Saudi Journal of Nursing and Health Care
*Abbreviated key title: Saudi J. Nurs. Health. Care.*
*A Publication by "Scholars Middle East Publishers", Dubai, United Arab Emirates*
**ISSN: 2616-6186 (E)**
**ISSN: 2616-7921 (P)**

# Educational Program To Improve Quality Of Life in Elderly patients with Visual Impairment

**Eman Shokry Abd–Allah[1], Shimaa Badie Mahmoued Gad Zahra[2] , Amany Rashad Abo El-Seoud[3]**
[1]Professor of Community Health Nursing and Gerontological Nursing in Faculty of Nursing at Zagazig University
[2]Clinical instractor of Gerontological Nursing in Faculty of Nursing at Zagazig University
[3]Professor of Community Medicine in Faculty of Medicine at Zagazig University.

**Original Research Article**

***Corresponding author**
*Eman Shokry Abd–Allah*

*Email:*
emanshokry2012@yahoo.com

**Article History**
*Received: 04.02.2018*
*Accepted: 28.02.2018*
*Published: 10.03.2018*

**Abstract:** Background: Visual impairment can have a significant effect on an individual's functioning and their interaction with their physical and social environments and it is associated with disability and poor quality of life. The aim of this study was to evaluate the effect of an educational program to improve the quality of life (QoL) in elderly patients with visual impairment. Design: A quasi-experimental pre test-and-post test design was utilized. Setting: The study was conducted at the ophthalmology outpatient clinics and ophthalmology department at Zagazig University Hospitals. Sample: Aconsecutive sampling technique of 70 elderly with visual impairment who fulfilled the study inclusion criteria. Tools:Two tools were used to collect the study data: I) A structured interview questionnaire consisted of five parts. II) Low Vision Quality Of Life (LVQOL) , The study was conducted through assessment, planning, implementation, and evaluation phases. Results: The study results revealed that the duration of visual problems ranged between 1.0 and 26.0 years, mostly bilateral (64.3%), and had negative impacts on their life (92.9%). Elderly had deficient related knowledge, with low Quality of Life (QoL) and high dependency in DLAs. The educational program was effective in improving their knowledge, QoL and independence in DLAs . Conclusion: The findings emphasize the importance of well-designed patient education programs. Recommendation: Further research is suggested to explore the effectiveness of multiple-approach nursing interventions in improving the QoL of elderly with visual problems.
**Keywords:** Educational programme, Visual impairment, Quality of life, Elderly Patients

**Introduction:**

Eyes are important organs of body and it is also known as "The Windows of the Soul". They are important to perform daily function. Eye contacts also to express emotion and feeling. Therefore vision is precious and should be protected from damage caused by various eye diseases. There are multiple causes of decreased vision or blindness in elderly. The common eye diseases among elderly are cataracts, age-related macular degeneration (ARMD), glaucoma and diabetic retinopathy. Some of the eye diseases can be diagnosed early and treated and further visual loss can be prevented. It is therefore important to increase awareness of elderly on their eye conditions and to seek medical advice early in order to avoid irreversible visual loss [1].

Vision impairment and age-related eye diseases affect economic and educational opportunities, reduce quality of life, and increase the risk of death. The World Health Organization estimated that vision loss caused 3.9% of the total global burden of disease measured as disability-adjusted life years in 2004. A further update estimated that 39 million people were blind and 285 million were visually impaired in 2010 [2]**.** The prevalence of low vision increases from 1% at age 65 to 4% at age 79, and increases dramatically to 17% after age 80. In addition, the prevalence of low vision is increasing, and depression is becoming a common issue for individuals with low vision [3].

The major causes of vision impairment include age-related macular degeneration (AMD), cataracts, diabetic retinopathy (DR), and glaucoma. About 90% of people who are visually impaired live in the developing world. Age-related macular degeneration, glaucoma, and diabetic retinopathy are the leading causes of blindness in the developed world [4]. Quality of life (QoL) can be understood as "the degree to which a person enjoys the important possibilities of

life". It is multidimensional and depends on: (a) the individual's external factors (i.e. social, cultural, economic and political ones); (b) health condition and health related to quality of life (i.e. symptoms, functional state and components of health perception); and (c) the individual's internal factors (i.e. biological, lifestyle, health behavior, personality and values). Most eye diseases end up in serious physical, social and psychological consequences that affect the patients' quality of life [5].

Community health education is important on prevention of eye diseases. It is unlikely that patients with limited knowledge on the symptoms of eye diseases will seek medical advice at early stage of the diseases. Health education is needed to increase public awareness of eye diseases in order to avoid unnecessary blindness. However, elderly generally have lower health literacy than younger adults. Health literacy is important in success of health education which determines the ability of individual to receive and understand healthcare information to make decisions on health. The low health literacy in elderly should be considered in delivery of health messages to elderly. Therefore younger family members of elderly are encouraged to join health education program with elderly [6].

Visual rehabilitation services are important for people with irreversible visual loss. The aim of services is to improve productivity, independence, function of daily living and quality of life of visual impaired people. A comprehensive visual rehabilitation services include physical assessments, psychological counseling, skill training and supports for daily living so that patients can cope with visual impairment, return to workforce and take care of him/herself [7].

**Significance of the study:**

The burden of eye diseases in elderly is increasing due to aging population and it becomes a public health issue. The most common eye diseases causing visual impairment in elderly are cataracts, age-related macular degeneration (ARMD), glaucoma and diabetic retinopathy. The physical and mental health of elderly is affected by visual impairment. In Egypt ,the prevalence of low vision is 47.9% of the population aged 65 years .the major causes for blindness are cataract (54.8%), corneal opacity other than trachoma (18.8%), refractive error (7%), and glaucoma (4.6%) [8]. Financial burden of eye diseases is heavy. Public education and rehabilitation services are needed. Screening of eye diseases can detect diseases at early stage and periodic eye examination in elderly is recommended by clinical authorities [1] **.** This study will help determine the need to improve the quality of life (QoL) in patients with visual impairment. The expected results will serve to set a strategy to raise public awareness about the health needs of the elderly.

**Aim of the study:**

The aim of the current study was to evaluate the effect of an educational program to improve the quality of life (QoL) in elderly patients with visual impairment.

**Research hypothesis:**

After implementation of the educational program, the quality of life in elderly patients with visual impairment will be improved.

**Subjects and Methods:**

**Research design**:

A quasi-experimental design with pre-post assessment design was adopted in this study to achieve the stated aim.

**Study setting:**

The current study was carried out at the ophthalmology outpatient clinics and ophthalmology department at Zagazig University Hospitals.

**Study subjects:**

Apurposive sample composed of 70 elderly were recruited for this study according to the following **inclusion criteria:**

1. Age: 60years and older.
2. Both sexes (male & female).
3. Diagnosed with visual impairment.
4. Mentally oriented older persons.
5. Free from communication problems (speech and hearing problems).
6. Attending the outpatient clinics (the study setting) regularly.
7. Agree to participate in the study.

**Tools of data collection***:*

Two tools were used for data collection,

**Tool I- A structured interview questionnaire** was developed by the researcher. **It consisted of five parts:**

**Part1:**socio-demographic characteristics of the elderly.

**Scoring system:**

The scoring system was calculated as follow: score less than 50% was considered as low social class. score from 50% to less than 75% was be considered as a middle social class. And score more than 75% was be considered as a high social class.

**Part 2:** Medical history of the elderly.

**Part 3:** History of the visual problem**.**

**Part 4:** assessment of the effects of the visual impairment on the Daily Life Activities (DLAs).

**Scoring system:**

The scale has 8 items on a 3-point Likert scale: "independent/partially dependent/totally dependent." These were scored from "2" to "0" respectively. The sum of the scores of the eight items was converted into a percent score. An elderly with a total percent score of 60% or higher was considered independent.

**Part 5:** assessment of the knowledge of the elderly.

**Scoring system:**

Each correct answer was scored 1 and the incorrect zero. For each area of knowledge and for the total knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. Knowledge was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%.

**Tool II- Low Vision Quality of Life (LVQOL) developed by Wolffsohn and Cochrane (2000)** [9]

It was translated into Arabic using the translate-back-translate process to ensure its validity as recommended by Behling and Law (2000) [10] .The scale consists of 25 questions to assess four areas of QoL as follows.

- Mobility, distance vision and lighting: 12 items such as the ability to read signs in the street, to watch TV clearly, to cross the street, etc.
- Feelings and adjustment: 4 items such as feeling unhappy due to visual problem, feeling restrictions in social activities, etc.
- Fine tasks: 5 items such as ability to read newspapers, to read labels on medications, etc.
- Daily Life Activities (DLAs): 4 items such as problems with leisure time, with home chores, etc

**Scoring System:**

The respondent was asked about how much his/her visual impairment affects negatively each item. The response was on a 6-point scale ranging from "No effect" to "unable to perform," in addition to a "Not Applicable" response. These were scored from "6" to "1" respectively so that a higher score indicates better QOL. The "Not Applicable" items were not scored and were discounted from the total maximal grade. For each domain of QOL, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. Then, for each domain and for the total scale, the QoL was considered high if the percent score was 60% or higher and low if less.

**The preparatory phase:**

For full understanding of the research problem and the technique used, the researcher took enough time to review the related literature and theoretical knowledge of various aspects of the study using books, articles, internet periodicals and magazines to develop tools for data collection.

**Content validity:**

The tools were checked before the pilot study through the distribution of it's to five experts in the field of study with the covering letters and explanation sheet that explains the study, purpose and other related information to ensure appropriateness , relevancy, clarity and completeness of the tools.

**Pilot study:**

The pilot study was carried out on 7 elderly to test the clarity and applicability of the study tools as well as estimation

of the time needed to fill the questionnaire. Those who shared in in the pilot study were excluded from the study.

**Field work:**

The fieldwork was carried out within the period of 9 months, starting from the beginning of January 2016 to the end of September 2016. This included the phases of assessment, planning, implementation, and evaluation of the program.

**Assessment phase:** This phase involved the pre-program data collection for baseline assessment. The researcher introduced herself and explained the purpose of the study briefly to the studied elderly seeking their agreement in the study. The researcher read and explained each item of the study scales to the elderly and then recorded his/her response to each item. The time consumed for filling the study tools ranged from 30 to 45 minutes. The data were preliminary analyzed to provide the basis for building-up the program according to identified needs.

**Planning phase:** Based on the results obtained from the data analysis of the assessment phase, and in view of the pertinent literature about visual impairment ,the researcher developed the program and sessions contents according to the elderly needs and the study objectives. Identified needs, requirements and deficiencies were translated into aim and objectives of program and set in the form of a booklet.

**Implementation phase:** The program was implemented in the study setting in the form of seven sessions for small groups. This was intended to give more chance for discussions, interactions, and practical training. The total sample was divided into small groups (4 to 6 elderly in each group). All groups received the same content using the same teaching methods, media, discussions, and the same booklet. The researcher allocated two days per week for implementation of the program from 9 am to 1 pm.

The duration of each session was variable according to elderly's responses and active participation, as well as the time available, and the content of each session. To ensure that the studied elderly understand the content, each session was started by a summary of what was given through the previous session and the objectives of the new one, taking into consideration the use of simple language to suit the level of understanding of the elderly. Motivation and reinforcement techniques as praise and recognition during the session were used to enhance active participation and foster learning. The sessions were aided by using pictures, posters, as well as the booklet.

The researcher utilized various approaches of learning in carrying out the program. These included interactive lectures with group discussions and brain storming to exchange ideas between the elderly participants and the researcher. Various teaching media were used including power-point presentations, posters, and pictures. The researcher also prepared an illustrated booklet and distributed it to all of the participants to enhance the process of learning.

**Evaluation phase:** The evaluation of the effectiveness of educational program (posttest) was done immediately after completion the program by using the same pretest tools to evaluate the degree of improvement in elderly's knowledge, DLAs, and QoL. A follow-up testing was done after three months through to assess the retention of the gained improvements.

**Administrative and ethical considerations:**

Firstly, the study protocol was approved by the pertinent committee (Research Ethics Committee) at Faculty of Nursing, Zagazig University. Then, at the time of data collection, a verbal informed consent for participation was taken from each of the elderly subjects after full explanation of the aim of the study. Participants were given the opportunity to refuse participation, and they were notified that they could withdraw at any stage of the data collection without giving any reason.

**Statistical analysis:**

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the developed scales through their internal consistency. Quantitative continuous data were compared using the non-parametric Mann-Whitney or Kruskal-Wallis tests. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the scores of knowledge, DLAs, and QoL, multiple linear regression analysis was used and analysis of variance for the full regression models was done. Statistical significance was considered at p-value $<0.05$.

**Results:**

**Table (1)** shows that, The study sample consisted of 70 elderly persons whose age ranged from 60 to 86 years, with median 69.0 years . The sample had slightly more females (60.0%). (60.0%)of the elderly were illiterate. More than half of them had no work either currently (55.7%) or previously (56.4%).

**Table (2)** indicates that (91.4%) of them were having chronic diseases, and(90.0%) were using regular medications. The most commonly reported chronic diseases were hypertension (55.7%) and diabetes (52.9%). The most frequent side effect of medications was the affection of the equilibrium (85.7%).

**Table (3)** indicates the duration of visual problems among the elderly ranged between 1.0 and 26.0 years, with median 5.0 years. It was mostly bilateral (64.3%), and caused by diabetes (60.1%), cataract (40.0%), or glaucoma (24.3%). (45.7%) of the elderly were using eyeglasses, and it was effective in most of them. (41.4%) of the elderly had had eye surgery, and (79.3%) of these improved after surgery .Moreover(65.7%) of the elderly had previous eye injuries mostly due to falling (60.9%).

**Figure 1** demonstrates (92.9%) of the elderly in the study sample reported negative impacts of their visual problems on their life.

**Table (4)** shows very low percentages of satisfactory knowledge about visual problems among the elderly before the program. The only exception was regarding the knowledge of preventive measures, which was known by almost all of them (98.6%). At the post-educational program phase, there were statistically significant improvements in elderly's knowledge ($p<0.001$) in all areas except for the area of preventive measures. The follow-up phase showed some declines in elderly's knowledge, but it still remained significantly higher compared with the pre-program levels.

**Figure 2** illustrates, only 2.9% of the elderly had satisfactory total knowledge about visual problems before the educational program. This increased to 54.3% at the post-program phase, and declined to 9.8% at the follow-up phase. These improvements were statistically significant.

**Table (5)** indicates variations in elderly's independence in the performance of their Daily Life Activities (DLA) before the program. The percentages were high concerning toileting (92.9%) and clothing (70.0%), but very low concerning the home chores, especially cleaning (0.0%). The post-educational phase demonstrated statistically significant improvements in all personal hygiene DLAs, except toileting, and in the home chores of preparing food ($p<0.001$), and laundry ($p=0.003$). At the follow-up phase, the areas of significant improvements continued but with some slight declines in some of them.

**Figure 3** shows that the elderly independence in the performance of their DLAs increased steadily and significantly throughout the program phases, both for personal hygiene and home chores activities. In total, 21.4% of the elderly were independent before the program; this increased to 40.0% at the post-program phase, and 44.3% at the follow-up phase. These improvements were statistically significant.

**Table (6)** illustrates, very low percentages of the elderly had high QoL before the program. This was particularly evident regarding the fine tasks (1.4%). At the post-educational phase, there were statistically significant improvements in elderly's QoL ($p<0.001$) in all areas. The follow-up phase showed some declines in elderly's QoL, but it still remained significantly higher compared with the pre-program levels. The only exceptions were in the areas of feelings and DLA, which had no significant difference from the baseline levels.

**Figure 4** shows only 2.9% of the elderly had high QoL before the educational program . This rose to 38.6% at the post-program phase, with a statistically significant improvement ($p<0.001$). However, the total QoL declined to 9.8% at the follow-up phase, a level not significantly different from the pre-program level.

**Table (7)** illustrates, elderly's scores of knowledge, independence in the performance of the Daily Life Activities (DLAs) and QoL had statistically significant moderate positive correlations. The strongest correlation was between the scores of knowledge and QoL ($r=0.680$).

**Table (8)** shows that elderly's age had statistically significant moderate negative correlations with their scores of knowledge, independence in the performance of the Daily Life Activities (DLAs) and QoL, and the number of eyes affected had weak negative correlations with these scores. Meanwhile, the educational level had weak positive correlations with these scores.

**Table (9)** Concerning the QoL score, Table 21 indicates that the statistically significant independent positive predictors of this score were the program in addition to elderly's educational level, receiving eye medications, and the scores of knowledge and DLA. Conversely, elderly living alone, having chronic disease, and having both eyes affected were negative predictors. The model explains 68% of the variation in the QoL score.

**Table 1: Demographic characteristics of elderly in the study sample (n=70)**

| Demographic characteristics | Frequency | Percent |
|---|---|---|
| Age: | | |
| <70 | 39 | 55.7 |
| 70+ | 31 | 44.3 |
| Range | 60.0-86.0 | |
| Mean±SD | 70.3±6.9 | |
| Median | 69.0 | |
| Gender: | | |
| Male | 28 | 40.0 |
| Female | 42 | 60.0 |
| Education: | | |
| Illiterate | 42 | 60.0 |
| Read/write | 11 | 15.7 |
| Educated | 17 | 24.3 |
| Current job: | | |
| None | 39 | 55.7 |
| Working | 31 | 44.3 |
| Previous job (n=39): | | |
| None | 22 | 56.4 |
| Employee | 3 | 7.7 |
| Worker | 14 | 35.9 |

**Table 2: Medical history of elderly in the study sample (n=70)**

| Health and disease characteristics | Frequency | Percent |
|---|---|---|
| Have chronic disease | 64 | 91.4 |
| Diseases:[@] | | |
| Hypertension | 39 | 55.7 |
| Diabetes | 37 | 52.9 |
| Hepatic | 21 | 30.0 |
| Osteoporosis | 21 | 30.0 |
| Rheumatoid | 13 | 18.6 |
| Gastrointestinal | 11 | 15.7 |
| Osteoarthritis | 9 | 12.9 |
| Cardiac | 8 | 11.4 |
| Renal | 6 | 8.6 |
| Asthma | 4 | 5.7 |
| Cancer | 3 | 4.3 |
| Back problem | 2 | 2.9 |
| Use regular medications | 63 | 90.0 |
| Medications affect:[@] | | |
| Alertness | 21 | 33.3 |
| Equilibrium | 54 | 85.7 |
| Memory | 4 | 6.3 |

*(@) Not mutually exclusive*

**Table 3: Visual problems among elderly in the study sample (n=70)**

| Visual problems | Frequency | Percent |
|---|---|---|
| Duration of visual problem (years): | | |
| <5 | 31 | 44.3 |
| 5+ | 39 | 55.7 |
| Range | 1.0-26.0 | |
| Mean±SD | 6.2±4.9 | |
| Median | 5.0 | |
| Side: | | |
| Unilateral | 25 | 35.7 |
| Bilateral | 45 | 64.3 |
| Cause: | | |
| Diabetes | 42 | 60.1 |
| Cataract | 28 | 40.0 |
| Glaucoma | 17 | 24.3 |
| Injury | 15 | 21.4 |
| Retinal detachment | 11 | 15.8 |
| Retinal hemorrhage | 6 | 8.7 |
| Severe myopia | 2 | 2.9 |
| Wear eyeglasses: | | |
| No | 38 | 54.3 |
| Yes | 32 | 45.7 |
| Eyeglasses are effective (n=32): | | |
| No | 1 | 3.1 |
| Yes right | 15 | 46.9 |
| Yes left | 16 | 50.0 |
| Had eye surgery: | | |
| No | 41 | 58.6 |
| Yes | 29 | 41.4 |
| Improved after surgery (n=29) | 23 | 79.3 |
| Had previous eye injury | 46 | 65.7 |
| Injury type (n=46): | | |
| Fall | 28 | 60.9 |
| Burn | 2 | 4.3 |
| Fracture | 2 | 4.3 |
| Knife | 1 | 2.2 |
| Collision | 1 | 2.2 |
| Multiple causes | 12 | 26.0 |

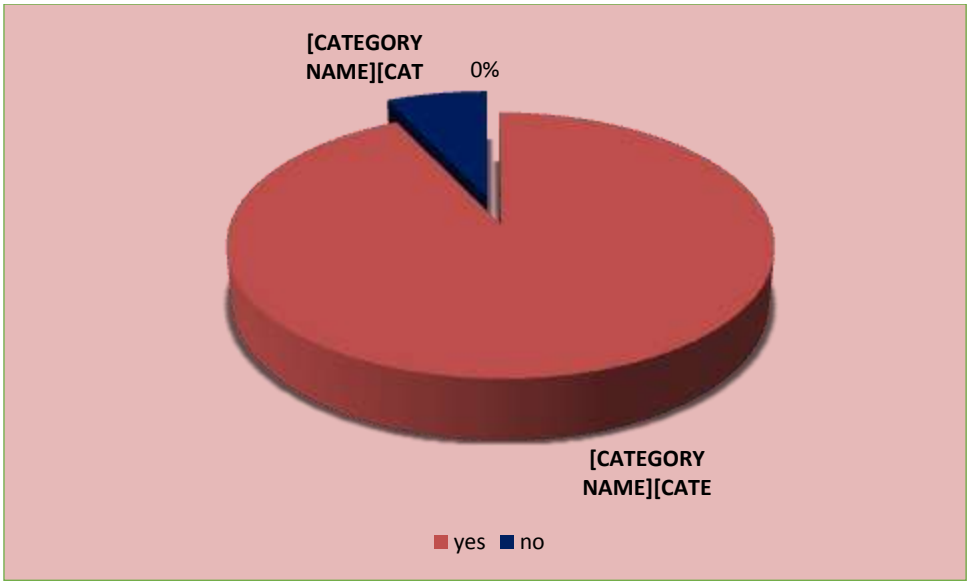


**Figure 1: Negative impact of visual problem as reported by the elderly in the study sample (n=70)**

**Table 4: Knowledge about visual problems of aging among elderly throughout the study phases**

| Satisfactory knowledge (50%+): | Time | | | | | | $X^2$ Test (p-value) Pre-post | $X^2$ Test (p-value) Pre-FU |
|---|---|---|---|---|---|---|---|---|
| | Pre (n=70) | | Post (n=70) | | FU (n=61) | | | |
| | No. | % | No. | % | No. | % | | |
| Aging changes | 6 | 8.6 | 52 | 74.3 | 15 | 24.6 | 62.29 (<0.001*) | 6.21 (0.01*) |
| Cataract | 0 | 0.0 | 22 | 31.4 | 7 | 11.5 | 26.10 (<0.001*) | Fisher (0.004*) |
| Glaucoma | 0 | 0.0 | 11 | 15.7 | 7 | 11.5 | 11.94 (0.001*) | Fisher (0.004*) |
| Retinal problems | 1 | 1.4 | 24 | 34.3 | 12 | 19.7 | 25.76 (<0.001*) | 12.14 (<0.001*) |
| Preventive measures | 69 | 98.6 | 70 | 100.0 | 61 | 100.0 | Fisher (1.00) | Fisher (1.00) |

*(*) Statistically significant at p<0.05*

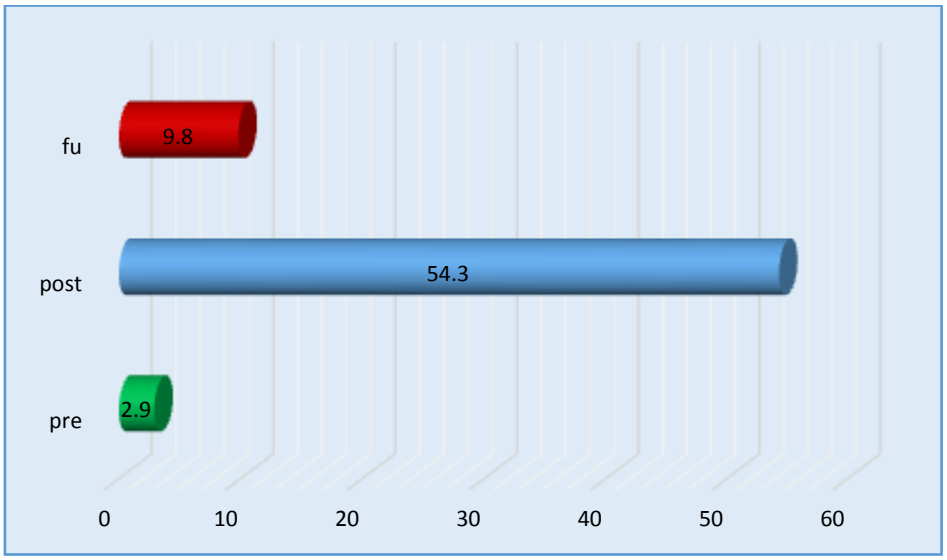


**Fig- 2: Total knowledge about visual problems of aging among elderly throughout the study phases**
*(*) Statistically significant at p<0.05*

**Table 5: Independence in the performance of daily life activities (DLA) among elderly throughout the study phases**

| Daily Life Activities (DLA) | Time (independent) | | | | | | $X^2$ Test (p-value) Pre-post | $X^2$ Test (p-value) Pre-FU |
|---|---|---|---|---|---|---|---|---|
| | Pre (n=70) | | Post (n=70) | | FU (n=61) | | | |
| | No. | % | No. | % | No. | % | | |
| Personal hygiene: | | | | | | | | |
| Bathing | 33 | 47.1 | 50 | 71.4 | 45 | 73.8 | 8.55 (0.003*) | 9.59 (0.002*) |
| Toileting | 65 | 92.9 | 68 | 97.1 | 58 | 95.1 | Fisher (0.44) | Fisher (0.72) |
| Clothing | 49 | 70.0 | 62 | 88.6 | 54 | 88.5 | 7.35 (0.01*) | 6.66 (0.01*) |
| Medication | 46 | 65.7 | 67 | 95.7 | 58 | 95.1 | 20.24 (<0.001*) | 17.18 (<0.001*) |
| Home chores: | | | | | | | | |
| Preparing food | 11 | 15.7 | 32 | 45.7 | 26 | 42.6 | 14.80 (<0.001*) | 11.65 (0.001*) |
| Cleaning | 0 | 0.0 | 3 | 4.3 | 3 | 4.9 | Fisher (0.24) | Fisher (0.10) |
| Laundry | 7 | 10.0 | 21 | 30.0 | 21 | 34.4 | 8.75 (0.003*) | 11.57 (0.001*) |
| Shopping | 5 | 7.1 | 7 | 10.0 | 6 | 9.8 | 0.36 (0.55) | 0.31 (0.58) |

*(*) Statistically significant at p<0.05*

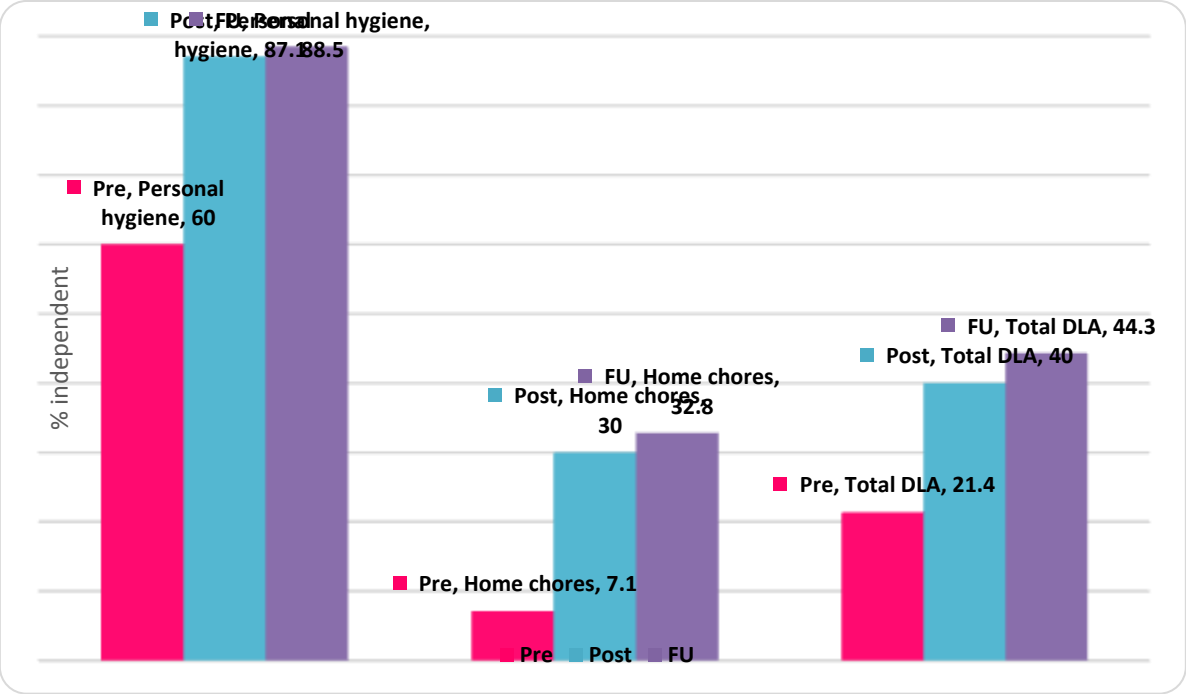


**Fig-3: Total independence in the performance of daily life activities (DLA) among elderly throughout the study phases**

**Table 6: Quality of Life (QoL) among elderly throughout the study phases**

| High (60%+) QoL | Time | | | | | | $X^2$ Test (p-value) Pre-post | $X^2$ Test (p-value) Pre-FU |
|---|---|---|---|---|---|---|---|---|
| | Pre (n=70) | | Post (n=70) | | FU (n=61) | | | |
| | No. | % | No. | % | No. | % | | |
| Mobility | 2 | 5.9 | 27 | 38.6 | 11 | 18.0 | 27.18 (<0.001*) | 8.40 (0.004*) |
| Feelings | 31 | 44.3 | 53 | 75.7 | 19 | 31.1 | 14.40 (<0.001*) | 2.38 (0.12) |
| Fine tasks | 1 | 1.4 | 15 | 21.4 | 11 | 18.0 | 13.83 (<0.001*) | 10.80 (0.001*) |
| DLA | 16 | 22.9 | 38 | 54.3 | 19 | 31.1 | 14.59 (<0.001*) | 0.34 (0.56) |

*(*) Statistically significant at p<0.05*

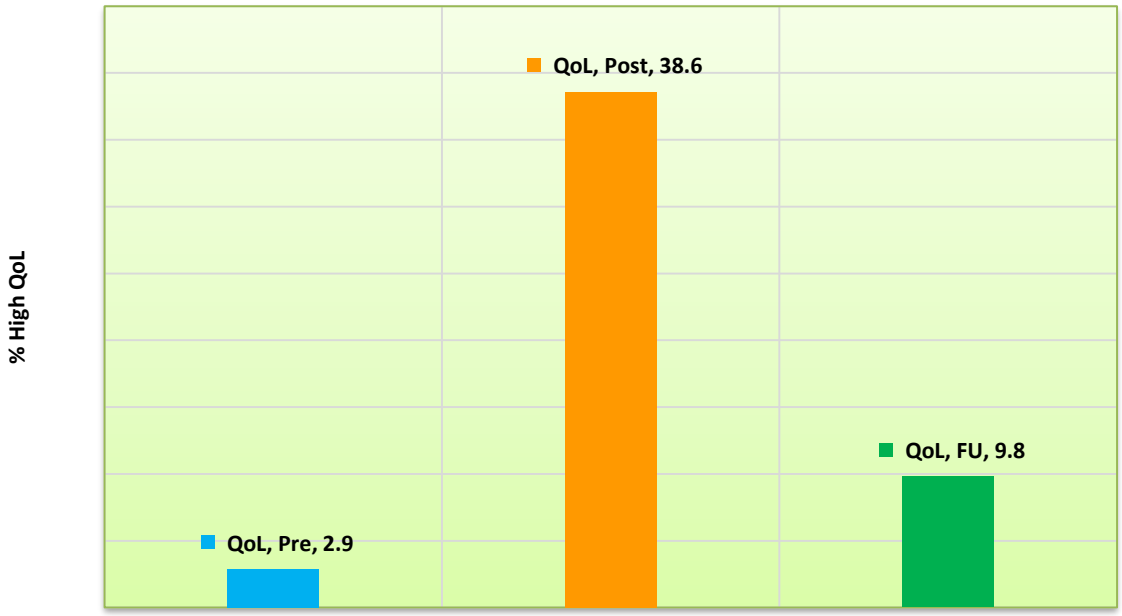


**Fig- 4: Quality of Life (QoL) among elderly throughout the study phases**
*(*) Statistically significant at p<0.05*

**Table 7: Correlation matrix of Daily Life Activities (DLA), knowledge, and Quality of Life (QoL) scores**

| Scores | Spearman's rank correlation coefficient | | |
|---|---|---|---|
| | DLA | Knowledge | QoL |
| DLA | | | |
| Knowledge | .518** | | |
| QoL | .602** | .680** | |

*(**) Statistically significant at p<0.01*

**Table 8: Correlation between Daily Life Activities (DLA), knowledge, and Quality of Life (QoL) scores and elderly characteristics**

| Scores | Spearman's rank correlation coefficient | | |
|---|---|---|---|
| | DLA | Knowledge | QoL |
| Age | -.682** | -.421** | -.432** |
| Educational level | .279** | .293** | .363** |
| Crowding index | -.161* | -.113 | -.116 |
| Income | -.082 | .094 | .129 |
| Socio-economic level | .082 | -.094 | -.129 |
| Duration of visual problem | -.298** | -.090 | -.173* |
| Eyes affected | -.287** | -.140* | -.408** |

*(*) Statistically significant at p<0.05* *(**) Statistically significant at p<0.01*

**Table 9: Best fitting multiple linear regression model for the Quality of Life (QoL) score**

| | Unstandardized Coefficients | | Standardized Coefficients | t-test | p-value | 95% Confidence Interval for B | |
|---|---|---|---|---|---|---|---|
| | B | Std. Error | | | | Lower | Upper |
| Constant | 40.08 | 3.81 | | 10.516 | .000 | 32.56 | 47.60 |
| Intervention | 7.20 | 1.34 | .29 | 5.357 | <0.001 | 4.55 | 9.86 |
| Educational level | 1.81 | .63 | .13 | 2.885 | .004 | .57 | 3.05 |
| Live alone | -3.86 | 1.64 | -.10 | 2.356 | .019 | -7.09 | -.63 |
| Chronic disease | -4.07 | 1.80 | -.10 | 2.257 | .025 | -7.63 | -.51 |
| Both sides | -5.98 | 1.04 | -.24 | 5.725 | <0.001 | -8.04 | -3.92 |
| Take eye medication | 3.12 | 1.12 | .11 | 2.797 | .006 | .92 | 5.33 |
| Knowledge score | .15 | .04 | .22 | 3.590 | <0.001 | .07 | .23 |
| DLA score | .18 | .03 | .33 | 6.540 | <0.001 | .13 | .24 |

r-square=0.68 Model ANOVA: F=53.67, p<0.001

Variables entered and excluded: age, gender, marital status, working, residence, duration of visual problem, socio-economic level

**Discussion:**

The rise in ocular disorders and visual impairment with aging is a universal public health issue, and is likely to increase in the near future (Tawiah and Mba, 2011) [11]. It is associated with disability and poor quality of life (Wang et al, 2016) [12], with negative impacts on individual self-esteem, occupational restrictions, and consequent income losses (World Health Organization ,2014) [13].

Concerning demographic characteristics the mean age of the elderly in the present study was 70.3±6.9 is close to the mean reported reported in the Central Intelligence Agency (CIA) report where the life expectancy was 70.8 years for male and 76.2 years for females (Central Intelligence Agency [CIA], 2014) [14].The finding is in congruence with many similar previous studies such as in Thailand (Hirunwatthanakul, 2013) [15] , Ghana(Ocansey et al., 2013) [16], and Taiwan (Wang et al., 2016). [12]

The elderly persons with impaired vision included in the present study had typical characteristics of rural middle socio-economic level people, with low education and income. This is quite expected given that the illiteracy and low level of education are associated with high health illiteracy, which would increase the risk of visual problems. Such association between illiteracy and visual impairment has been previously reported (Katibeh et al., 2014) [17]. In this respect, Carol et al. (2012) [18]clarified that misconception of eye disease and limiting it to the "eye sight" is an important factor that decreases population desire for eye follow-up and education.

Concerning the health and medical conditions, the results demonstrated that almost all of them were having chronic diseases, mostly hypertension and diabetes. These are typical diseases of aging, which are often associated with visual problems, especially diabetes. In congruence with this foregoing, Netwish et al. (2015) [19] highlighted that diabetes

leads of damage of multiple organ systems through its microand macro-vascular changes.Thus,itsmicroangiopathycauses retinal ischemia and development of neovascularization and the proliferative stage of diabetic retinopathy. Moreover, Diabetic retinopathy has been shown as a leading cause of vision loss in middle-aged and elderly people (Ting et al., 2016) [20]. Meanwhile, as in the current study, studies in Iran (Jones et al., 2010) [21] and in Ghana (Ocansey et al., 2013) [16] found that cataract was a main cause of visual impairment among elderly. Furthermore, and in agreement with the present study findings concerning the high prevalence of chronic diseases among the elderly, a study inHong Kong showed that hypertension and diabetes mellitus were the most commonly reported co-morbidities among the elderly with visual impairment (Fong et al., 2014) [22] . Similar findings were also reported by Alma et al. (2011) [23] in a study in Bangladesh, and Falahaty et al .(2015) [(24)] in Malaysia, where diseases of the circulatory system and diabetes mellitus were the most prevalent chronic conditions among participants suffering from visual problems. Such high prevalence of these diseases is expected in this age group due to the process of aging, and particularly among those having visual problems due to the association between these diseases and the eye ailments as clarified by Wang et al .(2016)[12].

Another possible cause of the visual problem among the elderly in the present study is injury, mostly due to falling. This may constitute the remaining part of the sample complaining of unilateral visual problem. This could be due to their visual problem, which makes them at high risk of falling as reported by Yoo et al. (2016) [25] in South Korea. Moreover, a great majority of these elderly people were on regular medications, mostly affecting their equilibrium, which may predispose them to falling. In agreement with this, a study carried out in Alexandria, Egypt (El-Kady et al., 2011) [26] revealed that the majority of the elderly were on regular medication for chronic diseases. Hence, Melillo et al. (2017) [27] proposed a new method to identify ophthalmic patients at higher risk of falling in the following 12 months, which would be used as a tool for fall risk screening on patients with visual impairment referred to eye clinics.

According to the present study findings, the duration of visual problems among the elderly varied widely, ranging between 1.0 and 26.0 years, with a median five years. This indicates that the problem was longstanding and chronic. This explains the finding that almost all of them stated that it had negative impacts on their life. An even longer duration of visual problems among elderly was found in a study in the United Kingdom (Alma et al., 2011) [23] , where the median of vision loss was 7 years. This higher median could be explained by the higher life expectancy in the United Kingdom compared with Egypt. The long duration of the visual problem in the current study might explain the finding that a great majority of them mentioned that it affected their lives negatively. A similar finding was reported by Katibeh et al. (2014) [17] in a study in Tehran, where only 8.4% of the participants believed that vision loss would have no effect on their daily performance at all.

Almost one-half of the elderly in the current study were using eyeglasses to correct their visual impairment, and most of them mentioned it was effective. Meanwhile, less than a half of them had previous eye surgery to deal with their visual problems, and this improved the condition of most of them. Moreover, almost one-fourth were using eye medications, which is often prescribed after surgery or in cases of glaucoma. Thus, the management of the visual problem is variable with different levels of success. Nonetheless, the role of the healthcare providers, especially at the primary care level, is to help these people cope with uncorrectable vision problems through appropriately timed referrals, promoting behavioral modifications, and allocating low-vision care resources (Marra et al., 2016) [28]. Moreover, elderly patients should be encouraged to undergo eye testing every two years, and health professionals must ensure patients have access to appropriate disease detection and treatment (Green et al., 2014) [29].

One of the objectives of the present study was to improve the knowledge related to visual impairment among the elderly. The findings revealed very deficient knowledge among them before the program. This was noticed in all the tested knowledge areas such as the changes associated with aging, as well as the most common visual problems. The only exception was the part related to the preventive measures, which was known by almost all of them. This could be explained by the very specific instructions provided to them by their ophthalmologists regarding their own condition.

In agreement with this present study finding, a study in Ethiopia by Tenkir et al. (2010) [30 revealed low levels of knowledge about visual disorders among participants, particularly about glaucoma. Similarly, another study in India by Dandona&Dandona(2011) [31] revealed that the awareness of glaucoma was very low. On the same line, a study in Saudi Arabia demonstrated that the patients who have been diagnosed with cataract had poor knowledge and awareness of their disease, particularly among the less educated. The study found poor understanding of the definition, risk factors, signs, symptoms, and treatment of cataract. The authors attributed this poor knowledge to the gap between healthcare providers and patients(Magliyah et al., 2015) [32].

Conversely, a study in Australian and New Zealand revealed high level of awareness about glaucoma and related symptoms (Lartey, 2015) [33]. Moreover, Attebo &Mitchell (2012) [34], in an Australian study reported a very high level

of knowledge of glaucoma. The differences among studies could be related to the level of education of participants, which reflects the variation in health literacy in developing versus developed countries. It is also due to the barriers between the population and healthcare providers, which include health-care system, sociocultural, educational, environmental, financial, geographical, and health status barriers (Marcela &Robert, 2009) [35].

A second objective of the present study was to help the elderly persons suffering from visual impairment to be more independent in the performance of the Daily Life Activities (DLAs). Before the educational program, there were wide variations in elderly's independence. Thus, while the majority did not need help in activities such as toileting and clothing,only a small minority of them was able to undertake home chores, particularly cleaning, independently. This could be partly due to low physical abilities due to advanced age. In confirmation of this, the elderly aged less than 70 years, those having education, working, and practicing regular exercise were significantly more independent in their DLAs. Moreover, the score of independence was negatively correlated to age and positively correlated to the educational level.

A similar variation in elderly's independence in the performance of DLAs was revealed by Falahaty et al. (2015) [24]. Meanwhile, a study in theUnited Kingdom (UK) demonstratedthatthe majority of the elderly were able to perform light household activities and shopping, and were involved in socializing with family members, friends and neighbors (Alma et al., 2011) [23].

However, the high pre-program dependence in the performance of DLAs could be due to their visual impairment. In support of this, the elderly with longer duration of visual problem, having bilateral affection, and a history of previous eye injury were significantly more dependent in their DLAs before the program .Thus, the educational program was aimed at helping them to overcome the problems related to their visual impairment, and to be independent despite this problem. In line with this, Falahaty et al. (2015) [24] reported that the disability in the performance of DLAs increased with decreasing vision.

Moreover, a recent study in France (Pérès et al., 2017) [36] found that the elderly people suffering visual impairment was associated with a high risk of developing limitations in the performance of the activities of daily life. Thus, Campbell et al. (2010) [37] emphasized that the decline in elderly's functional capacity requires an increase in their coping skills to allow them to continue participation in their daily lives. They also need an improved fit with their "less-than-ideal" environment.

At the post-educational program of the current study, there were statistically significant improvements in many of the DLAs, particularly the activities that were low at the pre-intervention phase such as the home chores of preparing food and laundry. The positive effect of the educational program on elderly independence in DLAs was further confirmed by the results of the multivariate analysis, which identified the program as a positive predictor of the score of independence. The finding is in agreement with the educational program study carried out by Kim (2017) [38] in Korea, and demonstrated significant improvements in the elderly's ability to perform the DLAs independently. A similarly successful intervention was also reported in a study in the United States (Draper et al., 2016) [39].

Unlike knowledge, the improvements in elderly scores of independence in DLAs continued with only small declines throughout the follow-up phase of the program. This might be explained by that the improvement in the performance of the DLAs was dependent on the acquisition of certain simple skills to surmount the negative effect of the visual problem. Such skills do not depend on recall or memorization as the knowledge requires. In line with this, a study in the Netherlands (Holstege et al., 2017) [40] reported sustained improvement in the elderly's independence in the performance of DLAs at a one-year follow-up.

The ultimate goal of the present study was to improve the Quality of Life (QoL) of elderly persons having visual impairment. The findings demonstrated generally low levels of QoL among these elderly before the educational program. This was especially noticed in the QoL related to fine tasks and mobility. The findings are expected given the importance of these two functions in daily life. In agreement with this, a study in Nigeria(Adigun et al., 2014) [41] reported poor QoL in the domain of visual function, self-care, and mobility. On the same line, a study in Spain found that almost a half of the participant elderly people had low QoL, and this was significantly associated with sensory impairments such as visual disorders (Machón et al., 2017) [42].

According to the present study findings, the pre-program elderly's QoL was influenced by many of their personal as well as their health and disease characteristics. The personal factors with positive impact were younger age, male gender, higher education, currently working, being married, as well as a lower crowding index. All these factors indicate better socioeconomic and psychological status. Moreover, the effects of age and education were confirmed in

correlation analysis. In agreement with this, a study in Germany reported significant associations between elderly's low QoL and older age, female gender, and low level of education (Mangen et al., 2017) [43].

As regards the health and disease factors influencing the QoL of the elderly in the present study, it was found that a better health status, with no chronic diseases and no intake of regular medications, in addition to practicing regular exercise were positive factors. Moreover, a less severe visual impairment in the form of unilateral affection, no eye surgery or history of previous eye injury were also associated with better QoL. In congruence with this, Matamoros et al. (2015) [(44)], in a study in France demonstrated a significant relationship between the degree of visual impairment and the level of QoL.A similar relationship was also revealed by (Adigun et al., 2014) [41] in a study in Nigeria.

After the implementation of the current study educational program, statistically significant improvements were shown in all areas of elderly's QoL. However, there were some declines at the follow-up phase. This indicates the success of the educational program, and leads to acceptance of the set research hypothesis. In further confirmation, the multivariate analysis identified the educational program as a significant positive predictor of the QoL score. In agreement with this finding, a similar effectiveness of the programpromoting independence in improving the QoL of elderly patients was reported in a recent study in the United Kingdom (Walters et al., 2017[45].

The positive effect of the educational program on elderly'sQoLwas both direct and indirect. The indirect effect was through the mediation of improved knowledge as well as the more independence in DLAs. In support of this, the scores of knowledge, independence in DLAs and QoL were shown to be significantly and positively correlated. Moreover, the scores of knowledge and DLAs were identified as independent positive predictors of the QoL score in multivariate analysis. Thus, the better knowledge and acquired skills in performing DLAs independently lead to better QoL. In congruence with this, in a study in France emphasized the importance of training of elderly with visual impairment in effecting dramatic improvements in their QoL.

**Conclusion:**

Based upon the findings of the present study and answer of hypothesis , it was concluded that the study results add to the evidence that the problem of visual impairment is a serious problem facing elderly persons living in rural community and was common among elderly persons. The results of the study lead to the conclusion that the elderly having visual problems in the study settings have deficient related knowledge, with low Quality of Life (QoL) and high dependency in the Daily Life Activities (DLAs). The applied educational program is effective in improving their knowledge, with consequently higher QoL and low dependency. However, the effect declines with time. Socio-demographic and disease characteristics such as age, education, work, smoking, exercise, as well as the duration and bi-laterality of the visual problem do influence elderly knowledge and QoL. The findings underscore the importance of well-designed patient education programs.

**Recommendations:**

- ✓ The educational program should be implemented on a wider scale in settings providing geriatric care, needs improvement in the knowledge part to give more emphasis on more applicable areas.
- ✓ The developed booklet and similar illustrative pamphlets should be distributed to elderly persons attending health care setting as well as in the community at large.
- ✓ Targeted public health awareness-raising campaigns for eye health should be developed and delivered in partnership with the community.
- ✓ Rehabilitation programs are strongly recommended for the elderly with severe, irreversible visual impairment.
- ✓ Further research is suggested to explore the effectiveness of multiple-approach nursing interventions in improving the QoL of elderly with visual problems.

**References:**

1. Pascolini D., and Mariotti S.P. (2012): Global estimates of visual impairment: Br J Ophthalmol;96:614–8.
2. The Global Burden of Disease, (2014): update. Geneva: World Health Organization; 2008:40e49, 60. Available at: http:// www.who.int/healthinfo/global_burden_disease/GBD_report_ 2004update_full.pdf. Accessed April 9, 2013.
3. American Journal of Occupational Therapy (2013): Occupational Therapy Interventions to Improve Performance of Daily Activities at Home for Older Adults with Low Vision USA: A Systematic Review, pp. 279–287.
4. Bunce C and Wormald R. (2011): "Leading causes of certification for blindness and partial sight in England & Wales". BMC Public Health 6: 58. doi:10.1186/1471-2458-6-58. PMC 1420283. PMID 16524463
5. Cohen-Carneiro F., Souza-Santos R., and Rebelo M. (2011): Quality of life related to oral health: contribution from social factors.Ciênc. saúde coletiva vol.16 supl.1 Rio de Janeiro WHO 2010: Prevention of Blindness and Visual Impairment.

6. World Health Organization [WHO] (2011): A strategy for active, healthy ageing and old age care in the Eastern Mediterranean Region 2006-2015. http://applications. emro.who.int/dsaf/dsa542.pdf. Accessed 2 November 2013
7. Percival J. (2011): Whole system care and social inclusion of people with sight loss: implications of key research for policy and service development, Journal of Integrated Care;19(5): 47-57. 184
8. Hegazy SM., Ragheb MM., Elsayed NO., and Rashed M.A. (2012): Health Needs Management Among Patients Undergoing Day Case 1327. Accessed on Jan 12, 2017 at: http://www. lifesciencesite.com.
9. Wolffsohn J.S., and Cochrane A.L. (2000): Design of the low vision quality-of-life questionnaire (LVQOL) and measuring the outcome of low-vision rehabilitation. Am J Ophthalmol. ;130:793–802.
10. Behling O., and Law K. (2000): In: Translating questionnaires and other research instruments: Problems and Solutions. Lewis-Beck MS, editor. Thousand Oaks: Sage, pp. 1–70.
11. Tawiah E.O., and Mba J.C. (2011): Population aging in Ghana: a profile and emerging issues. African Population Studies; 25(2):623–643.
12. Wang W.L., Chen N., Sheu M.M., Wang J.H., Hsu W.L., and Hu Y.J. (2016): The prevalence and risk factors of visual impairment among the elderly in Eastern Taiwan. Kaohsiung J Med Sci.;32(9):475-81. doi: 10.1016/j.kjms.2016.07.009. Epub 2016 Aug 31.
13. World Health Organization [WHO], (2014): Priority eye diseases. Geneva, Switzerland: World Health Organization. Available from: http://www.who.int/blindness/causes /priority /en/print.html. Accessed February 14, 2014.
14. Central Intelligence Agency [CIA], (2014): The world fast book. Field listing-age Structure. Retrieved February 24, 2016, from https://www.cia.gov/ library/publications.
15. Hirunwatthanakul P. (2013): The impact of visual impairment on quality of life among older persons in rural northeast Thailand. At Massey University, Palmerston North, Newzealand.
16. Ocansey S., Asare K., Kyereme A., and Kusi S.B. (2013): Ocular Health of the Emerging Elderly Population in Ghana: Evidence From a Peri-urban Community.
17. Katibeh M., Ziaei H., Panah E., Reza Moein H., Hosseini S., Kalantarion M., Eskandari A., and Yaseri M. (2014): Knowledge and Awareness of Age Related Eye Diseases: a Population-Based Survey; 9( 2): 223-226.
18. Carol H., Dave T., Vivien N., Donna-Louise H., Sarah D., and Ian R. (2012): The barriers and enablers that affect access to primary and secondary eye care across the UK. London, UK: RNIB and Shared Intelligence.
19. Netwish N.J., Royak-Schaler R., Passmore S.R., Higginbotham E.J. (2015): Knowledge, attitudes, and beliefs about dilated eye examinations among African-Americans. Invest Ophthalmol Vis Sci.; 48(5):1989-94.
20. Ting D.S., Cheung G.C., and Wong T.Y. (2016): Diabetic retinopathy: global prevalence, major risk factors, screening practices and public health challenges: a review. ClinExp Ophthalmol.; 44(4):260.
21. Jones G.C., Crews J.E., and Danielson M.L. (2010): Health risk profile for older adults with blindness: an application of the international classification of functioning, disability, and health framework. Ophthalmic Epidemiol; 17:400-410.
22. Fong K.N.M., Lam B.K., Chan S.W., Tsang F.T., Wong V.Y., Tam E.T., and Lo T. (2014): Falling in older adults with or without visual impairment in community Dwellings. Healthy Aging Research. Accessed on Feb 2, 2017 at: www.har-journal.com
23. Alma D.S., Jha P., Ramasundarahettige C., Streatfield P.K., Niessen L.W., Chowdhury M.A. (2011): Smoking-attributable mortality in Bangladesh: proportional mortality study. Bulletin of the World Health Organization;91(10):757–64. Pmid: 24115799; PubMed Central PMCID: PMC3791659.
24. Falahaty K., Cheong L., and ISA., M.B.H. (2015): Disability among Elderly People with Visual Impairment in Two Welfare Homes in Malaysia; 8(2): 1369-1382 (2015) DOI: http://dx.doi.org/10.13005/bpj/897 (Received: September 11, 2015; accepted: November 05, 2015)
25. Yoo J.S., Kim C.G., Yim J., and Jeon M.Y. (2016): Factors influencing falls in the frail elderly individuals in urban and rural areas. Aging ClinExp Res.;28(4):687-97. doi: 10.1007/s40520-015-0469-2. Epub 2015 Oct 13.
26. El Kady H.M., Ibrahim H.K., and Mohamed S.G. (2011): Cognitive behavioral therapy for institutionalized elders complaining of sleep disturbance in Alexandria, Egypt. Sleep Breath; 16(4): 1173-1180.
27. Melillo P., Orrico A., Chirico F., Pecchia L., Rossi S., Testa F., and Simonelli F. (2017): Identifying fallers among ophthalmic patients using classification tree methodology. PLoS One.; 12(3):e0174083. doi: 10.1371/journal.pone. 0174083. eCollection 2017.
28. Marra K.V., Wagley S., Kuperwaser M.C., Campo R., and Arroyo J.G. (2016): Care of Older Adults: Role of Primary Care Physicians in the Treatment of Cataracts and Macular Degeneration. J Am Geriatr Soc.; 64(2):369-77. doi: 10.1111/jgs.13927. Epub 2016 Jan 30.
29. Green C., Goodfellow J., and Kubie J. (2014): Eye care in the elderly. AustFam Physician.; 43(7):447-50.
30. Tenkir A., Solomon B., and Deribew A. (2010): Glaucoma awareness among people attending ophthalmic services in Southwestern Ethiopia BMC Opthalmology; 10:17doi:10: p. 1186/147-2415-10- 17.
31. Dandona L., and Dandona R. (2011): What is the global burden of visual impairment? BMC Med;4:6.

32. Magliyah M.S., Nageeb M.R., Abdulmannan D.I., Badr H.M., Hemmeish M.M., Alotaibi W.T., and Azhari E.F. (2015): Assessment of knowledge regarding cataract among Saudi adult population in Makkah city, Saudi Arabia International Journal of Medical Science and Public Health;(4 Issue 5).
33. Lartey S. (2015): Glaucoma. A Awareness and Knowledge of Glaucoma Among Adult Patients at the Eye Clinic of a Teaching Hospital.; 8(3):190.
34. Attebo K., and Mitchell P. (2012): Knowledge and diseased about common eye diseases. Australian and New Zealand. Journal of Ophthalmology. ; 25(3):283.
35. Marcela F., and Robert N.K. (2009): Access and barriers to eye, vision and health care. Optometric Care within the Public Health Community. NY: Old Post Publishing; Available at: http://webpages.charter.net/oldpostpublishing/oldpostpublishing Frazier%20and%20Kleinstein.pdf (last accessed on December, 2013).
36. Pérès K., Matharan F., Daien V., Nael V., Edjolo A., Bourdel-Marchasson I., Ritchie K., Tzourio C., Delcourt C., and Carrière I. (2017): Visual Loss and Subsequent Activity Limitations in the Elderly: The French Three-City Cohort. Am J Public Health; 107(4):564-569. doi: 10.2105/AJPH.2016. 303631. Epub 2017 Feb 16.
37. Campbell A.J., Robertson M.C., La Grow S.J., Kerse N.M., Sanderson G.F., Jacobs R.J., Sharp D.M., and Hale L.A. (2010): Randomized controlled trial of prevention of falls in people aged_75 with severe visual impairment: the VIP trial. BMJ;331:817.
38. Kim D. (2017): The effects of a combined physical activity, recreation, and art and craft program on ADL, cognition, and depression in the elderly. J PhysTher Sci.;29(4):744-747. doi: 10.1589/jpts.29.744. Epub 2017 Apr 20.
39. Draper E.M., Feng R., Appel S.D., Graboyes M., Engle E., Ciner E.B., Ellenberg J.H., and Stambolian D. (2016): Low Vision Rehabilitation for Adult African Americans in Two Settings. Optom Vis Sci.; 93(7):673-82. doi: 10.1097/OPX.
40. Holstege M.S., Caljouw M.A.A., Zekveld I.G., van Balen R., de Groot A.J., van Haastregt J.C.M., Schols J.M.G.A., Hertogh C.M.P.M., Gussekloo J., and Achterberg W.P. (2017): Successful Geriatric Rehabilitation: Effects on Patients' Outcome of a National Program to Improve Quality of Care, the SINGER Study. J Am Med Dir Assoc.; 18(5):383-387. doi: 10.1016/j.jamda.2016.10.011. Epub 2016 Dec 6
41. Adigun K. Oluleye T., Ladipo, M.M., and Olowookere S.A. (2014): Quality of life in patients with visual impairment in Ibadan: a clinical study in primary care. Journal of Multidisciplinary Healthcare; 7: 173–178.
42. Machón M., Larrañaga I., Dorronsoro M., Vrotsou K., and Vergara I. (2017): Health-related quality of life and associated factors in functionally independent older people. BMC Geriatr; 17(1):19. doi: 10.1186/s12877-016-0410-3.
43. Mangen M.J., Bolkenbaas M., Huijts S.M., van Werkhoven C.H., Bonten M.J., and de Wit G.A. (2017): Quality of life in community-dwelling Dutch elderly measured by EQ-5D-3L. Health Qual Life Outcomes; 15(1):3. doi: 10.1186/s12955-016-0577-5.
44. Matamoros E., Maurel F., Léon N., Solomiac A., Bardoulat I., Joubert M., Hermans M., Moser E., Le Picard S., Souied E.H., and Leveziel N. (2015): Quality of Life in Patients Suffering from Active Exudative Age-Related Macular Degeneration: The EQUADE Study. Ophthalmologica; 234(3):151-9. doi: 10.1159/000433448. Epub 2015 Aug 25.
45. Walters K., Kharicha K., Goodman C., Handley M., Manthorpe J., Cattan M., Morris S., Clarke C.S., Round J., and Iliffe S. (2017): Promoting independence, health and well-being for older people: a feasibility study of computer-aided health and social risk appraisal system in primary care. BMC Fam Pract.; 18(1):47. doi: 10.1186/s12875-017-0620-6.