S, Bachner YG. Subjective well-being of visually impaired older adults living in the community. *Aging & Mental Health*. 2018; 22(9): 1223-31.
25. Dev MK, Paudel N, Joshi ND, Shah DN, Subba S. Impact of visual impairment on vision-specific quality of life among older adults living in nursing home. *Current Eye Research*. 2014; 39(3):232-8.
26. Lança CC, Serra H, Prista J. Reading performance in children with visual function anomalies. *International Journal of Ophthalmology and Clinical Research*. 2014; 1: 1-5.
27. Nguyen AM, van Landingham SW, Massof RW, Rubin GS, Ramulu PY. Reading ability and reading engagement in older adults with glaucoma. *Investigative Ophthalmology & Visual Science*. 2014; 55(8): 5284-90.
28. Edwin HA. Visual impairment in the elderly and what care givers need to know: A literature review [Degree thesis]. Finland: The Federation of Swedish Speaking Visually Impaired in Finland; 2014.
29. Margrain TH. Helping blind and partially sighted people to read: the effectiveness of low vision aids. *British Journal of Ophthalmology*. 2000; 84(8): 919-21.
30. Qiu M, Wang SY, Singh K, Lin SC. Association between visual field defects and quality of life in the United States. *Ophthalmology*. 2014; 121(3): 733-40.
31. Ekici F, Loh R, Waisbourd M, Sun Y, Martinez P, Nayak N, et al. Relationships between measures of the ability to perform vision-related activities, vision-related quality of life, and clinical findings in patients with glaucoma. *JAMA Ophthalmology*. 2015; 133(12): 1377-85.
32. Daien V, Peres K, Villain M, Colvez A, Carriere I, Delcourt C. Visual acuity thresholds associated with activity limitations in the elderly. *The Pathologies*

- Oculaires Liées à l'Age study. *Acta Ophthalmologica*. 2014; 92(7): 500-6.
33. Deremeik J, Broman AT, Friedman D, West SK, Massof R, Park W, et al. Low vision rehabilitation in a nursing home population: the SEEING study. *Journal of Visual Impairment & Blindness*. 2007; 101(11): 701-14.
34. Wolffsohn JS, Cochrane AL. Design of the low vision quality-of-life questionnaire (LVQOL) and measuring the outcome of low-vision rehabilitation. *American Journal of Ophthalmology*. 2000; 130(6): 793-802.
35. Gyawali R, Paudel N, Adhikari P. Quality of life in Nepalese patients with low vision and the impact of low vision services. *Journal of Optometry*. 2012; 5(4): 188-95.
36. Nutheti R, Shamanna BR, Nirmalan PK, Keeffe JE, Krishnaiah S, Rao GN, et al. Impact of impaired vision and eye disease on quality of life in Andhra Pradesh. *Investigative ophthalmology & Visual Science*. 2006; 47(11): 4742-8.
37. Khorrami-Nejad M, Sarabandi A, Akbari MR, Askarizadeh F. The impact of visual impairment on quality of life. *Medical Hypothesis, Discovery & Innovation in Ophthalmology*. 2016; 5(3): 96-103.
38. Habibi A, Nikpour S, Seiedoshohadaei M, Haghani H. Quality of life and status of physical functioning among elderly people in West region of Tehran: A cross-sectional survey. *Iran Journal of Nursing*. 2008; 21(53): 29-39. [Persian]
39. Sarabandi A, Mobaraki H, Kamali M, Chabok A, Soltani S. The effect of rehabilitation services on quality of life for the blind. *Journal of Modern Rehabilitation*. 2013; 7(4): 48-56. [Persian]
40. Kuyk T, Liu L, Elliott JL, Grubbs HE, Owsley C, McGwin G, et al. Health-related quality of life following blind rehabilitation. *Quality of Life Research*. 2008; 17(4): 497-507.
41. Kamelska AM, Mazurek K. The assessment of the quality of life in visually impaired people with different level of physical activity. *Physical Culture and Sport Studies and Research*. 2015; 67(1): 31-41.
42. Vela C, Samson E, Zunzunegui MV, Haddad S, Aubin M-J, Freeman EE. Eye care utilization by older adults in low, middle, and high income countries. *BMC Ophthalmology*. 2012; 12(5): 1-7.