

## Effect of Nurse-Led Interventions on Post-surgical Expected Outcomes among Patients with Cataract

Engy E. Eldoushy

Assistant Professor of Medical Surgical Nursing Faculty of Nursing, Menoufia University

Correspondence: Engy E. Eldoushy (enjoy.eldaoshi@nursing.menoufia.edu.eg)

### Abstract

**Background:** Medical attention for the visually impaired patients is an essential element for their overall wellbeing. Cataract dominates among the main causes of visual impairment in Egypt and South Africa. Early detection, patients' awareness, eye self-care practice, dynamic treatment and adherence to treatment are imperative perspectives to avoid extra damage and hence protect vision.

**Aim:** Assessing the effect of nurse-led interventions on post-surgical expected outcomes among patients with cataract **Setting:** current study was conducted at the lecture's room of the ophthalmology Department in Menoufia University Hospital and at the waiting area of Shebien El-Kom Ophthalmology Hospital, Menoufia Governorate, Egypt. **Design:** A quasi-experimental research design was used in this study. **Tools:** three tools: **Structured interview questionnaire** that included three parts for assessing patients' sociodemographics, past/present medical and family history, and knowledge level, **Observational checklist** to evaluate patient's self-care practices regarding eye care and **patient's post-surgical expected outcomes' scale** to assess the achieved patient's outcomes after applying nurse-led interventions. **Results:** a highly statistically significant post-intervention improvement regarding patients' total knowledge score, satisfactory expected outcomes' mean score and a major achievement in patients' eye self-care practice among study group patients than for control group in comparison between study and control groups with p value <0.001. Furthermore, the present study showed a significant post-intervention positive correlation between total scores of patient's expected outcomes' scale and eye self-care practice associated with knowledge about cataract among study group with p value <0.001. **Conclusion:** Nurse-led interventions including health education for enhancing patients' knowledge and self-care practice were found to be an effective method to attain the targeted improvement in cataract patients' post-surgical expected outcomes. **Recommendation:** Nurse-led interventions should be implemented in periodic training programs for ophthalmology patients to consolidate, update and refresh their knowledge base and promote safe and good eye self-care practice regarding cataract in order to properly meet the patient's needs and thus enhancing safety.

**Keywords:** Nurse-Led Interventions, Post-Surgical Expected Outcomes, Cataract.

### Introduction

Cataract could be a cloudy region within the eye focal point that leads to diminish in vision that regularly creates gradually and can influence one or both eyes (*Gimbel & Dardzhikova, 2021*). According to the *National Eye Institute (2020)*, "there are five main types of cataract: age related cataract (Nuclear sclerosis), pediatric cataract (congenital cataract), secondary cataract, radiation cataract and traumatic cataract".

Nuclear sclerosis or age related cataract is the most common type of cataract, which involves the central or 'nuclear' part of the lens, which becomes hard, or 'sclerotic', due to condensation on the lens nucleus and the deposition of brown pigment within the lens

(*Gimbel & Dardzhikova, 2021*). In its advanced stages, it is called a brunescant cataract, while in its early stages; an increased sclerosis may result in increased refractive lens index that consequently causes a myopic or lenticular shift where patients see at near objects only (*Chan et al., 2019*).

According to the WHO Fact Sheets 2020, age-related cataracts affected more than 67 million persons globally and it takes the upper hand for blindness, as it is responsible for 51% of world blindness, about 20 million people (*WHO, 2020*). Globally, cataracts cause moderate to severe disability in 53.8 million of them 52.2 million of whom are in low and middle-income countries (*GBD, 2020*).

In many countries, surgical services are inadequate, and cataracts remain the leading cause of blindness (*Allen & Vasavada, 2019*). Even where surgical services are available, low vision associated with cataracts may still be prevalent because of long waits for, and barriers to surgery, such as cost, lack of information and transportation problems (*Gimbel & Dardzhikova, 2021*).

According to the **American Ophthalmology association, (2019)**, in the United States, age-related lens changes have been reported in 42% between the ages of 42 and 54, 60% between the ages 55 and 64, and 91% between the ages of 65 and 75. Cataracts affect nearly 22 million Americans age 40 and older. By age 80, more than half of all Americans have cataracts (**Global Data on Visual Impairments, 2020**). Direct medical costs for cataract treatment are estimated at 6.8 billion dollars annually (*GBD, 2020*).

In the eastern Mediterranean region, cataracts are responsible for more than 51% of blindness. Access to eye care in many countries in this region is limited (**Global Data on Visual Impairments, 2020**). Childhood-related cataracts are responsible for 5-20% of world childhood blindness (*Chan et al., 2019*). Moreover, in Africa, about 29.7 million individuals of age 40 or older were affected by cataract (**The National Eye Institute, 2020**). Around 22.3 million cases of cataract were found in the South Africa among them 120,000 cases of blindness yearly and nearly 60% of blindness in parts of Africa is caused by cataract (*GBD, 2020*).

In Egypt, 2.2 million individuals are affected with cataract, and it will lead to bilateral blindness in about two percent of the populations over age of 40 (1.9 million individuals) (**Global Data on Visual Impairments, 2020**).

Depending on the type and stage of condition, common signs and symptoms of cataract may include temporary or partial blindness, faded colors, blurry or double vision, halos around light, trouble with bright lights, and trouble seeing at night (**National Institute of Health, 2020**). This may result in trouble driving, reading, or recognizing faces (*Gimbel & Dardzhikova, 2021*). Poor vision caused by

cataracts may also result in an increased risk of falling and depression (*Lamoureux, et al., 2021*) and according to the **WHO, (2020)**, cataracts cause half of all cases of blindness and 33% of visual impairment worldwide.

Prescription of different mixtures of eye drops, laser trabeculoplasty and/or microsurgeries such as Phacoemulsification are the common treatment options for cataract (*Allen & Vasavada, 2019*). Prescribed eye drops act by reducing the risk of infection development after surgery (*Gimbel & Dardzhikova, 2021*). Side effects may include allergic reaction, redness, stinging, blurry vision, and irritated eyes (*Chan et al., 2019*).

Cataract is one of the chief causes of irreversible blindness worldwide. Importance of initial diagnosis in cataract is of a great value for a valuable management and blindness prevention (*Allen & Vasavada, 2019*). Lack of understanding may not only affect the timing of the diagnosis, but also the consumption of eye care facilities. Assessment of awareness is the first stage in the planning of disease management (*Rao et al., 2021*)

Nurse-led interventions help to understand, feel of competence, comfort and assist with recovery. Nurse-led interventions are any nursing activity to guarantee that the patient is aware of disease by expanding patient's data about cataract (*Taylor et al., 2015*). A well-prepared patient with an instructive informational plan can bargain superior with their illness and enhance engagement in eye self-care practices including eye drops and ointment application, eye exercises, eye compresses, hygiene and protection of the affected eye (*Hassankhani et al., 2020*).

Nurse-led interventions are considered of the foremost successful interventions performed for cataract patients as it permit promoting patients' knowledge and self-care practice (*Mansour et al., 2019*). Along with the **World Health Organization, (2018)** estimations that the number of cataract patients is expected to rise due to the globally aging population and thus requiring better awareness to create more evidence-based and proficient methods of caring for those patients to attain the expected outcomes. Demonstrating the effectiveness of nurse-led interventions on

patient with cataract was only discussed in few studies (*Taylor, et al., 2015*), thus determining the effect of nurse-led interventions on post-surgical expected outcomes among cataract patients was the main concern of this study.

### Significance of the study

Cataract's consequent shortage in quality of life may eventually lead to blindness (*National Eye Institute, 2020*) so; it requires life-long treatment and independent self-care performance of the daily living activities (*Rabinovitac, 2020*). Cataract affects more than 67 million individuals globally and leads to blindness in 4.5 million individuals worldwide (**Global Data on Visual Impairments, 2020**). There are extra than 7.4 million persons with visual impairments in Egypt of them 2.2 million individuals have cataract and 900,000 of them are totally blind (*GBD, 2020*). While in Menoufia Governorate the incidence of cataract as the cause of acquired blindness is 9.2% of visual impairment admission cases according to the *Statistical Ophthalmology records of Menoufia University Hospital and Shebien El-Kom Ramad Hospital, (2021)*. Avoiding and/or curing cataract could be achieved through awareness, early diagnosis and accurate medical treatment (*Mansour et al., 2019*).

Cataract has been connected with blindness that can reduce quality-of-life and productivity for both the blind persons and their care suppliers (*Taylor et al., 2015*). Although cataract prevention is impossible, nevertheless early detection can help to obtain better disease management, which simultaneously gives assistance in avoiding serious harm to a person's vision (**World Health Organization, 2018**) hence, it is imperative to increase cataract patients' knowledge and self-care practice enhancement as the disease takes a long period of time to arise (*Rabinovitac, 2020*).

### Aim of the Study

Investigate the effect of nurse-led interventions on post-surgical expected outcomes among patients with cataract through the following: health education about; cataract disease to increase patients' knowledge level,

the correct application of eye self-care practice including eye drops' instillation, eye ointment, eye compresses and eye exercises application.

**Research Hypotheses:** The next research hypotheses are articulated to accomplish the aim of the study.

- Nurse-led interventions group (study group (I) will have higher total knowledge score than control group (II).
- Nurse-led interventions group (study group (I) will exhibit higher level of eye self-care practice than control group (II).
- Nurse-led interventions group (study group (I) will exhibit more satisfactory post-surgical expected outcomes' score than control group (II).
- Nurse-led interventions group (study group (I) will exhibit post-intervention improvement in scores of knowledge, eye self-care practice and post-surgical expected outcomes than pre-intervention.

### Operational definitions:

- **Nurse-led Interventions:** are defined formally as the application of any nursing intervention that can lead to an improvement in patient's outcomes (*Hassankhani et al., 2020*). While in the current study are group of nursing interventions including health teaching through using colored booklet supported with illustrative pictures and simple videos was prepared by the researcher to reinforce patient's knowledge about cataract and focusing on eye self-care practices through demonstration and re-demonstration about different types of ophthalmological treatments including; handling of eye drops' instillations, eye ointment application, eye exercises and eye compresses
- **Post-Surgical Expected Outcomes:** are defined formally as the targeted results that should be reached after any surgical procedure (*Dawn et al., 2017*), while in the current study they are including different symptoms that indicate speedy recovery in the form of decreased eye-inflammations, infections, and no complications such as allergic reaction, redness, stinging, blurry vision, and irritated eyes.

### Subjects and methods:

**Research design:** A quasi-experimental research design was used, which involves the manipulation of an independent variable without the random assignment of participants, pretest-posttest, and is generally higher in internal validity than correlational studies but lower than true experiments.

**Setting:** The study was conducted at the lecture's room of the ophthalmology Department in Menoufia University Hospital and at the waiting area of Shebien El-Kom Ophthalmology Hospital, Menoufia Governorate, Egypt. Data were gathered over an interval of 8 months extended from the start of February 2021 to the end of September 2021.

**Sample:** A purposive sample of 100 adult patients diagnosed with cataract from the previously mentioned setting were selected then divided equally into two groups (50) patients for each group (study and control).

**Control group:** Patients were received the scheduled routine hospital care only such as measuring ocular pressure, and taking prescribed medications.

**Study group:** Patients were received detailed nurse-led interventions, which included instructions about cataract and eye self-care practice alongside with the scheduled routine hospital care.

**Inclusion criteria:**

- Adult
- Diagnosed with cataract regardless of its type
- Alert and can communicate.

**Exclusion criteria: -**

- Acute physical, mental or cognitive disability such as burn, trauma, delirium and dementia
- Attended teaching sessions about cataract before

**Sample size calculation:** the study sample was calculated by the following formula:

$z = z$  score

$\varepsilon =$  margin of error

$n =$  population size.

$\hat{p} =$  the population proportion.

**Tools of the study:**

Three tools were utilized for data gathering of the existing study.

**Tool I: Structured Interview Questionnaire:**

The researcher developed this tool and included the following three parts:

**Part 1: Patients' Sociodemographics:** Used to assess patients' age, sex, educational level, occupation, marital status and income

**Part 2: Medical history:** Used to assess patients' past, present medical and family history such as duration of illness, taken medication, and previous eye surgeries.

**Part 3: Patients' Knowledge:** to assess patients' knowledge level related to cataract. It included 10 questions asking about cataract's definition, incidence, risk factors, causes, signs and symptoms, types, diagnostic evaluation, complications, prevention, and management.

**Scoring system:** Four responses were derived for each question as follows:-

- A score of three was given to the correct and complete answer
- A score of two was given to the partially correct answer
- A score of one was given to the incorrect answer and
- A score of zero was given to no answer or I do not know answer.

Then all responses were recorded and the total knowledge score was calculated and put within the range from 0 to 30 as a maximum score and categorized into:

- A score of  $\leq 30\%$  denoted poor or unsatisfactory knowledge level
- A score between  $>30\% - \leq 60\%$  indicated accepted knowledge level
- A score of  $>60\%$  denoted satisfactory knowledge level.

**Tool II: Observation checklist:**

It is adapted from (Margret *et al.*, 2009), which included twelve points to assess patient's practices regarding eye self-care. Four points assessing each item of the following: eye drops' instillation, eye ointment, and application of non-pharmacological methods such as eye compresses, eye exercises eye massage and

$$n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

deep breathing exercise while closing both eyes in the form of the correct application method, compliance to treatment regimen, storage, and expiration date after opening the package of eye drops and ointment. Each point was rated from one to five in which one denoted never to five indicated always. Scores were summed then the total score ranged from 0 to 60 where higher scores indicated good eye self-care practices

- Poor eye self-care practices  $\leq 30\%$
- Fair eye self-care practices  $>30\% - \leq 60\%$
- Good eye self-care practices  $>60\%$

### **Tool III: Patients' post-surgical expected outcomes' scale:**

It is an adapted four-point scale that was developed by (*Dawn et al., 2017*). It consisted of 10 items to assess patient's post-surgical expected outcomes related to visual acuity, quality of surgical procedure, overall satisfaction, ability to do a number of daily activities involving eyesight, length of recovery, absence of complications; total or partial blindness, infection, allergy, redness, pain, itching and discharges.

**Scoring system:** responses were coded as follows: (Excellent =3, good=2, fair=1, or poor =0) then the total score was calculated and put within the range from 0 to 30 as a maximum score and categorized into:

- Poor patient's post-surgical expected outcomes  $\leq 30\%$
- Fair patient's post-surgical expected outcomes  $>30\% - \leq 60\%$
- Good patient's post-surgical expected outcomes  $>60\%$

### **Methods:**

#### **Written approval:**

- An official letter explaining purpose and data collection strategies was obtained from the Dean of the Faculty of Nursing, Menoufia University then conveyed to the hospitals' administrators, the chief executive, the director of ophthalmic department and head nurses in order to get the approval to perform this study.

#### **Validity of the tools:**

To ascertain relevance and completeness of the current study tools seven experts in the

field of (Medical Surgical Nursing, Ophthalmology, Clinical nurse specialist, Medical Statistics and English Specialty) tested all tools for its content validity and did the needed modifications.

#### **Reliability of the tools:**

The entire tools were evaluated and tested using a test-retest strategy and Pearson correlation coefficient formula was used to ascertain reliability of instruments; with 2 weeks intervals between each test. Cronbach's alpha was used to evaluate internal consistency for all tools. It was 0.85 alpha for Tool (I) Structured Interview Questionnaire, 0.81 alpha for observational checklist (tool II) and 0.83 alpha for Tool (III) Patients' post-surgical expected outcomes scale.

#### **Ethical consideration**

- A written approval was obtained from the ethical and research committee of Faculty of Nursing, Menoufia University.
- A written consent was obtained from all participants who met the inclusion criteria after illustrating purpose, procedure, and benefits of the current study.
- All participants were informed that involvement in the current study is voluntary and each patient had the right to withdraw at any time.
- Participants' privacy and anonymity was guaranteed through coding the collected data and preserve papers in a closed cabinet.
- Participants' had no physical or emotional harm from the tools.

**A pilot study:** Was performed on 10% of the estimated sample size (10 patients) to evaluate the feasibility, applicability and appropriateness of the constructed tools before data collection to do necessary modifications. The used sample was kept out from the actual study.

#### **Data collection:**

- Data were collected over a period of 11 months beginning of the starting of February 2021 to the end of September 2021.

- The researcher interviewed patients who agreed to join in the study and met the inclusion criteria individually at the ophthalmology department of Menoufia University Hospital and Shebien El-Kom Ophthalmology Hospital, Menoufia Governorate, Egypt.
- At first, the researcher interviewed the control group (II), then the study group (I) to avoid any mixing of the results. Each participant of both study and control groups was informed with the purpose of the study.
- The current study data collection included four consecutive phases, were applied by the researcher are **assessment, planning, implementation, and evaluation.**

### 1. Assessment phase:

- Each participant of both studied groups was interviewed individually in a session ranged from 20-30 minutes to collect sociodemographic and medical data through using part one and two from tool I
- Patients' knowledge level for participants of both groups about cataract was assessed through using part three of tool I in the form of definition, incidence, risk factors, causes, signs and symptoms, types, diagnostics, complications and management.
- Patients' eye self-care practices for participants of both groups were assessed through utilizing observational checklist (instrument II) for eye drops instillation, eye ointment application, demonstration of eye exercises, eye massage, warm eye compresses and deep breathing exercise while closing both eyes.
- All studied Patients were assessed for their post-surgical expected outcomes related to visual acuity, quality of surgical procedure, overall satisfaction, ability to do a number of daily activities involving eyesight, length of recovery, absence of complications; total or partial blindness, infection, allergy, redness, pain, itching and discharges using instrument III.

### 2. Planning phase:

- **Nurse-led interventions:** According to the assessment phase collected data, there were two theoretical and one practical teaching sessions each theoretical teaching session took about 30-45 minutes, while practical session took about 45-60 minutes.
- The first theoretical teaching session covered the fundamentals of eye anatomy and physiology as well as the causes, types, risk groups, clinical manifestations, diagnosis, and prevention of cataract disease.
- The second teaching session included information about indications for cataract surgery, the most common surgical procedures, and instructions to prevent complications such as; avoid coughing, lifting heavy objects, or bending over at the waist.
- **The practical teaching session** started with an instructional colored booklet supported with illustrative pictures, simple videos that were prepared by researcher focusing on eye self-care practices instructing study group participants' about the correct technique for eye drops instillation, eye ointment application, demonstration of eye exercises, eye massage, warm eye compresses and deep breathing exercise while closing both eyes. It took about 45-60 minutes and included two parts are:
  - 1) **The first practical part** included asking patients to give feedback to the previously received information that was instructed during theoretical session about cataract for assessment and filling the missed knowledge gap.
  - 2) **The second practical part:** included demonstration and re-demonstration on eye self-care practices in the form of; eye drop instillation, eye ointment application and demonstration of non-pharmacological methods to reduce pain and tension such as eye exercises, warm eye compresses, eye massage, and deep breathing exercise while closing both eyes. At the same time, the researcher observed the patients' practices using tools (II) and assessed their expected outcomes using tools (III).

### 3. Implementation phase:

- This phase accomplished in at least three teaching sessions for each participant according to his/ her level of understanding where the researcher collected data through questioning each participant of study group (I) personally at the lectures' room of the Ophthalmology Department in Menoufia University Hospital and at the waiting area of Shebien El-Kom Ophthalmology Hospital, Menoufia Governorate.
- The researcher utilized power point presentation lectures and discussion during each session to improve learning while, demonstration and re-demonstration were added at the last session.
- The researcher dispensed the previously prepared booklet for every participant of study group (I) or his/her accompanying person before starting the first consultation session.
- **The initial consultation session** took about 30-45 minutes where the researcher gave information to participants of study group (I) about fundamentals of eye anatomy and physiology as well as causes, types, risk groups, clinical manifestations, diagnosis, and prevention of cataract disease and at the end of the session, participants were allowed to ask questions and the researcher answered them.
- **The second consultation session:** This session took about (45-60) minutes according to each participant's level of understanding. Firstly, the researcher focused on the previously obtained information, via teaching members of study group (I) eye self-care practices including; the correct technique for eye drops' instillation, eye ointments application, and demonstration of non-pharmacological methods to reduce pain and tension such as; eye exercises, warm eye compresses, eye massage, and deep breathing exercise while closing both eyes. At the end of the session, participants were allowed to ask questions and the researcher answered them.
- **The third consultation session:** This session took about (30-45) minutes where the researcher utilized demonstration and re-demonstration of the learned skills on

performing eye self-care practices in order to refresh and strengthen the previously given information.

#### 4) Evaluation phase:

The educational effect was highlighted two weeks post-intervention through evaluating participants of both studied groups where the researcher utilized part three of instrument I, tool II and tool III to evaluate the effectiveness of nurse-led interventions on participants' knowledge, self-care practice and post-surgical expected outcomes.

#### Statistical analysis

SPSS software was used to organize, tabulate and statistically analyze the collected data (Statistical Package for the Social Sciences, version 19, SPSS Inc. Chicago, IL, USA).

#### Results:

**Table (1):** This table demonstrated that the mean age for study and control group was ( $50.26 \pm 4.7$  &  $50.4 \pm 4.29$ ), respectively. Males represented about more than half of study subjects of both of study and control groups (54% & 60%), respectively. **Regarding residence**, more than half of both study and control group patients live in rural area (64% & 60%, respectively)

**Concerning marital status**, almost all study group subjects (96%) were married compared with 52% of control group. **Regarding educational level**, (28%) of both study and control groups were graduated from secondary school, moreover **regarding to occupation**, (56%) of both study and control groups had jobs, furthermore regarding **monthly income**, majority of both study and control groups have enough income and were smokers. No statistical significant differences observed among both groups regarding all sociodemographics except for marital status which has a highly statistical difference with P value  $< 0.001$ .

**Table (2):** Illustrated past, present medical and family history distribution of both study and control groups. According to this table, more than one third (42%) of control group have past medical history of chronic

cataract complain, (54%) have diabetes mellitus and (52%) have hypertension, while about three fourths of study group (70%) have past medical history diabetes mellitus. Furthermore, concerning previous cataract surgery, this able illustrated that majority of study group (78%) compared with about one third of control group (32%) had previous cataract surgery.

Additionally, regarding to family history, majority of both study and control groups have family history of hypertension (82%&86%) and diabetes mellitus (92%&84%) respectively, followed by 34% for past family history of cataract among study group compared to 56% among control group and (10% &16% respectively) had past family history of refractive error. **Regarding source of information related to cataract** nearly half of both study and control groups (44% and 48% respectively) had their information from TV, magazines, and social media while minority of study group (22%) and control group (16%) had their information from ophthalmologist and optometrist. No one of both groups attended any training sessions related to cataract. Both groups showed no statistically significant differences regarding all past, present medical and family history except for previous surgeries which has a highly statistical significant difference with P value <0.001.

**Table (3):** Demonstrated comparison between pre/post intervention patient's total knowledge score about cataract for both study and control groups showed no statistical significant difference among studied groups regarding pre-intervention mean total score of knowledge while, it illustrated a high statistical significant difference mean score of knowledge post-intervention in comparison between study and control groups with p value 0.001. In addition, an apparent statistically significant difference was found within study group post-intervention with p value <0.001.

**Table (4):** Compare patient's eye self-care practices pre/ post intervention for both study

and control groups. It showed a highly post-intervention statistically significant difference within study and control groups regarding all items of eye self-care; eye drop instillation, eye ointment application, eye compresses and non-pharmacological methods with p value 0.001. In addition, this table revealed a highly statistically significant difference within study group pre and post-intervention regarding total score of patient's eye self-care practices and between study and control groups post-intervention with p value <0.001, while there was no pre/post-intervention significant difference within control group.

**Table (5):** Compares patients' post-surgical expected outcomes (pre/post-intervention) between study and control groups. The table revealed a highly statistically significant post-intervention improvement in patients' expected outcomes among study and control groups with a mean score (28.26±4.7 & 20.74±4.7) respectively, while showed no statistically significant difference concerning mean score of patients' pre-intervention expected outcomes as it was (23.0±7.96 and 22.58±5.25) for study and control groups respectively. Lastly, there was an obvious pre/post-intervention statistically significant difference within study group with p value <0.001.

**Table (6):** Demonstrates the correlation between patients' total scores of eye self-practice and post-surgical expected outcomes in relation to knowledge within study group. It revealed that there was a positive correlation between pre-intervention **total Scores of patients' knowledge and eye self-care practice** with a high statistical significance as p value was <0.001. In addition, there was a positive correlation between post-intervention **total Scores of patient's knowledge and eye self-care practice** with statistical significance as p value was 0.01. Moreover, there was a positive pre and post-intervention correlation between **total Scores of patient's knowledge and expected outcomes** with a high statistical significance as p value was <0.001.

**Table (1):** Frequency and percentage distribution of socio-demographic characteristics among the studied groups (n=100)

| Sociodemographic characteristics | Studied groups     |       |                      |       | X2    | P value            |
|----------------------------------|--------------------|-------|----------------------|-------|-------|--------------------|
|                                  | Study group (n=50) |       | Control group (n=50) |       |       |                    |
|                                  | NO.                | %     | NO.                  | %     |       |                    |
| Age (years):<br>Mean ± SD Range  | 50.26±4.7          |       | 50.4±4.29            |       | 0.156 | 0.877<br>NS        |
| Gender: Male                     | 27                 | 54.0% | 30                   | 60.0% | 0.367 | 0.545<br>NS        |
| Female                           | 23                 | 46.0% | 20                   | 40.0% |       |                    |
| Residence: Urban                 | 18                 | 36.0% | 20                   | 40.0% | 0.17  | 0.68<br>NS         |
| Rural                            | 32                 | 64.0% | 30                   | 60.0% |       |                    |
| Marital status:                  |                    |       |                      |       | 27.74 | 0.001<br><b>HS</b> |
| Single                           | 0                  | 0.0%  | 21                   | 42.0% |       |                    |
| Married                          | 48                 | 96.0% | 26                   | 52.0% |       |                    |
| Widowed                          | 2                  | 4.0%  | 3                    | 6.0%  |       |                    |
| Education level:                 |                    |       |                      |       | 2.14  | 0.71<br>NS         |
| Illiterate                       | 6                  | 12.0% | 9                    | 18.0% |       |                    |
| Read and write.                  | 9                  | 18.0% | 12                   | 24.0% |       |                    |
| Primary                          | 11                 | 22.0% | 7                    | 14.0% |       |                    |
| Secondary                        | 14                 | 28.0% | 14                   | 28.0% |       |                    |
| University                       | 10                 | 20.0% | 8                    | 16.0% |       |                    |
| Occupation:                      |                    |       |                      |       | 0.000 | 1.000<br>NS        |
| Work                             | 28                 | 56.0% | 28                   | 56.0% |       |                    |
| Don't work                       | 22                 | 44.0% | 22                   | 44.0% |       |                    |
| Monthly income: Enough           | 44                 | 88.0% | 41                   | 82.0% | 0.706 | 0.401<br>NS        |
| Not enough                       | 6                  | 12.0% | 9                    | 18.0% |       |                    |
| Smoking: No                      | 18                 | 36.0% | 13                   | 26.0% | 1.169 | 0.280<br>NS        |
| Yes                              | 32                 | 64.0% | 37                   | 74.0% |       |                    |

T test: student t test     $\chi^2$ : chi square test    NS: not significant    HS: highly significant

**Table (2):** Medical Data of the Studied Groups (n=100):

| Medical data  | Studied groups     |       |                      |       | X2    | P value          |
|---|--------------------|-------|----------------------|-------|-------|------------------|
|   | Study group (n=50) |       | Control group (n=50) |       |       |                  |
|   | NO.                | %     | NO.                  | %     |       |                  |
| <b>Past Medical history</b>                                 |                    |       |                      |       |       |                  |
| <b>Cataract</b>   | 13                 | 26.0% | 21                   | 42.0% | 2.852 | 0.091 NS         |
| <b>Refractive error</b>                                     | 7                  | 14.0% | 3                    | 6.0%  | 1.778 | 0.159 NS         |
| <b>DM</b>   | 35                 | 70.0% | 27                   | 54.0% | 2.72  | 0.149 NS         |
| <b>Duration of DM (years)</b>                               |                    |       |                      |       | 6.036 | 0.002 <b>S</b>   |
| Mean±SD Range   | 4.7±0.788          |       | 3.72±0.834           |       |       |                  |
| <b>Hypertension:</b>  | 18                 | 36.0% | 26                   | 52.0% | 2.597 | 0.107 NS         |
| <b>Duration of hypertension (yrs)</b>                       |                    |       |                      |       | 1.899 | 0.06<br>NS       |
| Mean±SD Range   | 2.46±0.74          |       | 2.72±0.474           |       |       |                  |
| <b>Past Surgical history</b>                                |                    |       |                      |       |       |                  |
| <b>Previous surgery:</b>                                    | 39                 | 78.0% | 16                   | 32.0% | 21.37 | <0.001 <b>HS</b> |
| <b>Previous cataract surgery</b>                            | 7                  | 14.0% | 12                   | 24.0% | 1.624 | 0.202 NS         |
| <b>Family history</b>                                       |                    |       |                      |       |       |                  |
| <b>Cataract</b>   | 17                 | 34%   | 28                   | 56.0% | 4.89  | 0.026 <b>S</b>   |
| <b>Refractive error</b>                                     | 5                  | 10.0% | 8                    | 16.0% | 0.796 | 0.277 NS         |
| <b>DM</b>   | 46                 | 92.0% | 42                   | 84%   | 1.5   | 0.22 NS          |
| <b>Hypertension</b>   | 41                 | 82.0% | 43                   | 86.0% | 0.298 | 0.585 NS         |
| <b>Glaucoma</b>   | 9                  | 18.0% | 8                    | 16.0% | 0.071 | 0.790 NS         |
| <b>Source of information related to cataract:</b>           |                    |       |                      |       | 0.589 | 0.745<br>NS      |
| Ophthalmologist, Optometrist                                | 11                 | 22.0% | 8                    | 16.0% |       |                  |
| TV, magazines or other media                                | 22                 | 44.0% | 24                   | 48.0% |       |                  |
| Relative/friend suffering from it                           | 17                 | 34.0% | 18                   | 36.0% |       |                  |
| <b>Attending any training sessions related to cataract:</b> |                    |       |                      |       | NA    | NA               |
| Yes   | 0                  | 0     | 0                    | 0     |       |                  |
| No  | 50                 | 100   | 50                   | 100   |       |                  |

\*Fisher's Exact test    NA: not applicable    S: significant    t test: student t test  
NS: not significant    HS: highly significant

**Table (3):** Comparison between Patients' total Knowledge score about Cataract Pre-and Post-intervention for both study and control groups(n=100):

| Patients' knowledge related to cataract | Studied groups      |                      | Mann- Whitney | P value         |
|---|---------------------|----------------------|---------------|-----------------|
|   | Study group (n=50)  | Control group (n=50) |               |                 |
|   | Mean±SD<br>Range    | Mean±SD<br>Range     |               |                 |
| <b>Total score:</b>                     | 10.08               | 8.34                 | 0.638         | 0.53 NS         |
| Pre-intervention                        | 4.88                | 3.07                 |               |                 |
| Post-intervention                       | 16.2<br>3.98        | 9.06±<br>1.67        | 11.7          | 0.001 <b>HS</b> |
| <b>Wilcoxon test</b>                    | 7.33                | 1.67                 |               |                 |
| <b>P value</b>                          | <0.001<br><b>HS</b> | 0.102<br>NS          |               |                 |

NS: not significant HS: highly significant

**Table (4):** Comparison of patients' eye self-care practices pre- and post- intervention mean and standard deviation for both study and control groups (n=100):

| Patient's eye self-care practices  | Studied groups     |                      | Test of sig. | P value            |
|--|--------------------|----------------------|--------------|--------------------|
|  | Study group (n=50) | Control group (n=50) |              |                    |
|  | Mean±SD<br>Range   | Mean±SD<br>Range     |              |                    |
| Eye Drop Instillation (pre-intervention)   | 19.2±4.79          | 18.66<br>4.902       | 0.557        | 0.579<br>NS        |
| Eye Drop Instillation (post-intervention)  | 26.02<br>1.91      | 21.38<br>3.0<br>7    | 9.073        | 0.001<br><b>HS</b> |
| <b>Paired t test</b>   | 9.27               | 3.355                |              |                    |
| <b>P value</b>   | <0.001             | 0.002                |              |                    |
| Eye Ointment Application (pre-intervention)  | 15.66<br>3.69      | 14.96<br>3.24        | 1.008        | 0.316 NS           |
| Eye Ointment Application (post-intervention)   | 18.6<br>2.2        | 16.18<br>3.86        | 3.847        | 0.001 <b>HS</b>    |
| <b>Paired t test</b>   | 4.8                | 1.94                 |              |                    |
| <b>P value</b>   | <0.001             | 0.058                |              |                    |
| Eye Compresses (pre-intervention)  | 1.82±1.24          | 0.56±0.57            | 6.51         | 0.01 S             |
| Eye Compresses (post-intervention)   | 2.42±0.673         | 0.82±0.87            | 8.284        | 0.001 <b>HS</b>    |
| <b>Wilcoxon test</b>   | 5.612              | 1.99                 |              |                    |
| <b>P value</b>   | <0.001             | 0.052                |              |                    |
| Non- pharmacological methods to reduce intraocular pressure or tension of cataract (pre-intervention)  | 22.2±14.49         | 20.64±11.3           | 0.6          | 0.55<br>NS         |
| Non- pharmacological methods to reduce intraocular pressure or tension of cataract (post-intervention) | 50.16±7.665        | 23.14±11.099         | 14.165       | 0.001<br><b>HS</b> |
| <b>Wilcoxon test</b>   | 11.33              | 1.17                 |              |                    |
| <b>P value</b>   | <0.001             | 0.249                |              |                    |
| <b>Total score (pre-intervention)</b>  | 65.84±24.09        | 62.2±18.52           | 0.637        | 0.526<br>NS        |
| <b>Total score (post-intervention)</b>   | 103.00±7.357       | 66.04±19.64          | 14.475       | 0.001<br><b>HS</b> |
| Test of sig.   | 11.85              | 1.2                  |              |                    |
| <b>P value</b>   | <0.001             | 0.032                |              |                    |

**HS:** highly significant **t test:** student t test **U:** mann-whitney **NS:** not significant **S:** not significant

**Table (5):** Comparison of patients' post-surgical expected outcomes pre- and post-intervention mean and standard deviation for both study and control groups (n=100):

| Patients' post-surgical expected outcomes | Studied groups     |                      | Students' t test | P value             |
|---|--------------------|----------------------|------------------|---------------------|
|   | Study group (n=50) | Control group (n=50) |                  |                     |
|   | Mean±SD Range      | Mean±SD Range        |                  |                     |
| Total score: Pre- intervention            | 23±7.96            | 22.58±5.25           | 1.63             | 0.088<br>NS         |
| Post- intervention                        | 28.26±4.7          | 20.74±4.7            | 5.69             | <0.001<br><b>HS</b> |
| <b>Paired t test</b>                      | 3.75               | 1.72                 |                  |                     |
| <b>P value</b>                            | <0.001             | 0.09                 |                  |                     |

HS: highly significant

NS: not significant

**Table (6):** Correlation between pre-/post-intervention total scores of patients' eye self-care practices and post-surgical expected outcomes related to cataract in relation to knowledge within study group (n=100):

| Patients' total scores of eye self-practice and post-surgical expected outcomes related to cataract in relation to knowledge within study group | Patients' knowledge score (pre-intervention) |                     | Patients' knowledge score (post-intervention) |         |
|---|--|---------------------|---|---------|
|   | R (spearman correlation coefficient)         | P value             | R (spearman correlation coefficient)          | P value |
| Patients' eye self-care practice total score (pre-intervention)   | 0.532  | <0.001<br><b>HS</b> |   |         |
| Patients' eye self-care practice total score (post-intervention)  |  |                     | 0.42  | 0.02    |
| Patients' expected outcomes' total score (pre-intervention)   | 0.59   | <0.001<br><b>HS</b> |   |         |
| Patients' expected outcomes' total score (post-intervention)  |  |                     | 0.39  | 0.01 S  |

HS: highly significant

S: not significant

## Discussion

### Sociodemographic characteristics of the studied sample:

Concerning age, the mean age of study group was 50.26±4.7 and 50.4±4.29 for control group. This finding was constant with *Lamoureux et al., (2021)* who said that "the mean age of studied patients was 50.3±4.5 years" and, *Lee et al., (2018)* who reported that "the majority of patients' age was older than 45 years". On the other hand this result was incompatible with *Gimbel & Dardzhikova (2021)* who mentioned that "the mean age of the studied sample was 57.6 years", additionally *Mansour et al., (2015)* who declared that "52.9±6.5 years was the mean age of studied patients". This contradiction may be attributed to the decreased patients' awareness,

incomes and health services in Egypt that allow cataract symptoms to appear early than in other countries.

Regarding to sex, more than half of both study and control group were males 54% and 60% respectively, was revealed in this study. This finding was in agreement with *Gimbel & Dardzhikova (2021)* who mentioned, "Males constitutes more than half of control group". Moreover, the present study findings were in accordance with *Mansour et al., (2015)* who stated, "Males represented majority of control group" besides, *Rabinovitch (2020)* who found, "About half of his study group were females while males represented most of control participants". Also, was compatible with *Lee et al., (2018)* who reported, "Males constituted two thirds of his control group". These agreements may be due to the nature of cataract

incidence as it affects male patients three to four times more than female patients.

**As regards to marital status;** according to the current study results, majority of study group were married compared with less than half of control group which was compatible with their age group. The current study results was supported by **Hassankhani et al., (2020)** who mentioned, "Most of their studied subjects were married". On contrary, **Allen & Vasavada (2019)** mentioned, "Most of studied groups were single" this contradiction may be attributed to that these range ages usually are married according to the Egyptian culture.

**Concerning the educational level:** the current study revealed that about one third of both study and control groups were graduated from secondary school. These findings were in agreement with **Lamoureux et al., (2021)** who declared, "Only one third of their sample have secondary school education", however against **Allen & Vasavada (2019)** who said, "Minority of their intervention group had better academic education". Besides, **Rabinovitač (2020)** pronounced, "Greater than three quarters of his studied patients had college education" and also **Lee et al. (2018)** who referred to that "almost all patients had better education".

**Concerning occupation,** the present study revealed that greater than one-half of both study and control groups had work. This result mismatched with **Gimbel & Dardzhikova (2021)** who pronounced, "The rate of jobless is high among cataract patients". This contradiction may be attributed to the expensive daily life needs with low incomes and bad health insurance services that all necessitate working under any condition.

**Regarding medical history,** the present study revealed that the most common chronic diseases were diabetes and hypertension for both studied groups. This finding is in harmony with **Lee et al., (2018)** who stated, "Hypertension was the highest chronic disease among studied subjects and about half of both studied subjects complain of chronic diseases". This harmony may be because of the nature of cataract risk factors since chronic diabetes and hypertension are considered main risk factors for cataract.

**Regarding family history,** about one third of study group subjects and more than half of control group subjects have family history of eye diseases according to this study. These results keep up a correspondence with the higher cataract incidence and prevalence estimates of positive family history amongst those individuals **National Eye Institute (2020)**.

Furthermore, the existing study findings agreed with **Rabinovitač (2020)** who revealed, "Majority of both groups had past family and first degree relatives' history of eye diseases". Besides these findings were compatible with **Kotecha et al., (2015)** who confirmed, "Majority of both groups had eye diseases related to chronic illnesses like hypertension and diabetes". In addition, the current study findings were consistent with **Mohammadpour et al., (2019)** who mentioned, "About half of both studied groups were complaining of chronic diseases with a high number of cataract patients with positive family history of hypertension".

**As regards to patients' information source about cataract,** the present study revealed that about half of both studied groups got their information about cataract from TV, magazines and social media, while the minority got their information about cataract from ophthalmologist and optometrist. This result indicates that patients never seek medical help unless the condition is serious because of their low incomes. This result is in discrepancy with **Lee et al. (2018)** who stated, "almost of their patients get their information about cataract from ophthalmologist and optometrist" additionally the current study result was contradicted with **Reddy (2019)** who stated "Majority of the control and study group patients had their information about cataract from health care providers.

#### **Regarding Patient's total knowledge score:**

The current study revealed that post-intervention total knowledge scores' mean showed a higher statistical significant improvement for study group than in control group, furthermore current study results illustrated that study group total knowledge scores' had a higher statistical significant post-led-intervention improvement than pre-intervention. These findings was compatible with **Reddy (2019)** who stated, "Majority of studied patients had good post-intervention score of knowledge level"

also, it was into steady with *Edward & Harkness (2020)* who confirmed, "There has been an immediate development in knowledge level post-intervention ranged from adequate to good level with high statistical significant improvement". Conversely, *Rabinovitač (2020)* stated, "There was dissatisfaction of patients' understanding for anatomy and structure of the eye".

Moreover, the existing study findings have been in similarity with *Pandey & Suresh (2018)* who stated, "An improvement was proven in patient's understanding level after instructional intervention than earlier". Similarly, a post-intervention improvement in patients' knowledge regarding eye care was illustrated by *Christen et al., (2021)* who suggested, "There was a significant improvement in patient's knowledge in all tested areas upon implementation of nursing interventions and this improvement was retained throughout follow-up". Besides, *Newman et al., (2019)* stated, "A proven significant improvement in patients' understanding level regarding treatment strategies post-educational intervention". This improvement indicates that there was a high quality effect of nurse-led intervention on patients' understanding, which was confirmed by several researches that recognized the intervention as one of the exceedingly independent positive predictors of patient's knowledge development. From the researchers' point of view, patients' educational needs are verified through an earlier rating of their awareness prior to any intervention, whilst an improved knowledge level subsequent to education ascertained the positive impact of the nursing led-interventions.

### Regarding Self-care practice

An apparent significant enhancement in patients' reporting proportions regarding all items of eye self-care practices was found in current study results. Obviously, patients' awareness should be improved via receiving health education about the importance of eye self-care to minimize the danger of visual impairments. The present study results concurred with *Christen et al., (2021)* who stated, "There is a lack of attention from eye care practitioners regarding proper explanation and demonstration techniques for correct displaying of eye drops instillation approach. This may be owing to lack of their time, stressful practice schedule and/or lack of data

which, all contribute to the fact that the patient no longer knows how to instill eye drops effectively".

Furthermore, this study have shown a post-intervention positive relationship between patient's total scores of all items of eye self-care practices in relation to total score of knowledge within study group, which give rise to post-intervention appropriate and efficient eye self-care practice total score. The present study finding was interrelated with results of *Newman et al., (2019)* who detailed, "Patients' compliance and self-care practice was improved via educational interventions", likewise this finding was related to results of *Ram et al., (2020)* who mentioned, "There was post-educational intervention improvement among patients' self-care practice".

Moreover, the existing study revealed that there was an evident measurable post-intervention statistical significant difference regarding study group patient's practice total score in respect to eye self-care in comparison between study and control groups with p value <0.001. This finding was compatible with *Edward & Harkness (2020)* who established, "A profound association between patients' awareness and self-care practice". From the researchers' viewpoint, this could be resulted from effective nurse-led interventions that resulted in increasing level of patients' awareness about cataract and their self-care practice.

*Regarding nurse-led interventions*, the results of this study showed that approximately three fourths of both groups have low awareness about cataract and did not practice eye exercise at all. This was based on the mean knowledge level, self-care practice and expected outcomes at baseline data for both study and control groups. This conclusion is consistent with that of *Mansour et al., (2019)* who declared that "barely one third of their patients practiced eye exercises", as well as *Rabinovitač (2020)* who reported that "minority of studied patients conducted eye exercises". According to the researcher's opinion, the patients did not understand the value of eye exercises and were not aware of cataract management; as a result, those subjects have a critical need for cataract management education to improve their quality of life.

### Regarding Patients' expected outcomes

The current study results revealed that study group patients had significantly higher mean expected outcomes scale scores than control group patients, in addition to a significant improvement in patients' expected outcomes post-intervention scale scores among study group. A highly statistically significant improvement in the patient's expected outcomes following the use of nurse-led intervention was found. These results may be attributed to the demonstrated efficacy of the practiced nurse-led interventions given for study group, while prohibited for control group on the more, *Howard (2017)*, who stated that "Patients' contentment with the practiced treatment can allow the attainment of his/her predicted outcomes," backed up these findings. Additionally, findings of the current study corresponded with those published by *Weatherall et al., (2019)*, who noted that "Higher score of expected outcomes of treatment post-intervention" and concurred with *Mathew (2021)* who claimed, "There was a highly statistically significant difference of patient's practice regarding eye care post-intervention with p value (<0.001) dependent on development of patients' knowledge and practice".

**According to the current study's findings,** there was a substantial positive post-intervention significant association between the study group's average scores of patient's knowledge and proper and effective self-care practice scale. This conclusion was reinforced by the findings of *Mansour et al., (2019)* who noted that "patient's compliance and self-care practice were enhanced by increasing their awareness through the use of educational interventions". The current study's findings also revealed, when comparing the study and control groups, a highly statistically significance in the post-intervention practices of patients for eye care with a p value 0.00. This result was in line with what *Hassankhani et al., (2020)* reported in their study on the subject, in which they stated that "A substantial link between awareness of cataract and self-care practice was identified." This could be due to the efficient use of the study methods, in the opinion of the researcher.

### Conclusion:

Derived from the existing study findings, it was concluded that applying nurse-led

interventions had a significantly positive effect on patients' expected outcomes and eye self-care practices related to cataract disease, as they resulted in an improvement in all of their overall scores related to the knowledge after application of the nurse-led interventions. Thus, educational nurse-led interventions increased patients' awareness about their disease, which improved their quality of life and assisted the patient in meeting daily needs and performing life activities effectively.

### Recommendations:

Based on the current study results, the subsequent recommendations are made:

1. Designing nurse-led interventions training programs for ophthalmology patients that should be given periodically to reinforce, update and refresh their awareness and knowledge base about self-care practice regarding cataract for proper achievement of patient's needs, enhancing safety, improve patients' post-surgical expected outcomes, minimize complications and prevent further visual problems.
2. Replication of the study on a larger sample size from a wide geographical area and with a long-term follow-up period that allows more generalization of the results
3. Application of similar studies in other clinical research areas is highly recommended for enhancing a better and greater understanding of the effect of nurse-led interventions in different clinical research areas.

### References

- Allen D, & Vasavada A (2019).** "Cataract and surgery for cataract". *BMJ.* 333 (7559): 128–32. doi:10.1136/bmj.333.7559.128. PMC 1502210. PMID 16840470.
- American Ophthalmology association, (2019):** Facts about cataract, Available at: <http://nei.nih.gov/health/ataract/ataractfacts>.
- Chan, WH; Biswas, S; Ashworth, JL; & Lloyd, IC (April 2019).** "Congenital and infantile cataract: Etiology and management". *European Journal of Pediatrics.* 171 (4): 625–30. doi:10.1007/s00431-019-1700-1. PMID 22383071.

- Christen WG, Manson JE, Seddon JM, Glynn RJ, Buring JE, Rosner B, & Hennekens CH (August 2021).** "A prospective study of cigarette smoking and risk of cataract in men". *JAMA*. 268 (8): 989–93. doi:10.1001/jama.2021.03490080063025. PMID 1501324.
- Dawn, A., Santiago, C. & Lee, P.(2012).** Patient expectations regarding eye care: development and results of the Eye Care Expectations Survey (ECES). *American Journal of Ophthalmology* ;121(36):762-768.
- Edward S. & Harkness N., (2020).** "Posterior Supcapsular Cataract". Digital Reference of Ophthalmology. Department of Ophthalmology of Eye Institute, Columbia University. 2020. Archived from the original on 27 March 2019. Retrieved 2 April 2020.
- GBD (2020):** Disease and Injury Incidence and Prevalence, Collaborators. (8 October 2021). "Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 2000–2020: a systematic analysis for the Global Burden of Disease Study 2020". *Lancet*. 388 (10053): 1545–1602. doi:10.1016/S0140-6736(16)31678-6. PMC 5055577. PMID 27733282
- Gimbel, HV; & Dardzhikova, AA (January 2021).** "Consequences of waiting for cataract surgery". *Current Opinion in Ophthalmology*. 22 (1): 28–30. doi:10.1097/icu.0b013e328341425d. PMID 21076306. S2CID 205670956.
- Global Data on Visual Impairments (2020).** WHO. 2022. p. 6. Archived (PDF) from the original on 2022-03-31.
- Hassankhani, H., Haririan, H. & Heidarnejad ,F., (2020).**The Relationship Between Self-Management and Quality of Life and Visual Function in Cataract Patients. *J Holist Nurs Midwifery*; 30(2):93-100
- Howard M., (2017).** Patient Satisfaction. Available online at: <https://www.practicebuilders.com/blog/patient-satisfaction-why-it-matters-and-how-to-improve-it/> (accessed August 24, 2018).
- Kotecha, A., Bonstein, K., & Cable, R .(2015).** Qualitative investigation of patient's experience of cataract. *BMJ Open*; 5(1) :1-6.
- Lamoureux, EL; Fenwick, E; Pesudovs, K; & Tan, D (January 2021).** "The impact of cataract surgery on quality of life". *Current Opinion in Ophthalmology*. 22 (1): 19–27. doi:10.1097/icu.0b013e3283414284. PMID 21088580. S2CID 22760161.
- Lee, J.,Bailey, G., & Thompson, V., (2018).** Cataract diagnosis and management. Available at: <https://www.aao.org/eye-health/diseases/ataract-treatment>.
- Mansour M., Abd-Elaziz,N., Mekkawy, M. &Ahmed ,R., (2019):** Awareness among cataract patient at upper Egypt . *International Journal of Advanced Nursing Studies* ;44(4):436-441
- Margret N., Watkinson S., & Seewoodhaky, R., (2009).** Administering eye medications, *Nursing Standard*;22(18):42-48.
- Mathew MC., Ervin AM., Tao J., & Davis RM. (2021).** "Antioxidant vitamin supplementation for preventing and slowing the progression of age-related cataract". *Cochrane Database of Systematic Reviews*. 6 (6): CD004567. doi:10.1002/14651858.CD004567.pub2. PMC 4410744. PMID 22696344. Retrieved 11 March 2020.
- Mohammadpour, M; Shaabani, A; Sahraian, A; Momenaei, B; Tayebi, F; Bayat, R; & Mirshahi, R (June 2019).** "Updates on managements of pediatric cataract". *Journal of Current Ophthalmology*. 31 (2): 118–26. doi:10.1016/j.joco.2018.11.005. PMC 6611931. PMID 31317088.
- National Institute of Health (2020):** "Recognizing Cataracts". NIH News in Health. 2019-05-30. Retrieved 2020-02-02. Try wearing sunglasses or a hat with a brim. Researchers also believe that good nutrition can help reduce the risk of age-related cataract. They recommend eating plenty of green leafy vegetables, fruits, nuts and other healthy foods.

- Newman K., Casey P., Jennifer, S., WeizerL., Heisler M., Paul P., Lee F., and Joshua S., (2019).** Systematic Review of Educational Interventions to Improve Cataract Medication Adherence. *SeminOphthalmol*; 28(3): 191–201.
- Pandey A., & Suresh K. (2018).** Cataract Surgery Techniques, Complications, And Management. Philadelphia: Lippincott Williams & Wilkins. p.20. ISBN 978-0781743075. Archived from the original on 2018-05-24.
- Rabinovitch h., (2020):** Assessment needs for cataract patient care Available at [www.northtorontoeyecare.com/glaucoma/news](http://www.northtorontoeyecare.com/glaucoma/news).
- Ram L., Jagat E., GuptaY., & RohitK., (2020).** "Petaloid Cataract". *New England Journal of Medicine*. 374 (18): e22. doi:10.1056/NEJMicm1507349. PMID 27144871.
- Rao, GN; Khanna, R; & Payal, A (January 2021).** "The global burden of cataract". *Current Opinion in Ophthalmology*. 22 (1): 4–9. doi:10.1097/icu.0b013e3283414fc8. PMID 21107260. S2CID 205670997.
- Reddy SC (2019).** "Age-Related Cataract: a case report and review of the literature". *European Journal of Ophthalmology*. 9 (2): 134–38. doi:10.1177/112067219900900211. PMID 10435427. S2CID 45814684.
- Statistical Ophthalmology records of Menoufia University Hospital and Shebien El-Kom Ramad Hospital, (2021).**
- Taylor C., Lillis C., Lynn P., & Limond, P. (2015).** *Fundamentals of nursing: the art and science of nursing care* 8th ed. 10 (3):817-38.
- The National Eye Institute (September 2020).** "Facts About Cataract". Archived from the original on 24 May 2021. Retrieved 24 May 2021.
- Weatherall M., Clay J., James K., Perrin K., Shirtcliff P., & Beasley R., (2019).** "Dose-response relationship of inhaled corticosteroids and cataracts: a systematic review and meta-analysis". *Respirology* (Carlton, Vic.). 14 (7): 983–90. doi:10.1111/j.1440-1843.2009.01589.x. PMID 19740259. S2CID 43843511.
- WHO (2020):** "Priority eye diseases". Archived from the original on 24 May 2020. Retrieved 24 May 2020.
- World Health Organization, (2018):** Prevention of Blindness and Visual Impairment: Priority Eye Diseases. Available at: <http://www.who.int/blindness/causes/priority/en/index1.html>
- WHO (May 2020).** "Visual impairment and blindness Fact Sheet N°282". Archived from the original on 12 August 2020. Retrieved 23 August 2020.