IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 11, Issue 3 Ser. VI (May. – June. 2022), PP 60-75
www.iosrjournals.org

The Effect of an Educational Program Designed for Nursing Eye Care on Critical Care Nurses' Performance

[1]Gamila Mohamed Sayed, [2]Zeinab Hussein Ali, [3]Moustafa Abdel Naby Saeed
1. Assistant Lecturer at Medical-Surgical Nursing Department, Faculty of Nursing, Beni-Suef University.
2. Professor of Medical Surgical Nursing, Faculty of Nursing, Helwan University.
3. Lecturer of Ophthalmology, Faculty of Medicine, Beni-Suef University

Abstract
Background: *Critical care nursing is a specialty focused on the care of unstable, chronically ill or post-surgical patients and those who have severe illnesses with life threatening conditions. Critically ill patients have many factors that predispose them for ocular surface disorders such as incomplete eyelid closure, metabolic derangements and immuno-suppression. Eye care has a great importance for the critically ill patients to prevent ocular complications.* ***Aim****: This study aimed to evaluate the effect of an educational program designed for nursing eye care on critical care nurses' performance.* ***Research design:*** *A quasi-experimental research design was used to conduct this study.* ***Sample:*** *A purposive sample of 50 critical care nurses in Beni-Suef University Hospitals' intensive care units.* ***Setting:*** *This study was conducted in Beni-Suef University Hospitals' intensive care units.* ***Tools:*** *Three tools were used for data collection (1) Self- Administered Questionnaire, which covered the socio-demographic characteristics of the studied nurses, (2) Eye Care Competence Inventory (ECCI) which included (a) Knowledge Assessment, (b) Attitude Assessment, (3) Eye Care Practices Assessment Sheet which included (a)Methods and techniques of eye care, (b) Eye care practices observational checklist.* ***Results:*** *This study revealed that; after educational program implementation; there was a statistically significant improvement in critical nurses' performance regarding eye care. Also, there was a significant positive correlation between critical care nurses' attitude and their knowledge and practice.* ***Conclusion****: Implementation of the educational program was effective in improving the critical nurses' performance regarding eye care.* ***Recommendations:*** *Continuous In-service training programs are recommended to improve the critical care nurses' performance regarding eye care.*

Key words: *Eye Care, Critically ill patients, critical care nurses' performance.*

Date of Submission: 15-06-2022 Date of Acceptance: 30-06-2022

I. Introduction

Intensive care units care for patients who are in life-threatening situations that require the comprehensive care of an interdisciplinary team. The medical team mainly focuses on ensuring basic vital functions, controlling life-threatening diseases, and stabilizing the patient's condition throughout hospitalization. Ocular complications, are sometimes overlooked by medical professionals. In critically ill patients, normal eye protection mechanisms, such as tear production, blinking, and keeping the eye closed, are impaired. Furthermore, many additional factors related to the severity of the patient's illness and treatment have a role in occurrence of ocular surface diseases in critically ill patients **(Płaszewska-Żywko et al., 2021).**

Critically ill patients have a number of factors that lead to ocular defense mechanisms impairment include; an alteration in level of consciousness, impacting on the blink reflex specially blinking frequency lower than 5 times per minute and lagophthalmos, fluid and metabolic derangements, immunosuppression, mechanical ventilation, medications such as sedatives, muscle relaxants, open suction technique and systemic diseases. Sedatives and neuromuscular blocking drugs inhibit the Orbicularis oculi muscles eye muscles and lead to lagophthalmos. Lagophthalmos is considered as the defective or incomplete closure of the eyelids. Lagophthalmos disables the first protective mechanism of the eyes, which may predispose them to evaporation of tear film, eye dryness, exposure keratopathy and microbial keratitis**(Ebadi et al., 2021).**

A change in level of consciousness, impacting on the blink reflex, particularly blinking frequency less than 5 times per minute and lagophthalmos, fluid and metabolic derangements, immunosuppression, mechanical ventilation, medications such as sedatives, muscle relaxants, open suction technique, and systemic diseases all are factors that lead to ocular defense mechanisms impairment in critically ill patients.Lagophthalmos is considered as the defective or incomplete closure of the eyelids.Sedatives and neuromuscular blocking agents cause lagophthalmos by inhibiting the Orbicularis oculi eye muscles. Lagophthalmos disables the first protective mechanism of the eyes which may putting them at risk for tear film evaporation, eye dryness, exposure keratopathy and microbial keratitis **(Sansome & Lin,**

2020)

The neglected eye is more likely to develop ocular problems, which can deteriorate and become a sight-threatening problem, lowering the patient's quality of life. Patients admitted to the intensive care units can develop ocular problems ranging from a mild conjunctival infection to serious corneal injuries such as corneal ulcers and even corneal perforation, which can result in irreversible eye damage.Exposure keratopathy, chemosis, corneal ulcers, and microbial keratitis were the most common ocular problems found in the intensive care unit **(H Abdullah et al., 2021)**.

In intensive care units, effective eye care is an important part of nursing care for critically ill patients. Nurses in intensive care units play a significant role in the prevention and management of eye disorders. The incidence of ocular surface complications is reduced when eye care is performed on a regular basis, demonstrating the necessity of eye care in intensive care units. Nurses should pay extra attention to the patient's eye at the beginning of admission in the intensive care unit. Eye care practices requires continuous training and monitoring by nursing managers based on clinical guidelines to help critical care nurses to provide optimum eye care for critically ill patients **(Momeni Mehrjardi et al., 2021)**

II. Aim of the study

The aim of the current study was to evaluate the effect of an educational program designed for nursing eye care on critical care nurses' performance through:

A. Assess critical care nurses' knowledge, practices and attitude regarding eye care to identify the knowledge gap.

B. Design an educational program for nursing eye care based on critical care nurses' knowledge, practices and attitude.

C. Implement the designed educational program for nursing eye care.

D. Evaluate the critical care nurses' knowledge, practices and attitude regarding eye care

Research hypothesis:

The mean scores of knowledge, practices and attitude of critical care nurses who will attend the eye care educational program will be higher after receiving the program than before as measured by tool II (Eye care competence inventory) and tool III (Eye care practices Assessment sheet).

III. Significance of the study

The main concern of critical care nurses is to save the patient's life. Eye care is usually a neglected part of critical patients' care. Critical care nurses are usually overwhelmed by life-saving procedure and see ocular infection as a minor problem; however, Neglected eye may deteriorate and develop ocular complications. Ocular complications in critically ill patients can range from mild conjunctival infection to serious corneal infection and injury as corneal abrasion, corneal ulcer, perforation and may also vision loss. Ocular surface disorders are common in critically ill patients with 20–42% of patients developing corneal epithelial defects **(Hearne et al., 2018)**.

The study by **Momeni Mehrjardi et al. (2021)** entitled "Effect of Training Eye Care Clinical Guideline for ICU Patients on Clinical Competence of Eye Care in Nurses" which reported that eye care practice requires continuous training and monitoring by nursing managers based on clinical guidelines. Also; a study by **Sayed (2018)** entitled "Effect of Designated Nursing Eye Care Protocol on the Prevention of Ocular Infection among Unconscious Patients" in which about 8.8 % of patients had corneal ulcer and corneal abrasion was found in 26.7 % of patients in intensive care unit of Beni-Suef University Hospital.

IV. Subject And Methods

Research design:A Quasi-experimental research design was used in this study.

Setting of the study: This study was conducted in Beni-Suef University Hospitals; Intensive Care Units (General ICU, Neurological ICU, Cardiac ICU).

Subject: A purposive sample of 50 critical care nurses in Beni-Suef University Hospital intensive care unitswere selected based on inclusion criteria.

Inclusion criteria:

- At least one year experience in intensive care unit.

Tools of data collection

Data were collected using the following tools:

Tool I: Self- Administered questionnaire:

This questionnaire was adapted from**(Alghamdi et al., 2018)**and was used to evaluate the demographic characteristics of study subjects including age, gender, educational level, years of experience in critical care unit, type of ICU, and any previous special training for eye care.

Tool II: Eye care competence inventory (ECCI)
This tool adapted from **(Ebadi et al., 2017)** to assesscritical care nurses' knowledge and attitudes on eye care for patients in intensive care units It is divided into two parts and written in plain Arabic and consists of two parts:
Part 1: Knowledge Assessment:
This part is comprised of 17 multiple choice questions for the assessment of knowledge about eye care and iatrogenic eye conditions (causes, treatment and nursing practices) in critically ill patients. **Scoring system:** Each correct answer was given one degree and the incorrect answer was given zero. The total score of knowledge, based on statistical review; it was considered that:
- ≥60% Satisfactory level of knowledge (11 – 17)
- <60% Unsatisfactory level of knowledge (0 – 10).

Part 2: Attitude Assessment: This part is comprised of seven items assessing attitudes towards the importance of eye care nursing procedures. All items were recorded on a scale of 5 points from very low to very high (1= Very low, 2= Low, 3= Moderate, 4= High, 5= Very high). The sum scores were referred to a 100% level (transformed scale score). Based onstatistical review; Scores ≥ 60% indicate high agreement or positive attitude, while scores <60% indicate low agreement or negative attitude.

Tool III: Eye care practices Assessment sheet: This tool adapted from **(Güler et al., 2016)**to assess current practices in eye care and their frequency and consist of two parts:

Part 1: Methods and techniques of eye care: This part is comprised of seven items to assess methods and techniques used for eye care.
Part 2: Eye care practices observational checklist: This part is comprised of 13 items to assess the practices of the studied nurses regarding eye care. Scoring system for tool III: This tool is comprised of 20 items. Minimum and maximum scores range 0-61 with higher score indicates more competent practice.
Scoring system was based on statistical review as the following:
- ≥75% Competent level of practice (47 – 61)
- <75% Incompetent level of practice (0 – 46)

Validity:
Face and content was ascertained by (5) experts: professors of medical surgical nursing from faculty of nursing, Sohag University, professor of medical surgical nursing from faculty of nursing, Banha University and professors of ophathalmoloy from faculty of medicine, Beni-Sueif University who reviewed the content of the tools for clarity, relevance, comprehensiveness, accuracy and applicability, some modifications were done.
Reliability:
Tools were examined for their internal consistency by using Cronbach's coefficient alpha which is a model of internal consistency and the reliability levels were (0.986, 0.977) for Tool II and (0.963) for Tool III. Statistical equation of Cronbach's coefficient alpha normally ranges between 0 and 1; higher values (more than 0.7) denote acceptable reliability.

1. Ethical considerations:
An approval was taken to carry out the study from the ethical committee of the faculty of nursing, Helwan University. An official permission for conducting the study was obtained from administrative and responsible personnel after explaining the purpose and scope of the study and submission of a formal letter from the faculty of nursing Helwan University. Informed consent to participate in the study was obtained from nurses during the initial interview after explaining the nature, purpose, and benefits of the study, as well as the fact that there are no risks expected from the study, that participation is voluntary, and that participants have the option to withdraw at any time. The researcher assured maintaining anonymityand confidentiality of the subject data.

2. Pilot study
A pilot study was carried out on 10% (6 nurses) of the subjects to test applicability, feasibility, practicability of the tools, and then the necessary modifications were done. The nurses who participated in the pilot study were replaced with others in the study sample.

3. Field work
The actual field work was started at the beginning of July (2020) and was completed and ended on July (2021). The study time took about 12 months divided as three months for assessment phase and program preparation, four months for the educational program implementation phase, added to immediately post- test and five months for follow up phase. The sample were divided into ten groups; each group was including five nurses and each group took five sessions (three sessions for the theoretical part and two sessions for the practical part and each session took 120 minutes for theory and 150 minutes for practice).

Statistical analysis

Statistical presentation and analysis of the present study was conducted, using Pearson Correlation test, ANOVA test and Chisquare tests by (IBM SPSS Statistics for Windows, Version 27). A significant level value was considered when p- value <0.05*, and highly significant level value was considered when p-value<0.001**, while p- value >0.05 indicate non-significant result.

V. Results

Table (1) showed the distribution of the studied nurses according to their demographic characteristics. About 78 % of them were from 20-<30 years old and 84 % of them were female. While, regarding the Experience; 44 % of them were from 3-<5 years and 62 % of them were Bachelor nurse. Also; 60 % of them was working in general ICU and no one of them had training courses for eye care before.

Table (2) revealed that; there were 26%, 20%, 24 and 28% of the studied nurses had correct answer regarding potential risk factor for eye disorders, The best time for beginning and administrating eye care for patients hospitalized in ICU, the right technique of endotracheal suction to prevent eye complications and the right direction for applying adhesive tape on eyelids for closing the eyes at pre-program implementation compared to 76%, 76%, 76% and 80 % at post-program then decreased to 74%, 70%, 76% and 74 % for all at follow up respectively with highly statistically significance differences between pre, post and follow up program with P-value (0.000, 0.000, 0.000, 0.000) respectively.

Table (3) showed that; there were 2%, 4% and 2% of the studied nurses had responded very high regarding the effect does pre and post-procedure hand washing have on preventing or reducing the incidence of eye disorders, priority do they give to eye care in patients receiving mechanical ventilation and the effect does standard endotracheal suctioning have on reducing the incidence of eye disorders at pre-program implementation compared to 28%, 20% and 24% at post-program then decreased to 20%, 16% and 16% for all at follow up respectively with highly statistically significance differences between pre, post and follow up program with P-value (0.000, 0.000, 0.000) respectively.

Table (4) showed that; there were statistically significant differences between pre, post and program follow up regarding eye care practices items with P-value (0.000). Regarding Frequency of eye assessment; about 88 % of studied nurses weren't perform eye assessment at pre-program; while at post-program; about 96 %of them were frequently performing eye assessment. As regard to Frequency of eye care; about 80 % of studied nurses weren't apply eye care at pre-program; while at post-program; about 98 %of them were frequently applying eye care. In relation to Methods of eye covering; none of the studied nurses were applying eye covering at pre-program; while at post-program; about 40 % were applying Polyethylene film.

Table (5) showed that; at post- program and program follow up; there are higher scores in most of items regarding eye care practice than in pre-program. At pre-program, about 74 % of the studied nurses weren't performing hand washing before and after procedures, while at post-program; about 80 %of them were performing hand washing before and after procedures correctly and completely. Also; only 16 % of the studied nurses were covering patient's eyes while suctioning at pre-program while, at post-program; about 76 % of them were covering patient's eyes while suctioning. In addition, only 6 % of the studied nurses were using a new swap of gauze for each wipe of eye and don't use it again while, about 84 % of them were using a new swap of gauze for each wipe of eye and don't use it again. Also, statistically significant differences are found in Provide ocular medications as physician prescriptions between pre, post and program follow up with P-value (0.002).

Table (6) revealed that; there was a strong positive relationship between the total knowledge score and the total practice score at pre, post and program follow up with p value (0.000). This means that, nurses who had satisfactory level of knowledge, tended to have satisfactory level of practice. Also, there was a strong positive relationship between the studied nurses' attitude and their total practice score at pre, post and program follow up with p value (0.000). This means that, nurses who had positive attitude toward eye care tended to have a satisfactory level of practice. In addition, this table illustrated that; there was a strong positive relationship between the studied nurses' attitude and their total knowledge score at pre, post and program follow up with p value (0.000).

Table (7) revealed that; there was a positive statistical significant relationship between the total knowledge score of studied nurses and their age, educational level, years of experience and ICU type post-program implementation with p value (0.046, 0.000, 0.000, 0.005) respectively.

Table (8) revealed that; there was a positive statistical significant relationship between the total knowledge score of studied nurses and their age, educational level, years of experience and ICU type at program follow up with p value (0.046, 0.000, 0.001, 0.002) respectively.

Table (9) revealed that; there was a positive statistical significant relationship between the attitude of the studied nurses and their age, educational level, years of experience and ICU type Post-Program implementation with p value (0.033, 0.000, 0.000, 0.001) respectively.

Table (10) revealed that; there was a positive statistical significant relationship between the attitude of the studied nurses and their age, educational level, years of experience and ICU type at Program follow up with p value (0.002, 0.000, 0.000, 0.000) respectively.
Table (11) revealed that; there was a positive statistical significant relationship between the total practice of the studied nurses and their age, educational level, years of experience and ICU type at post-program with p value (0.046, 0.000, 0.000, 0.005) respectively; This means that; nurses who are older, highly educated and has more years of experience, tend to be more skillful than others.
Table (12) revealed that; there was a positive statistical significant relationship between the total practice of the studied nurses and their age, educational level, years of experience and ICU type at Program Follow Up with p value (0.021, 0.000, 0.006, 0.000) respectively.
Figure (1) illustrates that, there was statistical significant improvement in the studied nurses' total knowledge after implementation of the program with P-value (0.000). As shown, only about 26 % of the studied nurses had satisfactory level of knowledge at pre-program that increased to76 % of the studied nurses had satisfactory total level of knowledge post-program then decreased to 74 % at follow up of educational program.
Figure (2) illustrates that, there was statistical significant improvement in the studied nurses' attitude after implementation of the program with P-value (0.000). As shown, only about 8 % of the studied nurses had positive attitude toward eye care at pre-program that increased to 60 % of the studied nurses had positive attitude toward eye care post-program then decreased to 50 % at follow up implementation of educational program.
Figure (3) illustrates that, there was statistical significant improvement in the studied nurses' total practice after implementation of the program with P-value (0.000). As shown, only about 6 % of the studied nurses had competent practice toward eye care at pre-program that increased to 76 % of the studied nurses had competent practice toward eye care post-program then decreased to 70 % at follow up educational program.
Figure (4) illustrates that, there was statistical significant improvement in the studied nurses' total knowledge, practice and attitude after implementation of the educational program with P-value (0.000).

Table (1): Demographic characteristics among the studied nurses (N=50)

Demographic characteristics	No.	Percentage (%)
Age (years)		
20-<30	39	78.0
30-<40	11	22.0
Gender		
Male	8	16.0
Female	42	84.0
Education		
Technical nurse	19	38.0
Bachelor nurse	31	62.0
Experience (years)		
1-<3	10	20.0
3-<5	22	44.0
5-<10	6	12.0
>=10	12	24.0
ICU Type		
1) Medical	11	22.0
2) General	30	60.0
3) Cardiac	9	18.0

Table (2): Distribution of the studied nurses' level of knowledge regarding eye care throughout study phases (N=50)

Items	Pre				Post				Follow up				F	Sig.
	Correct		Incorrect		Correct		Incorrect		Correct		Incorrect			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Which of the following factors disturbs blink reflex?	30	60	20	40	40	80	10	20	39	78	11	22	3.120	0.047*
Which of the following choices is a potential risk factor for eye disorders?	13	26	37	74	38	76	12	24	37	74	13	26	20.768	0.000**
What is the most important criterion in assessing eye disorders in ICU?	32	64	18	36	42	84	8	16	37	74	13	26	2.638	0.075
Which factors aggravate Chemosis?	10	20	40	80	37	74	13	26	37	74	13	26	26.227	0.000**
The best time for beginning and administrating eye care for patients hospitalized in ICU is	10	20	40	80	38	76	12	24	35	70	15	30	25.156	0.000**

Items	Pre				Post				Follow up				F	Sig.
	Correct		Incorrect		Correct		Incorrect		Correct		Incorrect			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
How often should patient be assessed regarding the protective mechanisms of the eye (ability to blink, etc.)?	33	66	17	34	43	86	7	14	40	80	10	20	3.067	0.050*
How should endotracheal suctioning be performed to prevent eye complications?	12	24	38	76	38	76	12	24	38	76	12	24	24.213	0.000**
What is the proper way for cleansing patient's eyes?	27	54	23	46	40	80	10	20	37	74	13	26	4.535	0.012*
What is the appropriate size for eye pads and covers?	30	60	20	40	42	84	8	16	37	74	13	26	3.769	0.025
How should eye care be provided for a patient who can blink and close his eyes completely?	12	24	38	76	43	86	7	14	39	78	11	22	35.242	0.000**
What is the best eye care for a patient who cannot close his eyes and his conjunctiva and cornea exposed?	12	24	38	76	38	76	12	24	38	76	12	24	24.213	0.000**
How should eye care be given to a patient who receives mechanical ventilation and sedative agents?	11	22	39	78	38	76	12	24	38	76	12	24	26.638	0.000**
The key objective of eye care is?	13	26	37	74	37	74	13	26	37	74	13	26	19.559	0.000**
The best eye care plan is	35	70	15	30	45	90	5	10	41	82	9	18	3.328	0.039*
Which of the following methods is the most effective for preventing corneal abrasion?	12	24	38	76	38	76	12	24	38	76	12	24	24.213	0.000**
Eye cleansing by distilled water	13	26	37	74	43	86	7	14	41	82	9	18	35.930	0.000**
What is the right direction for applying adhesive tape on eyelids for closing the eyes?	14	28	36	72	40	80	10	20	37	74	13	26	21.475	0.000**

F ANOVA test

* Statistically significant at p≤0.05

Items	Pre (%)					Post (%)					Follow up (%)					F	Sig.
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
1. How much effect does pre and post-procedure hand washing have on preventing or reducing the incidence of eye disorders?	6.0	18	70	4	2	0	14	28	30	28	0	26	54	0	20	12.847	0.000**
2. How much importance does eye care have for patients receiving mechanical ventilation?	10	70	12	6	2	0	16	28	40	16	0	26	54	8	12	30.207	0.000**
3. How much priority do you give to eye care in patients receiving mechanical ventilation?	10	76	6	4	4	0	16	28	36	20	0	26	54	4	16	30.882	0.000**
4. How much willingness do you have to provide eye care for patients receiving mechanical ventilation?	10	76	6	4	4	0	20	26	40	14	0	48	32	10	10	25.294	0.000**
5. How much effect does staff education in terms of eye care have on preventing eye disorders?	10	70	12	6	2	0	22	22	44	12	0	48	32	12	8	24.244	0.000**
6. How much effect does eye care have on preventing eye disorders?	6	18	70	4	2	0	18	26	38	18	0	48	30	10	12	10.834	0.000**
7. How much effect does standard endotracheal suctioning have on reducing the incidence of eye disorders?	76	10	8	4	2	0	32	12	32	24	0	44	34	6	16	47.366	0.000**

Table (3): Percentages distribution of the studied nurses' attitude regarding Eye care throughout study phases (N=50)

1= Very low, 2= Low, 3= Moderate, 4= High, 5= Very high.

F ANOVA test

** Highly statistical significant at p≤0.01

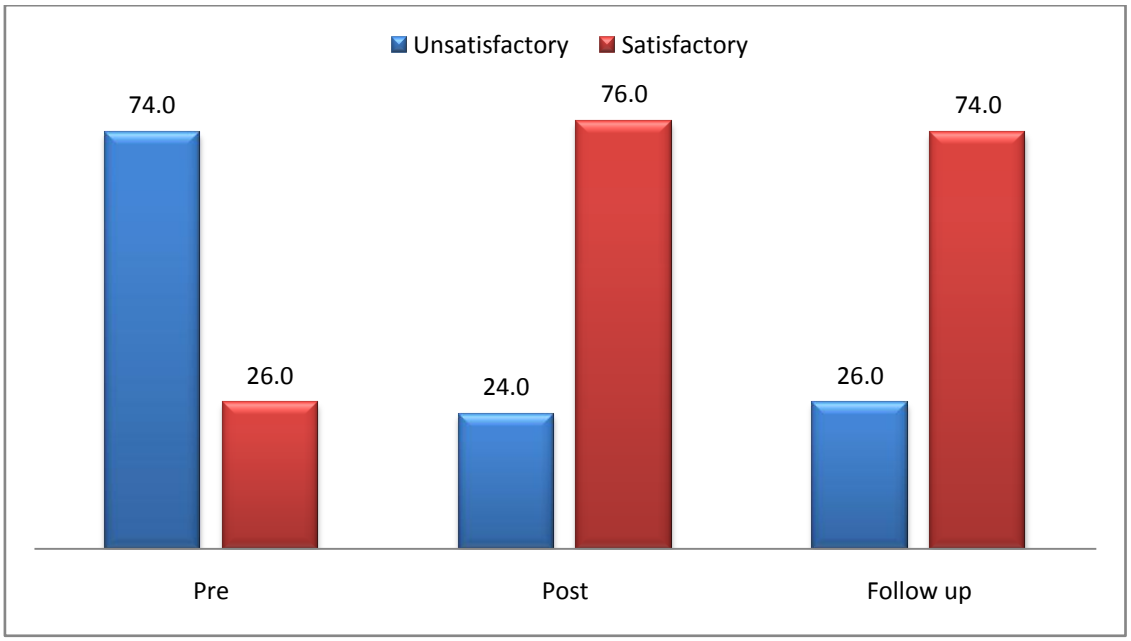

Figure (1): Percentage distribution of the studied nurses according to their total knowledge regarding eye care at pre, post and follow-up (n=50).

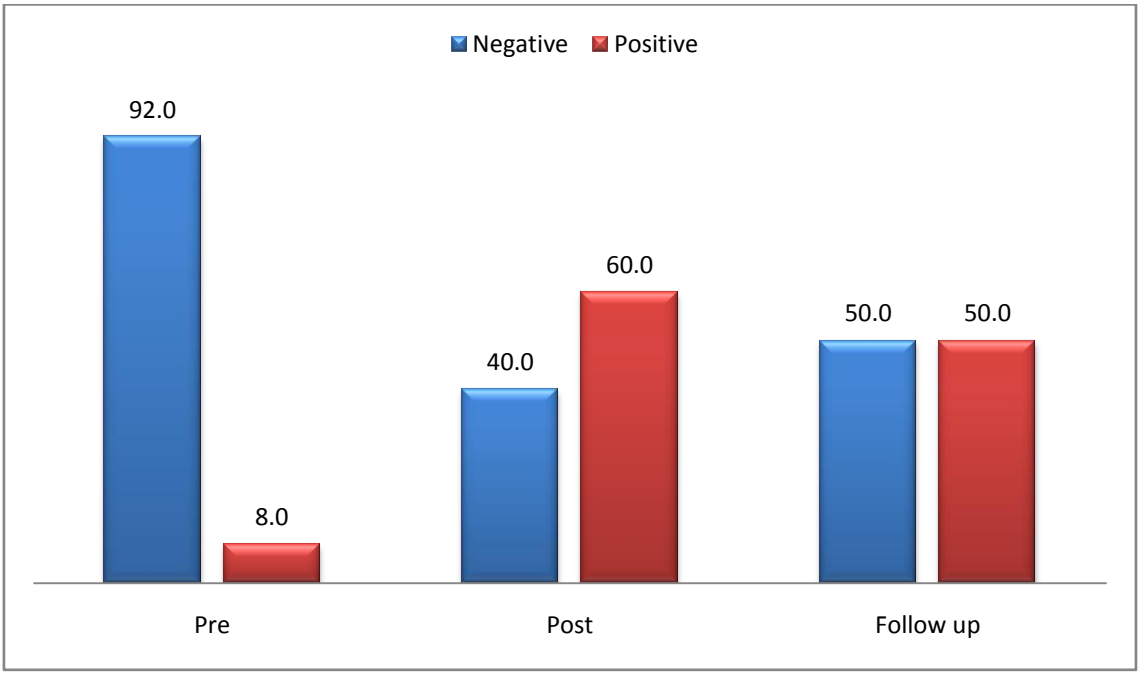

Figure (2): Percentage distribution of the studied nurses according to their total attitudes towards eye care at pre, post and follow-up (n=50).

Table (4): Percentage distribution of the studied nurses regarding eye care methods and techniques throughout study phases (N=50)

Items	Pre		Post		Follow up		F (Sig.)
	No.	%	No.	%	No.	%	
1. Frequency of eye assessment							
1. None	44	88	2	4	6	12	58.213
2. Every 2hrs	0	0	5	10	5	10	(0.000**)
3. Every 4hrs	0	0	3	6	7	14	
4. Every 6hrs	0	0	20	40	9	18	
5. Every 8hrs	6	12	20	40	23	46	
6. Every 12hrs or more	0	0	0	0	0	0	
2. Frequency of eye care							
• None	40	80	1	2	3	6	71.390
• Every 2hrs	0	0	1	2	1	2	(0.000**)
• Every 4hrs	0	0	2	4	2	4	
• Every 6hrs	0	0	7	14	7	14	
• Every 8hrs	4	8	17	34	14	28	
• Every 12hrs or more	6	12	22	44	23	46	
3. Technique of eye care							
• None	40	80	1	2	3	6	56.578
• Open chamber technique	10	20	31	62	29	58	(0.000**)
• Closed moisture chamber technique	0	0	11	22	11	22	
• Combined technique (covering after eye cleansing, application of eye lubricants)	0	0	7	14	7	14	
4. Eye cleansing							
• None	40	80	1	2	3	6	22.475
• By using normal saline 0.9%	3	6	28	56	28	56	(0.000**)
• By using distilled water	0	0	12	24	12	24	
• By using tap water	7	14	9	18	7	14	
5. Methods of eye lubrication							
• None	44	88	19	38	19	38	19.995
• By using eye drops	6	12	21	42	21	42	(0.000**)
• By using eye gel	0	0	10	20	10	20	
6. Methods of eye covering							
• None	50	100	32	60	30	64	12.056
• Eye patch	0	0	0	0	0	0	(0.000**)
• Polyethylene film	0	0	18	40	20	36	
• Swimming goggles	0	0	0	0	0	0	
7. Closing the eyelid by using adhesive tape							
• No	50	100	50	100	50	100	(1.000)

F ANOVA test

** Highly statistical significant at p≤0.01

Table (5): Percentage distribution of Eye Care practices observational checklist among studied nurses throughout study phases. (N=50)

Items	Pre (%)			Post (%)			Follow up(%)			Test	Sig.
	A	B	C	A	B	C	A	B	C		
1. Hand washing before and after procedures	74	20	6	8	12	80	8	20	72	83.394	0.000**
2. Assess the tightness of endotracheal or the tracheostomy tube	40	60	0	4	20	76	10	20	70	57.805	0.000**
3. Performing suctioning while standing besides, not above, the patient's bed	74	0	26	8	14	78	10	18	72	40.576	0.000**
4. Covering patient's eyes while suctioning	80	4	16	6	18	76	10	20	70	62.033	0.000**
5. Provide care for each eye separately especially in case of unilateral eye infection	80	16	4	8	10	82	12	18	70	90.809	0.000**

6. Cleansing the eye from the inner to the outer cantus.	80	0	20	10	14	76	10	20	70	49.365	0.000**
7. Ensuring that the edges of the linens and blankets away from the eyes of the patients.	74	20	6.0	4.0	14	82	8	20	72	97.380	0.000**
8. Using a new swap of gauze for each wipe of eye until all discharge has been removed and don't use it again	74	20	6	8	8	84	10	18	72	83.084	0.000**
9. Elevate the head of the bed especially in case of Chemosis	10	0	0	8	16	76	10	20	70	161.479	0.000**
10. Provide eye care to the uninfected eye first then the infected one	94	0	6	6	18	76	12	18	70	109.448	0.000**
11. During endotracheal tube insertion procedure, keep the equipment away from the patients' eyes	54	2	44	8	18	74	8	24	68	14.959	0.000**
12. Report any ocular abnormalities to physician immediately	34	0	66	8	20	72	10	24	66	2.351	0.099
13. Provide medications as physician prescriptions (eye drops, gel, ointment …)	34	6	60	4	16	80	12	8	80	6.659	0.002**

A= not done B= incorrect or incomplete C= Done
F ANOVA test
** Highly statistical significant at p≤0.01

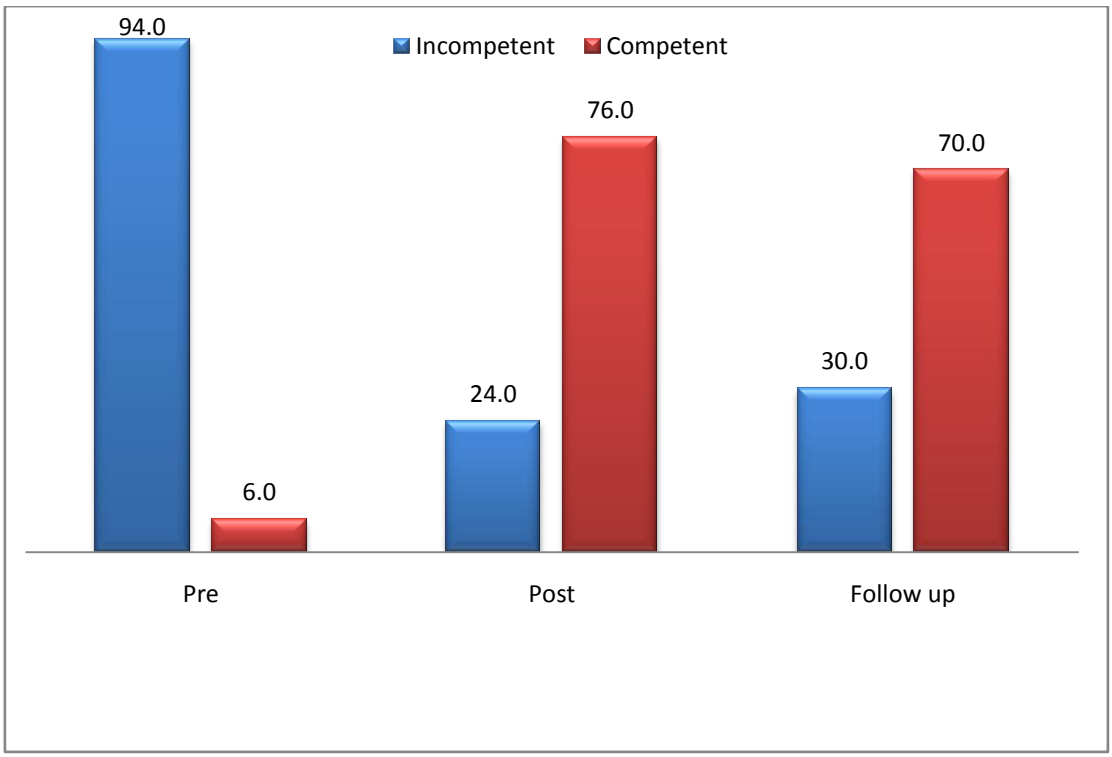

Figure (3): Percentage distribution of the studied nurses according to their total practices regarding eye care at pre, post and follow-up (n=50).

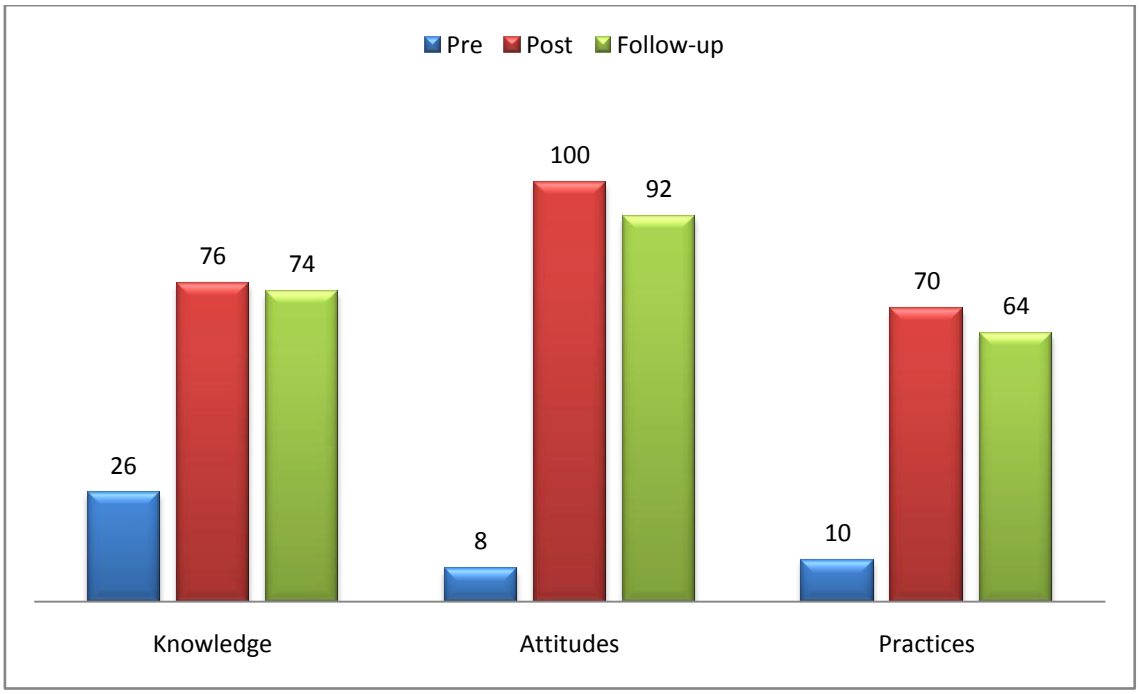

Figure (4): Percentage distribution of satisfactory levels of knowledge, attitudes and practices among studied nurses in Pre, Post and Follow-up observations.

Table (6): Correlation between Knowledge, Attitudes and Practices among Studied Nurses throughout study phases.

Items	Knowledge			Attitudes		
	Pre	Post	Follow up	Pre	Post	Follow up
Attitudes						
R	0.507	0.748	0.553			
Sig.	0.000**	0.000**	0.000**			
Practices						
R	0.945	0.896	0.869	0.656	0.661	0.490
Sig.	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**

r Pearson Correlation test

** Highly statistical significant at p≤0.01

Table (7): Comparison between Demographic Characteristics and Total Knowledge among Studied Nurses Post-Program. (N=50).

Items	No.	Knowledge Post-program				X^2	Sig.
		Unsatisfactory		Satisfactory			
		No	%	No	%		
Age (years)							
20-<30	39 (78.0)	12	30.8	27	69.2	FE	0.046*
30-<40	11 (22.0)	0	0.0	11	100.0		
Gender							
Male	8 (16.0)	2	25.0	6	75.0	FE	1.000
Female	42 (84.0)	10	23.8	32	76.2		
Education							
Technical nurse	19 (38.0)	12	63.2	7	36.8	FE	0.000**
Bachelor nurse	31 (62.0)	0	0.0	31	100.0		
Experience (years)							
1-<3	10 (20.0)	4	40.0	6	60.0	18.118^{FE}	0.000**
3-<5	22 (44.0)	0	0.0	22	100.0		
5-<10	6 (12.0)	0	0.0	6	100.0		
>=10	12 (24.0)	0	0.0	12	100.0		
ICU Type							
1) Medical	9 (18.0)	0	0.0	9	100.0	10.137^{FE}	0.005**
2) General	11 (22.0)	0	0.0	11	100.0		
3) Cardiac	30 (60.0)	12	40.0	18	60.0		

X^2Chi Square test

^{FE}Expected cell count less than 5, Fisher's exact test was used.

* Statistically significant at p≤0.05
** Highly statistical significant at p≤0.01

Table (8): Comparison between Demographic Characteristics and Total Knowledge among Studied Nurses in Program Follow up. (N=50).

	No.	Knowledge during follow up phase				X^2	Sig.
		Unsatisfactory		Satisfactory			
		No	%	No	%		
Age (years)							
20-<30	39 (78.0)	13	33.3	26	66.7	FE	0.046*
30-<40	11 (22.0)	0	0.0	11	100.0		
Gender							
Male	8 (16.0)	2	25.0	6	75.0	FE	1.000
Female	42 (84.0)	11	26.2	31	73.8		
Education							
Technical nurse	19 (38.0)	13	68.4	6	31.6	FE	0.000**
Bachelor nurse	31 (62.0)	0	0.0	31	100.0		
Experience (years)							
1-<3	10 (20.0)	0	0.0	10	100.0	15.134[FE]	0.001**
3-<5	22 (44.0)	12	54.5	10	45.5		
5-<10	6 (12.0)	0	0.0	6	100.0		
>=10	12 (24.0)	1	8.3	11	91.7		
ICU Type							
1) Medical	9 (18.0)	0	0.0	9	100.0	11.524[FE]	0.002**
2) General	11 (22.0)	0	0.0	11	100.0		
3) Cardiac	30 (60.0)	13	43.3	17	56.7		

X^2Chi Square test
[FE] Expected cell count less than 5, Fisher's exact test was used.
* Statistically significant at p≤0.05
** Highly statistical significant at p≤0.01

(9): Comparison between Demographic Characteristics and Total Attitudes among the Studied Nurses Post-Program. (N=50).

Items	No.	Attitudes Post-program				X^2	Sig.
		Negative		Positive			
		No	%	No	%		
Age (years)							
20-<30	39 (78.0)	19	48.7	20	51.3	FE	0.033*
30-<40	11 (22.0)	1	9.1	10	90.9		
Gender							
Male	8 (16.0)	5	62.5	3	37.5	FE	0.240
Female	42 (84.0)	15	35.7	27	64.3		
Education							
Technical nurse	19 (38.0)	16	84.2	3	15.8	24.958	0.000**
Bachelor nurse	31 (62.0)	4	12.9	27	87.1		
Experience (years)							
1-<3	10 (20.0)	9	90.0	1	10.0	24.439[FE]	0.000**
3-<5	22 (44.0)	11	50.0	11	50.0		
5-<10	6 (12.0)	0	0.0	6	100.0		
>=10	12 (24.0)	0	0.0	12	100.0		
ICU Type							
1) Medical	9 (18.0)	0	0.0	9	100.0	13.496[FE]	0.001**
2) General	11 (22.0)	2	18.2	9	81.8		
3) Cardiac	30 (60.0)	18	60.0	12	40.0		

X^2Chi Square test
[FE] Expected cell count less than 5, Fisher's exact test was used.
* Statistically significant at p≤0.05
** Highly statistical significant at p≤0.01

Table (10): Comparison between Demographic Characteristics and Total Attitudes among the Studied Nurses at Program Follow up. (N=50).

Items	No.	Attitudes during follow up phase				X^2	Sig.
		Negative		Positive			
		No	%	No	%		
Age (years)							
20-<30	39 (78.0)	24	61.5	15	38.5	9.441	0.002**
30-<40	11 (22.0)	1	9.1	10	90.9		
Gender							
Male	8 (16.0)	6	75.0	2	25.0	FE	0.247
Female	42 (84.0)	19	45.2	23	54.8		
Education							
Technical nurse	19 (38.0)	17	89.5	2	10.5	19.100	0.000**
Bachelor nurse	31 (62.0)	8	25.8	23	74.2		
Experience (years)							
1-<3	10 (20.0)	8	80.0	2	20.0	24.191[FE]	0.000**
3-<5	22 (44.0)	16	72.7	6	27.3		
5-<10	6 (12.0)	1	16.7	5	83.3		
>=10	12 (24.0)	0	0.0	12	100.0		
ICU Type							
1) Medical	9 (18.0)	0	0.0	9	100.0	18.577[FE]	0.000**
2) General	11 (22.0)	3	27.3	8	72.7		
3) Cardiac	30 (60.0)	22	73.3	8	26.7		

X^2Chi Square test

[FE] Expected cell count less than 5, Fisher's exact test was used.

* Statistically significant at p≤0.05

** Highly statistical significant at p≤0.01

Table (11): Comparison between Demographic Characteristics and Total Practices among the Studied Nurses Post-Program. (N=50).

Items	No.	Practices Post-program				X^2	Sig.
		Incompetent		Competent			
		No	%	No	%		
Age (years)							
20-<30	39 (78.0)	12	30.8	27	69.2	FE	0.046*
30-<40	11 (22.0)	0	0.0	11	100.0		
Gender							
Male	8 (16.0)	2	25.0	6	75.0	FE	1.000
Female	42 (84.0)	10	23.8	32	76.2		
Education							
Technical nurse	19 (38.0)	12	63.2	7	36.8	FE	0.000**
Bachelor nurse	31 (62.0)	0	0.0	31	100.0		
Experience (years)							
1-<3	10 (20.0)	5	50	5	50	18.118[FE]	0.000**
3-<5	22 (44.0)	0	0.0	22	100.0		
5-<10	6 (12.0)	0	0.0	6	100.0		
>=10	12 (24.0)	0	0.0	12	100.0		
ICU Type							
1) Medical	9 (18.0)	0	0.0	9	100.0	10.137[FE]	0.005**
2) General	11 (22.0)	0	0.0	11	100.0		
3) Cardiac	30 (60.0)	12	40.0	18	60.0		

X^2Chi Square test

[FE] Expected cell count less than 5, Fisher's exact test was used.

* Statistically significant at p≤0.05

** Highly statistical significant at p≤0.01

Table (12): Comparison between Demographic Characteristics and Total Practices among the Studied Nurses in Program Follow up. (N=50).

Items	No.	Practices during follow up phase				X^2	Sig.
		Incompetent		Competent			
		No	%	No	%		
Age (years)							
20-<30	39 (78.0)	15	38.5	24	61.5	FE	0.021*
30-<40	11 (22.0)	0	0.0	11	100.0		
Gender							
Male	8 (16.0)	2	25.0	6	75.0	FE	1.000
Female	42 (84.0)	13	31.0	29	69.0		
Education							
Technical nurse	19 (38.0)	15	78.9	4	21.1	34.962	0.000**
Bachelor nurse	31 (62.0)	0	0.0	31	100.0		
Experience (years)							
1-<3	10 (20.0)	1	10.0	9	90.0	10.551^{FE}	0.006**
3-<5	22 (44.0)	12	54.5	10	45.5		
5-<10	6 (12.0)	0	0.0	6	100.0		
>=10	12 (24.0)	2	16.7	10	83.3		
ICU Type							
1) Medical	9 (18.0)	0	0.0	9	100.0	14.526^{FE}	0.000**
2) General	11 (22.0)	0	0.0	11	100.0		
3) Cardiac	30 (60.0)	15	50.0	15	50.0		

X^2Chi Square test

^{FE} Expected cell count less than 5, Fisher's exact test was used.

* Statistically significant at p≤0.05

** Highly statistical significant at p≤0.01

VI. Discussion

Concerning the demographic characteristics of the studied nurses; in the current study; most of the studied nurses were female, all of them were aged less than 40 years old and no one of them had passed an eye care training courses. Also; about two thirds of them had less than 5 years of experience. In addition; more than half of the studied nurses were holding bachelor's degree and were working in general ICU. This could be due to that; most hospital administration personnel prefer to assign nurses with bachelor degree to work in ICU. This is similar to **Ebadi et al. (2021)** entitled "Evaluating Intensive Care Nurses' Clinical Competence in Eye Care; a Cross-Sectional Descriptive Study" in Iran in which the majority of participant nurses were female, aged less than 40 years and held bachelor's degrees in nursing.

Concerning the critical care nurses' performance regarding eye care; the current study illustrated that more than two thirds of nurses had unsatisfactory level of knowledge regarding eye care pre-program implementation. While post-program; more than three quarters of the studied nurses had satisfactory level of knowledge regarding eye care which could be due to the providing of the educational program which included different sessions about eye care and ocular surface disorders in critically ill patients. This is consistent with **(Jaafar & Al-Jubouri, 2020)** which about "Nurses' Knowledge based on Evidence Based Practice toward Eye Care for Intensive Care Units Patients" which reported that that participation in training courses regarding eye care has a significant impact on critical care nurses' knowledge.

In addition; this is in congruent with **Cho et al. (2017)** which about "Development and validation of an eye care educational programme for intensive care unit nurses" in Korea reported that The levels of eye care-related knowledge, awareness and practice were enhanced following the implementation of the educational programme and it is necessary to intensify eye care education aimed at new nurses who are inexperienced in intensive care unit nursing and provide continuing education on the latest eye care methods and information to experienced nurses.

In the current study; less than one third of studied nurses didn't know risk factors for eye disorders post-program while more than two thirds of them didn't know risk factors for eye disorders pre-program implementation. This could be due to the effect of the provided educational program on their knowledge which concentrated on risk factors and management of most common ocular disorders in critically ill patients. This in agreement with **Milutinović et al. (2017)** entitled "Eye care in mechanically ventilated critically ill adults: nursing practice analysis" in Serbia in which most of studied nurses did not know the causes for corneal abrasions in mechanically ventilated critically ill patients.

Also; in the current study, less than one quarter of nurses didn't know the right technique of endotracheal suction to prevent ocular complications post-program while more than two thirds of them didn't know the right technique of endotracheal suction pre-program. This could be due to the effect of the provided

educational program on their knowledge which included the right technique of endotracheal suction. This is in agreement with **Płaszewska-Żywko et al. (2021)** entitled "Risk Factors of Eye Complications in Patients Treated in the Intensive Care Unit" in Poland which reported that Suction done over the patient's head across the eyes can cause contamination of the ocular surface this may enhance ocular infection.

The study results illustrated that; majority of studied nurses knew the right direction for applying adhesive tape on eyelids for closing the eyes at post-program implementation, this could be due to the effect of educational program which included different eye care methods and techniques. This is in congruent with **Ahmadinejad et al. (2020)** entitled "Efficacy of simple eye ointment, polyethylene cover, and eyelid taping in prevention of ocular surface disorders in critically ill patients: a randomized clinical trial" in Iran which reported that; for closing the eyes, adhesive tape should be applied horizontally on eyelids to prevent corneal abrasion.

In addition, more than three quarters of the studied nurses knew the best time for beginning and administrating eye care for patients hospitalized in ICU post-program implementation. This might be due to the effect of the provided educational program which included the importance of providing eye care immediately after admission to ICU. This is in agreement with **Momeni Mehrjardi et al. (2021)** entitled "Effect of Training Eye Care Clinical Guideline for ICU Patients on Clinical Competence of Eye Care in Nurses" in Iran which reported that nurses need to take special care of the patient's eye at the beginning of admission in ICU to prevent eye complications.

Also, in the current study; it is noted that the majority of studied nurses had unsatisfactory level of practice regarding eye care pre-program implementation while more than more than three quarters of studied nurses had satisfactory level of practice regarding eye care post-program implementation. This could be due to implementation of practical sessions and demonstration of eye care procedures to prevent ocular complications in critically ill patients. This agrees with **Cho et al. (2017)** entitled "Development and validation of an eye care educational programme for intensive care unit nurses" in Korea found that Level of eye care practice showed an increase post-education. This is supported by **Demirel et al. (2014)** entitled "Effective management of exposure keratopathy developed in intensive care units: the impact of an evidence based eye care education programme" in Turkey; found that exposure keratopathy significantly decreased before and after training courses and that raising eye care awareness among nurses helps improve eye care in ICU patients.

In the current study, more than half of the studied nurses were using normal saline as a solution for eye cleansing post-program. This could be due to that, normal saline is more available than distilled water in their work setting. This in agreement with **Güler et al. (2016)**entitled "Intensive Care Nurses' Views and Practices for Eye Care: An International Comparison: in which normal saline was the most commonly reported solution for eye hygiene among the Palestinian nurses and gauze soaked in normal saline or sterile water (64.3%) were the most frequently used supplies by the Turkish nurses.

The current study revealed that higher percent of studied nurses were using eye drops post-program. This could be due to the effect of the educational program on their practices. This is in agreement with **Ribeiro et al. (2019)** which about "Effectiveness of using preservative-free artificial tears versus preserved lubricants for the treatment of dry eyes: a systematic review" in Brazil which reported that eye drops are used to lubricate dry eyes, help maintain moisture on the outer surface of eyes, decrease eye irritation, pain and discomfort.

Regarding eye covering; more than third of studied nurses had used Polyethylene eye cover. This could be due to the effect of the educational program on their practices. This is in agreement with **Nikseresht et al. (2019)**which about "Effectiveness Of Polyethylene Cover Versus Polyethylene Cover With Artificial Tear Drop To Prevent Dry Eye In Critically Ill Patients: A Randomized Controlled Clinical Trial" in Iran which reported that Both methods of polyethylene covering and polyethylene covering with artificial tear drop were more effective than a conventional method, but the method of polyethylene cover with artificial tear drop was clinically more effective. Therefore, it is recommended for use in critically ill patients.

In the current study most of studied nurses were performing hand washing before and after eye care procedure at post-program while more than two thirds of them weren't performing it pre-program implementation. This could be due to the effect of the educational program on their practices. This is in agreement with **Elkasby et al. (2021)** entitled "Effect of Eye Care Learning Package for Mechanically Ventilated Patients on Critical Care Nurses' Performance" in Egypt which reported that more than half of nurses washed their hands incorrectly.

In relation to critical care nurses' attitudes regarding eye care, the results of the current study illustrated that, most of studied nurses had negative attitude regarding eye care pre-program implementation while more than half of studied nurses had positive attitude toward eye care post-program implementation. This could be due to providing sessions about benefits of eye care and complications of neglected eye care in critically ill patients. This is supported by **Momeni Mehrjardi et al. (2021)**which about "Effect of Training Eye Care Clinical Guideline for ICU Patients on Clinical Competence of Eye Care in Nurses" reported that Training

nurses based on eye care clinical guidelines for anesthetized patients can improve the knowledge, attitude, and practice of ICU nurses.

In the current study; only few nurses consider eye care as the first priority while providing care for patients receiving mechanical ventilation pre-program implementation. This could be due to that decreases awareness about the most dangerous ocular complications in critically illpatients pre-program implementation. This in agreement with **Alghamdi et al. (2018)**entitled "Assessment of intensive care nurse knowledge and perception of eye care practice for unconscious and mechanically ventilated patients in intensive care units in Saudi Arabia" in which very few nurses reported performing eye care as the first task and gave eye care the first priority while managing the comorbidities of their patients.

Concerning the association between the study variables, the current study revealed that nurses' knowledge regarding eye care significantly correlated with their eye care attitude at pre, post and program follow up. This could be due to the direct or indirect contribution of benefit and risk knowledge to attitude formation through the mediating roles of benefits and risk perceptions. This is congruent with **Ebadi et al. (2021)** entitled "Evaluating Intensive Care Nurses' Clinical Competence in Eye Care; a Cross-Sectional Descriptive Study" in Iran which found strong positive relationship between nurses' knowledge and their attitude regarding eye care.

Also; the current study revealed that there was a strong positive relationship between critical care nurses' knowledge and their practices at pre, post and program follow up. This could be due to the application of the gained knowledge into the clinical practice. This is consistent with **Vyas et al. (2018)** entitled "Knowledge and practice patterns of Intensive Care Unit nurses towards eye care in Chhattisgarh state" in India which found that improving awareness of nurses may lead to improved eye care delivery in comatose patients on mechanical ventilation. This is disagree with **Ebadi et al. (2021)** entitled "Evaluating Intensive Care Nurses' Clinical Competence in Eye Care; a Cross-Sectional Descriptive Study" which found that while their participants had limited eye care knowledge, they followed a good eye care practice. This could be due to that they used a self-report questionnaire that subjectively evaluated nurses' eye care practice.

The current study revealed that there wasn't significant relationship between studied nurses' gender and their performance. This finding is disagree with **Milutinović et al. (2017)** entitled "Eye care in mechanically ventilated critically ill adults: nursing practice analysis" which found that male gender had more positive impact on nurses' attitudes. This could be due to decreased numbers of male nurses in the current study. In the current study, it was noticed that; nurses worked in cardiac ICU had lower levels of performance regarding eye care. This could be due to that those nurses are extremely focused on the cardiac status of their mechanically ventilated patients and thus weren't concentrating on the eye health of their patients.

The current study illustrated that; there was a significant relationship between educational level and work experience of nurses and their level of performance. This could be due to that; newly recruited critical care nurses usually focus their attention to learn lifesaving procedures. This agrees with **Elkasby et al. (2021)** entitled "Effect of Eye Care Learning Package for Mechanically Ventilated Patients on Critical Care Nurses' Performance" which found that; there was a positive statistical significant relationships between nurses' knowledge and practices with years of experience.

In the current study; there was a strong positive statistical significant relationship between nurses' level of performance with their age. This could be due to more clinical experience in older nurses, which leads to a positive attitude towards eye care in ICU patients. This is in agreement with **Ebadi et al. (2021)** entitled "Evaluating Intensive Care Nurses' Clinical Competence in Eye Care; a Cross-Sectional Descriptive Study" in Iran which found that There was a significant positive correlation between nurses' age and their eye care attitude.

VII. Conclusion:

On the light of the current study results, it can be concluded that, the studied nurses had an improvement in their level of performance (knowledge, practice and attitude) post-program implementation. As well as there was a significant positive correlation between critical care nurses' attitude and their knowledge and practice at post and follow up implementation of the educational program. Also; there was a statistically significant correlation between critical care nurses' performance and their age, educational level, years of experience and type of ICU.

VIII. Recommendations:

- Establishing evidence based eye care protocol of critically ill patients in ICU departments of Beni-Suef university hospitals to prevent ocular complications.
- More researches are needed to evaluate the effectiveness of applying educational program regarding eye care in patient' outcomes.

Refrences

[1]. **Ahmadinejad, M., Karbasi, E., Jahani, Y., Ahmadipour, M., Soltaninejad, M., & Karzari, Z. (2020).** Efficacy of simple eye ointment, polyethylene cover, and eyelid taping in prevention of ocular surface disorders in critically ill patients: a randomized clinical trial. Critical Care Research and Practice, pp 1-6.

[2]. **Alghamdi, M. A., Ghaleb, M. A., & Aal, S. E. A. (2018).** Assessment of intensive care nurse knowledge and perception of eye care practice for unconscious and mechanically ventilated patients in intensive care units in Saudi arabia. Journal of Nursing and Health Sciences, 4(1), pp 15.

[3]. **Cho, O. H., Yoo, Y. S., Yun, S. H., & Hwang, K. H. (2017).** Development and validation of an eye care educational programme for intensive care unit nurses. Journal of clinical nursing, 26 (14), pp 2073-2082.

[4]. **Demirel, S., Cumurcu, T., Fırat, P., Aydogan, M. S., & Doğanay, S. (2014).** Effective management of exposure keratopathy developed in intensive care units: the impact of an evidence based eye care education programme. Intensive and Critical Care Nursing, 30(1), pp 38-44.

[5]. **Ebadi, A., Moayed, M. S., Mirsadeghi, A., & 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 171-175.

[6]. **Ebadi, A., Saeid, Y., Ashrafi, S., & Taheri-Kharameh, Z. (2017).** Development and psychometric evaluation of a questionnaire on nurses' clinical competence eye care in intensive care unit patients. Nursing in critical care, 22(3), pp 169-175.

[7]. **Elkasby, W. E., Abd-Elaziz, W. W., & Mohamed, w. G. (2021).** Effect of Eye Care Learning Package for Mechanically Ventilated Patients on Critical Care Nurses' Performance. Mansoura Nursing Journal, 10 (3) pp 2. doi:10.21608/mnj.2021.74198.1049

[8]. **Güler, E. K., Eşer, İ., & Fashafsheh, I. H. D. (2016).** Intensive Care Nurses' Views and Practices for Eye Care: An International Comparison. Clinical Nursing Research, 26(4), pp 504-524. doi:10.1177/1054773816631471

[9]. **H Abdullah, W., Shehata, S. M., Mohamed Abdel Azeem, A., & Faisal Ellakwa, A. (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.

[10]. **Hearne, B. J., Hearne, E. G., Montgomery, H., & Lightman, S. L. (2018).** Eye care in the intensive care unit. Journal of the Intensive Care Society, 19(4), pp 345-350.

[11]. **Jaafar, S., & Al-Jubouri, M. B. (2020).** Nurses' Knowledge based on Evidence Based Practice toward Eye Care for Intensive Care Units Patients. Indian Journal of Forensic Medicine and Toxicology, 14 (37), pp 593-597. doi:10.37506/ijfmt.v14i3.10573

[12]. **Milutinović, D., Cvijanović, D., Ćirić, Z., Jovanović, G., & Andrijević, A. (2017).** Eye care in mechanically ventilated critically ill adults: nursing practice analysis. Medicinski pregled, 70(12), pp 377-383.

[13]. **Momeni Mehrjardi, Z., Mirzaei, S., Gohari, M., Hafezieh, A., & Nasiriani, K. (2021).** Effect of Training Eye Care Clinical Guideline for ICU Patients on Clinical Competence of Eye Care in Nurses. Critical Care Research and Practice, 21(4), pp 357-362.

[14]. **Nikseresht, T., Abdi, A., & Khatony, A. (2019).** Effectiveness Of Polyethylene Cover Versus Polyethylene Cover With Artificial Tear Drop To Prevent Dry Eye In Critically Ill Patients: A Randomized Controlled Clinical Trial. Clinical Ophthalmology (Auckland, NZ), 13(17), pp 2203.

[15]. **Płaszewska-Żywko, L., Sega, A., Bukowa, A., Wojnar-Gruszka, K., Podstawa, M., & Kózka, M. (2021).** Risk Factors of Eye Complications in Patients Treated in the Intensive Care Unit. International journal of environmental research and public health, 18(21), pp 1117. doi:10.3390/ijerph182111178

[16]. **Ribeiro, M. V. M. R., Barbosa, F. T., Ribeiro, L. E. F., Sousa-Rodrigues, C. F. d., & Ribeiro, E. A. N. (2019).** Effectiveness of using preservative-free artificial tears versus preserved lubricants for the treatment of dry eyes: a systematic review. Arquivos brasileiros de oftalmologia, 82(32), pp 436-445.

[17]. **Sansome, S. G., & Lin, P.-F. (2020).** Eye care in the intensive care unit during the COVID-19 pandemic. British Journal of Hospital Medicine, 81(6), pp1-10.

[18]. **Sayed, G. M. (2018).** Effect of Designated Nursing Eye Care Protocol on the Prevention of Ocular Infection among Unconscious Patients, Helwan University, Egypt, pp 85.

[19]. **Vyas, S., Mahobia, A., & Bawankure, S. (2018).** Knowledge and practice patterns of Intensive Care Unit nurses towards eye care in Chhattisgarh state. Indian journal of ophthalmology, 66(9), pp 1251.