Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (280-293), Month: January - April 2020, Available at: www.noveltyjournals.com

Effect of Designated Eye Care Protocol on Prevention of Ocular Surface Disorders among Patients in Intensive Care Unit

Rasha Awad A' Elmagied Salime[1], Reham Adel Ebada El Sayed[2]

[1] Lecturer of Critical Care Nursing, Faculty of Nursing, Helwan University, Egypt
[2] Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Ain Shams University, Egypt

Abstract: **Ocular surface disorders (OSD) are frequently encountered in critically ill unconscious patients due to the loss of normal ocular protective mechanisms. in addition to the drawback effect of mechanical ventilation & the use of sedations which leads to decrease tear production and increase evaporation due to eye lid opening, may progress to microbial keratitis and vision defect. Unfortunately, this common problem is underappreciated by ICU clinicians, who usually focused on the management of organ failures, and eye care becomes a side issue. Eye care guidelines and protocols have been developed for increasing eye care implementation in intensive care units. However, the guidelines lack consistency in assessment or intervention methodology. The study aim was to examine the effect of designated eye care protocol on prevention of ocular surface diseases (OSD) among intensive care units (ICU) patient. Methods: To achieve this aim A quasi experimental/interrupted time- series design with nonequivalent group design was utilized to guide and achieve the aim of the current research. Study results of this study revealed that there were high statistical significance differences between pre eye care protocol application and post protocol application among study group regarding OSD sub items as eye discharges, eye lid position, presence of conjunctival edema and corneal changes (P<0.001). The study concluded that, regular screening by ICU staff, protocolised care is necessary to prevent the OSD and subsequent complications and prompt ophthalmic referral can significantly decrease the ocular morbidity and improve the quality of life following discharge. The study recommended; establishing a written update protocol of eye care for ventilated & sedated patients in CCU to ensure providing complete and professional care for patients; it's also recommended to implement the current study on the other hospitals in Egypt.**

Keywords**: Designated Eye care, Intensive Care Unit, Ocular surface disorders.**

1. INTRODUCTION

Patients in intensive care units are at high risk for eye problems due to the loss of normal physiologic defense mechanisms of the eyes in addition to the drawback effect of the mechanical ventilation & the use of sedations which leads to decrease tear production and increase evaporation due to eye lid opening. [1]

Life-sustaining measure is the top priority in the intensive care unit (ICU). Eye care is relatively a minor consideration for ICU patients. However, ocular surface disorders (OSDs) occur in 42 to 60 percent of the comatose, sedated, or paralyzed patients in the ICU. The consequences of OSDs will lead to unnecessary and preventable suffering of the patients and should not be underestimated. [2]

Patients in critical care areas are at increased risk for developing ocular complications, most commonly as a result of excessive exposure and drying of the surface of the eye. Proper, simple eye care measures can decrease the incidence of sight-threatening infections and scarring that can yield long-term problems for a patient who was otherwise successfully treated during their time in the critical care Unit. Additionally, for patients who are terminally ill, proper eye care will help maintain the health of the corneal tissue and preserve the option of eye donation for the patient or the patient's family members. [3]

Many critical care patients are sedated, both medically and as a result of their systemic illness. Sedation decreases the blink rate and predisposes the ocular surface to desiccation. At particular risk are patients receiving mechanical ventilation. These patients are often treated with muscle relaxants that impair closure of the eyelids. During sleep, the eyelids close via active, tonic contraction of the orbicularis oculi muscle. Paralysis of these muscles brings closure to the eyelids only via passive means (i.e. gravity) and this frequently yields incomplete closure known as "lagophthalmos". [4]

Clear vision requires light to be precisely focused on the nerve layer (retina) that lines the internal aspect of the posterior eye wall. Approximately 70% of this focusing is accomplished by the cornea the clear dome over the central portion of the front of the eye. Any scarring or distortion of the central cornea, or the tear film coating the cornea will yield blurring of the vision. Any significant disruption of the tear film not only blurs vision, but also places the underlying corneal tissue at risk for infection and subsequent permanent scarring. [5]

Increased jugular venous pressure from mechanical ventilation can also lead to fluid buildup, known as chemosis, under the conjunctiva — a stretchy mucous membrane covering the white part of the eyeball (sclera). This chemosis can be quite pronounced, with conjunctiva protruding over the lower eyelid. This condition can yield further impairment of passive eyelid closure and increased drying of the ocular surface. Positive end expiratory pressure (PEEP) of 5 cm H20 and above is thought to worsen conjunctival chemosis by decreasing venous outflow from the head and neck. [6]

Corneal infections are most commonly caused by the patient's own bacterial flora. It is important that the patient's face is kept clean and that care be taken to protect the patient's eyes when suctioning gastrointestinal or respiratory secretions. Introduction of bacterial flora from these sites onto a compromised ocular surface can yield aggressive bacterial infections. [7] Severe exposure keratopathy is infrequent in a protocolised ICU setting. Eyelid position and duration of ventilation are associated with exposure keratopathy. [8]

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. [9]

From the researcher experience and some estimate of unconscious mechanically ventilated ICUs patients have developed eye problems especially after 48 hours of being ventilated and sedated. Examples of complications seen are dryness, redness of the conjunctiva (inflammation), edema and discharge, etc. From the previous issues, the researcher found that it is important to work on exploring and applying protocols for assessment, diagnosis, planning, implementation, and evaluation of eye care for patients with high risks of eye problems trying to decrease the incidence first and to improve the eye health assessment to done early detection for OSDs.

2. SUBJECTS AND METHODS

Aims of the study:

This study aims to evaluate the effect of the designated eye care protocol on prevention of ocular surface disorders among patients in Intensive Care Units. This aim will be attained through:

- Assessing ICU patients eye health status.
- Designing and implementing eye care protocol related to prevention of ocular surface disorders among patients in Intensive Care Units.
- Evaluating the effect of the designated eye care protocol on prevention of ocular surface disorders among patients in Intensive Care Units.

Research hypotheses:

H 1: study group who received the designated eye care protocol will have a significant lower mean ocular surface disorders score than the control group who receive the routine ICU care.

H 2: The percentage of OSDs will be less among patients who are received the designed eye care protocol than the control group who receive the routine ICU care.

Subjects and methods:

A quasi experimental/interrupted time- series design with nonequivalent group design was utilized to guide and achieve the aim of the current research. As Paul, Rajiv, Chiang, Leighton & Cuttler (2017) [10], mentioned that this design is a way to improve upon the interrupted time-series design is to add a control group. It involves taking a set of measurement at intervals over a period of time both before and after an intervention of interest.

Setting of the study:

The study was conducted at Medicine general adults' intensive care units (Medicine ICU 1, consists of 17 beds with patient admission number 517 patients in year 2018 - 2019, and Medicine ICU 2, consists of 17 beds with patient admission number 553 patients in year 2018 - 2019,) with total 34 beds in medicine ICU at selected Ain Shams university hospital; Egypt.

Sample:

Over 6 consecutive months; a purposive sample of 64 adult male & female patients was included, 4 patients were dropped out of the study as intervention could not be achieved. So 60 adult patients were remaining till the end of the study. The study was (from august-2018 to January-2019). The inclusion criteria were as follows: patients' admitted in ICU on mechanical ventilator, patients' sedated with sedatives or neuromuscular relaxant, disturbed conscious level GCS (3-12) & patients' first 24 hours of admission. The sample divided randomly into two equal groups, control group (n=30 patients) received the routine ICU care, and study group (n=30 patients) received routine ICU care in addition to eye care protocol. Study and control groups' sample homogeneity was maintained. While the exclusion criteria: patients with burn & facial trauma/injury.

Tools for data collection:

In order to achieve the aim of the current research two tools were utilized to gather data pertinent to the study variables as follows;

Tool I: patient assessment sheet: It include two parts: 1st part: demographic data and 2nd part: medical health history data; it consisted of items seeking information about subjects such as age, gender, medical diagnosis, length of stay, duration of mechanical ventilator, past history and patients' clinical data.

Tool II: Eye health status assessment sheet; aims to assess eye status. It consists of 18 questions. Scoring system: For eye discharge: graded from 0=watery, 1= mucopurulent, 2= purulent. For eye lid position: graded from 0=No exposure, 1= Only conjunctival exposure, 2= Lower 1/4th of the cornea exposed, 3= Lower ½ of the cornea exposed, 4= ¾ th of the cornea exposed, 5= Cornea fully exposed. For conjunctival edema: 0= Absent, 1= Conjunctival Injection, 2= conjunctival hyperameia, 3=Conjunctival edema without dellen formation, 4= Conjunctival edema with dellen formation. For corneal changes: 0= No changes, 1= Punctate epithelial erosions involving the inferior third of the cornea, 2= Punctate epithelial erosions involving more than the inferior third of the cornea, 3= Stromal scar, 4= Microbial keratitis. The reliability of eye health assessment sheet was measured as correlation coefficient between odd and even responses of questions related to eye health status with Cronbach's coefficient alpha was 0.854 (The normal range value of this test range between 0.0 and+ 1.0). This value is considered high which values reflects a higher degree of internal consistency of the questionnaire (Fashafsheh, Morsy, Ismaeel & Alkaiasi, 2013) [11].

Designated Eye Care Protocol toward early detection and prevention of Ocular Surface Disorders among Patients in Intensive Care Unit. The eye care protocol was designed by the researchers to improve ICU patients' eye health status by early detection and prevention through eye health status assessment. Eye care protocol: Unconscious or sedated patients on ventilators are highly at risks for eye health problems; these problems can be reduced or even totally prevented if nurses follow a protocol for assessment and management. Here is a suggested protocol that I hope our colleges in ICU will follow trying to evaluate its effect at the end of the period of hospitalization of such patients.

1. In unconscious, heavily sedated, and muscle relaxed patients the eyes should be shiftily inspected with a pen light to check whether there is a conjunctival or corneal exposure due to the level of eye lid closure.

2. On assessment infection control, measures must be followed (hand washing, gloves).

3. Oral hygiene and suctioning of the ETT must be done from one side and away from the eyes of the patient, and eyes must be covered.

4. Eye swaps from the conjunctiva must be taken for culture and sensitivity if there are any signs of infection.

5. On assessment the nurses should determine if?

a- There is periorbital edema.

b- Conjunctival edema.

c- Sub conjunctival hemorrhage.

d- Eyelid completely closed or not.

e- Tear production.

f- Signs of infection or inflammation.

6. Intervention according to findings and prevention has the priority

Pilot study: Once permission was granted to proceed with the proposed study, a pilot study was carried out before starting data collection on 6 of targeted patients to evaluate the clarity, feasibility and applicability of the tools as well as estimate the time needed to collect data. Also panel of three juries' expertise were review the utilized tool for its validity. The used tools were valid and reliable.

Ethical Considerations: An official permission was taken from the hospital administrators. The researcher clarified the objectives and aim of the study to patients included in the study. The researcher assured maintaining anonymity and confidentiality of subjects` data. Moreover, the intervention used in the current study is safe.

Procedure:

The preparatory phase: Initially the patients admitted to ICU on mechanical ventilator for first 24 hrs., sedated with disturbed conscious level GCS (3-12) and has been fulfilled the inclusion criteria would have enrolled in current research; by using simple random sample method, into two matched equal groups, patients would have distributed to be either in control or at the study group. The demographic data and eye health status assessment sheet was utilized to assess the current eye health status of mechanically ventilated unconscious or sedated patients admitted to ICUs for both groups.

The implementation phase: the control group would receive only the routine ICU care; while the study group would receive the eye care protocol beside the routine ICU care. Unconscious or sedated patients on ventilators are highly at risks for eye health problems; these problems can be reduced or even totally prevented if nurses follow a protocol for assessment and management. The researcher was assigned team leader of nurses in every shift were helped researcher on Intervention according to findings and prevention has the priority. On assessment the researcher and assigned team leaders were determined; presence of periorbital edema, Conjunctival edema, Sub conjunctival hemorrhage, Eyelid completely closed or not, Tear production, Signs of infection or inflammation. Patients under the study were exposed to the routine care in addition to the designed eye care protocol, and then eye health status assessment was carried out by the investigator utilizing eye health assessment sheet

Eye care protocol is designed by the researcher taking in consideration three levels of care depending on assessments regularly: a- General eye hygiene and cleaning with normal saline .09%. b- Patients who cannot achieve complete eye closure independently, cleaning with sterile water or normal saline 0.09% soaked sterile gauze, regularly and lubrication of chloramphenicol antibiotic ointment as prophylactic and eyes should be kept closed by mechanical eye covers as Polyethylene covers. Mechanical eye cover is preferred over eye lubricant Q8h. c- Patients who cannot achieve complete eye closure independently, cleaning with normal saline 0.09% regularly and lubricate with chloramphenicol antibiotic ointment as treatment or as prescribed after swap culture is taken if signs of infection presented and covered by Polyethylene covers Q8h.

The evaluation phase: A simple designated eye care protocol substantially reduced the incidence of OSDs, which can be easily achieved in clinical practice when a multidisciplinary focused approach is taken. Measurement was after five to seven days of implementing designated eye care protocol, which had a positive effect on eye health status in ICU patients.

Statistical analysis:

The data was coded and tabulated using a personal computer. Statistical Package for Social Science (SPSS) version 20 was used. Data was presented using descriptive statistics s in form of frequencies and percentage. T- test was utilized as an inferential statistic to compare means between study and control groups in relation to research variables, chi-square test was used to identify relationship between qualitative variables and paired-t test also was used. Statistical significance was considered at P-value ≤ 0.05.

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (280-293), Month: January - April 2020, Available at: www.noveltyjournals.com

3. RESULTS

Table (1): Number and percentage distribution of the study and control groups according to their demographic characteristics

Items	Study (n=30)		Control (n=30)		Tests	
					T or X^2	P-value
Age						
20<40	12	40.0%	11	36.7%	0.158	0.924
40<50	11	36.7%	10	33.3%		
≥ 50	7	23.3%	9	30.0%		
Mean ± SD	**45.75±4.27**		**45.37±5.76**			
Gender						
Female	10	33.3%	8	26.7%	0.100	0.752
Male	20	66.7%	22	73.3%		
Medical diagnosis						
Chronic Kidney Diseases	3	10.0%	2	6.7%	0.360	0.548
Chronic Obstructive Pulmonary Diseases (COPD)	3	10.0%	3	10%	0.000	1.000
Cerebral Vascular Accident	4	13.3%	3	10%	2.105	0.147
Acute liver failure	2	6.7%	2	6.7%	2.105	0.147
Bilateral lung infiltrate	2	6.7%	0	0.0%	1.026	0.311
Brain hemorrhage	1	3.3%	2	6.7%	1.026	0.311
Brain tumor	1	3.3%	1	3.3%	0.000	1.000
Guillain-Barré syndrome	1	3.3%	1	3.3%	1.026	0.311
Heart failure	0	0.0%	3	10%	2.105	0.147
Hepatic coma	2	6.7%	3	10%	0.360	0.548
Liver cirrhosis	2	6.7%	0	0.0%	2.105	0.147
Lung carcinoma	1	3.3%	1	3.3%	1.026	0.311
Lung fibrosis	0	0.0%	1	3.3%	0.000	1.000
Mythenia grave	0	0.0%	1	3.3%	1.026	0.311
Renal failure	3	10.0%	2	6.7%	0.000	1.000
Respiratory failure	4	13.3%	4	13.3%	2.105	0.147
Systemic lupus	1	3.3%	1	3.3%	1.026	0.311
Length of stay (LOS)	**4.35±2.13**		**4.70±2.20**		0.511	0.612
Duration of Mechanical Ventilator (MV)	**3.95±1.18**		**3.15±1.27**		1.329	0.192

Table (1) shows study and control matched/homogeneity groups as there was no mean of difference which equal 45.75±4.27 and 45.37±5.76 respectively. In relation to age, (76.7%) and (70%) of the study and control groups had age ranged between 20 to less than 50 years with mean age (45.75±4.27) for study group and (45.37±5.76) for control group. Male gender represents (66.7%) of the study group and (73.3%) of control group. According to medical diagnosis (13.3%) of both study and control groups diagnosed as respiratory failure, with a no significant difference between the two groups. According patient's length of stay period mean (4.35±2.13) for study group and (4.70±2.20) for control group with no mean of difference between both groups. In addition to patients' duration of mechanical ventilator for study and control matched/homogeneity groups as there was no mean of difference which equal 3.95±1.18 and 3.15±1.27 respectively.

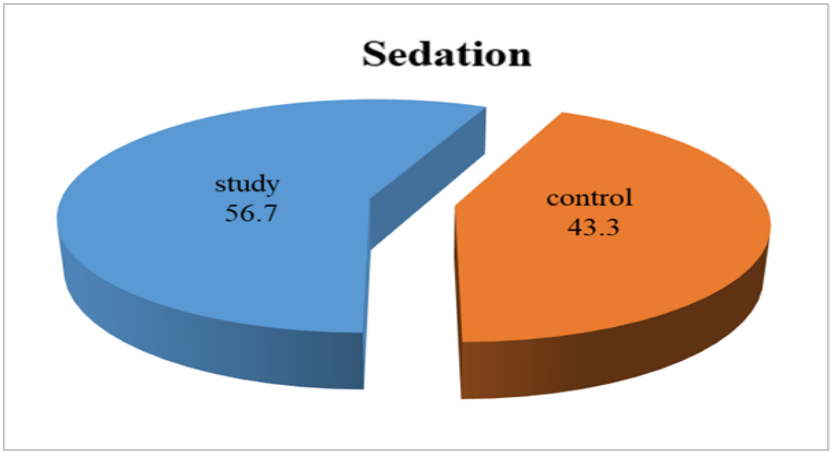

Figure (1) percentage distribution of sedation among study and control groups (n=60)

Figure (1) represents that (56.7%, 43.3% respectively) of both study and control groups had sedated respectively. In addition, there was no statistical significant difference between both groups (X2 = 0.400, p- value= 0.527); which reflected matched/homogeneity groups.

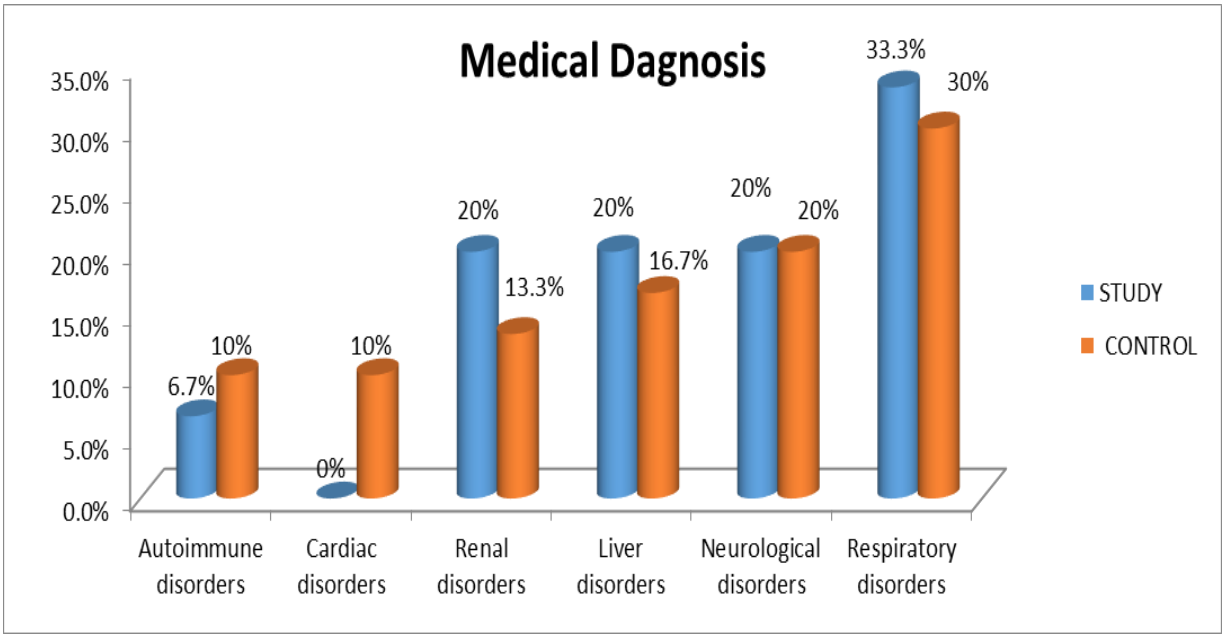

Figure (2) percentage distribution of medical diagnosis among study and control groups (n=60)

Figure (2) clarifies that (33.3%, 30% respectively) of both study and control groups diagnosed as respiratory disorders respectively (as bilateral lung infiltrate, COPD, lung carcinoma, lung fibrosis and respiratory failure). In addition, there was no statistical significant difference between both groups (X2 = 2.105, p- value= 0.147).

Table (2): Distribution of the patient's in both groups according to their Medical past history and Patient's clinical data.

Items	Study (n=30)		Control (n=30)		Tests	
					T or X^2	P-value
Medical past history						
cardiac diseases	17	56.7%	14	46.7%	0.400	0.527
Hypertension	19	63.3%	18	60%	0.107	0.744
Diabetes mellitus	12	40%	15	50%	0.404	0.525
Kidney diseases	7	23.3%	6	20%	0.143	0.705
Liver diseases	6	20%	6	20%	0.000	1.000
Others	0	0.0%	2	6.7%	2.105	0.147
Patient's clinical data						
GCS	6.02±2.14		7.44±2.2		0.586	0.561
Mechanical ventilator mode:						
SIMV	12	40%	8	26.7%	6.739	0.081
CMV	0	0	3	10%		
CPAP	6	20%	9	30%		
PEEP	12	40%	10	33.3%		
Endo tracheal Tube (ETT)	23	76.7%	25	83.3%	0.625	0.429
Respiratory colonization	11	36.7%	11	36.7%	0.000	1.000
Muscle relaxant	7	23.3%	6	20%	0.143	0.705
Sedation duration	2.25±1.55		2.95±1.23		1.582	0.121
Ramsy Sedation Score	4.30±1.03		3.90±1.33		1.061	0.295

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (280-293), Month: January - April 2020, Available at: www.noveltyjournals.com

Table (2) shows that (63.3%, 60% respectively) of both study and control groups had past history of hypertension. Regarding Glasgow coma scale, study and control matched/homogeneity groups as there was no mean of difference which equal 6.02±2.14 and 7.44±2.2 respectively. In relation to mechanical ventilator mode, (40%, 33.3% respectively) of both study and control group been on PEEP mode. Moreover, (36.7%) of both groups were had respiratory colonization. (23.3%, 20% respectively) of the study and control group had sedated by muscle relaxant. While the mean of sedation duration was (2.25±1.55) for study group and **(**2.95±1.23) for control group. As regard, mean of Ramsy Sedation Score was (4.30±1.03) for study group and (3.90±1.33) for control group. In addition, there was no statistical significant difference between both groups; which reflected matched/homogeneity groups.

Table (3): Distribution of the patient's in both groups regarding their Eye health status assessment pre application of designated eye care protocol

Pre	Study (n=30)		Control (n=30)		Chi-square	
					X^2	P-value
Discharge						
Watery	11	36.7%	21	70%	0.148	0.929
Mucopurulent	6	20%	3	10%		
Purulent	13	43.3%	6	20%		
Eye lid position						
No exposure	11	36.7%	13	43.3%	7.089	0.214
Only conjunctival exposure	3	10%	6	20%		
Lower ¼ of the corneal exposed	4	13.3%	3	10%		
Lower ½ of the corneal exposed	2	6.7%	3	10%		
¾ of the corneal exposed	6	20%	3	10%		
Cornea fully exposed	4	13.3%	2	6.7%		
Conjunctival edema						
Absent	9	30%	13	43.3%	3.271	0.352
Conjunctival Injection (hyperameia)	11	36.7%	8	26.7%		
Conjunctival edema without dellen formation	6	20%	6	20%		
Conjunctival edema with dellen formation	4	13.3%	3	10%		
Corneal changes						
No changes	6	20%	9	30%	2.667	0.615
Epithelial erosions inferior third of the cornea	9	30%	7	23.3%		
Epithelial erosions more than the inferior third of the corn	6	20%	4	13.3%		
Stromal scar	3	10%	2	6.7%		
Microbial keratitis (infection)	6	20%	8	26.7%		

Table (3) clarifies that (36.7%, 70% respectively) of both study and control groups had watery discharge. While (36.7%, 43.3% respectively) of both study and control groups were no exposure eye lid. (36.7%) of study group had Conjunctival Injection (hyperameia) and (43.3%) of control group had no conjunctival edema. Moreover, (30%) of study group had epithelial erosions inferior third of the cornea and (30%) of control group had no corneal changes. In addition, there was no statistical significant difference between both groups pre implementation of designated eye care protocol

Table (4): Distribution of the patient's in both groups regarding their Eye health status assessment post application of designated eye care protocol

Post	Study (n=30)		Control (n=30)		Chi-square	
					X^2	P-value
Discharge						
Watery	20	66.7%	9	30%	6.533	0.038*
Mucopurulent	3	10%	9	30%		
Purulent	7	23.3%	12	40%		
Eye lid position						
No exposure	25	83.3%	6	20%	17.848	0.003*
Only conjunctival exposure	2	6.7%	5	26.7%		

Lower ¼ of the corneal exposed	2	6.7%	6	20%		
Lower ½ of the corneal exposed	1	3.3%	4	13.3%		
¾ of the corneal exposed	0	0	3	10%		
Cornea fully exposed	0	0	6	20%		
Conjunctival edema						
Absent	22	73.3%	9	30%	9.500	0.023*
Conjunctival Injection (hyperameia)	4	13.3%	6	20%		
Conjunctival edema without dellen formation	2	6.7%	10	33.3%		
Conjunctival edema with dellen formation	2	6.7%	5	16.7%		
Corneal changes						
No changes	21	70%	3	10%	15.602	0.004*
Epithelial erosions inferior third of the cornea	7	23.3%	9	30%		
Epithelial erosions more than the inferior third of the corn	2	6.7%	4	13.3%		
Stromal scar	0	0	2	6.7%		
Microbial keratitis (infection)	0	0	12	40%		

Table (4) illustrates that, (66.7%) of study group had watery discharge and (40%) of control group had purulent discharge. Regarding (83.3%, 20% respectively) of both study and control group were no exposure eye lid. While, (73.3%) of study group had had no conjunctival edema and (33.3%) of control group Conjunctival edema without dellen formation. Moreover, (70%) of study group had had no corneal changes and (40%) of control group had Microbial keratitis (infection); with statistical significant difference between study and control groups post implementation of designated eye care protocol.

Comparison between level of Eye health status assessment among patients of study group pre and post designated eye care protocol application:

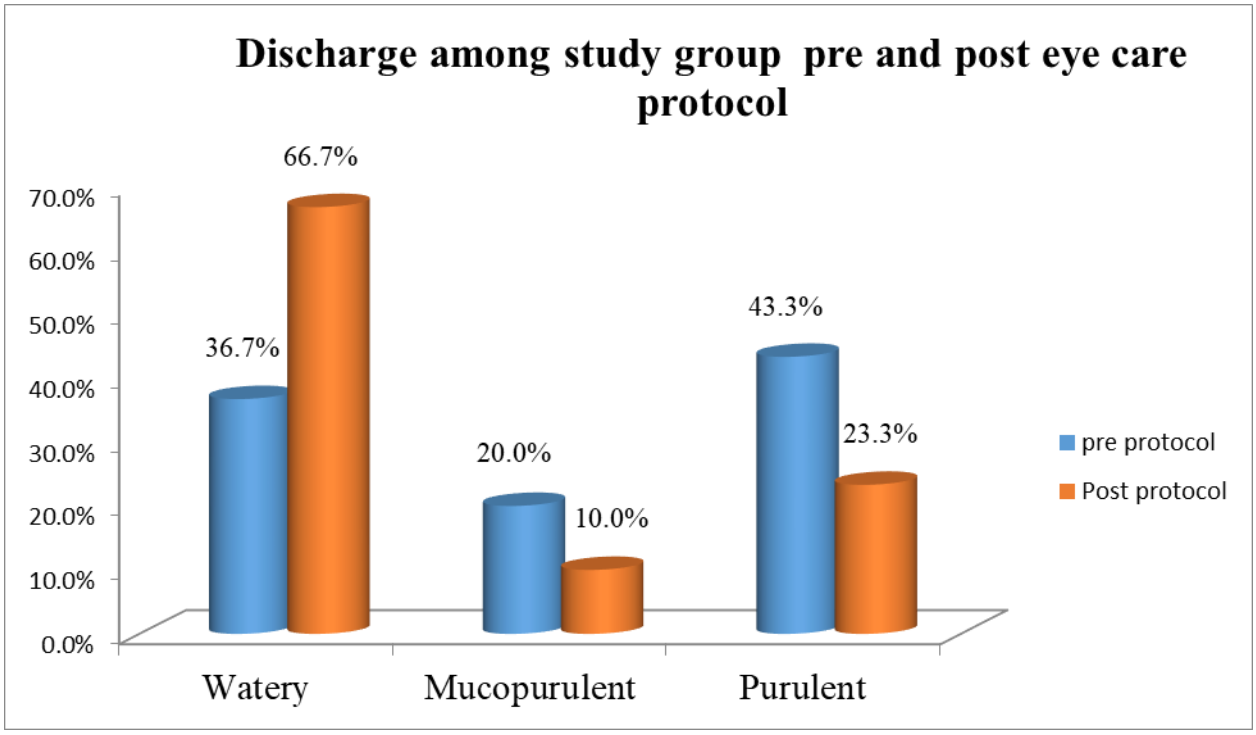

Figure (3) percentage & frequency distribution of study group regarding their eye health assessment pre and post eye care protocol application related to discharge (n=30)

Figure (3) revealed that the percentage of watery discharge was 36.7% in pre eye care protocol application while in the post was 66.7% and mucopurulent / purulent discharge were 63.3% in pre eye care protocol application with highly statistically significant differences between the both phases (P<0.001).

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (280-293), Month: January - April 2020, Available at: www.noveltyjournals.com

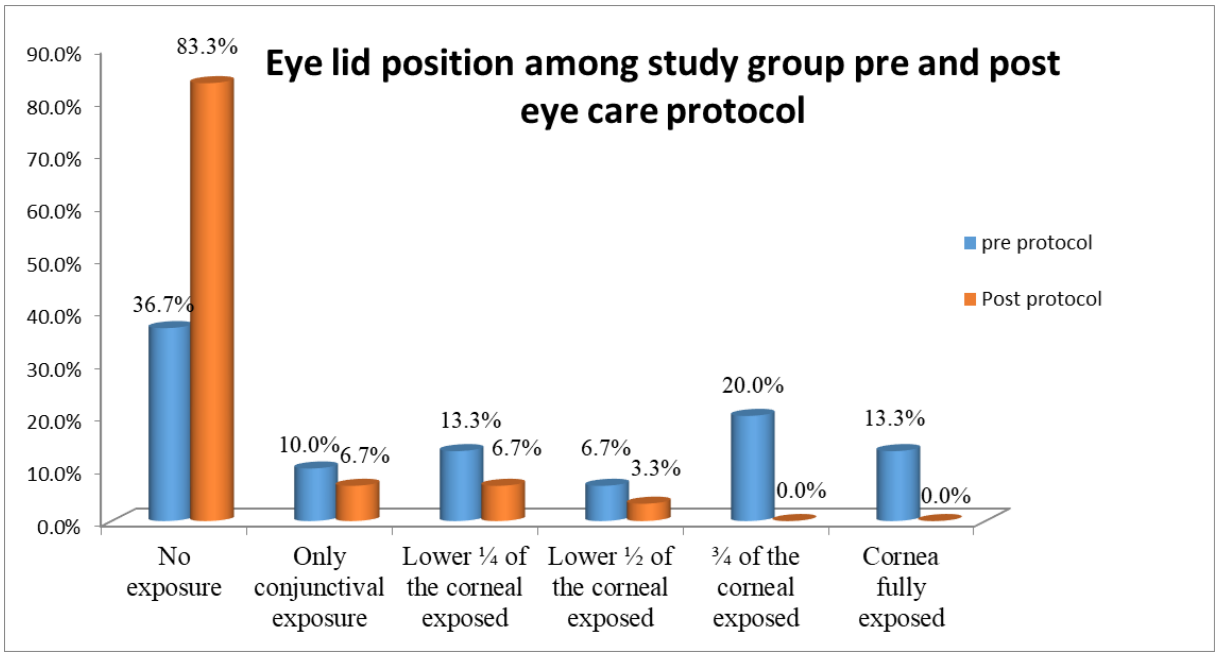

Figure (4) percentage & frequency distribution of study group regarding their eye health assessment pre and post eye care protocol application related to eye lid position (n=30)

Figure (4) showed that the percentage of no exposure of the eye lid was 36.7% in pre eye care protocol application while in the post was 83.3%, conjunctival exposure was 10% in pre eye care protocol application while in the post was 6.7% and for lower 1/4 of the cornea exposed in pre was 13.3% while in post protocol application was 6.7%. For the lower ½ of the cornea exposed and ¾th of the cornea exposed in pre eye care protocol application were 20% and 13.3% respectively but there no exposed in post- protocol application with highly statistically significant differences between the both phases (P<0.001).

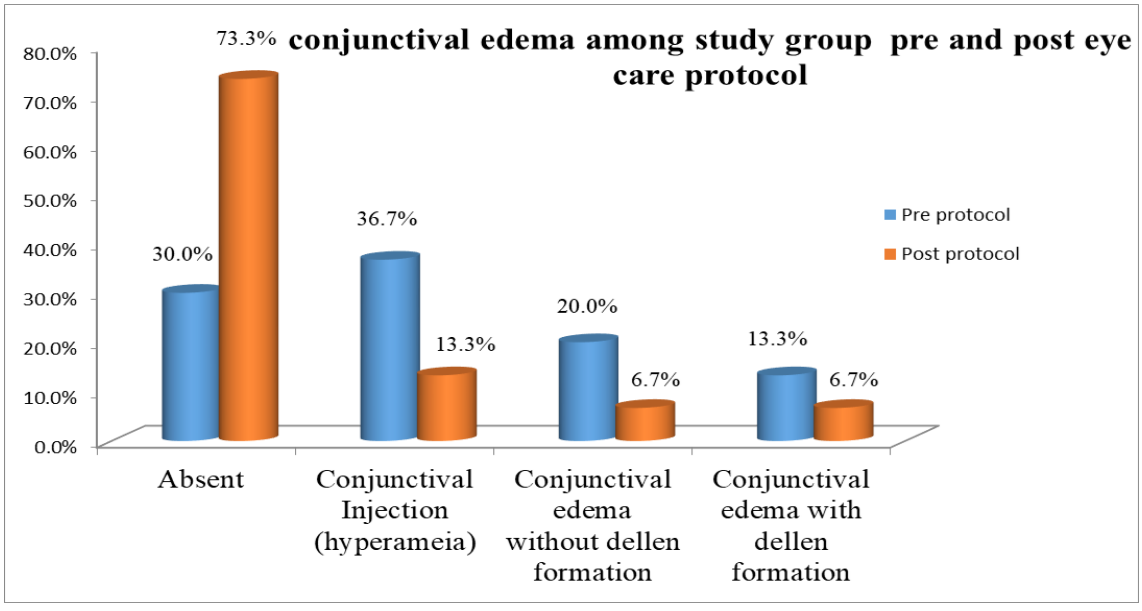

Figure (5) percentage & frequency distribution of study group regarding their eye health assessment pre and post eye care protocol application related to conjunctival edema (n=30)

Figure (5) clarified that the percentage of absence conjunctival edema in pre eye care protocol application was 30% but in post application was 73.3%, for conjunctival hyperameia, was 36.7% pre and in post was 13.3% and we can notice that conjunctival edema without dellen formation and conjunctival edema with dellen formation was 20% & 13.3%

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 1, pp: (280-293), Month: January - April 2020, Available at: www.noveltyjournals.com

respectively in pre and 6.7% in post eye care application with highly statistically significant differences between the both phases (P<0.001).

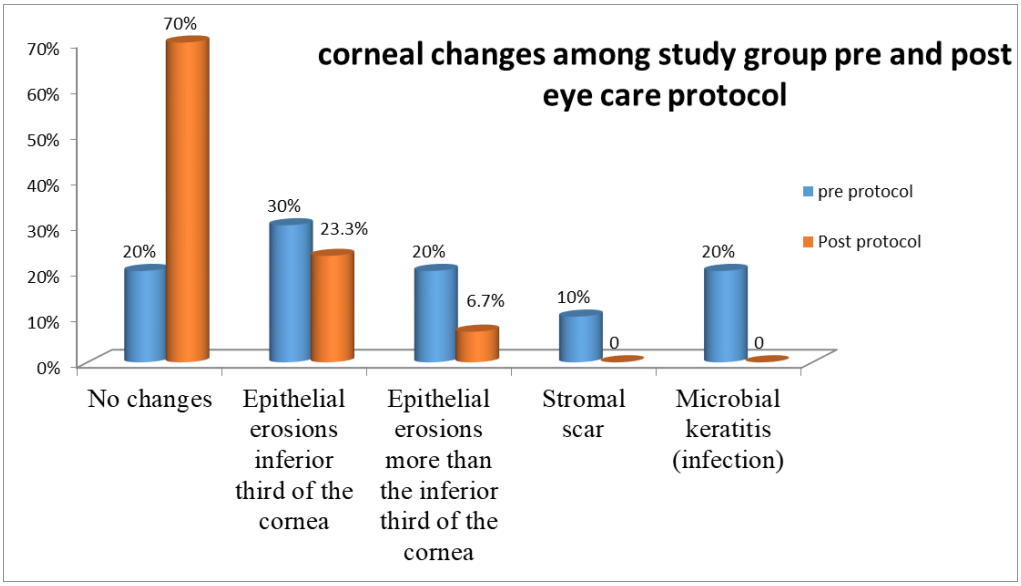

Figure (6) percentage & frequency distribution of study group regarding their eye health assessment pre and post eye care protocol application related to corneal changes (n=30)

This figure illustrated that 20% of eyes had no change in pre protocol comparing with 70% in post protocol, for punctate epithelial erosions involving the inferior third of the cornea in pre protocol there were 30% and in post protocol were 23.3%, punctate epithelial erosions involving more than the inferior third of the cornea had 20% in pre protocol but in post protocol had 6.7%. while, in pre protocol there were 10% & 20% respectively with stromal scare and microbial keratitis not present in post protocol with highly statistically significant differences between the both phases (P<0.001).

Table (5): Comparison of mean of Eye health status assessment before and after **implementation** of **designated eye care protocol** among **study and control groups (n=60)**

Intervention		Control	Study	T-test	
		Mean ± SD	Mean ± SD	t	P-value
Pre		31.17 ± 5.814	30.60 ± 5.556	0.386	0.701
Post		25.87 ± 5.770	29.30 ± 6.380	9.919	<0.001**
Paired t-test	T	25.758	18.045		
	P-value	<0.001**	<0.001**		

Table (5) reveals that, there was a statistical significant mean of difference among study and control group (Paired t-test: 25.758 and 18.045, p-value: <0.001**) respectively along the study period. In addition, there was no statistical significant difference between study and control groups before eye care protocol application. While, there was a statistical significant difference between study group when compared to control group in post eye care protocol application.

4. DISCUSSION

There are insufficient number of studies on eye care in intensive care units. It is a global problem in developing countries. In providing health care services, the existing available procedures noted the lack of a written guidelines for eye care. This fact confirms that nurses are still not aware of the importance of eye care in critically ill patients [12]. Nurses and doctors in the intensive care units (ICU) 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. The patients hospitalized in intensive care unit are exposed to increased risk of eye disorders by removing natural protective mechanisms for eyes such as reduction of tear production and direct corneal reflex. These patients are not able to nictitate and close their eyelid due to reduction of consciousness level and

receiving tranquilizers and anesthetic medicines and as a result, risk of eye injuries such as dryness, abrasion, tear, and keratitis will increase [13].

Eye care is an important component of a daily nursing care plan. It consists of regular eye assessment, and prevention of iatrogenic ophthalmological complications (cleaning of the eye with normal saline or sterile water, closure of the eyelid using either ocular lubricant, or creation of a moisture chamber using polyethylene wrap). Eye care should be provided to all hospitalized patients, especially to patients in intensive care units, in whom regular protective mechanisms of the eye are often impaired. Healthy persons have physiological mechanisms for eye protection. By blinking and eye closure, tears cover eye surface and prevent mechanical injuries and microorganism colonization. At the same time, blinking prevents tears evaporation and desiccation of the eye. Physiological tear production is important for corneal epithelium, acting as a lubricant, maintaining the moisture of the eye, nurturing epithelial cells of the cornea and clearing mechanically small foreign particles from the eye [14].

Ocular surface disorders have been reported to occur in up to 60% of critically ill patients. Patients in ICU often have impaired ocular defense mechanisms as a result of multi organ dysfunction, metabolic disturbances, mechanical ventilation, and unconsciousness. The eyelids are important physical barriers to trauma and infections preventing the adherence of microorganisms to the ocular surface. The sedatives and neuromuscular blockers inhibit contraction of the orbicularis oculi muscle, resulting in incomplete eyelid closure, which has been reported to occur in 20% to 75% of sedated patients in ICUs [15].

Apparently the following discussion represented in two main parts. First part represented the patients' demographic and medical data results; while the second part represented the first related hypothesis that "study group who received eye care protocol will have a significant lower mean of sub items of ocular surface disorders than the control group who received only routine ICU care"; (eye discharge, eye lid position, conjunctival edema and corneal changes).

First part is related to demographic and medical data results the current study revealed that around half of both study and control groups; there age was between twenty to less than fifty years old while three quarters of control group, as well as nearly two thirds of the study was male and approximately one third of both groups diagnosed as respiratory disorders. Kousha, Kousha, & Paddle, (2018) [16] congruent with the current findings as more than half of study sample was male, young and middle aged adults with mean age 57.8±15.53 years. On the other hand, a study conducted by Cho, Yoo, Yun & Hwang (2017) [17] found diverse result that in the general study population 55.2% were female (10-fold less in males) and of undiagnosed OSDs 0.5 % of women and added that more recent critical patients based survey in the united states revealed a prevalence result that OSDs have no difference between men and women.

Regarding sedation, the current study showed that merely half of both study and control groups were sedated and merely one quarter of them sedated by muscle relaxant with RAMSY sedation 4.30±1.03 scores, this finding is supported by Kousha, Kousha, & Paddle (2018) [16] who nearly half of study subjects had sedation and one quarter of them with muscle relaxant. Nearly two thirds of both study and control groups had past history of hypertension and merely two fifths of both groups PEEP mode. Moreover, three quarters of study group had endotracheal tube (invasive mechanical ventilator), while, the majority of control group had ETT. As regard, GCS of both study and control groups there was no statistical significant difference between both groups; so groups' homogeneity has been maintained. A study performed by Kousha, Kousha & Paddle (2015) [15] stated that, it is necessary to note that there was no difference between the studied groups in terms of the demographic variables.

The current study found regarding eye health status assessment, that two thirds of study group had watery discharge and nearly three quarters of control group had mucopurulent or purulent secretion with Inadequate lid closure was detected in more than half of the both study and control groups. While conjunctiva hyperemia was noted in nearly one fifth of both groups. Furthermore, nearly three quarters of both groups had corneal changes, as regards Keratitis was observed in one fifth of study group and one quarter of control group. In addition, there was no statistical significant difference between both groups pre implementation of designated eye care protocol. This result is congruent with Milutinović, Cvijanović, Ćirić, Jovanović & Andrijević (2017) [18] who mentioned that Out of 80 eyes, conjunctiva hyperemia was noted in 45 eyes (56.25%), mucopurulent or purulent secretion in 29 eyes (36.25%), corneal staining in 12 eyes (15%), and corneal filaments in 4 eyes (5%). Keratitis was observed in 4 patients (10%). Inadequate lid closure was detected in 16 subjects (40%). Keratitis was observed in 4 patients (10%) and treated successfully with topical antibiotics.

On the same scope, Ebadi, Saeid, Ashrafi, Taheri-Kharameh (2017) [19] reported that majority of critically ill patients in intensive care units, having altered state of consciousness (due to sedation or brain conditions) lose protective eye mechanisms. It can lead to

eye dryness, infection, ulcerations, even perforation and iatrogenic mechanical corneal injuries, with the end result of visual impairment and decreased quality of life. In the same context, this finding is supported by Hearne, Elewys, Hearne, Montgomery& Lightman (2018) [20] reported that Sedatives and neuromuscular blocking drugs inhibit eye muscles and lead to lagophtalmus -no complete eyelid closure, which can lead to iatrogenic eye conditions. Different states as circulatory volume overload, high blood vessel permeability and inadequate endotracheal tube fixation can lead to a reduction of venous drainage from the eye, edema of the eye and lagophtalmus as a consequence.

In the same line, Lagophtalmus can lead to infection due to exposure of the eye to numerous pathogens in the intensive care environment. Mechanically ventilated patients with positive end-expiratory pressure (PEEP) more than 5 mmH2O can develop a condition called "ventilator eye" and iatrogenic corneal injury, due to decreased venous drainage, conjunctival edema and chemosis. Infection risk is higher in patients who require frequent endotracheal suctions, especially if there is an inappropriate technique [13].

Moreover, the second part; related to the first hypothesis which hypothesized that study group who cared based on designated eye care protocol will have significant lower mean ocular surface disorders than the control group who cared with routine ICU care. The study revealed that there was no statistical significance difference between study and control groups which maintained groups matching regarding the initial reading. While both study and control groups after 3-5 days; had statistical significance difference when comparing between study and control groups regards different ocular surface disorders which focused on no "mucopurulent/purulent discharge, inadequate eye lid closure, conjunctival edema and corneal changes".

In fact; the current result disclosed that patients in the study group who cared based on designated eye care protocol in addition to routine ICU care have been improved in their eye health status assessment more than the control group who cared with routine ICU care. This gave optimistic results that clinicians' knowledge, attitudes and belief can change their behavior and enhance targeted implementation strategies in caring for critical ill patients which improve their health status [21]. The current study had good improvement on eye health status in all domains related to eye complications (eye lid position, conjunctival and cornea), even the researcher was not the only applicator and helped with assigned team leader nurses in every shift, and then he was evaluating findings of what the assigned leader nurses have done. Like decrease in conjunctival edema and increase of conjunctival injection also increase in punctate epithelial erosions involving the inferior third of the cornea and decrease in punctate epithelial erosions involving more than the inferior third of the cornea, this finding is in consistent with what was reported by Güler, Eşer, Eğrilmez (2018) [22].

One of the noticeable findings of the study showed good improving after protocol application in relation to the occurrence rate of epithelial damage to the outer eye, as well as mucopurulent/purulent eye discharge amongst study group has been reported to be merely one third of them. While inadequate eye lid position occurred in only less than one fifth of them, but conjunctival edema occurred in one quarter of the study group patients. Keratitis was observed in 6 patients (20%) and treated successfully with topical antibiotics. Regarding eye lid closure, it helps in preventing of microbial keratitis secondary to exposure keratopathy. This identifies the population with incomplete lid closure that will be vulnerable to exposure keratopathy. [16]

Guidelines or protocols need to be simple to be effective. Significant adherence issues arise with detailed than complicated protocols. The most pertinent risk factors need to be identified to develop a simplified eye assessment and management plan. However, to date, there is no widely accepted eye care protocol for prevention of EK in critically ill patients [18]. More recently, many studies found that polyethylene cover was more effective in preventing dry eye syndrome in ICU patients than other measures (standard deviation ¼ 0_3835, Z¼_3_873, P < 001). Generally, it can be mentioned that washing eyes of patients hospitalized in intensive care unit with normal saline cannot only act as a method for perfect and effective eye care and as mentioned above, the patients receiving this care (control group) showed the highest degree of corneal abrasion. Therefore, it is recommended to use polyethylene, cover as a selective method [13].

On the other hand, Hearne, et al. (2018) [20] proved that, Eye care guidelines and protocols have been developed recently for increasing eye care implementation in ICUs. Their application has resulted in effective prevention of vision defects in patients after recovery [19] [26]. However, the developed eye care guidelines lack consistency in assessment or intervention methodology and eye care methods or degree of implementation vary with the hospital environment or individual nurses [27]. Assessment or evaluation of decubitus ulcer, pain and sedation should be performed regularly in ICUs. Standardized guidelines for such assessment have not been developed, which can result in missing records and act to reduce awareness of eye status.

On the same scope, it was reported by Güler, Eşer, Eğrilmez (2018) [22] in a previous study that ICU nurses were supposed to carry out an eye assessment that focused only on evaluating the apparent symptoms without applying any diagnostic test on several complications, such as swelling of the eyelids, inflammation of the conjunctiva, haziness in the cornea, eye discharge, and crusting on the eyelid margins. The findings that are obtained through a single observation alone could lead the health team towards inaccurate and unnecessary approaches and might not always be sufficient to determine the actual problem [28]. Eye health assessment should be part of routine patient physical assessment practice and be performed on admission and then routinely at the beginning of the new nursing shift [29].

5. CONCLUSION

Regular screening by ICU staff, protocolised care is necessary to prevent the OSD and subsequent complications and prompt ophthalmic referral can significantly decrease the ocular morbidity and improve the quality of life following discharge. There is insufficient knowledge about some elements of nursing practices considering eye care, especially assessment and prevention of iatrogenic eye conditions. To ensure effectiveness and compliance with these guidelines, training methods will need to be developed; providing education to the multidisciplinary team is a vital part of the successful implementation of this simple eye care protocol

6. RECOMMENDATIONS

The researcher recommended that establishing a written update protocol of eye care for ventilated & sedated patients in CCU to ensure providing complete and professional care for patients; it's also recommended to implement the current study on the other hospitals in Egypt.

ACKNOWLEDGMENTS

We would like to thank all the ICU patients, their families in this study for their participation and assigned team leaders nurses for their acceptance to participate in performing eye health assessment and applying designated eye care protocol hand to hand with us which supported our work and helped us get results of better quality.

REFERENCES

[1] Guler, E.K.,.Eser,I. and Fashafsheh, I.H.D." Impact of A Designed Eye Care Protocol on Nurses Knowledge, Practices and on Eye Health Status of Unconscious Mechanically Ventilated Patients at North Palestine Hospitals" clinical nursing research.2014; Vol.4, No.28.

[2] Lenart, S., Garrity, J. "Eye Care for Patients Receiving Neuromuscular Blocking agents or Propofol during Mecahnical Ventilation." American Journal of Critical Care 2017; 9: 188-91.

[3] Cortese, D., Capp, L., McKinley, S. "Moisture Chamber Versus Lubrication for the Prevention of Corneal Epithelial Breakdown." American Journal of Critical Care 2017; 4: 425-8.

[4] Kai Kuo,Y, Chan Lin, I, Nien Chien,L, Yu Lin,T, Ying-Ting, H, Hua Chen,K, Gregory J. and Ching-Li, T,(2019). Dry Eye Disease: A Review of Epidemiology in Taiwan, and its Clinical Treatment and Merits J. Clin. Med. 2019, 8, 1227; doi:10.3390/jcm8081227. Received: 30 June 2019; Accepted: 8 August 2019; Published: 15 August 2019

[5] Dua, H. "Bacterial Keratitis in the Critically Ill and Comatose Patient." Lancet 2015; 351: 387-8.

[6] Farrek, M., Wray, F. "Eyecare for Ventilated Patients." Intensive and Critical Care Nursing 2018; 9: 137-41.

[7] McHugh J, Alexander P, Kalhoro ,A., & Ionides, A.(2018). Screening for ocular surface disease in the intensive care unit. Eye 22, 1465–1468.

[8] Parkin, B., Turner, A., Moore, E., et al. "Bacterial Keratitis in the Critically Ill." British Journal of Ophthalmology 2017; 81: 1060-3.

[9] Suresh, P., Mercieca, F., Morton, A., et al. "Eye Care for the Critically Ill." Intensive Care Medicine 2015; 26: 162-6.

[10] Paul, C. Price, Rajiv Jhangiani, Chiang, C.A., Leighton D.C., & Cuttler C. (2017). Non- Equivalent Groups Designs. Research Methods in Psychology.3rd American Edition. PRESSBOOKS.

[11] Fashafsheh, I. H.D., Morsy, W.Y.M., Ismaeel, M. S. and Alkaiasi, A. A.S. (2013). Impact of Designed Eye Care Protocol on Nurses Knowledge, Practice and on Eye Health Status of Unconscious Mechanically Ventilated at North Palestine

Hospitals.Journal of Education and Education and Practices www.iiste.org. ISSN 2222-1735 (paper) ISSN 2222-288X (online) Vol.4, No.28,2013.

[12] de França CF, Fernandes AP, Carvalho DP, de Mesquita Xavier SS, Júnior MA, Botarelli FR, et al. Evidence of interventions for the risk of dry eye in critically ill patients: an integrative review. Appl Nurs Res. 2016; 29:e14–7.

[13] Kalhori,R.P., Ehsani, S., Daneshgar, F., Ashtarian, H. & Rezaei,M. Different Nursing Care Methods for Prevention of Keratopathy Among Intensive Care Unit Patients ,Global Journal of Health Science; Vol. 8, No. 7; 2016,ISSN 1916-9736 E-ISSN 1916-9744.Published by Canadian Center of Science and Education

[14] Güler EK, Eşer İ, Fashafsheh IHD. Intensive care nurses'views and practices for eye care: an international comparison. Clin Nurs Res. 2017; 26(4):504–24.

[15] Kousha, O., Kousha, Z. & Paddle, J. The risk factors for developing exposure keratopathy in ICU patients. Intensive Care Medicine Experimental, 3, (2015) A731.

[16] Kousha, O., Kousha, Z. & Paddle, J. Incidence, risk factors and impact of protocolised care on exposure keratopathy in critically ill adults: a two-phase prospective cohort study. Crit Care 22, 5 (2018) doi:10.1186/s13054-017-1925-5.

[17] Cho, O.H., Yoo, Y.S., Yu,n S.H. and Hwang, K.H. (2017). Development and validation of an eye care educational programme for intensive care unit nurses. J Clin Nurs. 2017;26(13-14):2073–82.

[18] Milutinović, D., Cvijanović, D., Ćirić,Z., Jovanović,G. and Andrijević, A.(2017). Eye Care in Mechanically Ventilated Critically Ill Adults –Nursing Practice Analysis. Med Pregl 2017; LXX (11-12): 377-383. Novi Sad: novembar-decembar. https://doi.org/10.2298/MPNS1712377M

[19] Ebadi A, Saeid Y, Ashrafi S, Taheri-Kharameh Z. Development and psychometric evaluation of a questionnaire on nurses' clinical competence eye care in intensive care unit patients. NursCrit Care. 2017;22(3):169–75.

[20] Hearne,B,J, Elewys G Hearne,E,G, Montgomery,H, and Lightman,S,L . Eye care in the intensive care unit. Journal of the Intensive Care Society. 2018 Nov; 19(4): 345–350. doi: 10.1177/1751143718764529

[21] Alansari MA, Hijazi MH, Maghrabi KA. Making a difference in eye care of the critically ill patients. J Intensive Care. Med. 2015;30(6):311–7.

[22] Güler EK, Eşer İ, EG˘ RİLMEZ, S. Nurses can play an active role in the early diagnosis of exposure keratopathy in intensive care patients. Japan Journal of Nursing Science. 2018; 15, 31–38 doi:10.1111/jjns.12165

[23] Oliveira, R. S., Fernandes, A. P. N. L., Botarelli, F. R., Araujo, J. N. M., Bareto, V. P. & Vitor, A. F. Risk factors for injury in the cornea in critical care patients in intensive care: An integrative review. (2016). Journal of Research Fundamental Care Online, 8, 4423–4434.

[24] Kuruvilla, S., Peter, J., David, S., Premkumar, P. S., Ramakrishna, K., Thomas, L. et al. (2015). Incidence and risk factor evaluation of exposure keratopathy in criticall ill patients: A cohort study. Journal of Critical Care, 2, 400–404.

[25] Câmara, V. G. N., Araujo, J. N. M., Fernandes, A. P. N. L., Botarelli, F. R., da Silva, A. B., Medeiros, R. A. C. et al. (2016). Methods for detection of dry eye in critically ill patients: An integrative review. International Archives of Medicine Section: Ophthalmology, 9, 1–10.

[26] Kadri, R., Parameshwar, D., Rajan, M. S., Hegde,S., Kudva, A. and Shetty, A.(2017). Ophthalmic profile of patients in an intensive care unit with protocolised care. MedPulse. International Journal of Ophthalmology. November 2017; 4(2): 18-20. https://www.medpulse.in/Ophthlmology.

[27] Phadatare, S. P., Momin, M., Nighojkar, P., Askarkar, S. & Singh, K. K. (2015). A comprehensive review on dry eye disease: Diagnosis, medical management, recent developments, and future challenges. Advances in Pharmaceutics, 2015, 1–12.

[28] Horng, C., Chou, H., Tsai, K., Hsiao, H., Lin, S., Huang, S. et al. (2014). The observation for ocular surface diseases in respiratory care center in one regional teaching hospital in Southern Taiwan. Life Science Journal, 11, 672–679.

[29] Araújo, J. N. D., Botarelli, F.R., Fernandes, A. N., Oliveira-Kumakura, A.D., Júnior, M.A.F. and Vitor, A.F.(2019). Predictive clinical factors for ocular dryness in patients admitted to the Intensive Care Unit. Print version ISSN 0080-6234On-line version ISSN 1980-220X. Rev. esc. enferm. USP vol.53 São Paulo. 2019 Epub Aug 05, 2019.