

Effect of Eye Care Guidelines on Nurses' Competence for Comatosed Patients

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Abstract

Background: Eye care is a significant aspect in the management of comatosed patients. **Aim:** The study aimed to evaluate the effect of eye care guidelines on nurses' competence for comatosed patients. **Design:** Quasi- experimental research design was utilized in this study. **Setting:** The study was carried out in Intensive Care Unit at Benha University Hospital. **Sample:** Convenient sample (60) nurses. **Tools:** three tools were used, Tool (1): Self-administered questionnaire to assess nurses' knowledge regarding patient's eye care, tool (2): Observational checklist to assess nurses' practice regarding eye care, Tool (3): Nurses' attitude toward eye care. **Results:** The study revealed that 10% of studied nurses had good level of knowledge, 20% had satisfactory level of practices and 33.3% of the studied nurses had positive attitude score regarding eye care pre guidelines implementation, which improved immediately post guidelines implementation to become (83.3%, 86.7% and 93.3%), respectively with a highly statistically significant difference at ($p \leq 0.001$). **Conclusion:** Providing nursing guidelines has been shown to be effective on nurses' competence regarding eye care for comatosed patients. **Recommendation:** Continuous education and training of nurses regarding eye care for comatosed patients.

Key Words: Eye care guidelines, Nurses' Competence, Comatosed patients.

Introduction

Patients admitted to Intensive Care Units (ICUs) usually experience failures in one or more vital organ systems such as respiratory, neurologic, and cardiovascular systems accompanied by many other complications. Ocular Surface Disease (OSD) is a common complication in this patient population, but receives minimal clinical consideration to prevent it. Due to the ICU patients' life-threatening conditions, the eye care and symptoms of the OSD are often given low priority (Khatiban et al., 2021).

Comatosed patients are more susceptible for developing ocular complications because the decline in the

protective mechanisms due to the lower level of consciousness Glasgow coma scale (GCS) score < 6 , use of pharmacological agents (sedatives and muscle blocking drugs), periorbital oedema, mechanical ventilation, , prolonged hospitalization, blinking < 5 times per minute, oxygen therapy and tracheostomy (Oliveira et al., 2022).

Ocular surface disorders (OSDs) affect 23–60% of ICU patients. Lagophthalmos is considered as the defective or incomplete closure of the eyelids. Lagophthalmos disables the first protective mechanism of the eyes of these patients, which may predispose them to eye dryness and corneal epithelial breakdown. Intensive

care nurses are often preoccupied by life-threatening issues and this can reduce their attention to other body parts, including the eyes of patients (**Badparva et al., 2021**).

Eye care is a significant aspect in the management of intensive care patients. The protective ocular mechanisms are disrupted in this vulnerable group of patients, thus increasing the risk of developing ocular surface disease. OSD can present as direct corneal injury, exposure keratopathy, chemosis or conjunctivitis and keratitis. It leads to increased morbidity and requires further follow-up after recovering from the initial insult that required intensive care management (**Dhanapala & Sabaretnam, 2021**).

Nursing care in ICUs places more emphasis on the cardiovascular, renal, and neurological systems. Eye care is usually neglected because critically ill patient does not report discomfort about dry or irritated eye, increasing the risk of corneal injury. These factors along with the lack of clinical practice guidelines related to nursing interventions may contribute to the high incidence of corneal injury in critically ill patients (**Prado et al., 2021**).

Nursing competency is a “complex integration of knowledge including professional judgment, skills, values, and attitude. It is an intelligent practical skill set that integrates or combines different factors and issues in complex ways, specific to each circumstance. The worldwide perspective of professional nursing competency is focused on providing safe and quality service. It is the responsibility of each professional nurse to be competent in delivering the skills sets required to improve the quality of patient care and increase patient satisfaction (**Evelyn et al., 2021**).

Critical care nurses play an important role in delivering comprehensive care for patients with a critical illness, so it is necessary for nurses to use accurate and evidence-based methods in EC for comatosed patients. Despite the different methods of EC, ICU nurses need to have a proper evaluation of the performance and effectiveness of EC methods. Therefore, the implementation of a comprehensive, complete and accurate eye care protocol can be one of the most effective methods of EC in the ICU (**Pourghaffari et al., 2021**).

Significance of the study

The incidence of eye disorders in the intensive care population is difficult to quantify due to poor documentations when compared to the nursing care required to stabilize vital body systems. Eye care is often seen as a relatively minor problem. Patients in (ICU), especially ventilated patients, are at considerable risk of developing eye problems. Sedation and muscle relaxants also lead to impairment of blink reflexes and loss of eyelid muscle tone, while fluid imbalance and positive pressure ventilation may lead to chemosis (**Salime & El Sayed, 2020**).

At Benha University Hospital the researcher observed from his experience as a clinical instructor in Benha University, that there was a lack of practices regarding eye care of comatosed patients that easily led to many eye complications especially after 48 hours of being ventilated and sedated. Examples of complications seen are Lagophthalmos, dryness, redness of the conjunctiva (inflammation), edema and discharge, etc.

Aim of the study

The aim of this study was to evaluate the effect of eye care guidelines on nurses' competence for comatosed patients.

Study hypotheses:

H1- Nurse's knowledge regarding eye care for comatosed patients would be higher after implementing eye care guidelines than before.

H2- Nurse's practice regarding eye care for comatosed patients would be higher after implementing eye care guidelines than before.

H3- Nurse's attitude regarding eye care for comatosed patients would be changed after implementing eye care guidelines than before.

Subjects and method

Design:

Quasi- experimental research design was utilized to achieve the aim of the study.

Setting:

The study was carried out in Intensive Care Unit (ICU) at Benha University Hospital. ICU locates in second floor of the medical building, there is a nurse station at the center of the ICU, it contains three rooms and four counters; each room has two beds, each counter contains four beds and it has semiconscious and unconscious critically ill patients. There are another four small rooms which are nursing room, nursing supervisor's room, physicians' room and teaching room.

Subjects:

Convenient sample was selected and included all available (60) nurses from both sex who were working at ICU at Benha University Hospital during the time of data

collection and agree to participate in this study.

Tools for data collection:

To achieve the purpose of the study three tools were used to collect data for this study.

Tool I- Self-administered questionnaire

This tool developed by the researcher after reviewing related literature such as **Abd Elhameed et al., (2019), Liem., (2019) & Vyas et al., (2018).**

This questionnaire was presented in simple Arabic structure items related to different aspects and aimed to assess nurses' knowledge regarding eye care for comatosed patients in intensive care unit .

It was consisted of two parts:-

Part one: Nurses' demographic data, this part concerned with assessment of nurses' demographic characteristics. It was composed of five questions related to age, gender, educational level, years of experiences and training courses.

Part two: Nurses' knowledge, which composed of 34 multiple choice questions related to:

- Basic anatomy and physiology of eye (7 questions)
- Ocular problems for comatosed patient (7 questions)
- Infection control (3 questions)
- Assessment of the eye (6 questions)
- Prevention and management of the ocular complications (11 questions)

Scoring system:

The score distributed as: one mark for each correct answer and zero for incorrect

answer, the total score converted into percentage and graded as the following -:

- Below 60% graded as poor level of knowledge. (Less than 21 marks)
- From 60 to 74% graded as average level of knowledge. (From 21 to 25 marks)
- From 75% and above graded as good level of knowledge. (26 marks or more).

Tool II: - Observational checklist regarding eye care:

It adapted from **Perry et al., (2021)** and modified by the researcher after reviewing related literatures. This checklist aimed to assess nurses' practice regarding eye care. It consisted of 23 steps and divided into:-

- * Pre Procedure of eye care contains 3 steps
- * During Procedure 14 steps
- * Post procedure 6 steps

Scoring system:

Nurses' practice steps were observed 3 times then take the mean. The score distributed as: one mark for each step correctly done, and zero for incorrectly done & not done, the total score converted into percentage and graded as the following:-

- Below 75% graded as unsatisfactory level of practice. (Less than 17 marks)
- From 75% and above graded as satisfactory level of practice. (17 marks and more).

Tool III: Nurses attitude toward eye care:

It was Adapted from **Ebadi et al., (2017)** and modified by the researcher after reviewing related literatures. It used to measure the attitudes of nurses toward the risk of eye disease in unconscious patients undergoing mechanical ventilation, and consisted of seven questions.

Scoring system:

Each item is marked according to a 3 points likert scale: Low (1 point); moderate (2 point) and high (3 points). The total score of attitude was ranged from (7 to 21 marks).
- Below 50% considered as negative attitude. (From 1 to 10 marks).
- From 50% and above considered as positive attitude. (From 11 to 21 marks).

*** Nurses' guidelines:**

It developed by the researcher based on related literature such as **Benjamin et al., (2018)**, **Gwenhure & Shepherd, (2019)**. It was given to nurses after pretest; the general objective of the nursing guidelines was Improving nurses' competence regarding eye care for comatosed patients. The guidelines was written in a simple Arabic language and supplemented by pictures, videos and illustrations to help the nurse understanding of the content. It was distributed into two parts:-

The theoretical part: it included knowledge related to anatomy and physiology of eye, ocular problems, risk factors for eye disease, precautions to control infections. Eye assessment and signs of eye infection, prevention and management of ocular complications.

The practical part: It was about practice regarding eye care. The researcher demonstrated nurses' practical skills about eye care which included cleaning of the eye, application of eye drops or eye ointment, eye irrigation if any foreign body is present and finally covering the eye with eye patch.

- This guidelines presented by Arabic language with colored booklet.

Content validity

The tools were reviewed by a panel of five experts from medical surgical nursing field at faculty of nursing Benha University. Jury involved three assistant professors and two lecturers to test the relevance, clarity of tools' content, comprehension, understanding and necessary modification was done accordingly.

Reliability

The researcher used test – retest – methods to test the internal consistency of the tools, by administration of the same tools to the same subjects under similar condition on two different occasions. Testing the reliability of the tools through Alpha Cronbach. Tool reliability for self-administered questionnaire was 0.823, for observational checklist was 0.851 and for attitude was 0.883.

Ethical consideration

- The aim of this study was explained to all nurses and they were reassured that all information was confidential and it was used only for their benefit and for research purpose.
- Nurses' consent was obtained in order to participate in the study.
- Nurses were informed that they were allowed to choose to participate or not in the study and they had the right to withdraw from the study at any time without introducing any reason.
- The research tools not cause any harm for participants.
- Permission to carry out the study was obtained from responsible authorities in the faculty of nursing at Benha University and hospital administration personnel after explanation of the purpose of the study.

Pilot study

A pilot study was conducted on 10% of all nurses that were included in the study from the total number of nurses (60) in order to test the clarity and applicability of the tools. The tools were modified according to results of pilot study. The nurses involved in the pilot study (6 nurses) were included in the study because there was no modification in tools.

Preparatory Phase:

Preparatory phase included reviewing the recent related literatures of various aspects of the study using books, periodicals, magazines and internet such as **Alghamdi et al., (2018), Cho et al., (2017), Elkasby et al., (2021) & Hearne et al.,(2018)** in order to develop the data collection tool and nursing guidelines. The duration of this phase take 2-4 months.

Field work:

The fieldwork was performed over a period of six months during morning and afternoon shifts, started in March and April 2022 to perform pretest then the implementation of the guidelines started from May to the end of Jun 2022 and posttest was performed in July and Augusts 2022.

The study was conducted on four phases as the following:

Assessment Phase:

First: - Assessment of the nurses' practical skills through observational checklist (Tool II) was done at time of patient's care and during suction. The time needed to complete the checklist ranged between 10-15 minutes for each nurse.

Then assessment of the nurses' knowledge and attitude through self-administered questionnaire (Tool I) and (Tool III) was given to each nurse to fill it and time required for completion of the questionnaire was ranged from (30-40) minutes .

This assessment shed- light and was given more insight about the current practice, knowledge and attitude level to help detecting knowledge and practice deficits , as its results was obtained from this assessment.

Planning phase: The researcher put plan for carrying out the study after collecting data about the study setting. The guidelines developed by the researcher according to nurses' needs and deficiencies in their performance. It was written in Arabic language and it was reviewed by the supervisors and the validity was done by a panel of five experts from medical surgical nursing field.

Teaching materials was prepared e.g. discussion, demonstration, video, picture and guidelines that helped in covering theoretical and practical information.

The implementation phase:

- All available nurses in the intensive care unit during the time of data collection and agree to participate in this study was recruited into the study.
- The researcher gave the instructional colored guidelines booklet to nurses immediately after assessment phase.
- Total number of the studied nurses was 60 nurses; they were divided into 10 groups. Each group contained six nurses in every session. The researcher was attended two days/week in the morning and afternoon shift.
- The researcher met every group for three sessions: Two sessions for theory and one session for practice. Each session ranged

between 20 - 30 minutes, including the period of discussion.

- An orientation to the intervention and its process were presented. Each session started with a brief summary about what had been given through the previous session, then the objectives of the new topics, taking into consideration the use of simple language to suite the level of all nurses' education.

- Discussion, motivation and reinforcement during the intervention sessions were used to enhance learning. At the end of each session the nurses ask questions to correct any misunderstanding.

Evaluation Phase:

After implementation of guidelines the post test was administered to evaluate the effectiveness of guidelines through evaluation of nurses' practice using observational checklist (Tool II), nurses' knowledge and attitude through self-administered questionnaire (Tool I) and (tool III) was done immediately after giving the nursing guidelines.

Comparison was done between the pretest and posttest at the end of the study to determine the effect of eye care guidelines on nurses' competence for comatosed patients.

Statistical analysis:

The collected data were organized, categorized, tabulated and analyzed using the number and percentage distribution. The statistical analysis of data was done by using the computer software of Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 21. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (\bar{X}) and

standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (χ^2) as the test of significance and independent (t) test was used to compare mean score between two groups. Correlation (r) was used to test the correlation between quantitative data.

Results

Table (1): showed the Frequency distribution of the studied nurses according to their demographic data. It revealed that, 50% of the studied nurses aged between 20-<30 years old with mean age 28.91 ± 6.20 years; females were 71.7% of the studied nurses. Also, 50% of studied nurses have years of experience in intensive care unit between 5-<10 years with mean experience of 8.75 ± 4.55 years. Moreover, only 8.3% of studied nurses attended training courses on eye care. Also, 56.7% of the studied nurses had technical institute of nursing. Moreover, 23.3% of them had bachelor of nursing.

Table (2): showed the nurses' knowledge about eye care among comatosed patients at pre and post implementation of nursing guidelines. It showed that, there was a marked improvement in all subscales of nurses' knowledge about eye care among comatosed patients post implementation of nursing guidelines with a highly statistically significant difference at ($P = < 0.01$) between pre and post implementation of nursing guidelines with mean total knowledge of 12.74 ± 5.47 pre implementation of nursing guidelines. While changed to 30.14 ± 3.07 post implementation of nursing guidelines.

Figure (1): concerned with total nurses' knowledge about eye care among comatosed patients at pre and post implementation of nursing guidelines. It showed that, 10.0% of

the studied nurses have good level of total knowledge about eye care among comatosed patients pre implementation of nursing guidelines. While changed to 83.3% at post implementation of nursing guidelines.

Table (3): concerned with nurses' practices regarding eye care among comatosed patients at pre and post implementation of nursing guidelines. It showed that, there was a marked improvement in all items of nurses' practices regarding eye care among comatosed patients at post implementation of nursing guidelines with a highly statistically significant difference at ($P = < 0.01$). As evidence, only 16.7% and 8.3%, respectively of the studied nurses observe patient's eyes and stand besides, not above, the patient's bed at pre implementation of nursing guidelines. While changed to 93.3% and 90.0%, respectively at post implementation of nursing guidelines, with mean total practice of 10.81 ± 6.22 at pre implementation of nursing guidelines, while changed to 21.49 ± 2.51 at post implementation of nursing guidelines.

Figure (2): Presented the total nurses' practices regarding eye care among comatosed patients at pre and post implementation of nursing guidelines. It revealed that, 20.0% of the studied nurses have satisfactory level of total practices regarding eye care among comatosed patients pre implementation of nursing guidelines. While changed to 86.7% post implementation of nursing guidelines.

Table (4): concerned with nurses' attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines. It presented that, there was a marked improvement in nurses' attitude towards eye care among comatosed patients post implementation of nursing guidelines

with a highly statistically significant difference at ($P = < 0.01$) between pre and post implementation of nursing guidelines. As evidence, only 20% and 16.7%, respectively of the studied nurses had low priority to do eye care in patients receiving mechanical ventilation and had low willingness to provide eye care for patients receiving mechanical ventilation at pre implementation of nursing guidelines. While changed to 86.7% and 100%, respectively at post implementation of nursing guidelines, with mean total attitude had 8.91 ± 2.67 at pre implementation of nursing guidelines. While changed to 13.1 ± 0.43 at post implementation of nursing guidelines.

Figure (3): showed the total nurses' attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines. It revealed that, 33.3% of the studied nurses have positive attitude towards eye care among comatosed patients pre implementation of nursing guidelines.

While changed to 93.3% post implementation of nursing guidelines.

Figure (4): showed the total nurses' competence regarding eye care among comatosed patients at pre and post implementation of nursing guidelines. It revealed that, there was a marked improvement in total nurses' competence regarding eye care among comatosed patients post implementation of nursing guidelines rather than pre implementation of nursing guidelines.

Table (5): concerned with Correlation between total nurses' knowledge, practice and their attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines. It showed that, there were high significant statistical positive correlation between nurses' knowledge, practice and their attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines at $p < 0.01$.

Table (1): Frequency distribution of the studied nurses according to their demographic data (n=60)

Demographic data of the studied nurses	No.	%
Age (years)		
20-<30	30	50.0
30-<40	16	26.7
40-<50	12	20
50-60	2	3.3
Mean \pmSD	28.91\pm6.20	
Range	21-56	

Sex		
Male	17	28.3
Female	43	71.7
Number of years of experience in the intensive care unit		
<5 years.	16	26.7
5-<10 years.	30	50
≥ 10 years.	14	23.3
Mean ±SD	8.75±4.55	
Range	1-33	
Attending training courses		
Yes	5	8.3
No	55	91.7
Academic qualifications		
Secondary diploma in nursing	9	15
Technical institute of nursing	34	56.7
Bachelor of nursing	14	23.3
Postgraduate studies	3	5

Table (2): Comparison between nurses' knowledge about eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

Knowledge subscales	Pre guidelines						Post guidelines						X ²	p-value
	Good		Average		Poor		Good		Average		Poor			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Anatomy and physiology of the eye	6	10.0	15	25.0	39	65.0	50	83.3	7	11.7	3	5.0	76.92	0.000**
Ocular complications of the comatosed patient	5	8.3	18	30.0	37	61.7	48	80.0	8	13.3	4	6.7	61.07	0.000**
Necessary	10	16.7	18	30.0	32	53.3	58	96.7	2	3.3	0	0.0	55.90	0.000**

precautions to control infection															
Eye assessment for comatosed patients	8	13.3	15	25.0	37	61.7	51	90.0	6	10.0	3	5.0	60.60	0.000**	
Prevention and management of the eye complications	7	11.7	16	26.7	37	61.7	49	81.7	7	11.7	4	6.7	54.33	0.000**	
Range	3-30						10-31								
Mean SD	12.74 ± 5.47						30.14 ± 3.07						t=50.57	0.000**	

X2: Chi Square Test t= Paired T test (**) highly statistically significant at p<0.001.

Figure (1): Percentage distribution of total nurses' knowledge about eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

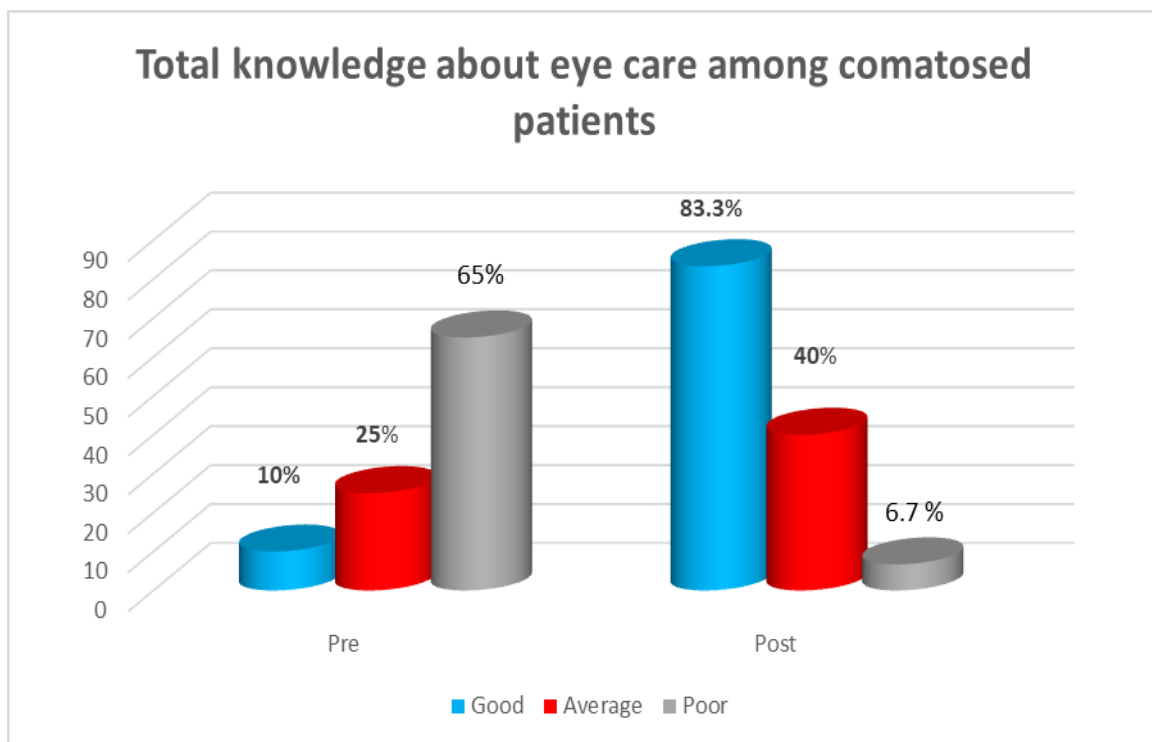


Table (3): Comparison between nurses' practices regarding eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

Eye care steps	Pre guidelines				Post guidelines				X ²	p-value
	Done		Not done		Done		Not done			
	No.	%	No.	%	No.	%	No.	%		
Pre procedure										
Identify patient	15	25.0	35	75.0	58	96.7	2	3.3	31.27	0.000**
Review patient's chart	3	5.0	57	95.0	55	91.7	5	8.3	39.52	0.000**
Perform hand hygiene.	9	15.0	51	85.0	54	90.0	6	10.0	28.00	0.000**
During procedure										
Observe patient's eyes	10	16.7	50	83.3	56	93.3	4	6.7	31.08	0.000**
Apply clean gloves if drainage is present.	25	41.7	35	58.3	60	100	0	0.0	22.30	0.000**
Remove eye patch (if present).	60	100	0	0.0	60	100	0	0.0	0	0
Assess for blink reflex.	3	5.0	57	95.0	50	83.3	10	16.7	53.07	0.000**
Examine eye pupils	3	5.0	57	95.0	50	83.3	10	16.7	52.99	0.000**
Observe of eye movement	4	6.7	56	93.3	52	86.7	8	13.3	53.47	0.000**
Remove gloves and perform hand hygiene. Apply new gloves.	20	33.3	40	66.7	60	100	0	0.0	32.30	0.000**
Arrange supplies at bedside. Lower side rails and place bed in working position.	16	26.7	44	73.3	58	96.7	2	3.3	41.93	0.000**
Place patient in supine position.	40	66.7	20	33.3	60	100	0	0.0	20.00	0.005**
Clean the eye from inner to outer	9	15.0	51	85.0	60	100	0	0.0	47.96	0.000**
Use a separate, clean cotton ball or corner of wash cloth for each eye.	6	10.0	54	90.0	60	100	0	0.0	53.08	0.048*
Apply lubricant to eye	10	16.7	50	83.3	56	93.3	4	6.7	33.88	0.000**
Be sure the lashes positioned clear of the cornea	8	13.3	52	86.7	56	93.3	4	6.7	36.11	0.000**
Apply sterile eye patches	22	36.7	38	63.3	60	100	0	0.0	31.04	0.000**
Post procedure										
Dispose of used supplies and perform hand hygiene.	20	33.3	40	66.7	60	100	0	0.0	30.25	0.000**
Place patient in a comfortable position. (Raise side rails)	25	41.7	35	58.3	56	93.3	4	6.7	18.99	0.001**
Remove eye pads every 4 hours	3	5.0	57	95.0	52	86.7	8	13.3	55.99	0.000**
stand besides, not above, the patient's bed	5	8.3	55	91.7	54	90.0	6	10.0	50.34	0.000**
Document eye examination	15	25.0	45	75.0	60	100	0	0.0	48.50	0.001**
Notify physician if signs of irritation or infection are present.	20	33.3	60	66.7	60	100	0	0.0	31.05	0.001**

Range	6-22	10-24	t=	
Mean ± SD	10.81 ± 6.22	21.49 ± 2.51	41.02	0.000**

X²: Chi Square Test. t= Paired T test. (*) Statistically significant at p <0.05. (**) highly statistically significant at p <0.001

Figure (2): Percentage distribution of total nurses' practices regarding eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

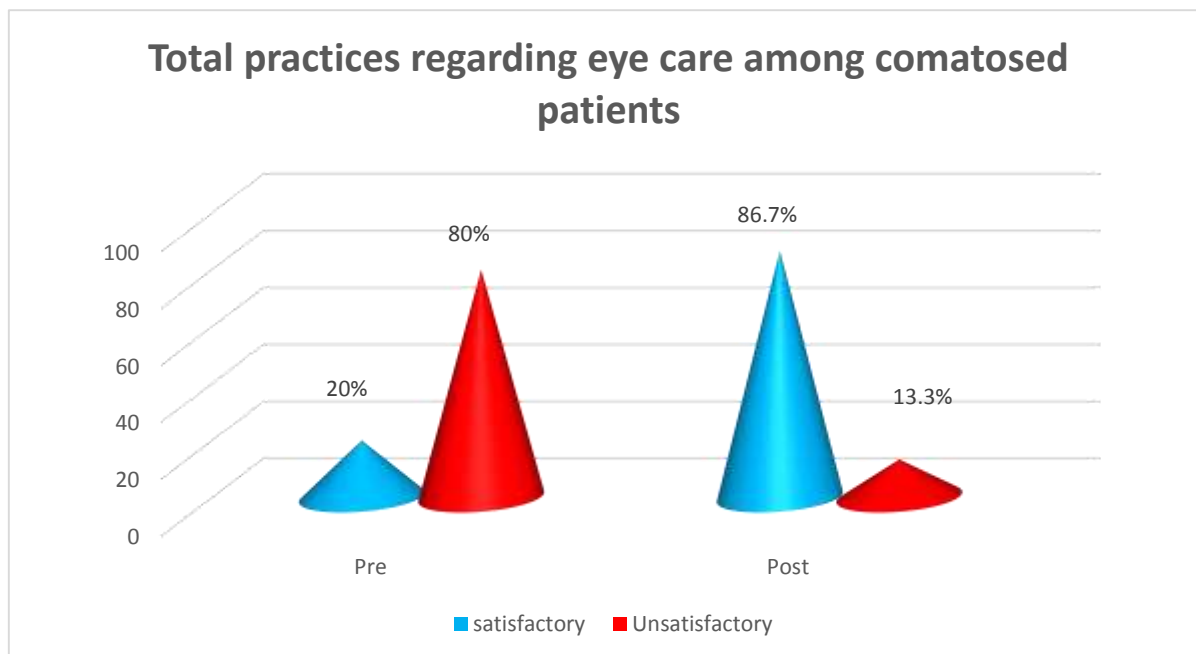


Table (4): Comparison between nurses' attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

Items	Pre guidelines						Post guidelines						X ²	p-value
	Low		Moderate		High		Low		Moderate		High			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
How much effect does pre and post procedure hand washing have on preventing or reducing the incidence of eye disorders?	1	13.3	30	50.0	22	36.7	0	0.0	7	11.7	53	88.3	45.06	0.000**
How much importance does eye care have for patients receiving mechanical ventilation?	12	20.0	30	50.0	18	30.0	0	0.0	8	13.3	52	86.7	50.13	0.000**
How much priority do you give to eye care in patients	12	20.0	30	50.0	18	30.0	0	0.0	8	13.3	52	86.7	50.15	0.000**

receiving mechanical ventilation?															
How much willingness do you have to provide eye care for patients receiving mechanical ventilation?	10	16.7	32	53.3	18	30.0	0	0.0	0	0.0	60	100	63.99	0.000**	
How much effect does staff education in terms of eye care have on preventing eye disorders?	8	13.3	21	35	31	51.7	0	0.0	0	0.0	60	100	67.31	0.000**	
How much effect does eye care performed every 4 h have on preventing eye disorders?	10	16.7	30	50.0	20	33.3	0	0.0	4	6.7	56	93.3	57.22	0.000**	
How much effect of the direction of endotracheal suctioning have on reducing the incidence of eye disorders?	12	20	32	53.3	16	26.7	0	0.0	5	8.3	55	91.7	55.93	0.000**	
Range Mean ± SD	4-12 8.91 ± 2.67						10-14 13.1 ± 0.43						t=37.81	0.000**	

.X2: Chi Square Test t= Paired T test (**) highly statistically significant at p<0.001

Figure (3): Percentage distribution of total nurses' attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

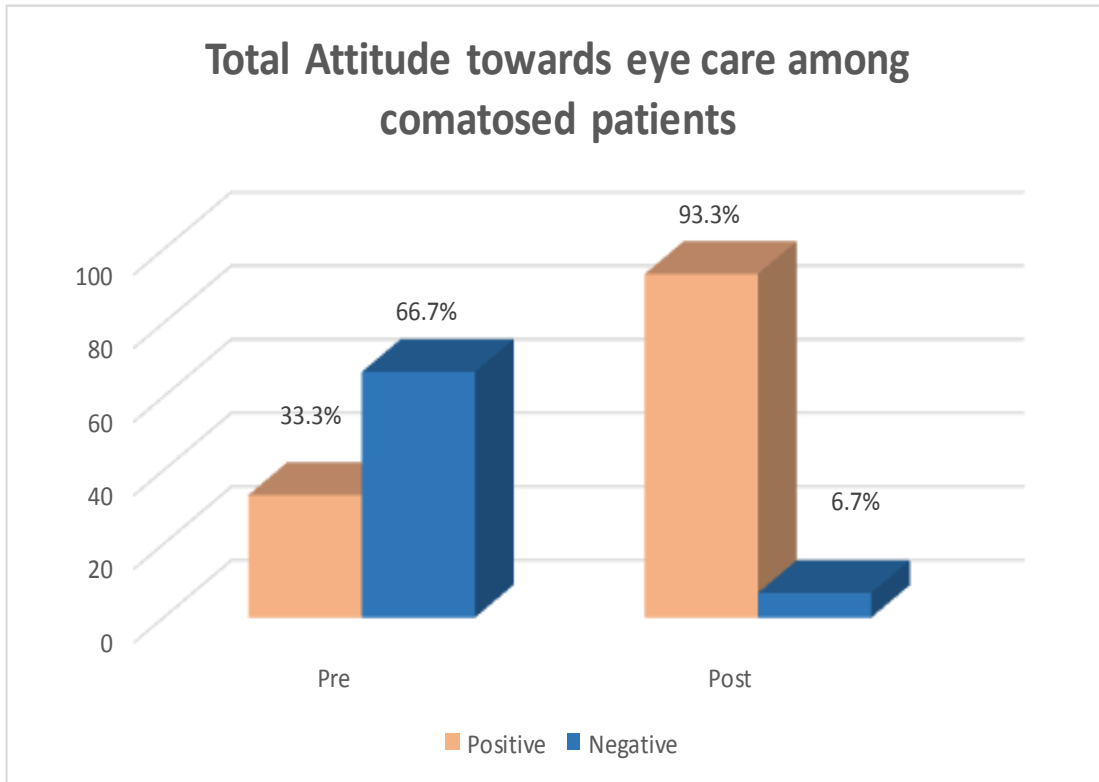


Figure (4): Percentage distribution of total nurses' competence regarding eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

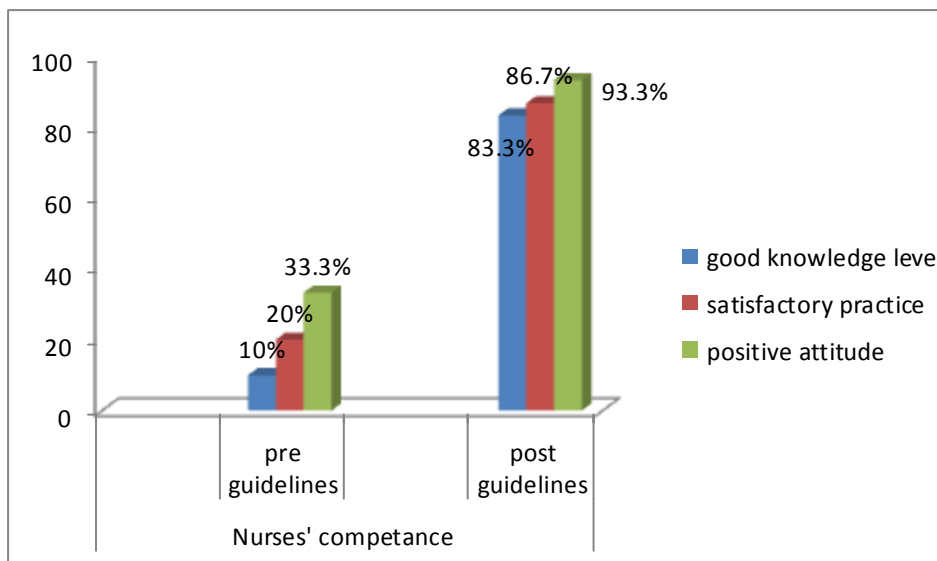


Table (5): Correlation between total nurses’ knowledge, practice and their attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines (n=60).

Variables		Total nurses’ practice		Total nurses’ Attitude	
		Pre	Post	Pre	Post
Total nurses’ knowledge	r	0.575	0.624	0.509	0.538
	p	.000**	.000**	.000**	.000**
Total nurses’ Attitude	r	0.513	0.530		
	p	.000**	.000**		

Discussion

Comatosed Patients present at high risk for the development of Dry Eye. These patients are predisposed to lose their natural mechanisms of eye protection and therefore need effective assistance from the health team (Araújo et al., 2017). Nurses and doctors in the intensive care units usually concentrate on life threatening issues which are emergency in most situations that lead to little concern of the less emergency issues like eye problems even it is serious problem (Kalhori et al., 2016).

The discussion of the present study was presented in six parts as the following: The **first part** concerned with demographic characteristics of studied nurses, **second part** concerned with nurses' knowledge regarding eye care, **third part** concerned with nurses' practice score regarding eye care, **fourth part** concerned with nurses' attitude regarding eye care, **fifth part** concerned with nurses' competence regarding eye care among comatosed patients, **six part** concerned with correlation between studied nurses' total knowledge score , total practice score and

attitude regarding eye care pre and post guidelines implementation.

First part concerned with demographic characteristics of studied nurses. Regarding age: the current study revealed that half (50%) of studied nurses aged between twenty to less than thirty years old. This may be related to nurses working in critical area usually new graduated. This result in the same line with **Sayed, (2022)** who reported that more than three quarters (78%) of studied nurses their age ranged from 20-<30 years old, in their study about " Assessment of Critical Care Nurses' Performance Regarding Eye Care for Critically Ill Patients."

Also the finding is consistent with **Elkasby et al., (2021)** who their study about " Effect of Eye Care Learning Package for Mechanically Ventilated Patients on Critical Care Nurses' Performance " and they stated that more than two- third of participant nursing staff aged from 25 to 29 years old ,also the finding is consistent with **Aslam et al., (2017)** who found that most of nurses were aged 18 - 29 years in there study about “Assessment of

Nurses' Knowledge and Practices about Fluid and Electrolytes Monitoring and Administration among Cardiac Surgery Patients ", also the finding is consistent with **Abd Elhameed et al.,(2019)** who reported that , the majority of studied nurses their age ranged between 25 and 30 years old, in their study about " Assessment of Nurses' Knowledge and practices concerning eye care of critically ill patients in intensive care units."

As regard to sex, the present study results showed that most of studied nurses were females. From researcher point of view this might be due to overall relation of male nurses to female nurses was less in the nursing profession. This finding is agreed with **Puspasari, (2019)** who found that most of the study participants were female, in their study about "Factors Associated with the Nurse Implementation towards Eye Care among Comatose Patient in Intensive Care Unit."

Our finding is inconsistent with **Fashafsheh et al., (2013)** who reported in their study about "Impact of a designed eye care protocol on nurses knowledge, practices, and eye health status of unconscious mechanically ventilated patients at North Palestine Hospitals" that the number of both genders was nearly equal.

Regard to years of experience, the finding of the present study represented that half (50%) of studied nurses have years of experience in intensive care unit between five to less than ten years of experience. This might be contributed to most of nurses were in young age and immediately worked after graduated.

This finding is in line with study by **Elkasby et al., (2021)** who reported that nearly half of studied nurses had 5 - 10 years of experience. The results are also consistent with a study

about " Assessment of Nurses' Knowledge and practices concerning eye care of critically ill patients in intensive care units " by **Abd Elhameed et al.,(2019)** which noted that the majority of the studied nurses had experience more than four years.

In relation to their level of education, the present study finding revealed that more than half (56.7%) of studied nurses had technical institute of nursing. Also, nearly one quarter (23.3%) of them had bachelor of nursing. From researcher point of view, this may be attributed nursing job in Egypt was exclusive on female only till few years ago and number of nurses graduated from institutes and diploma is higher than bachelor degree. This result in the same line with **Tork et al., (2022)** who studied about "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 ", they revealed that less than half (45%) of studied nurses had a technical institute of nursing.

Similarly, this result is agreement with **Gouda et al., (2020)** who studied about "Effect of nursing intervention guidelines regarding osteoporosis prevention on staff nurses knowledge and behavior", they revealed that more than half of studied nurses were instituted education. But, this finding is inconsistent with **Glüer et al., (2017)**, they found that the majority of the studied nurses in ICUs had bachelor's degrees, in their study about "Intensive care nurses' views and practices for eye care: An international comparison ."

Concerning their training courses on eye care, the present study finding revealed that

minority (8.3%)of the studied nurses attended training courses on eye care, this may be due to lack of time was the most common barrier cited, heavy work and shortage of trained workforce. This finding goes in the same line with **leim, (2019)** who showed in his study about "Assess knowledge and practice eye care for patients of intensive care unit nursing staff" that the most (92.2%) of ICU nurses reported that they had no previous EC training and all participants acknowledged that they did not have an EC protocol to follow. This is also in agreement with **Alghamdi et al., (2018)** study about "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 " and found that the most (91.1%) of the studied nurses didn't take eye care training course.

Second part: concerned with knowledge regarding eye care pre and post guidelines implementation.

Concerning knowledge of the studied nurses about eye care there were a significant improvement as regards eye care general information about anatomy and physiology of the eye, ocular problems of the comatosed patients, necessary precautions to control infection, eye assessment, prevention and management of the eye complications post guidelines implementation compared with pre guidelines implementation. From the researcher point of view this may be due to the current eye care guidelines had a great role in improving nurses' knowledge that may reflected it's importance in raising the level of knowledge and improving practice and attitude among them. In addition to, the researcher used different teaching materials as discussion, demonstration and booklet that helped in covering theoretical and practical information.

These findings were similar to the study done by **Cho et al., (2017)** who studied "Development and validation of an eye care educational program for intensive care unit nurses", and reported a significant increase in eye care-related knowledge, awareness and self-reported eye care practice after the implementation of the educational program. Moreover, satisfaction of the educational program and confidence to eye care was also high.

The results are also consistent with a study about " 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" by **Tork et al., (2022)** which noted that, less than two thirds of studied nurses' had good level of knowledge post designed eye care protocol implementation compared to less than one fifth pre designed eye care protocol implementation. In the same line, in study about " Assess knowledge and practice eye care for patients of intensive care unit nursing staff " that conducted by **Liem, (2019)** who stated that the score for educational intervention showed a significant increase in nurses' knowledge about eye care in the ICU environment after intervention.

Also, this result is supported by **Fashafsheh et al., (2013)** who stated that there were statistical significant differences in the total knowledge scores regarding eye care of unconscious mechanically ventilated patients after implementation of eye care protocol. This finding agree with **Elkasby et al., (2021)** who conducted study about "Effect of eye care learning package for mechanically ventilated patients on critical care nurses' performance" who found that there was significant improvement in nurses' total knowledge

regarding eye care for mechanically ventilated patients after learning package implementation.

As regards the anatomy and physiology of the eye, Tenth (10%) of studied nurses had good level of knowledge about the anatomy and physiology of the eye at pre implementation of nursing guidelines, While knowledge of the majority (83.3%) of studied nurses regarding anatomy and physiology of the eye has been improved post implementation of nursing guidelines. This finding is agree with **Abdel Azeem, et al., (2019)** which revealed that the majority of studied nurses had an improvement in their level of knowledge regarding to eye anatomy and physiology after nursing intervention, in their study about "Effect of Nursing Intervention on Nurses' Knowledge and Practice Regarding Cataract Surgery".

Also, this finding was consistent with **Taha & Abd Elaziz, (2015)** who studied about "Effect of nursing intervention guidelines on nurses' role, patients' needs, and visual problems post cataract surgery" they reported that most of nursing staff showed low knowledge level regarding ocular anatomical and physiological features. While knowledge of the majority of studied nurses regarding anatomy and physiology of the eye has been improved after learning package implementation.

Similarly, this finding was consistent with **Freitas et al., (2018)** who studied about "Corneal injuries in intensive care patients: contributions to the systematization of nursing care and patient safety" they reported that most of the studied nurse's had lack of knowledge regarding the structure of the cornea, its layers and functions, injury in this organ and its types, risk factors, compromises care and in

order for the nurse to implement and perform preventive care it is necessary to have a deeper knowledge as their lack of knowledge makes the nursing diagnosis impossible and, consequently adequate intervention is impossible and There is no eye care protocol to follow and need for eye care protocol to improve their knowledge and practice.

Concerning the ocular problems, the present study showed that more than three fifth (61.7%) of studied nurses had poor level of knowledge pre implementing nursing guidelines but post implementation of nursing guidelines the majority (80%) of studied nurses had good level of knowledge regarding ocular problems of the comatosed patient. This finding is in line with Kousha, et al., (2018) who study about "Incidence, risk factors and impact of protocolised care on exposure keratopathy in critically ill adults: a two-phase prospective cohort study" and mentioned when a protocol of eye care is developed with the involvement of the nursing staff and incorporated into the patient electronic record, excellent adherence and prevention of ocular complications can be achieved.

This finding was consistent with **Kocaçal, et al., (2018)** who studied about "Nurses can play an active role in the early diagnosis of exposure keratopathy in intensive care patients" and reported that after eye care and assessment training, intensive care nurses can play an effective role in detecting early-stage of exposure keratopathy in intensive care patients.

As regards the necessary precautions to control infection, the present study showed that more than half (53.3%) of the studied nurses have poor level of knowledge pre implementing nursing guidelines while post implementation of nursing guidelines the most

(96.7%) of studied nurses had good level of knowledge regarding necessary precautions to control infection. This finding was consistent with **Liu et al., (2021)** who stated that educating nurses on procedures for infection control, and implementing protective measures to prevent nosocomial infections are critical to prevent further outbreaks. and this is consistent with **Fashfishi et al. (2013)** who found that the most common precaution taken by the Palestinian nurses were taking swab for culture in case of any sign of infection.

As regards the eye assessment, the present study showed that more than three fifth (61.7%), of the studied nurses have poor level of knowledge pre implementing nursing guidelines while post implementation of nursing guidelines the most (90%) of studied nurses had good level of knowledge regarding eye assessment. This finding is consistent with other previous study conducted by **Milutinović et al., (2017)** who found that critical care nurses do not have sufficient knowledge and experience in performing eye assessments , and reported that this may be caused by lack of training programs, handouts or guidelines after learning package implementation and providing different sessions about eye assessment and availability of hand out, all of these leading to improvement in the CCN's practice regarding eye assessment.

Also, this finding is consistent with **Dhanapala & Sabaretnam, (2021)** who found that adequate eye care includes frequent assessment of the eye by using pen light from both physicians and nursing personnel should be considered the standard of care in the ICU, in their study about "Audit of eye care for ventilated patients in intensive treatment unit during covid-19 pandemic".

This finding disagrees with **Alghamdi, et al., (2018)** who stated that most of the studied nurses did "Assessment of the eye" very well, in their study about "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".

Concerning prevention and management of the eye complications, the finding of the present study illustrated that, more than three fifth (61.7%) of the studied nurses have poor level of knowledge pre implementing nursing guidelines while post implementation of nursing guidelines the majority (81.7%) of studied nurses had good level of knowledge regarding prevention and management of the eye complications.

this finding is consistent with **Abid et al., (2018)** who stated that, before guideline implementation the most of studied nurses had a low level of knowledge regarding nursing care pre and post eye surgery and they did not follow aseptic technique measures when changing eye dressing, in their study about "Effect of Implementing Nursing Guideline on Nurses' Performance Regarding Patients Undergoing Cataract or Glaucoma Surgery".

Also, this finding agrees with **Taheri-Kharameh, (2017)** who stated that application of simple protocols of eye care which including lubricants (ointments, drops, normal saline irrigation of the eyes), chambers (polyethylene covers, swimming goggles, shields, pads, eye patch), eyelid closure (taping the eyes closed with transparent tape, tarsorrhaphy), exposure keratopathy can be prevented and prevent eye complications in intensive care unit, thus improving patient care in the intensive care unit and stated that the most effective is the application of

polyethylene moisture chamber, in their study about " Eye care in the intensive care patients: An evidence based review ".

Third part: Concerned with studied nurses' practice score regarding eye care pre and post guidelines implementation.

Concerning to the nurses' practices regarding eye care, the current study revealed that there was a marked improvement in nurses' practices regarding eye care among comatose patients post implementation of nursing guidelines with a highly statistically significant difference between pre and post nursing guidelines implementation in all steps of eye care. As evidence the minority (8.3%) of studied nurses perform suctioning while standing besides, not above the patient's bed and covering patient's eyes, but post implementation of nursing guidelines the most (90%) of studied nurses perform suctioning while standing besides, not above the patient's bed and covering patient's eyes.

This finding supported by **Milutinović et al., (2017)** in their study entitled " Eye care in mechanically ventilated critically ill adults: nursing practice analysis " who stated that half of the studied nurses did not recognize endotracheal suction as a confounding factor for eye infections and nurses stated that endotracheal suction does not have any impact on eye infections in mechanically ventilated patients.

Also **Johnson & Rolls, (2014)** suggested best practices for endotracheal suction in order to prevent iatrogenic infections in intensive care units and reported that, during this procedure, the nurse should stand on the lateral side of the patient with mandatory preventive covering of the patient's eyes, in their study entitled " Manual best

practice for intensive care: Eye care for critically ill adults ".

The findings of the current study is agree with **Tork et al., (2022)** who stated that, the majority of the studied nurses had competent practice post designed eye care protocol implementation in all items, in their study about " 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 ".

Also, this finding supported by **Vyas et al., (2018)** in their study entitled " Knowledge and practice patterns of Intensive Care Unit nurses towards eye care in Chhattisgarh state " who stated that nurses with awareness about exposure keratopathy checked eyelid closure more frequently, instilled lubricant drops, and cleaned eyes with saline-soaked gauze more frequently than those without awareness, and stated that improving awareness in nurses may lead to improved eye care delivery in comatose patients on mechanical ventilation.

Similarly, this finding is agree with **Demirel et al., (2014)** in their study about "Effective management of exposure keratopathy developed in Intensive Care Units: The impact of an evidence based eye care education programme", who described a simple and easy eye care protocol, including eye cleaning with saline, application of topical antibiotic or lubricant, and closing the eyes with vertical thin adhesive tape and the eye should not be covered with a sponge and the blink reflex should be followed routinely in detected cases of lagophthalmos and found a significant reduction in the rates of exposure keratopathy in the subsequent period post training of nurses on this protocol.

Also, this is consistent with **Ahmadinejad et al., (2020)** who reported that ophthalmic ointment, eye closed and eye lid taping was used and examined and became routine eye care method in ICU setting, in their study about " Efficacy of simple eye ointment, polyethylene cover, and eyelid taping in prevention of ocular surface disorders in critically ill patients: A randomized clinical trial".

Concerning nurses' total practices regarding eye care pre and post implementation of nursing guidelines, the findings of this study revealed that, the majority (86.7%) of the studied nurses had satisfactory level of total practices post implementation of nursing guidelines compared to only one fifth (20%) pre implementation of eye care guidelines with a highly statistical significant differences. The researcher point of view that the finding was due to considering eye care is not lifesaving procedure among the majority health team members as well as no protocol of eye care is followed among the nurses in the intensive care unit. This finding supported by **Elkasby et al., (2021)** who found that there was highly statistical significant improvement in CCNs' total performance regarding eye care for MV patients after learning package implementation, in their study about " Effect of Eye Care Learning Package for Mechanically Ventilated Patients on Critical Care Nurses' Performance ", and reported that It is important to make the nurses in particular aware of the important of eye care protocol of sedated and intubated patients in ICU to keep eye healthy and prevent ocular surface disorders.

Fourth part concerned with studied nurses' attitude score regarding eye care pre and post guidelines implementation.

Concerning nurses' attitude regarding eye care pre and post implementation of nursing guidelines. The findings of this study revealed that, there was a marked improvement in nurses' attitude towards eye care among comatosed patients post implementation of nursing guidelines with a highly statistically significant difference at ($P < 0.01$) between pre and post implementation of nursing guidelines, as less than fifth (16.7%) of the studied nurses had low willingness to provide eye care for patients receiving mechanical ventilation at pre implementation of nursing guidelines, but post implementation of nursing guidelines total number of studied nurses had high willingness to provide eye care for patients receiving mechanical ventilation.

Also this finding supported by **Sayed, (2022)** in their study entitled " Assessment of Critical Care Nurses' Performance Regarding Eye Care for Critically Ill Patients " who revealed that the minority (4%) of the studied nurses had very high priority to do eye care in patients receiving mechanical ventilation and also the minority of them had very high attitude about the effect does standard endotracheal suctioning have on reducing the incidence of eye disorders, and also, stated that Continuous In-service training programs for critical care nurses are recommended to improve their performance regarding eye care.

Concerning total nurses' attitude regarding eye care pre and post implementation of nursing guidelines. The findings of this study revealed that, the most (93.3%) of the studied nurses had positive attitude post implementation of nursing guidelines compared to only one third (33.3%) had positive attitude pre implementation of eye care guidelines with a highly statistical significant differences. From the researcher

point of view this finding due to most of health team considering eye care is not lifesaving procedure and they didn't know the complications that may occur to the patients when eye care is ignored.

Also this finding supported by **Momeni et al., (2021)** in their study entitled "Effect of training eye care clinical guideline for ICU patients on clinical competence of eye care in nurses " who revealed that there were a significant change in the mean scores of knowledge, attitude, and practice before and after the intervention.

The previous results are also consistent with **Sayed, (2022)** who studied about "Assessment of Critical Care Nurses' Performance Regarding Eye Care for Critically Ill Patients" who reported that, the majority of studied nurses had negative attitude regarding eye care. Also, this finding disagree with **Alghamdi et al., (2018)** who reported that the studied nurses had high attitude towards EC procedures in patients undergoing mechanical ventilation, but this finding necessarily did not mean that they had good EC clinical practice, in their study about " 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 ".

Fifth part: concerned with Nurses' competence regarding eye care among comatosed patients. the current study showed that there was a marked improvement in total nurses' competence regarding eye care among comatosed patients post implementation of nursing guidelines as compared to pre implementation of nursing guidelines. From the researcher's point of view this finding shows that training nurses about eye care has

affected the knowledge, practice, and attitude of patients and also improve nurses' competence about eye care.

These findings agreed with **Momeni et al., (2021)** in their study entitled " Effect of training eye care clinical guideline for ICU patients on clinical competence of eye care in nurses" whose result showed that the mean score of knowledge, attitude, practice, and total score of clinical competence increased significantly in the experimental group in the post intervention phase as compared to the pre intervention phase.

Also this finding supported by **Azfar et al., (2013)** in their study entitled " Protocolized eye care prevents corneal complications in ventilated patients in a medical intensive care unit " who revealed that nurses who had access to eye care guidelines in their ward acquired significantly higher eye care knowledge, attitude, and practice scores than their counterparts who did not have such guidelines.

Six parts: concerned with correlation between studied nurses' total knowledge score, total practice score and attitude regarding eye care pre and post guidelines implementation. the study revealed that there were high statistical significant positive correlation between studied nurses' total knowledge score, total practice score and their attitude towards eye care pre and post guidelines implementation. From the researcher's point of view these result may be due to the knowledge acquired by studied nurses help them to perform practical skills after understanding the scientific knowledge background about them and the acquired knowledge helps them to change their attitude.

This finding agreed with **Sayed, (2022)** who studied about "Assessment of Critical

Care Nurses' Performance Regarding Eye Care for Critically Ill Patients" whose result showed that there were statistically significance positive correlation between total nurses' knowledge, total practice score and their attitude. Also, this finding is consistent with **Milutinović, et al., (2017)** who studied about " Eye care in mechanically ventilated critically ill adults: nursing practice analysis", and revealed that there were a strong positive correlation between attitudes and practices in eye care - the more positive attitudes lead to more quality practice but There was no statistically important correlation in knowledge between prevention, eye care treatment, attitudes and nursing practices in mechanically ven-tilated patients.

These finding also agreed with **Ebadi et al., (2021)** in his study entitled " Evaluating intensive care nurses' clinical competence in eye care; a cross-sectional descriptive study " whose result showed that knowledge had significant positive correlations with attitude and practice, and enhancing their knowledge would also positively influence their attitude and practice.

On the other hand, these findings were disagree with **Khalil et al., (2019)** who reported no significant correlation between total knowledge score of the studied nurses about eye care and their performance. In their study entitled "Critical care nurses' knowledge and practices concerning eye care of patients at two teaching university hospitals, Egypt".

Conclusion

- ❖ There were a highly statistically significant relation between total nurses' knowledge, practice & attitude at post guidelines implementation and their demographic data as age,

academic qualification, number of years of experience in intensive care unit and attendance of training courses at ($P = < 0.01$). While, there was no statistically significant relation with their sex at pre and post implementation at ($P = > 0.05$).

- ❖ There were high significant statistical positive correlation between nurses' knowledge, practice and their attitude towards eye care among comatosed patients at pre and post implementation of nursing guidelines at $p < 0.01$.
- ❖ Based on the results of the present study, it can be concluded that, the implementation of eye care guidelines proved to be effective in improving nurses' competence (knowledge, practice and attitude) regarding eye care for comatosed patients.

Recommendations

In the light of the findings of the current research, the following recommendations are suggested:

- Establishing a written updated protocol for eye assessment and care with continuous education & appraisal to ensure enough knowledge, and complete safe practices, which certainly leads to minimizing the incidence of eye complications.
- Provide continuous educational program and training courses for nurses working at intensive care units about eye care to improve their knowledge, practice and attitude.

- The availability of printed booklet about ocular surface disorder prevention and management will result in significantly better outcomes.
- Emphasize multidisciplinary collaboration to reliably implement eye care protocol in an effort in intensive care units for comatosed patients.

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