Effect of a Structured Intervention Program on Ophthalmic Nurses' Performance and Pediatric Visual Outcomes Following Cataract Surgery

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Abstract

Background: *Intraocular surgery is now widely practiced, and the ophthalmic nurse serves as the cornerstone of eye care delivery. Timely surgical intervention and high-quality perioperative nursing care are critical for improving visual outcomes.* ***Aim of the study:*** *was to evaluate the effect of a structured intervention program on ophthalmic nurses' performance and pediatric visual outcomes following cataract surgery. Design: A quasi-experimental design (pre-test, post-test, and follow-up) was employed. Setting: The study was conducted at the Ophthalmology Department and Outpatient Clinics of Zagazig University Hospitals and Al-Fath Hospital (Health Insurance System) in Zagazig City, Egypt. Subjects: A sample of 40 ophthalmic nurses and 40 children undergoing cataract surgery along with their caregivers. Tools of data collection: Three tools were used as follows: (1) a self-administered questionnaire for nurses, (2) an observational checklist, and (3) a children's assessment sheet for visual outcomes.* ***Results****: Nurses showed a statistically significant improvement in knowledge and clinical practice scores in both post-intervention and follow-up phases compared to baseline ($p < 0.01$). Moreover, children exhibited significant improvements in visual acuity and a notable reduction in postoperative complications over time.* ***Conclusion:*** *The structured intervention program effectively improved ophthalmic nurses' performance and contributed to better visual outcomes in children following cataract surgery. Recommendation: Periodic in-service training is recommended to sustain and advance ophthalmic nurses' knowledge and practices in pediatric cataract care.*

Keywords: *Pediatric Cataract, Intervention Program, Nurses' Performance, Visual Outcomes.*

Introduction

Pediatric cataract is defined as any opacity or clouding of the eye's natural lens that occurs in children, resulting in visual impairment and potentially irreversible blindness if not promptly managed. It may be congenital, developmental, or traumatic due to ocular injury **(Gupta et al., 2024).** Recent epidemiological data report an annual incidence of 1.8–3.6 per 10,000 children with a global prevalence figures ranging between 1 and 15 per 10,000. Congenital cataract specifically shows a pooled prevalence of approximately 4.24 per 10,000. Additionally, bilateral congenital cataracts affect an estimated 20,000–40,000 newborns annually **(Sheeladevi et al., 2016; EyeWiki, 2024; Mendoza-Moreira et al., 2024).**

In **Egypt**, pediatric cataract is a notable reason of visual impairment in children, arising from both congenital and traumatic factors. A retrospective analysis conducted at the Mansoura Ophthalmic Center from 2016 to 2021, which included 124 children and 160 eyes, found that congenital cataracts represented 41.3% of pediatric cases, while traumatic cataracts comprised the majority at 53.1% **(ALAJAMI et al., 2023)**. Early diagnosis and timely surgical intervention, supported by comprehensive pre- and postoperative care, are critical to prevent deprivation amblyopia and ensure optimal visual outcomes. The success of surgical treatment depends not only on the surgical technique but also on the quality of perioperative nursing care **(Berdahl and Vann, 2024; EyeWiki, 2024).**

Ophthalmic nurses play a pivotal role in caring for pediatric patients undergoing cataract surgery. Their responsibilities include preoperative preparation, postoperative monitoring, caregiver education, early complication detection, and ensuring adherence to follow-up (**Nizami et al., 2024)**. Despite this, several studies have identified notable gaps in ophthalmic nurses' knowledge and practice in the context of pediatric care, which can negatively affect patient outcomes**(Flayyih and Mohammed., 2023); (Mohamed et al., 2022).**

International research underscores that specialized educational interventions such as the "Pediatric Nursing Excellence Model" help close these gaps and yield sustained improvements in knowledge and clinical practice across diverse pediatric surgical contexts **(Ramadan et al., 2024).** Addressing this gap, the current study evaluates the effect of a structured intervention program on improving ophthalmic nurses' knowledge and clinical performance, as well as visual outcomes in children after cataract surgery.

Operational Definitions:

Intervention Program

The intervention program included targeted educational sessions, practical demonstrations, and supportive visual and written materials. The program was specifically designed to enhance ophthalmic nurses' knowledge and clinical practice and performance in the care of children undergoing cataract surgery.

Nurses' Performance: The combined measurable outcomes of ophthalmic nurses' knowledge and practical skills in delivering care to pediatric patients who have undergone cataract surgery.

Pediatric Visual Outcomes:

The measurable visual outcomes in children after cataract surgery were evaluated, including the presence or absence of postoperative complications, such as infection and inflammation, as well as assessing improvements in visual acuity using age-appropriate charts.

Significance of the study

Pediatric cataracts, if left untreated, lead to permanent visual disability, severely impacting a child's cognitive, motor, and social development during critical stages of growth **(Long et al., 2022; Dericioğlu et al., 2023).** In addition to the clinical impact, it imposes a high socioeconomic burden on families and healthcare systems, resulting in increased dependency, reduced educational attainment, and higher long-term care costs **(Uddin et al., 2024)**. Evidence indicated that early surgical correction, when paired with structured postoperative nursing care, significantly improves visual outcomes and reduces the risk of preventable childhood blindness **(Taha, 2021).** Enhancing pediatric cataract care through effective surgical management and high-quality nursing care can improve the overall quality of life for affected children and their families **(Madlabana et al., 2020)**.

Aim of the study:

To evaluate the effect of a structured intervention program on ophthalmic nurses' performance and pediatric visual outcomes following cataract surgery.

Research hypothesis:

H_1: Implementation of the structured intervention program will result in a significant improvement in ophthalmic nurses' performance scores, including both knowledge and clinical practice.

H_2: The visual outcomes of children undergoing cataract surgery are expected to improve after the implementation of the structured intervention program.

Subjects and Method

Research design:

A quasi-experimental design incorporating pre-test, post-test, and follow-up assessments was employed to identify the effectiveness of the intervention.

Setting:

The study was conducted in two main locations: the Ophthalmology Department and Outpatients' Ophthalmology Clinics at Zagazig University Hospitals and Al-Fath Hospital (affiliated with the health insurance system) and its Outpatient Clinics for follow-up in Zagazig City.

Subjects: The sample was divided into two main groups:

Group one: Ophthalmic nurses

The total accessible number (40) of the participating nurses in the previous setting was 28 nurses from the ophthalmology department at Zagazig University Hospital and 12 nurses from Al-Fath Hospital.

The inclusion criteria of nurses:

Willingness to practice in the study, actively involved in bedside care of children undergoing cataract surgery. Head nurses or supervisors who were not involved in direct patient care were excluded.

Group two: Children and their caregivers:

A purposive sample of 40 children scheduled for cataract surgery were recruited, along with their primary caregivers (mothers), who consented to participate.

The **inclusion criteria** involved children from birth up to 18 years of age, of either sex, willing to attend follow-up appointments, and free from other eye disease.

The sample size determination

Based on **El Shafaey and Basal (2018)** and using Epi Info version 7.2.5.0 with a 95% confidence level and 80% power, the required sample size was 40 children.

Tools for data collection:

Three tools were developed by the researchers and utilized for data collection.

Tool I :Self-Administrative Questionnaire for Nurses

It was developed by the researchers after a thoroughly detailed review of relevant literature and composed of two parts:

Part 1: Demographic and professional characteristics of the ophthalmic nurses, including age, marital status, educational level, years of experience, qualifications, previous training courses in ophthalmology, and sources of information about pediatric cataract surgery.

Part 2: Ophthalmic Nurses' Knowledge

This part was developed based on established guidelines and previous studies **[Donaldson et al., (2017), Richard et al., (2015), Silverthorne, (2016), and Vander et al., (2013)].** It was comprised of 49 multiple-choice and closed-ended questions designed to assess nurses' theoretical knowledge related to pediatric cataract surgery and its associated nursing care. This tool covers the following five key domains: ocular structure and function (8 questions), cataract disease and surgical management (10 questions), pre- and postoperative nursing interventions (10 questions), post-surgical complications (3 questions), and discharge instructions and home care (18 questions).

The scoring system:

Correct answers were awarded 1 point, while incorrect or "I don't know" answers received 0 points; the total and subscale scores were obtained by summing the points assigned to each response. The total knowledge score was 138 marks, classified as follows:

- **Poor:** less than 60%
- **Fair:** 60% to less than 80%
- **Good:** 80% and above.

Tool II: Observational Checklist for Nurses' clinical practice:

This tool was developed by the researchers following an extensive review of current and relevant literature and guided by **American Society of Health (2019), Bayomi et al. (2014), Ganesh & Khurana (2021), Jensen (2015), Nettina (2014), and Taylor et al. (2015).** It was designed to evaluate the actual nurses' clinical practices in caring for children undergoing cataract surgery distributed as follows: preoperative and immediate postoperative nursing interventions (21 steps), performing eye care techniques with infection control (14 steps), changing eye dressing (17 steps), ocular drop instillation (13 steps), ointment (15 steps), and methods for relieving postoperative cataract pain (34 steps).

The scoring system

Each item was evaluated based on the accuracy and completeness of the nursing practice observed: A score of 1 point was assigned for each step done correctly, while a score of "0 points" was given for steps that were either not performed or performed incorrectly. The total possible score for all procedures was **114 marks**. After data collection, the raw scores were converted into percentage scores to assess the overall level of nursing practice. Based on these percentage scores, nursing performance was categorized into two levels:

Unsatisfactory level of practice: < 80%

Satisfactory level of practice: ≥ 80%

Tool III: Children's Assessment Sheet:

It was developed by the researchers after a detailed review of relevant literature and guided by **El-khamisy et al. (2019), Kavitha (2022), and Rho & Cho (2012).** It is composed of four main parts:

Part 1: Description of the studied Children and Their caregivers, involving data related to the child's age, birth order, gender, educational level, residence, parental education, occupation, and presence of consanguinity.

Part 2: Medical history included type and etiology of cataract, clinical features, and family history, time of eye injury, and follow-up schedule.

Part 3: Visual assessment:

This part is designed to assess the best corrected visual acuity (BCVA) at three time points: pre-surgery, one week, and one month after surgery during the follow-up visits. For preverbal and uncooperative children, visual improvement is assessed through the presence or absence of the red reflex, which indicates the clarity or opacity of the optical media, and the child's ability to fixate on and follow an object of interest (e.g., a toy).

Part 4: Postoperative Visual Complications

This part is used to assess the presence or absence of postoperative complications such as endophthalmitis, elevated intraocular pressure, cystoid macular edema, posterior capsule opacification (PCO), increased redness of the eye, hemorrhage, wound leakage, creamy or crusty drainage on the eyelids, change in visual acuity, photophobia, corneal edema, and lens decentration. It was evaluated three times postoperatively (24 hours, one week, and one month).

Scoring system:

For visual assessment, one point was given for the presence of red reflex and the ability to fixate and follow objects, and zero points for the absence of red reflex and the inability to fixate and follow objects.

For postoperative complications, A score of one was assigned for the presence of any postoperative complication, while a score of zero was given if no complications were observed.

Content validity and reliability of tools:

To ensure content validity, the developed tools were reviewed by a panel of three experts: one professor and one assistant professor of pediatric nursing from the Faculty of Nursing and one professor of ophthalmology from the Faculty of Medicine, Zagazig University. The experts reviewed the tools for clarity, relevance, applicability, comprehensiveness, understanding, and ease to use. Minor revisions were made based on their feedback.

Reliability coefficients for the components of tools were done by calculating Cronbach's alpha to measure the reliability of the tools, yielding the following results: Knowledge reliability statistics Cronbach's alpha: 0.906, and practice reliability statistics Cronbach's alpha: 0.976, which indicate good consistency for both.

Pilot study:

A pilot study was conducted on 10% of the total sample (4 nurses and 4 children) to test practicality, coherence, comprehensibility, and usability of the study instruments. It also helped estimate the time required for each tool and identify any needed modifications. The pilot participants were later excluded from the final sample to avoid bias.

Ethical consideration:

Firstly, ethical approval from the Scientific Research Ethics Committee of the Faculty of Nursing was obtained. Prior to data collection, informed consent was obtained from all participants after explaining the purpose, procedures, and their freedom to join or leave the study at any time without facing penalty. All ethical principles were upheld throughout the study. Participants' privacy was fully protected, and all data collected were used strictly for academic research.

Administrative design:

Approval was granted following the submission of an official letter from the Faculty of Nursing Dean at Zagazig University to the concerned authorities, "the hospital director and head of the ophthalmology department at Zagazig University Hospital and Al Fath Hospital," to obtain their permission for conducting the research, explaining the aim, expected outcome, and data collection.

Study framework

The intervention program was executed through four phases as follows:

Assessment phase (pre-test)

The intervention program was partially constructed for the assessment of studied nurses' knowledge and practice. The assessment was started by individual interviews for each nurse to collect demographic and professional data and assess their baseline knowledge and practice after clarifying the study objectives and securing informed consent for participation. The estimated time for each questionnaire was around 25–30 minutes. The researchers observed nurses' actual practice during the caring for children undergoing cataract surgery checklist. This assessment phase shed light and gave more insight into deficits in nurses' knowledge and practices and helped in identifying their educational needs.

Planning phase:

Based on the feedback and results collected via the interview sheet and observational checklist during the pilot study and assessment phase, along with a thorough review of the related literature, the program was developed by the researchers. Identified needs, requirements, and deficiencies were translated into clear aims and objectives, with content tailored to address specific gaps in knowledge and practice.

Appropriate **Teaching methods** were selected to suit teaching in small groups in the form of lectures, group discussion, demonstration and re-demonstration. **Teaching materials** involved colored posters, handouts (booklets), brochures for home care instructions, videos presented via laptop, and real materials (e.g., eye droppers, tissue paper) covering both theoretical and practical content.

Implementation phase:

The intervention program was delivered through seven structured sessions combining both theoretical and practical content. Sessions were conducted individually or in groups based on nurses' availability. Each session lasted approximately 15 to 35 minutes, depending on the complexity of the content and the level of participant interaction. Throughout the sessions, the researchers employed motivational strategies and reinforcement techniques to promote engagement and active learning. At the end of the sessions, each nurse received an Arabic-language booklet summarizing the program content for future reference and clinical application. The content of each session was structured as follows:

Session 1: Program Orientation and Pre-Assessment

In the first session, the researchers introduced themself and clarified the aim and objectives of the intervention program. This session included a brief overview of the program structure, the total number of sessions, topics to be covered, and the expected outcomes. Additionally, a pre-intervention assessment of nurses' baseline knowledge and practice was conducted using the study tools, which helped to tailor the subsequent educational content to address identified gaps.

Session 2: Introduction and Basic Ocular Structure and Function

This session involved an overview of the basic structure and function of the eye and pediatric cataracts, including definition, causes, classifications, and common clinical manifestations. Emphasis was placed on the significance of early detection and timely management to prevent irreversible visual impairment.

Session 3: Diagnosis, surgical interventions, and post-surgery complications

In this session nurses were educated about methods of cataract diagnosis in children, surgical interventions, and types of cataract surgery performed in children. The researchers also addressed common postoperative complications such as wound-related inflammation and infection, etc.

Session 4: Pre- and postoperative nursing care

This session detailed comprehensive nursing responsibilities before and after cataract surgery. Preoperative nursing interventions include verifying surgical consent, conducting preoperative assessments, administering preoperative medications, and providing psychological support to both the child and caregiver to reduce anxiety. Postoperative care focused on knowledge about close monitoring for early signs of complications, proper administration of eye drops, maintaining proper hygiene to prevent infection, etc.

Session 5: Eye Care and Complication Management

This session focused on infection control during eye care procedures. Practical steps involved changing eye dressings and instilling eye drops and ointments. Core topics included hand hygiene, aseptic techniques during eye medication administration, and the importance of avoiding direct contact between the eyedropper and the eye. The researchers demonstrated proper eye drop and ointment instillation techniques, followed by hands-on practice.

Session 6: Pain Management Post-Surgery

This session focused on equipping nurses with essential knowledge and skills about pain relief measures and comfort techniques. The researchers discussed both pharmacological (e.g., analgesics such as acetaminophen and prescribed non-steroidal anti-inflammatory drugs) and non-pharmacological techniques (e.g., distraction, comfort positioning, relaxation techniques, and the importance of parental presence) in alleviating anxiety and discomfort. Practical demonstrations and role-play scenarios were used to enhance application in clinical practice.

Session 7: Discharge Planning and Caregivers' Education

The final session emphasized the critical role of nurses in ensuring safe and effective discharge planning. Emphasis was placed on ensuring continuity of care at home to enhance long-term visual outcomes and reduce the risk of complications. Key discharge instructions included the correct administration of medications, the importance of protective eyewear, activity restrictions, and signs warranting urgent medical consultation, food regimen, follow-up schedules, and hygiene practices.

Nurses were trained in delivering clear, simple, and culturally appropriate instructions to caregivers, supported by written materials such as brochures to ensure understanding and compliance.

Evaluation phase:

For Nurses:

To evaluate the effect of the intervention on nurses' performance, Tool I (knowledge assessment) and Tool II (observational checklist) were used at three stages: before implementation (pretest), immediately after (posttest), and three months post-intervention (follow-up). Results from these assessments were compared to measure improvement in knowledge and practice over time.

For children:

To assess the impact of improved nursing performance on children's outcomes, Tool III (Children's Assessment Sheet) was used:

Part Three (Visual Acuity Assessment): Conducted at three times; pre-surgery, one week, and one month postoperatively. Part Four (Postoperative Complications): Applied at 24 hours post-surgery (inpatient) and at one week and one month post-surgery (outpatient), aligning with the expected timeline for healing and complication observation.

Fieldwork:

The data collection phase spanned nine months, beginning in February and concluding in October 2023. Following official approval, the study tools were pilot-tested and analyzed.

Children and their caregivers were initially seen in the ophthalmic department prior to surgery to collect demographic information, medical history, and baseline visual acuity, as documented in the patients' medical records. Follow-up assessments were conducted in the outpatient clinic at two postoperative intervals: one week and one month after surgery, during which visual acuity was re-evaluated. At each assessment point, visual acuity was measured by the attending physician using standardized ophthalmic tools, including the Snellen chart, retinoscope, penlight and slit lamp examination.

Postoperative complications (part four) were assessed at three distinct intervals: immediately after surgery during the inpatient stay, at one week postoperatively, and again at one month during outpatient follow-up. This structured follow-up allowed for a comprehensive evaluation of short-term and early long-term visual outcomes.

Nurses were interviewed individually to fulfill the assessment tools, lasting approximately 20–30 minutes. Each nurse was observed over two shifts (morning and afternoon), and completion of the observational checklist took about 25–30 minutes, depending on the nature and timing of the nursing procedures.

Statistical analysis:

All data were collected, organized, and statistically analyzed using IBM SPSS for Windows (Version 25; IBM Corp., Armonk, NY, USA, 2017). Descriptive statistics were applied, where quantitative data were expressed as the mean ± SD, and qualitative data were expressed as absolute counts (frequencies) & percentage (relative frequencies). Appropriate statistical tests were used based on data type and distribution: McNemar, paired t-test, Wilcoxon test, Chi-square, ANOVA, and independent t-test. Spearman correlation assessed relationships between variables, and stepwise regression identified predictors of knowledge, practice, and complication scores. Reliability was measured using Cronbach's alpha. Results were considered statistically significant at $p < 0.05$ and highly significant at $p < 0.01$.

Results

Table 1 indicates that 45% of the nurses were aged 30–40 years (mean = 34.73±6.99), with 55% holding a diploma degree. More than half (52.5%) had over 10 years of general nursing experience, and 42.5% had similar experience in ophthalmology. Notably, none had received prior training in cataract surgery care, and 50% relied on physicians as their primary source of information regarding pediatric cataract surgery.

Figure 1 shows a significant improvement in nurses' knowledge after the intervention. The percentage of nurses with poor knowledge dropped from 85% to 0%, while those with good knowledge rose from 2.5% to 87.5% post-intervention and remained high at follow-up (82.5%). These changes were highly statistically significant **(p < 0.01). Table 2** displays the progression of the total mean scores of ophthalmic nurses' actual clinical practices throughout the pre-intervention, post-intervention, and follow-up phases of the study. A highly statistically significant improvement **(p < 0.01)** was observed in all domains of nursing practice following the implementation of the intervention program.

As observed from Table 3, there was a highly statistically significant relationship between nurses' age, marital status, qualifications, and years of experience and their knowledge scores in the post-intervention and follow-up phases **(p < 0.01).**

Table 4 reveals a statistically significant association between certain demographic and professional variables, such as marital status, years of experience (total and specific), and the nurses' total satisfactory practice scores in both pre- and post-intervention phases **(P < 0.01).**

Additionally, **Table 5** highlights a significant positive correlation between nurses' knowledge and practice scores before the intervention, which became highly significant after the intervention and at follow-up.

Table 6 reflects a statistically significant reduction in postoperative complications such as redness, swelling, and photophobia among children from 24 hours to one month after cataract surgery, with the most marked improvement observed between the first day and the one-week follow-up **(p < 0.01). Figure (2)** shows a highly statistically significant reduction in the total mean scores of cataract-related complications among the studied children from 24 hours post-surgery through the one-month follow-up period **(p < 0.01).**

Table 7 indicates a significant improvement in visual acuity among the studied children following cataract surgery. In verbal children, 41.3% achieved 6/24 BCVA at one week or better at one month postoperatively, compared to poorer baseline levels (e.g., 17.2% with hand motion only). All preverbal children who showed no visual response before surgery gained red reflex and could fixate and follow light postoperatively. These changes were highly statistically significant (**p < 0.01**).

Table 8 shows that total practice and knowledge scores were highly significant negative predictors of cataract surgery complications **(p < 0.001),** indicating that better nurse performance was associated with fewer complications.

Table1: Demographic and professional characteristics of the participating nurses (n=40).

Items	No.	%
Age (years)		
▪ 20-< 30 yrs.	12	30.0
▪ 30-40 yrs.	18	**45.0**
▪ >40 yrs.	10	25.0
Mean± SD 34.73±6.99		
Marital status		
▪ Unmarried	5	12.5
▪ Married	35	**87.5**
Qualifications		
▪ Diploma	22	**55.0**
▪ Technical health institute	15	37.5
▪ Bachelor of nursing	3	7.5
General years of experience		
▪ <5	6	15.0
▪ 5-10	13	32.5
▪ >10	21	**52.5**
Years of experience in ophthalmology		
▪ <5	8	20.0
▪ 5-10	15	37.5
▪ >10	17	**42.5**
Previous training programs in cataract surgery		
▪ No	40	**100.0**
▪ Yes	0	0
Sources of information about cataract surgery		
▪ Physician	20	**50.0**
▪ Previous experience	9	22.5
▪ Training courses	0	0
▪ Internet	10	25.0
▪ Books	1	2.5

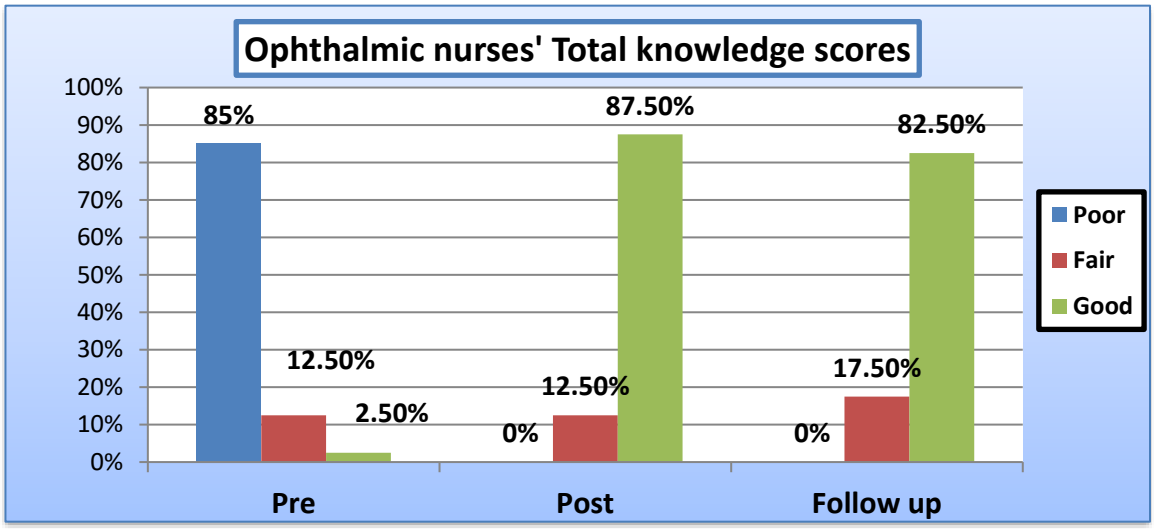

Fig (1): Bar chart showing total knowledge scores as reported by the studied nurses across the study phases.

Table 2 : Total Mean Scores of Nurses' Practices Related to Cataract Surgery and Nursing Interventions Across the Study Phases (n = 40)

Items	Pre-	Post-	Follow up	W and p1-value	Paired t-test and p2-value
	Mean± SD				
Preoperative nursing interventions	1.97±2.97	13.0±4.71	12.50±3.01	-5.517 (0.001**)	1.480 (0.147)
Immediate Postoperative nursing interventions	1.77±0.94	4.22±0.61	4.17±0.59	-5.425 (0.001**)	1.433 (0.160)
Performing eye care technique with infection control	1.40±2.25	12.20±2.09	11.80±2.84	-5.537 (0.001**)	1.567 (0.125)
Changing eye dressing	2.25±3.61	15.25±0.81	14.95±1.33	-5.507 (0.001**)	1.500 (0.142)
Instilling eye drop	1.95±2.81	13.17±1.21	12.77±2.0	-5.533 (0.001**)	2.013 (0.051)
Ointment application	2.45±2.97	13.85±0.83	13.40±2.02	-5.478 (0.001**)	1.761 (0.086)
Methods for relieving postoperative cataract pain	4.42±3.33	33.27±1.58	32.57±3.02	-5.528 (0.001**)	1.503 (0.141)
Total	16.22±10.46	108.80±10.03	107.72±9.88	-5.513 (0.001**)	1.339 (0.188)

W: Wilcoxon Signed Ranks Test, non-significant ($p>0.05$), **: statistically highly significant ($p<0.01$), p^1: for comparison between pre-intervention and post-intervention, p^2: for comparison between post-intervention and follow up phase.

Table 3: Relation between demographic and professional characteristics of studied nurses and their knowledge score throughout post-intervention and follow up phases.

Characteristics	Knowledge level								χ^2 ([1]p-value)	χ 2 (2p-value)
	Post				Follow up					
	Fair=5		Good=35		Fair=7		Good=33			
	No.	%	No.	%	No.	%	No.	%		
Age										
20-30	5	100.0	7	20.0	7	100.0	5	15.2	13.333 (0.001**)	19.798 (0.001**)
30-40	0	0.0	18	51.4	0	0.0	18	54.5		
>40	0	0.0	10	28.6	0	0.0	10	30.3		
Marital status										
Unmarried	5	100.0	0	0.0	5	71.4	0	0.0	FET (0.001**)	FET (0.001**)
Married	0	0.0	35	100.0	2	28.6	33	100.0		
Qualification										
Diploma	0	0.0	22	62.9	0	0.0	22	66.7	11.962 (0.003**)	12.294 (0.001**)
Technical institute	3	60.0	12	34.3	5	71.4	10	30.3		
Bachelor of nursing	2	40.0	1	2.9	2	28.6	1	3.0		
Years of experience (total)										
<5	5	100.0	1	2.9	6	85.7	0	0.0	32.381 (0.001**)	33.606 (0.001**)
5-10	0	0.0	13	37.1	1	14.3	12	36.4		
>10	0	0.0	21	60.0	0	0.0	21	63.6		
Years of experience in (ophthalmology)										
<5	5	100.0	3	8.6	7	100.0	1	3.0	22.857 (0.001**)	33.939 (0.001**)
5-10	0	0.0	15	42.9	0	0.0	15	45.5		
>10	0	0.0	17	48.6	0	0.0	17	51.5		
Sources of information about cataract surgery										
Physician	4	80.0	9	25.7	4	57.1	9	27.3	6.554 (0.161)	3.811 (0.432)
Previous experience	1	20.0	8	22.9	2	28.6	7	21.2		
Training courses	0	0.0	7	20.0	0	0.0	7	21.2		
Internet	0	0.0	10	28.6	1	14.3	9	27.3		
Books	0	0.0	1	2.9	0	0.0	1	3.0		

Table (4): Relation between demographic characteristics of the studied nurses and their satisfactory practice scores throughout the study phases.

Characteristics	Satisfactory practice level						χ^2 (^{1}p-value)	χ^2 (^{2}p-value)	χ^2 (^{3}p-value)
	Pre=2		Post=37		Follow up=32				
	No.	%	No.	%	No.	%			
Age									
20-30	2	100.0	9	24.3	10	31.3	4.912 (0.086)	7.568 (0.023*)	0.139 (0.933)
30-40	0	0.0	18	48.6	14	43.8			
>40	0	0.0	10	27.0	8	25.0			
Marital status									
Unmarried	2	100.0	2	5.4	4	12.5	FET (0.013*)	FET (.001**)	FET (0.99)
Married	0	0.0	35	94.6	28	87.5			
Qualification									
Diploma	0	0.0	22	59.5	16	50.0	25.965 (0.001**)	5.405 (0.067)	1.894 (0.388)
Technical health institute	0	0.0	12	32.4	13	40.6			
Bachelor of nursing	2	100.0	3	8.1	3	9.4			
Years of experience (total)									
<5	2	100.0	3	8.1	5	15.6	11.930 (0.001**)	18.378 (0.001**	0.405 (0.817)
5-10	0	0.0	13	35.1	11	34.4			
>10	0	0.0	21	56.8	16	50.0			
Years of experience in (ophthalmology)									
<5	2	100.0	5	13.5	7	31.9	8.421 (0.015*)	12.973 (0.002**	1.639 (0.441)
5-10	0	0.0	15	40.5	13	40.6			
>10	0	0.0	17	45.9	12	37.5			
Sources of information about cataract surgery									
Physician	1	50.0	10	27.0	11	34.4	1.853 (0.763)	6.736 (0.151)	6.923 (0.140)
Previous experience	1	50.0	9	24.3	6	18.8			
Training courses	0	0.0	7	18.9	7	21.9			
Internet	0	0.0	10	27.0	8	25.0			
Books	0	0.0	1	2.7	0	0.0			

χ 2: Chi square test FET: Fisher exact test non-significant(p>0.05), *: statistically significant (p <0.05), **: statistically highly significant (p<0.01), p^1: for pre-intervention, p^2: for post-intervention, p3: for follow up phase.

Table (5): Correlation between total knowledge and practice of studied nurses throughout study phases.

Pre	Practice		Post	Practice		Follow up	Practice	
	R	P		R	P		R	p
Knowledge	0.405	0.010*	knowledge	0.865	0.001**	Knowledge	0.895	0.001**

*: statistically significant (p<0.05), **: statistically highly significant (p<0.001), r: correlation coefficient

Table (6): Post-operative complications of studied children after 24 hours post cataract surgery up to one month (n=40).

Cataract complications	After 24 hours		After one week		After one month		MCp1	MCp2
	No.	%	No.	%	No.	%		
Increase redness of the eye	40	100.0	0	0.0	0	0.0	0.001**	------
Swelling	40	100.0	0	0.0	0	0.0	0.001**	------
Endophthalmitis	0	0.0	0	0.0	0	0.0	------	------
Drooping eyelid.	0	0.0	0	0.0	0	0.0	------	------
Wound leakage (creamy, white, dry)	0	0.0	0	0.0	0	0.0	------	------
Crusty drainage on the eyelids	0	0.0	0	0.0	0	0.0	------	------
Hemorrhage	0	0.0	0	0.0	0	0.0	-----	------
Photophobia	40	100.0	0	0.0	0	0.0	0.001**	------
lens decentration or dislocation	0	0.0	0	0.0	1	2.5	------	0.985
Retina moving out of place Retinal detachment	0	0.0	0	0.0	0	0.0	------	------
Posterior capsule opacification PCO	0	0.0	0	0.0	2	5.0	------	0.897
Secondary cataract	0	0.0	0	0.0	0	0.0	------	------
Corneal edema	4	10.0	4	10.0	0	0.0	0.999	0.125
Change in visual acuity	0	0.0	0	0.0	0	0.0	------	------
Vision loss	0	0.0	0	0.0	0	0.0	------	------

MC: McNemar test, non-significant (p>0.05), **: statistically highly significant (p<0.01), p1: for comparison between pre-intervention and post-intervention, p2: for comparison between post-intervention and follow-up phase.

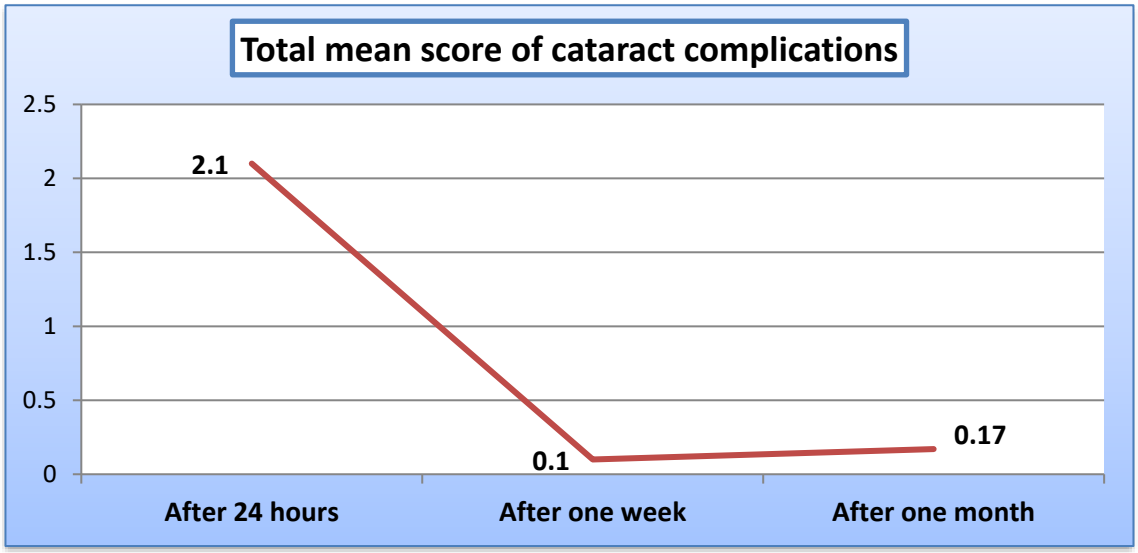

Figure (2): line graph showing total mean scores of cataract complications after 24 hours post cataract surgery up to one month.

Table (7): Improvement in Visual Acuity Among the Studied Children by Age Across Study Phases

Visual acuity Chart for the studied verbal and cooperative children (n=29)	Pre		Post		Follow up		MHp1	MHp2
	No.	%	No.	%	No.	%		
Hand Motion	5	17.2	0	0.0	0	0.0	0.001**	0.001**
Penetrating light	3	10.3	0	0.0	0	0.0		
Counting finger	2	6.9	0	0.0	0	0.0		
1/60	1	3.4	0	0.0	0	0.0		
3/60	3	10.3	0	0.0	0	0.0		
4/60	1	3.4	0	0.0	0	0.0		
5/60	2	6.9	0	0.0	0	0.0		
6/60	7	24.1	2	6.9	0	0.0		
6/36	5	17.2	12	41.3	4	10.0		
6/24	0	0.0	12	41.3	5	12.5		
6/18	0	0.0	2	6.9	12	41.3		
6/12	0	0.0	1	3.4	2	6.9		
6/9	0	0.0	0	0.0	3	10.3		
6/6	0	0.0	0	0.0	3	10.3		
Vision improvement of studied preverbal and uncooperative children (n=11).	Pre		Post		Follow up		MCp1	MCp2
	No.	%	No.	%	No.	%		
Red reflex	0	0.0	11	100.0	11	100.0	0.001**	0.999
Can fixate head and follow light	0	0.0	11	100.0	11	100.0	0.001**	0.999

MH: Marginal homogeneity test, **: statistically highly significant (p<0.01), p^1: for comparison between pre-intervention and post-intervention, p^2: for comparison between post-intervention and follow -up phase. MC: McNemar test, p1: for comparison between pre-intervention and post-intervention, p2: for comparison between post-intervention and follow-up phase.

Table (8): Determinants of Postoperative Complications Following Cataract Surgery: A Stepwise Regression Approach"

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.070	.232		13.231	.000	2.601	3.540
Practice score	-.027	.002	-.902	-12.854	0.001**	-.032	-.023
Knowledge	-.049	.010	-.540	-4.899	0.001**	-0.069	-0.029

**: statistically highly significant (p<0.001)
R-square=0.813, ANOVA: F= 165.213, P<0.001
Variables entered and excluded: child age, gender, Birth order, educational level, mother age, mother education, father age, father education, parental consanguinity, and residence.

Discussion

The results of the present study revealed statistically significant improvements in nurses' knowledge and practical performance scores after the implementation of the intervention program. These findings align with those of **Mahmoud Abo El-fadl et al. 2023; (Fatahi et al., 2023)** who noted enhancement of nurses' competencies following structured training in pediatric ophthalmic care. The observed improvement in the current study can be attributed to several factors: the interactive nature of the training sessions, the clarity and relevance of the clinical instructions provided, and the continuous supervision and support throughout the study. The enhancement in nurses' performance, particularly in areas such as eye care, dressing changes, medication administration, and complications monitoring, directly contributes to the quality of postoperative management for children undergoing cataract surgery.
Regarding nurses' knowledge about pediatric cataract surgery and related nursing interventions, the present study revealed that just a few percent of the studied nurses had good total scores related to all aspects of knowledge during the pre-intervention phase. However, a significant improvement was observed in both the post-intervention and follow-up stages, where majority of nurses achieved good total knowledge scores. The initially low knowledge could be explained in light of none of the studied nurses having previously attended any training programs aimed at improving and updating their knowledge. These notable variations demonstrate the effectiveness of the structured intervention program in addressing knowledge gaps and promoting sustained learning.
These findings are in harmony with **Taha (2021),** a highly statistically significant difference was noted in nurses' knowledge scores post-intervention and at follow-up compared to pre-intervention levels. Similar results are supported by **Abdullah et al. (2021)** and **Vidhyadevi et al. (2023),** who reported a notable increase in nurses' knowledge scores after implementing the intervention. These studies further reinforce the effect of targeted educational programs in enhancing nurses' knowledge and performance concerning cataract care.
On the other hand, **Hassan et al. (2022),** clarified that most of the nurses in their study had a fair level of knowledge regarding cataract care.

In relation to nurses' performance in caring for children undergoing cataract surgery, the data revealed a statistically significant improvement in the overall mean practice scores of all aspects of nursing care following the implementation of the intervention program. Moreover, in the pre-intervention phase, nurses' postoperative practices were generally unsatisfactory, as the majority of nurses did not correctly perform eye care techniques with appropriate infection control measures. This may be attributed to inadequate training, limited clinical supervision, and insufficient awareness of the critical role of infection control in postoperative eye care. However, in both the post-intervention and follow-up phases, there was a marked improvement, with the majority of nurses demonstrating correct practices, reflecting the positive impact of the program.
This result is consistent with **Abdullah et al. (2021)**, who revealed in their study a highly statistically significant improvement in the total mean nurses' performance scores related to eye care techniques and infection control in the post-intervention than pre-intervention. In the same context, **Tork et al. (2022)** highlighted that the majority of the nurses had competent practice post-designed eye care protocol implementation in all items. On the contrary, **Ebadi (2021)** stated that intensive care nurses demonstrated good levels of eye care practice.
As regards changing eye dressing, the results indicated a significant improvement in nurses' performance during the post-intervention phase, with clear advancement across all steps of the procedure. Following the implementation of the intervention, there was a marked increase, with most of the nurses correctly performing the procedure both immediately after and at the follow-up phase, indicating a substantial enhancement in clinical performance. These findings go in line with **Shehata (2019),** who reported that there was a major deficiency in postoperative nurses' practice related to eye care with infection control before implementation of the intervention than after the intervention.

Furthermore, in relation to instilling eye drops and applying ointment, it was observed that a small percentage of nurses had satisfactory practice in the pre-intervention phase, compared to most who achieved satisfactory levels post-intervention and at follow-up stages. This finding aligns with **Taha (2021)**, who initially observed that nurses had incompetent practice scores in administering eye drops and ointment, which significantly improved following the

implementation of a structured nursing intervention protocol. Also, **Vidhyadevi et al. (2023)** observed a highly statistically significant improvement in the total mean practice scores related to eye drop instillation during the post-intervention phase compared to the pre-intervention phase ($p < 0.001$), reinforcing the effectiveness of structured training programs in enhancing clinical competencies.

This finding disagreed with **El-Kasby et al. (2021),** who mentioned a high percentage of nurses had adequate practice levels in eye drop instillation and ointment application. The discrepancy may be attributed to limited access of the studied nurses to targeted training programs aimed at improving clinical practice. Moreover, the nurses may rely on habitual or acquired incorrect practices rather than adhering to evidence-based guidelines.

Taha et al. (2021) reported that the implementation of nursing intervention led to a significant improvement in nurses' practice, especially in the use of non-pharmacological methods for pain control pre-intervention as compared with post-intervention and after one week as a follow-up. This evidence supports the findings of the present study, which also demonstrated a notable improvement in nurses' application of pain-relieving methods across all study phases. This result is attributed to the structured educational approach used in the intervention, which provided nurses with clear guidance and practical demonstrations for managing postoperative pain. Additionally, the emphasis on non-pharmacological techniques in relieving postoperative pain, such as positioning, cold compresses, environmental modifications, and relaxation techniques.

The current study mentioned a statistically significant relation between nurses' age, marital status, qualification, years of experience (total, specific), and their total satisfactory practice scores in both pre- and post-intervention phases. These findings are supported by **El-kasby et al. (2021)**, who reported a positive statistically significant relationship between nurses' practice and their age, identifying age as a positive predictor for totally satisfactory practice. This can be explained as senior nurses acquiring greater mastery of clinical skills through prolonged years of professional experience.

Similarly, **Abid et al. (2018)** found a statistically significant relation between nurses' educational level and their total practice, as the nurses' practice improved with increasing level of education, noting that practice levels improved with higher education. This could be due to the fact that highly educated nurses are more capable of applying newly acquired knowledge, which positively impacts the quality of nursing care delivered to patients. Supporting this result, **Abd-Elftah et al. (2023)** found similar evidence, as there is a relationship between total practice score and years of experience. Moreover, **Khojastehfar et al. (2020)** found a significant relationship between age and nurses' practice. Conversely, **Mohamed et al. (2022)** found no association between nurses' age and knowledge or practice score. Also, the study of **Grešš Halász et al. (2021),** who reported there was no relation between the knowledge, practice and age of the studied nurses.

Furthermore, The findings of this study clarified a positive and statistically significant correlation between ophthalmic nurses' knowledge and practice scores across all study phases. **Mahmoud Abo El-fadl et al. (2023**) also observed a notable positive association between the nurses' knowledge, practice, and attitude scores pre- and post-implementation of the guidelines.

In relation to postoperative complications, the present study showed that all cases experienced early inflammatory and wound related complications such as redness, swelling and photophobia within the first 24 hours post-surgery. These transient effects were attributed to surgical manipulation and responded well to anti-inflammatory medications. A minority of children developed corneal edema within the first seven days due to prolonged surgical time, small pupil and poor endothelial function. Moreover, late complications observed included lens dislocation and posterior capsular opacification (PCO). The only case had lens dislocation was due to Marfan syndrome that was suffering from. PCO most commonly developed after pediatric cataract surgery due to the surgical technique when cataract removal and IOL implantation without primary posterior capsulotomy and anterior vitrectomy so mostly need YAG laser after that.

The finding was supported by **Dericioglu et al. (2023),** who reported the most common complications after pediatric cataract surgeries were inflammatory reactions and visual axis opacification. In the same vein, **El-shafaey et al.**

(2018) found that a minority of the patients had corneal edema and there were no cases of endophthalmitis. Similarly, **Kedwany et al. (2021)** noted that more than a quarter of the children in their study developed posterior capsular opacification (PCO) following pediatric cataract surgery.

Additionally, the present study showed a statistically significant reduction in the frequency and severity of cataract-related complications over time, particularly between the first postoperative day and the one-week follow-up ($p < 0.01$), indicating significant clinical improvement during the early postoperative period. This result was agreed upon by **Zuo et al. (2024)** in a study in Pakistan. They mentioned that the incidence of postoperative complications in the experimental group, who received high-quality nursing intervention, was significantly lower (3%), than that of the control group (15%), with complications including corneal edema, anterior chamber hemorrhage, and inflammatory complications.

The occurrence of lens dislocation in a pediatric age group with Marfan syndrome is also supported by previous studies that identify zonular weakness in connective tissue disorders as a risk factor for this complication **(Khokhar et al., 2019)**. In contrast, **StatPearls (2022)** reported that **posterior capsular opacification (**PCO) is the most common late complication following pediatric cataract surgery, especially in younger children. This is because the structured nursing interventions provided are more evidence-based, have been and proved to be more scientific, effective, and targeted, so they are conducive to decreasing the occurrence of postoperative complications in patients following cataract surgery **(Kessel et al. 2016; Kohnen 2017).**

In general, the reduction in postoperative complications observed in this study may be attributed to the early implementation of structured nursing interventions, including accurate medication administration, effective management of pain and inflammation, and regular monitoring for early signs of complications. Additionally, comprehensive caregiver education focused on eye hygiene, early detection of complications, and adherence to follow-up visits can significantly reduce postoperative risks. These findings underscore the essential role of both clinical nursing practice and caregiver involvement in improving children's postoperative outcomes following cataract surgery.

The results of the present study revealed a statistically highly significant improvement in Best Corrected visual acuity (BCVA)throughout the study phases. Visual acuity was assessed in 29 verbal and cooperative children, aged 4 to 17 years. Preoperatively, most children presented with severely impaired vision (e.g., hand motion [HM] and perception of light [PL]). Following cataract surgery and during subsequent follow-up visits, substantial improvement was observed, with a notable proportion of children achieving BCVA levels of 6/18 and 6/12 ($p < 0.001$). The previous findings highlight the importance of early postoperative assessment and continuous monitoring and scheduled follow-up of visual acuity in identifying and managing complications that may impact visual recovery. Additionally, providing a structured discharge plan including scheduled follow-up visits, clear written care instructions, and caregiver contact information can enhance continuity of care and support optimal postoperative recovery.

These outcomes align with the findings of **Kedwany et al. (2021),** who reported that three-quarters of children achieved a visual acuity of **6/18 or better postoperatively. Similarly, Wilson et al. (2023)** found that most children undergoing primary intraocular lens implantation achieved a postoperative visual acuity of ≥ 6/60, with severe visual impairment (e.g., HM and PL) resolving completely.

For preverbal children aged between 5 months and 2.8 years (11 children), visual acuity could not be formally recorded due to poor cooperation. Instead, alternative indicators—such as improved fixation and light-following behavior were used to assess visual response. These improvements were sustained during follow-up, suggesting continued visual gains. This finding is consistent with **Nikhil et al. (2016)**, who noted that alternative assessment methods, including behavioral observation, were necessary for assessing visual acuity in the 9% of uncooperative children in his study.

These findings are also supported by **Li (2021),** conducted in China. The study reported that evidence-based nursing care for patients undergoing cataract surgery significantly enhanced visual acuity recovery and reduced the incidence

and recurrence of postoperative complications. It was noted that the best corrected visual acuity (BCVA) of the affected eye after surgery was significantly higher than preoperative levels in both study groups, with the observation group (which received the nursing intervention) achieving better BCVA outcomes than the control group ($P < 0.05$). Generally, the observed improvement in nurses' performance and visual outcomes in the current study can be related to multiple factors, involving the researcher's step-by-step hands-on training approach, the use of live demonstration materials, and a visually supported educational booklet. These methods, supported by immediate feedback, reinforced procedural retention, guided the correct application of eye care techniques, and enhanced the accuracy of medication administration.

This interpretation is in line with the findings of **Al-Tannir et al. (2021),** who found that nurses who received hands-on clinical training with immediate feedback demonstrated significantly higher skill retention and procedural accuracy in pediatric settings. Additionally, **Vidhyadevi et al. (2023)** concluded that regular theoretical and practical educational sessions for nursing staff significantly enhance their knowledge and subsequently improve their clinical practice. Such improvements not only elevate the quality of patient care but also enable nurses to transfer relevant knowledge to patients and caregivers.

Conclusion:

This study concludes that the implementation of a well-structured intervention program had a significant positive impact on ophthalmic nurses' knowledge and clinical performance regarding the care of children undergoing cataract surgery. These improvements were reflected in better postoperative care and clinical outcomes, with a notable reduction in postoperative complications. Strengthening nurses' knowledge and practice through targeted programs is essential in advancing the quality of pediatric surgical care.

Recommendations:

- Periodic in-service training programs should be conducted to improve, update, and refresh ophthalmic nurses' knowledge and practices related to pediatric cataract care.
- Integrating these programs into routine nursing education and professional development may enhance the overall quality and consistency of pediatric ophthalmic care delivery.
- Continuous supervision and follow-up should be performed according to standardized nursing guidelines to ensure the consistent application of evidence-based practices.
- A comprehensive discharge plan, including scheduled follow-up visits, should be provided to families through outpatient clinics to reduce the risk of postoperative complications.
- Future research should investigate the long-term sustainability of improvements in nursing performance and their continued influence on pediatric clinical outcomes.

References

1. **Abd-Elftah, A.E.S., Mohamed, S.S. and Mohamed, O.A.** (2023) 'Effect of eye care guidelines on nurses' competence for comatosed patients', *Journal of Nursing Science Benha University*, 19(2), pp. 1-25.
2. **Abdullah, W., Mohamed Abdel Azeem, A., Faisal Ellakwa, A. and Said M. H. Shehata, O. (2021)** 'Educational Nursing Intervention: Its Effect on the Nurses' Performance, Patients' Daily Living Activities, Needs and Selected Visual Problems of Cataract Surgery', *Egyptian Journal of Health Care,* 12(2), pp. 280-297. doi: 10.21608/ejhc.2021.150268
3. **Abid, D., Hassanin, A., Salama, H., Salama, M. and Salama, H. (2018)** 'Effect of Implementing Nursing Guideline on Nurses ' Performance Regarding Patients Undergoing Cataract or Glaucoma Surgery', 8(8).
4. **ALAJAMI, R., El-Hefney Atta, E. M., Gaafar, W. and Abd Elfattah, D. (2023)** 'Pediatric cataract profile in Mansoura Ophthalmic Center, Dakahlia, Egypt', *Egyptian Journal of Ophthalmology,* 3(2), pp. 93-105.
5. **Al-Tannir, M., AlGahtani, F. H., Abu-Shaheen, A. (2021).** Impact of hands-on workshops on clinical practice skills among pediatric nurses: A quasi-experimental study. *Journal of Pediatric Nursing*, 58, 94–99.
6. **American Society of Health (2019)**: Eye care, how to apply eye ointment. Retrieved from: http://www.safemedication.com. Access Date [March, 19 th, 2019)].
7. **Bayomi R, Taha N and Zaiton H. (2014) '**Nurses' Role Regarding Postoperative Patients with Cataract Needs and Problems', *Zagazig Nursing Journal*, 10(1), 48-65. doi: 10.12816/0029304.
8. **Berdahl, J. P. and Vann, R. R. (2024)** 'Catract Surgery: Preoperative Evaluation', in Henderson, B.A., Pineda, R. & Chen, S.H. (eds.) *Essentials of Catract Surgery* 2nd ed. China: CRC Press Taylor&Francies Group, pp. 23-29.
9. **Dericioğlu, V., Sevik, M.O., Bağatur Vurgun, E. and Çerman, E. (2023)** 'Predictive factors of complications and visual outcomes after pediatric cataract surgery: a single referral center study from Türkiye', *Turkish Journal of Ophthalmology*, 53, pp. 267-274. https://doi.org/10.4274/tjo.galenos.2023.50951.
10. **Donaldson P.J., Grey A.C., Maceo Heilman B., Lim J.C. and Vaghefi E. (2017)** 'The physiological optics of the lens', Prog Retin Eye Res; 56:e1-e24. doi: 10.1016/j.preteyeres.2016.09.002.
11. **Ebadi, A., Moayed, M.S., Mirsadeghi, A. and Saeid, Y. (2021)** 'Evaluating intensive care nurses' clinical competence in eye care; a cross-sectional descriptive study', *Health Education and Health Promotion*, 9(3), pp. 1-2.
12. **El-Khamisy A M, Ahmed S A and Abo El-Ata A B (2019):** The effect of an individualize health teaching on post-operative outcomes for patients undergoing cataract surgery. Port Said Scientific Journal of Nursing; 6 (1): 229-246. DOI: 10.21608/pssjn.2019.35363.
13. **El Shafaey, M., and Basal, A., (2018**) 'Effect of implementing teaching program on knowledge and practice of nurses and clinical outcomes of patients post cataract surgery', *Journal of Nursing and Health Science*, 7(3), pp. 60-70.
14. **Elkasby, W.E., Wahdan Abd El-Aziz, W.E.A. and Ali, W. (2021**) 'Effect of eye care learning package for mechanically ventilated patients on critical care nurses' performance', *Mansoura Nursing Journal*, 8(3), pp. 75-89.
15. **EyeWiki, 2024.** 'Pediatric Cataract', *American Academy of Ophthalmology*. Available at: https://eyewiki.aao.org/Pediatric_Cataract [Accessed 18 Jun. 2024].
16. **FATAHI, B., FATAHI, S., NOSRATI, S. & BAGHERI, M. 2023.** Effect of motion-graphic video-based training on the performance of operating room nurse students in cataract surgery in Iran: a randomized controlled study. *J Educ Eval Health Prof,* 20**,** 34.
17. **FLAYYIH, M. J. & MOHAMMED., W. K. 2023.** Effectiveness of intervention program on nurses' practice about cataract. *Rawal Medical Journal,* 48**,** 670-672.
18. **Ganesh, S. and Khurana, R. (2021)** 'Post-operative Rehabilitation After Cataract Surgery in Children', In: Agrawal, S. (eds) Pediatric Cataract. Springer, Singapore. https://doi.org/10.1007/978-981-16-1736-2_8.

19. **Grešš Halász, B., Bérešová, A., Tkáčová, Ľ., Magurová, D., & Lizáková, Ľ. (2021).** Nurses'knowledge and attitudes towards prevention of pressure ulcers. International journal ofenvironmental research and public health, 18(4), 1705.
20. **GUPTA;, P., GURNANI;, B. & PATEL., B. C. 2024.** Pediatric Cataract. StatPearls [Internet]. Treasure Island (FL):. Last Update: June 8, 2024. ed.: StatPearls [Internet].. Available at: https://www.ncbi.nlm.nih.gov/books/NBK572080/ (Accessed Last Update: June 8, 2024.).
21. **Hassan, Z.A., Mohammad, Z.A., Abd Elmageed, E.S. and Wasfi, E.I. (2022)** 'Auditing of nursing care offered for patients undergoing cataract surgery at Assiut Ophthalmic Hospital', *Assiut Scientific Nursing Journal*, 10(28), pp. 184-190.
22. **Jensen S (2015)** 'Nursing Health Assessment A best Practice Approach: Eyes Assessment',2nd ed, Philadelphia: Wolters Kluwer Co.:310-15.
23. **Kavitha V, Heralgi, Mallikarjun M, Aafreen, Saba. (2022)** 'Analysis of postoperative visual and surgical outcome following surgery for absorbed cataract in pediatric age group and the intraoperative difficulties', *Indian Journal of Ophthalmology*; 70 (3): 788-793. doi: 10.4103/ijo.IJO_1091_21.
24. **Kedwany, S.M., Saleh, M.G., Tohamy, D. and Mostafa, M.M. (2021)** 'Outcome of pediatric traumatic cataract in Upper Egypt: a tertiary center study', *Clinical Ophthalmology*, 15, pp. 1583-1589.
25. **Kessel L., Andresen J., Erngaard D., Flesner P., Tendal B. and Hjortdal J. (2016)** 'Indication for cataract surgery. Do we have evidence of who will benefit from surgery? A systematic review and meta-analysis', *Acta Ophthalmol*, 94:10–20. doi: 10.1111/aos.12758.
26. **Khokhar, S., Pillay, G., Dhull, C., Agarwal, E. and Mahabir, M. (2019)** 'Pediatric cataract', *Indian Journal of Ophthalmology*, 67(4), pp. 480–488. https://doi.org/10.4103/ijo.IJO_240_19.
27. **Khojastehfar, S., Ghezeljeh, T. N., & Haghani, S. (2020)** 'Factors related to knowledge, attitude, andpractice of nurses in intensive care unit in the area of pressure ulcer prevention: A multicenterstudy'. Journal of tissue viability, 29(2), 76-81.
28. **Kohnen T. (2017)** 'Evidence-based treatment for macular edema after lens-based surgery', J *Cataract Refract Surg*, 43:151–152. doi: 10.1016/j.jcrs.2017.02.007.
29. **Li X. (2021)**. 'Application of evidence-based nursing in patients after cataract surgery and its impacts on visual acuity recovery and psychological status', *Am J Transl Res*. 15;13(8):9784-9789. PMID: 34540110; PMCID: PMC8430197.
30. **Long, E., Lin, H., Liu, Y. and Wang, L. (2022)** 'Recent advances in pediatric cataract surgery and management', Eye, 36(3), pp. 405–412. https://doi.org/10.1038/s41433-021-01803-y.
31. **MADLABANA, C. Z., MASHAMBA-THOMPSON, T. P. & PETERSEN, I. 2020.** Performance management methods and practices among nurses in primary health care settings: a systematic scoping review protocol. *Syst Rev,* 9**,** 40.
32. **Mahmoud Abo El-Fadl, N., Said Mohamed, S., Sobhy Omran, E. (2023).** 'Effect of an Educational Program on Nurses' Performance toward Caring for Ophthalmic Patients Affected by Climate Changes', *Journal of Nursing Science Benha University*, 4(2), pp. 1-22. doi: 10.21608/jnsbu.2023.305820.
33. **Mendoza-Moreira AL, Voigt AM, Stingl JV, Rezapour J, Wagner FM, Schuster AK, Hoffmann EM. Paul (2024)**'Glaucoma Implant following Congenital Cataract Surgery in a Pediatric Cohort. J Clin Med. 2024 May 15;13(10).
34. **Mohamed, A.E., El Sayed, H.A. and Hassan, A.M., 2022.** 'Impact of ophthalmic nursing training on nurses' performance and quality of pediatric eye care', *Egyptian Journal of Nursing Sciences*, 43(1), pp.45-56.
35. **Nettina S. (2014) 'Lippincott Manual of Nursing Practice**: Eye Disorders',10thed, Philadelphia: Wolters Kluwer/Lippincott Williams &wilkins Co.,590-87.

36. **Nikhil, R., Shubhi, T., Anushree, K.A., Sudhir, T. and Madan, D.** (**2016**) 'Evaluation of visual outcomes after pediatric cataract surgery in a Tertiary Eye Care Hospital in western Maharashtra', *Journal of Clinical Ophthalmology*, 4, pp. 13-18.
37. **Nizami, A. A., Gurnani, B., Gulani, A. C. and Redmond, S. B. (2024)** *Cataract (Nursing). Last Update: February 27, 2024.* Treasure Island (FL): StatPearls Publishing;: https://www.ncbi.nlm.nih.gov/books/NBK568765/#__NBK568765_dtls__.
38. **Li X. (2021)**. 'Application of evidence-based nursing in patients after cataract surgery and its impacts on visual acuity recovery and psychological status', *Am J Transl Res*. 15;13(8):9784-9789. PMID: 34540110; PMCID: PMC8430197.
39. **Ramadan, O.M.E., Hafiz, A.H., Elsharkawy, N.B., Katooa, N.E., Abunar, A., Abdelaziz, E.M., Baraka, S.I.M., Shaban, M. and Baraka, N.I.M., 2024.** 'Effectiveness of the Pediatric Nursing Excellence Model on nurses' knowledge and practice in pediatric orthopedic surgery care: A randomized controlled trial', *Children*, 11(12), p.1457. Available at: https://doi.org/10.3390/children11121457.
40. **Rho C &Cho K. (2012) '**Effect of Individualized Postoperative Education on Anxiety Level and Self Care Compliance After One Day Cataract Surgery ', Korean Ophthalmology Soc. ;53(3):412-19.
41. **Richard S, Elaine L & David C. Scrub's Bible (2013):** Self-Assessment Test Cataract Surgery.1st ed. USA: Springer New York, 91-4.
42. **Sheeladevi, S., Lawrenson, J.G., Fielder, A.R. and Suttle, C.M. (2021)** 'Global prevalence of childhood cataract: a systematic review', Eye, 35(3), pp. 632–648. https://doi.org/10.1038/s41433-020-1082-0.
43. **Shehata, O. (2019)** "Effect of Nursing Intervention on Nurses' Knowledge and Practice Regarding Cataract Surgery," Menoufia Nursing Journal. Egypts Presidential Specialized Council for Education and Scientific Research.
44. **Silverthorn D (2016)**: Human **Physiology** An Integrative Approach: Sensory Physiology,17th ed, England: Pearson Education Co., 364-365.
45. **StatPearls (2022)** '*Pediatric Cataract Surgery'*. [Online] Available at: https://www.ncbi.nlm.nih.gov/books/NBK562218/ [Accessed 14 June 2024].
46. **Taha, A.S.** (**2021**) 'Effectiveness of nursing intervention protocol on nurses' performance and patients' self-care after cataract surgery', *Evidence-Based Nursing Research*, 3(2), pp. 13-28.
47. **Taylor C, Lillis C, Lynn P. (2015)** 'Skill Checklists for Fundamentals of Nursing the Art and Science of Person – Centered Nursing Care: Health Assessment', 8th ed, Philadelphia: Wolters Kluwer Co., 2015:642-44.
48. **Tork, H., Mohamed, R., Elaasar, H., & El-Said, R. (2022)** 'Effect of Designed Eye Care Protocol on Nurses' Knowledge and Practices Regarding Prevention of Ocular Surface Disorders among Sedated and Intubated Children at Pediatric Intensive Care Unit', *American Journal of Nursing*,10(2), 46-57 doi: 10.12691/ajnr-10-2-2.
49. **Uddin, M. I., Rahman, M. M., Ahmed, S. and Haque, A. (2024**) 'Socioeconomic consequences of untreated childhood cataract in rural settings', *Community Eye Health Journal*, 37(1), pp. 12–18.
50. **Vander J and Gault J (2013**): Ophthalmology Secrets in Color: Techniques of Cataract Surgery. 3rd ed. Philadelphia: Elsevier Co., 224-18.
51. **Vidhyadevi, R., Saudhamini, S., Sandhiya V., Padmanaban S. and Uma P. M. (2023)** 'Effectiveness of Educational Intervention among Nursing Staff in Improving Post-Operative Cataract Care in a Tertiary Care Centre', *TNOA Journal of Ophthalmic Science and Research*, 61(2): p 169-171, Apr. | DOI: 10.4103/tjosr.tjosr_103_22.
52. **Wilson, M.E., Pandey, S.K. and Werner, L.** (**2023**) 'Visual outcomes after pediatric cataract surgery with primary intraocular lens implantation', *Journal of AAPOS*, 27(4), pp. 189-194.
53. **Zuo, K., Sun, Z., and Wen, K. (2024)** 'Study on the impact and clinical effect of high-quality nursing intervention on the quality of life of elderly cataract patients', *Pakistan journal of medical sciences*, 40(3Part-II), 499–504. https://doi.org/10.12669/pjms.40.3.7526.