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Faculty of Graduate Studies

Effect of Educational Program on Staff Nurse's Awareness and Practices Regarding Risk Factors and Prevention of Exposure Keratopathy among unconscious and mechanical ventilated Patients in Palestine.

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Thesis Approval

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Declaration

I declare that the work in this study titled “Effect of educational program on staff nurse's awareness and practices regarding risk factors and prevention of exposure keratopathy among unconscious and mechanical ventilated patients in Palestine” was carried out by me under the supervision of Associate Professor Imad Fashafsheh in the Department of Nursing .

In addition, I possess a comprehensive understanding of the concept of plagiarism and am fully cognizant of the University's policy on this matter.

The content presented in this thesis, unless explicitly cited, is the original work of the researcher and has not been submitted by anyone else for any other academic degree or certification.

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Signature: Murad Abdalkareem Jakhlab,

Dedication

I would like to present this dedication to everyone who participated in helping me during the period of study, including my supervisor, colleagues, friends, and family. Accordingly, I dedicate this work to everyone who helped me, especially my wife, my family, my inspiration, and my role model, Dr. Muhammad Shehadeh.

Immense gratitude to you all

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Associate Professor Imad Fashafsheh provided me with excellent knowledge in the field of research and considerable time assisting me in completing my thesis; with his guidance, support, and mentorship, I was able to progress to this point.

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Finally, I would like to sincerely express my gratitude to my parents for their unwavering support and care, which have consistently provided me with strength and drive. Their belief in me and encouragement throughout my academic pursuits have been instrumental in my achievements.

Abstract

Introduction: Visual impairments in patients inside the critical care unit may often go unreported, leading to potentially severe effects such as exposure keratopathy. To reduce these risks, it is important to promptly recognize, prevent, and educate ICU nurses about these problems. **Methodology:** A pre-post quasi-experimental design was used; the design was chosen because of its importance in contributing to examining and raising the level of awareness and practice among ICU nurses. **Sample of the study**: A sample of 109 ICU nurses who are currently employed was collected for convenience in private hospitals in Palestine and was selected from a population of 150 ICU nurses. **Aim of the study:** To assess the effect of the educational program on staff nurses' awareness and practices regarding risk factors and prevention of Exposure Keratopathy among patients on a mechanical ventilator and unconscious patients in Palestine. **Result:** After the intervention, nurses' awareness of the chi-score test reported a significant improvement in awareness (P-value < 0.001), and the chi-square test reported a significant improvement in practices after the intervention (P-value < 0.001). However, there were no significant variations in the outcomes according to years of nursing experience or gender. **Conclusion:** The intervention greatly improved nurses' understanding and implementation of keratopathy about risk factors and prevention in ICU patients. The study focuses on the efficacy of targeted interventions in improving critical care nursing, regardless of gender or level of experience. The results of pre-intervention underscore the need for continuous education to enhance patient care and guarantee safety inside the critical care setting.

KEYWORDS: Keratopathy, awareness, practice, nurses, mechanical ventilator, educational program.

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List Of Abbreviation

Abbreviation	
Ocular Surface Diseases	**(OSDs)**
Exposure Keratopathy	**(EK)**
Ministry of Health	**(MOH)**
Intensive Care Unit	**(ICU)**
Continuous Positive Airway Pressure	**(CPAP)**
Institutional Review Board	**(IRB)**
Statistical Package for Social Sciences	**(SPSS)**

CHAPTER ONE

1. Introduction

In the intensive care unit (ICU), life-sustaining processes are given priority because critically sick patients may have a variety of life-threatening systemic illnesses that may mask relatively "minor" eye issues. Even though patients in the intensive care unit (ICU) are more vulnerable to various ocular disorders, eye care is not given much thought. The effects of ocular surface diseases (OSDs), the destruction of the ocular contents, and ocular complications may be severe and fast, leading to vision loss if prompt and proper treatment is not received.

Patients who are very sick are often given analgesics and sedatives to reduce pain and anxiety, allowing intrusive (Ebadi et al., 2021).

The nursing staff in the intensive care unit (ICU) plays a vital role in preventing the occurrence of keratopathy in patients. Still, Eye care is sometimes overlooked in favor of treating systemic illness, which is often life-threatening. If ocular health is neglected, it could result in a vision-threatening situation. In ICU patients, the occurrence of incomplete eyelid closure, also known as lagophthalmos, is a common occurrence accompanied by the potential risk of corneal exposure and dehydration. Additionally, sedation may cause decreased blinking and reduced tear production from some ICU drugs. Corneal dehydration can cause abrasions, perforations, and infections (Vidha et al., 2021).

Exposure keratopathy is a commonly disregarded complication observed in approximately 60% of sedated or intubated patients in the intensive care unit (ICU). The initial manifestations of EK typically manifest as mild subjective indications of ocular discomfort and pain, which may subsequently escalate to significant visual impairment in the most extreme instances. The ability of critically ill patients to communicate clinical complaints typically associated with electrolyte

imbalance (EK) is often hindered by the presence of sedation. The combination of these factors, along with the potential for significant consequences, renders EK a preventable complication and a matter of patient safety. The clinical management of EK presents difficulties for healthcare providers and patients alike, primarily stemming from the treatment methods involving eye drops and ointments, as well as the associated burden and cost of procedural interventions (Bird et al., 2018).

Moreover, it can be suggested that critically ill patients may experience delays in receiving a timely diagnosis as a result of healthcare professionals prioritizing life-threatening issues over ocular prophylaxis. Nevertheless, the importance of preventing complications related to endothelial keratoplasty (EK) underscores the significance of proactive measures in the management of high-risk individuals. The education of health care providers emerges as the foremost preventive measure, although its efficacy may be limited when employed in isolation. To address this issue, the implementation of universal precautions against EK, coupled with educational initiatives, can be employed to mitigate the relatively elevated occurrence of this readily preventable ocular pathology (Bird et al., 2018).

1.1 Background:

An essential part of the nursing role is eye care, specifically for patients on a ventilator, where the patient is in a coma or under anesthesia, which causes the eyelids to relax and the eyes to open partially, which leads to exposure keratopathy (Vidha et al., 2021) .The dryness of the cornea with a subsequent epithelial breakdown is known as exposure keratopathy. Exposure keratopathy is caused by incomplete or insufficient eyelid closure, which results in evaporative tear loss and tear film inadequacy (Oliveira et al., 2016).

The role of staff nurses in reducing the risk of exposure to keratopathy among patients admitted to the intensive care unit (ICU) holds significant importance. The primary aim of this study was to evaluate the level of awareness among nursing staff regarding the potential risks associated with keratopathy exposure, as well as to evaluate their adherence to recommended eye care practices (Vidha et al., 2021).

However, early nursing diagnosis will be focused on identifying high-risk patients; the test had 15 things that addressed the demographic features of the patients, such as age, gender, and race. Their age, gender, medical diagnosis, length of stay in the ICU, mechanical ventilation support length, state of consciousness, ventilation mode, and positive end-expiratory pressure are all factors to consider. Ocular examinations, blood pressure, and the state of sedatives and muscle relaxants administration, such as the extent to which the eyelids are closed and the presence of a reflex to blink one's eyes spontaneously (Vidha et al., 2021).

And the other item. The fluorescein test is performed by injecting a small fluorescein drop into each conjunctival sac at a concentration of 2% (2 L). The degradation in the cornea and conjunctiva owing to a lack of tears can be observed more clearly with the use of a blue slit lamp in this (Phadatare et al., 2015).

Keratopathy is prevented through the results of the following studies. Between September 2011 and December 2012, a single-blind randomized controlled trial (RCT) in two intensive care units (ICUs) was conducted in a university hospital in Western Turkey. The intervention group received carbomer eye drops and a plastic cover, while the control group received only carbomer eye drops. The main result was a reduction in or absence of corneal injury, which corresponds to healing. The same ophthalmologist monitored corneal damage for ten days with a fluorescein dye test (decrease/absence of corneal staining) (Kocacal et al., 2021).

The eye care training program has effectively enhanced the clinical skills of intensive care unit (ICU) nurses in providing eye care to unconscious patients, it is advised that nurses take eye care clinical guidelines training as one of their continuing education subjects. In this regard, training sessions should be repeated based on the most recent revisions to the Eye Care Clinical Guideline to retain their efficacy. Furthermore, undergraduate and graduate nursing students should be taught the Eye Care Clinical Guideline. To enhance the standard of care, nursing managers should focus on the information in the Eye Care Clinical Guideline (Mehrjardi et al. 2021).

1.2 Problem statement:

Managing critically sick patients involves the importance of eye care due to the impaired eyelid closer that safeguards the eye from infection and damage (Hearne et al., 2018). Between 20% and 42% of individuals suffer corneal epithelial problems. The eye's surface is protected by tear secretion, blinking, and closing the eyes during rest or sleep. Interference with these systems in the critical care population may increase the likelihood of developing ocular surface disease (Johnson & Rolls, 2014).

The continuous exposure of the ocular surface places intensive care unit (ICU) patients at a heightened susceptibility for the development of exposure keratopathy. This particular medical condition increases the likelihood of developing microbial keratitis, a condition that can potentially result in corneal perforation and subsequent visual impairment. Prior research has indicated that approximately 40% of patients experience the development of exposure keratopathy while hospitalized in the intensive care unit (ICU). The implementation of ocular lubricants and the application of securing tape over the eyelids in intubated patients are effective in preventing it (Belmokhtar & Daoudi, 2016).

The field of eye care plays an important role in providing essential care for the eyes. Nevertheless, the scarcity of research on eye care is a prevalent concern worldwide, While both Palestinian and Turkish ICU nurses implemented certain measures to mitigate eye complications in critically ill patients, there were notable deficiencies and inadequacies in the provision of ocular care for ICU patients. There exists a necessity for ongoing training in this particular domain (Güler et al., 2017).

Insufficient knowledge and practices among nurses about the provision of eye care for unconscious ventilated patients in critical care departments were observed. Insufficient educational resources, policies, procedures, and protocols about the provision of eye care for unconscious ventilated patients were identified within critical care units. The implementation of a structured protocol, accompanied by an educational handout, yielded favorable outcomes in terms of nurses' knowledge, practices, and overall eye health status within the intensive care units of hospitals in North Palestine under the jurisdiction of the Ministry of Health (Alkaiasi, 2013).

The researcher suggests the implementation of a written protocol for updating eye care practices for unconscious ventilated patients in ICU departments. This protocol aims to ensure safe practices. Additionally, it is recommended to apply the findings of the previous study to the Ministry of Health (MOH) in Palestine (Alkaiasi, 2013).

1.3 Significance of the study

Apart from the fundamental reason for their disease, patients referred to intensive care units (ICU) face other emotional and physical threats; one is keratopathy exposure (Vidha, Shambhu, et al., 2021). The level of knowledge that ICU nurses had about the care of mechanically ventilated patients' eyes varied from adequate to inadequate and did not meet

satisfactory standards. Furthermore, eye care practices for mechanically ventilated patients were highly accepted by nurses, but sadly, this finding cannot be directly converted into appropriate clinical practice (Alghamdi et al., 2018).

Although there is high awareness, the practice patterns of ICU nurses were less than desired. Educational initiatives should focus on weaknesses in knowledge and practice noted to improve the eye care of patients in the ICU (Vyas et al., 2018). According to previous studies, approximately 40% of ICU patients acquire exposure to keratopathy throughout their hospitalization (Belmokhtar and Daoudi 2016), this percentage is considered high as a result of the lack of awareness of the nursing staff to avoid the occurrence of keratopathy.

On the other hand, at the local level, the researcher suggested that it is important for nurses to receive ongoing education and clinical training programs regarding eye assessment protocol and the care of unconscious ventilated patients. These programs should be specifically designed to assist nurses working in critical care units, with a particular focus on both theoretical knowledge and practical skill development, the promotion of collaboration among healthcare providers, particularly nurses, and doctors in the intensive care unit (ICU), is crucial for improving and increasing awareness of eye care for unconscious ventilated patients. This can be achieved through the utilization of up-to-date knowledge and the implementation of safe practices in Palestine(Alkaiasi, 2013). The study highlights the awareness and practice of ICU nursing in Palestine regarding exposure to keratopathy.

1.4 Research Aim

To assess the effect of educational program on staff nurse's awareness and practices regarding risk factors and prevention of exposure keratopathy among patients on a mechanical ventilator and unconscious patients in Palestine.

1.5 Objectives:

1- To assess the level of awareness about risk factors and prevention before and after applying education program

2-To assess the level of practice about risk factors and prevention before and after applying education program

3-To find out the relationship between nurses' demographic (gender, years of experience) and levels of awareness about risk factors and prevention, before and after applying the education program.

4-To find out the relationship between nurses' demographic (gender, years of experience) and practice about risk factors and prevention, before and after applying for the education program.

1.6 Research hypothesis :

H0: There is no statistically significant difference between a nurse's awareness pre and post-educational program implementation about risk factors and prevention EK.

H1: There is no statistical significant relationship between a nurse's practices pre and post-educational program implementation about risk factors and prevention EK.

H2: There is no statistical significant relationship between nurses' awareness pre and post-educational program implementation about risk factors and prevention EK regarding gender.

H3: There is no statistical significant relationship between nurses' practices pre and post-educational program implementation regarding risk factors and prevention EK regarding gender.

H4: There is no statistical significant relationship between nurse's awareness pre and post-educational program implementation about risk factors and prevention EK regarding experience level.

H5: There is no statistical significant relationship between nurse practices pre and post-educational program implementation regarding risk factors and prevention EK regarding experience level.

1.7 Dependent and independent variables:

Dependent variable

-Nursing Awareness

-Nursing practices

Independent variable

-Educational program

-Demographic data

1.8 Operational definition

The tool included 10 questions in the first segment to evaluate the nurses' awareness and five questions to examine their practice patterns while eye-caring for patients.

Corneal dryness: is the state of insufficient moisture in the cornea.

Exposure keratopathy: is the result of corneal damage or irritation caused by insufficient closure of the eyelids.

ICU patients: are individuals who are hospitalized in an intensive care unit for urgent medical care.

Sponge bath: A bathing technique that involves utilizing a sponge instead of submerging the body in water.

Incomplete lid closure: Insufficient closure of the eyelids, resulting in the eye being visible.

Ophthalmologist: A physician who specializes in the diagnosis and treatment of eye and visual disorders.

Lubricating eye drops: Eye drops that moisturize and lubricate the eye.

Tracheal suction is the procedure of eliminating mucus or secretions from the airway by inserting a tube into the trachea.

1.9 Theoretical framework: -

Nursing process theory is adopted in the current study research. The definition of the nursing process given by The American Nurses Association in 1980 was "The diagnosis and treatment of human responses to actual or potential health problems." Assessment, diagnosis, plan, execution, and evaluation are the nursing process practices (steps) that are circular, overlapping, and connected skills and data collection; subjective and objective. (Hsia et al., 2006).

Assessment: which provides the answers to the questions "What is happening (i.e., actual problem)?" and "What could happen (i.e., potential problem)?" Gathering, arranging, and evaluating patient-related data are part of this process. Data gathering and data analysis are the two components of it. The methods of data collection can include observation, interviewing, and examination. In general, the approach to data collection is comprehensive.

Diagnosis: This is a statement that explains a particular human reaction to an existing or probable health issue that calls for nursing care. According to a previous study, early nursing diagnosis made by nursing will be discussed and focused on the first item, Form identifying patients; the test had 15 things that addressed the demographic features of the patients, such as age, gender, and race. Their age, gender, medical diagnosis, length of stay in the ICU, mechanical ventilation support length, state of consciousness, ventilation mode, and positive end-expiratory pressure are all factors to consider. Ocular examinations, blood pressure, and the state of sedatives and muscle relaxants administration, such as the extent to which the eyelids are

closed and the presence of a reflex to blink one's eyes spontaneously (Vidha, Shambhu, et al. 2021).

Planning: Create a plan that incorporates patient goals and nursing directives and delivers consistent, ongoing care that fulfills the patient's specific needs. The nursing order outlines what the nurse will do to assist the patient in achieving the goals, and the patient's goals are closely tied to the difficulty the patient is experiencing as described in the diagnosis. To give the best eye care, the critical care nurses' performance in this area demands a special educational program. To enhance their performance in providing eye care, critical care nurses should participate in ongoing in-service training programs (Sayed, 2022).

Implementation: entails putting the nursing order into practice. The main duties include reassessing the patient, confirming the accuracy of the treatment plan, following the nurses' instructions, documenting the patient's chart, and so on.

Evaluation: comparing the patient's present condition to their stated goals, Evaluation, has three separate functions or purposes: assessing the written care plan's quality, gauging the client's progress, and assessing the care plan's status and currency. Nursing standards and protocols, which govern the delivery of healthcare services, are increasingly being used to codify nursing practices.

The evaluation of eyelid closure should be conducted at the initiation of the care plan, and subsequently at regular intervals during the patient's duration of treatment. A robust association exists between lagophthalmos and the subsequent occurrence of corneal erosion, which may subsequently progress to keratitis or corneal ulceration. The primary objective of this assessment is to evaluate the degree of severity of lagophthalmos on a scale ranging from zero to two (Ramírez et al., 2008).

Chapter Two
Literature Review

2.1 Introduction:

In this chapter, there will be a revision of the literature review and database from Pubmed, EBSCO, Google Scholar, Indian Journal of Ophthalmology, The Journal of Clinical Nursing (JCN), Helwan International Journal for Nursing Research and Practice, Mansoura Nursing Journal, Critical Care Research and Practice, International Journal of Nursing Studies, Clinical Nursing Research, Japan Journal of Nursing Science, International Journal of Environmental Research and Public Health, and Journal of Medical Sciences and Health.

Individuals admitted to Intensive Care Units (ICUs) face a heightened susceptibility to ocular ailments, including Exposure keratopathy (EK), as a result of compromised blinking and inadequate eye closure (Rezaei et al., 2022). Exposure keratopathy (EK) frequently manifests as a prevalent issue among unconscious individuals within the confines of Intensive Care Units (ICUs) (Hartford et al., 2019). Exposure keratopathy (EK) is a clinical syndrome distinguished by the presence of incomplete eyelid closure and impaired tear film, resulting in corneal injury (Kousha et al., 2018b). The clinical examination reveals that EK is distinguished by the presence of irregular minuscule abrasions located in the lower half of the cornea (Yao et al., 2021).

In many cases, sedatives and neuromuscular blocking agents cause the eyelid to look closed and impair the blink reflex and the Orbicularis oculi muscles of the eye. Lagophthalmos, on the other hand, might happen and result in the eye's mucosal surface drying up, which raises the possibility of infection and keratopathy. Mechanical ventilators often cause conjunctival edema, or "chemosis," and have an impact on eye health issues. The likelihood of ocular surface problems

increases with conjunctival edema. Ocular problems may also become more common if critical care nurses behave poorly when it comes to providing eye care (Momeni Mehrjardi et al., 2021).

2.2 Eye Injury

Ocular surface disease (OSD) may manifest in several ways, including 1) corneal injury, 2) exposure keratopathy, 3) chemosis, and 4) microbial conjunctivitis and keratitis (Hearne et al., 2018). The eye's defense mechanisms, including eyelid closure, blink reflex, and tear production, experience inhibition in patients who are mechanically ventilated, sedated, or under neuromuscular blockade (Kocaçal Güler et al., 2018). Ocular conditions often emerge in conjunction with the development of lagophthalmos, which refers to the incomplete closure of the eyelid. Subsequently, these conditions may advance to exposure keratopathy, which is recognized as the primary cause of ocular surface disease (OSD) in intensive care unit (ICU) populations (Kocaçal Güler et al., 2018; Kousha et al., 2018a).

According to (Comisso et al., 2018), there are many ways that eye injuries in the intensive care unit (ICU) might harm the systemic and ocular systems of the eye. These include metabolic depletion, multiorgan diseases, invasive and non-invasive mechanical ventilation, hypotension, decreased levels of awareness, and high-volume filling.

The eyelid serves as a mechanical barrier in a healthy individual to protect the eyes from harm, dehydration, and microbial adherence. The whole distribution of tears throughout the surface of the eye depends on the corneal reflexes. A lipid barrier keeps the cornea wet; leucocytes are transported by tears while the eyelids are closed during sleep (Comisso et al., 2018)

Tear retention in the eye is improved by the epithelial tissues of the cornea and conjunctiva.

The conjunctiva can maintain the proper temperature to prevent the growth of germs because of their constant evaporation.

The conjunctiva can maintain the proper temperature to prevent the growth of germs because of their constant evaporation. when corneal reflexology protects against physical harm, frequent eye movement is necessary to guarantee that watery humor is distributed behind closed eyelids when you sleep (Comisso et al., 2018).

The cornea has the potential to sustain inadvertent damage, often leading to intensive care unit (ICU) admission. This commonly manifests as a corneal abrasion, characterized by the superficial removal of the surface epithelium (Figure 1). The ocular condition will result in the reddening of the eye, and its detection is most effectively achieved through the utilization of fluorescein dye eye drops and a blue light source. Under this illumination, the epithelial defect will exhibit a vibrant yellow fluorescence. Although a white light source can also be employed, the visibility of the injury is comparatively diminished (Hearne et al., 2018).

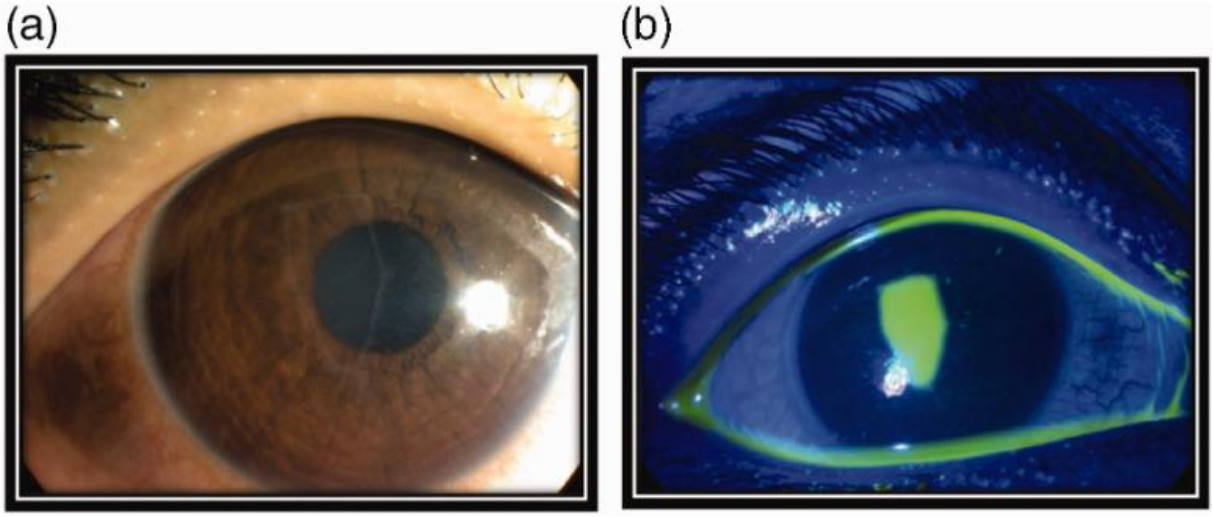

Figure 1: (a) corneal abrasion without fluorescein staining; (b) The same corneal abrasion under blue light with fluorescein staining, adopted from (Hearne et al., 2018).

2.3 Risk Factor

All patients on mechanical ventilation have their requirements met by the intensivists and nurses in the intensive care unit. Therefore, nurses must have an awareness of exposure-related

ocular problems and the preventative measures taken to minimize this condition. In the past, many surveys have been conducted to learn more about the knowledge, attitudes, and practices of nurses about eye care (Cho et al., 2017). Furthermore, researchers have created many training initiatives to raise nurses' awareness and lower exposure keratopathy rates (Alkaiasi, 2013; Cho et al., 2017)

The ocular well-being of the anterior eye surface, specifically the cornea, is contingent upon the capacity to generate tears, execute blinking motions, and achieve eye closure during periods of rest or sleep. The condition characterized by inadequate closure of the eyelids is referred to as lagophthalmos. Various mechanisms can cause impairment in patients in the intensive care unit (ICU) due to disease-related factors such as facial edema, decreased level of consciousness, and peripheral or central neurological injury. Additionally, treatments administered in the ICU, such as continuous positive airway pressure (CPAP) or oxygen masks, can also contribute to impairment by causing drying effects on the respiratory system (Hearne et al., 2018).

Muscle relaxants have the specific effect of diminishing the sustained contraction of the orbital muscle surrounding the eye, which typically maintains lid closure. Additionally, sedation decreases the frequency of blinking and hampers, and in some cases eradicates, the blink reflex. Individuals who are unable to voluntarily close their eyes or experience significantly reduced blinking rates are at a heightened risk of sustaining damage to the anterior part of the eye, regardless of the underlying cause. The risk of the aforementioned condition is elevated among individuals who undergo mechanical ventilation, primarily due to an extended duration of hospitalization, administration of sedative and paralytic medications, and the physiological impact of positive pressure ventilation (Hearne et al., 2018).

Eye care protocol orders should be taken into consideration in intensive care unit (ICU) settings when patients are intubated, sedated, or under neuromuscular blockade, as these conditions are associated with an increased risk for ocular surface disease (OSD) (Hayakawa et al., 2020).

2.4 Nursing Role

Because of the large number of patients admitted to the ICU and the limited number of ophthalmologists, it is impractical to expect routine eye examinations for all such patients. However, nurses, when trained adequately, can screen for ocular complications and triage so that only those who need special ophthalmic care are referred to the ophthalmologists (Kocaçal Güler et al., 2018).

An early nursing diagnosis study by (Kocaçal Güler et al., 2018), explains the importance of the role of early nursing diagnosis after obtaining one week of training in conducting the fluorescein test and identifying the characteristics and degree of corneal staining, the nurse gained knowledge and practical experience. The nurse was trained by an ophthalmologist who worked in the Ophthalmology Unit and had no affiliation with the study or its authors. The test had 15 items that addressed the demographic features of the patients, such as age and gender. their age, gender, medical diagnosis, length of stay in the ICU Mechanical ventilation support duration, state of consciousness, ventilation mode, positive end-expiratory pressure ocular examinations, blood pressure, and the condition of sedative and muscle relaxant administration such as the extent to which the eyelids are closed and the presence of a reflexive blink of the eyes (Vidha et al., 2021).

The utilization of lubricant eye drops, in conjunction with plastic covers, demonstrated efficacy in the management of exposure keratopathy, the implementation of plastic covers in nursing care

and treatment has the potential to decrease corneal damage and mitigate subsequent ocular complications (Kocacal et al., 2021).

There is a range of techniques that can be employed to safeguard the ocular well-being of patients in the intensive care unit (ICU). Some of the methods employed for this purpose are manual closure of the eyes or the application of tape to secure the eyes in a closed position. The practice of lid taping is not universally required and has the potential to cause distress among family members. Additionally, frequent removal of the tape may result in varying degrees of injury or irritation to the facial skin or eyelids. Hence, it is imperative to engage in such endeavors only when they are unequivocally essential (Hearne et al., 2018).

The necessary course of action is determined by the grading of lagophthalmos, as depicted in figures 2 and 3, there is no need to take any action in cases where there is no exposure, also known as Grade 0 exposure, lubrication is necessary for Grade 1 exposure, to address Grade 2 exposure, it is recommended to apply lubrication and secure the lids using Micropore tape along the lash margin.

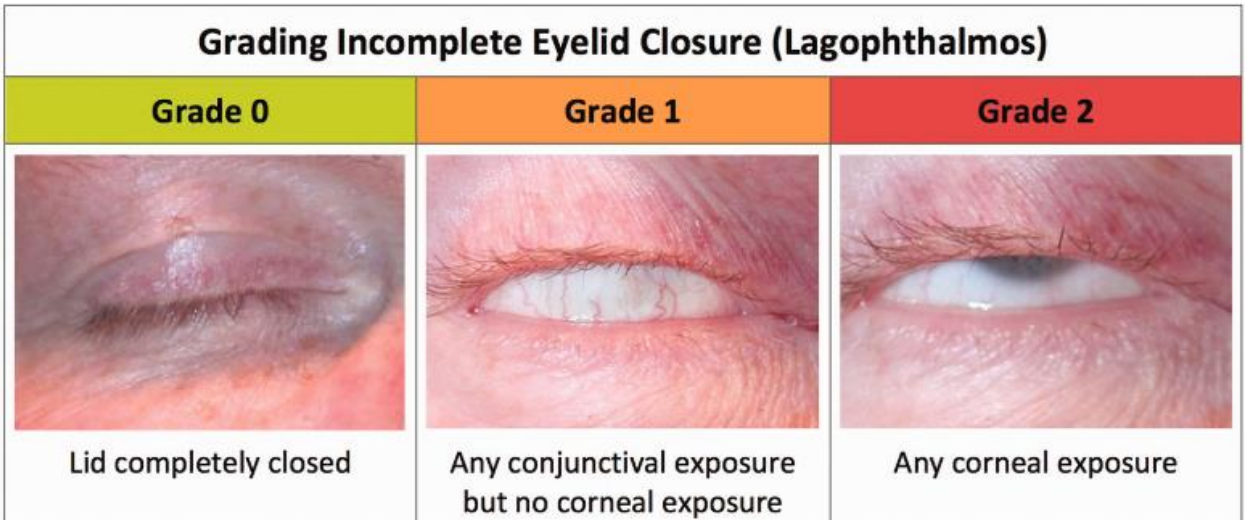

Figure 2: Diagram demonstrating the different lagophthalmos. Adopted from (Hearne et al., 2018).

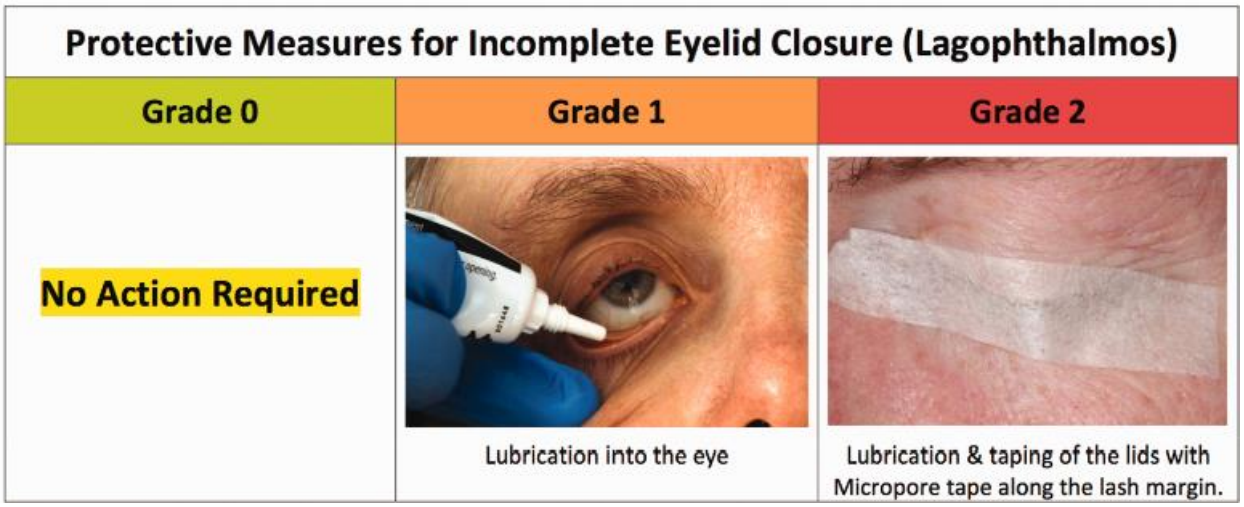

Figure 3: Schematic showing the necessary course of action according to the degree of diagnosed lagophthalmos. Adopted from (Hearne et al., 2018).

2.5 The importance of training intensive care nurses

Despite the existence of a high level of awareness, the practice patterns exhibited by intensive care unit (ICU) nurses were found to be suboptimal. The primary objective of educational initiatives should be to address identified deficiencies in knowledge and practice, and to enhance the provision of eye care for patients in the intensive care unit (ICU) (Vyas et al., 2018a). Despite the implementation of certain measures by Palestinian and Turkish ICU nurses to mitigate eye-related complications in critically ill patients, deficiencies and inadequacies in the provision of ocular care for ICU patients were observed. There is a need for ongoing training in this particular domain (Güler et al., 2017).

Furthermore, it is worth noting that providing education on the topics of OSD development, identification, and prevention, as well as the responsibilities of critical care nursing staff and providers in caring for high-risk patients, can contribute to the prevention of OSD. Additionally, the regular use of ocular lubricants for intensive care patients who have compromised ocular

defense mechanisms aligns with established eye care protocols requires a provider order is necessary, and serves as an effective intervention(Hearne et al., 2018)

Based on the findings of the previous study, it may be inferred that a specialized teaching program is necessary for critical care nurses to provide the best possible eye care since their performance in this area is inadequate(Sayed, 2022). The instrument of the awareness evaluation regarding eye care was modified from (Ebadi et al., 2017) to evaluate the critical care nurses' proficiency in providing eye care to patients in intensive care units with at least 60% level of awareness deemed satisfactory <60% inadequate degree of understanding(Ebadi et al., 2017). The instrument, adapted from (Güler et al., 2017), assesses current eye care practices based on a competency level of ≥75% and an incompetency level of <75%.

According to (Kocaçal Güler et al., 2018), nurses possess the requisite practical skills to identify early-stage exposure keratopathy in intensive care patients, thereby finalizing eye care, assessment guidance, and critical care.

Chapter Three

Methodology

Introduction:

This chapter contains the following heading :study design, study setting, study population and sample size, inclusion criteria, exclusion criteria, data collection and instrument, ethical considerations, and statistical analysis.

3.1 Study design.

A quantitative quasi-experimental pre-post design was used, this design was chosen because it develops a conceptual and operational definition of the variables, identifies problems with current practice, makes a judgment, describes variables that help interpret the theoretical, and provides a situation as it would occur through an educational video intervention.

3.2 Study setting.

In Palestine – Nablus –Jenin- Tulkarm cities at Private Hospitals on ICUs Nurses Al Najah, Women's Union, St. Luke's, Nablus Specialist, Arab Specialist, Iben Sena, Al Razi, Al Shefaa, Al-Amal, and Al-Esraa hospitals include 73 beds intensive care units (medical, surgical, pediatric and cardiac).

3.3 Study population and sample size.

Nursing plays an important part in providing healthcare to patients in Palestine. The research focused on hospitals located in the cities of Nablus, Jenin, and Tulkarm, particularly private institutions. There are 150 nurses employed in the intensive care units.

The sample size was calculated using Raosoft sample size calculator

$$x = Z(c/100)2r(100-r)$$

$$n = N\,x/((N-1)E2 + x)$$

E = Sqrt[(N - n)x/n(N-1)]

With consideration for the attrition rate of 10%, the sample size is 120 ICU nurses taken from intensive care unit nurses.

3.4 Sampling process.

The researcher used a convenience sampling strategy. The study included nurses on duty during morning and evening who achieved the following criteria: nurses who accepted to participate in the study, with no previous training course on eye care, and nurses with years of work experience between one to two in ICU, a well-defined sampling process was implemented for this thesis, involving the establishment of a precise timetable for sample collection across private hospitals in three northern Palestinian cities: Jenin, Nablus, and Tulkarm. Multiple visits were conducted to critical care units on consecutive days to identify and approach the targeted nurse sample utilizing the Raosoft sample size calculator, selected a convenient sample size of 120 ICU nurses was determined by adding an attrition rate of 10%. Questionnaires were distributed to all participants at the onset of October, with subsequent delivery of an educational video individually to each participant. Confirming their attendance video after receiving notification of the video's presence via the website link, data was reacquired approximately one month later.

3.5 Inclusion criteria

***** All registered nurses in intensive care units have between one to two years of experience.

* All ICU nurses who agreed to participate in the study.

* All nurses who have not taken eye care training.

3.6 Exclusion criteria

***** Nurses who work outside the intensive care units.

* All nurses who are on extended or maternity leave.

3.7 Data collection instrument.

A self-administered pre-post questionnaire was employed to gather data from nurses on topics closer to those explored in a previous study conducted in India titled "Awareness and practices of nursing staff regarding risk factors and prevention of exposure keratopathy among patients admitted in a multidisciplinary intensive care unit of a medical college hospital." Dr. Rashmi Shambhu was contacted via email, and upon receiving written approval, the questionnaire was forwarded for inclusion in my study (appendix 1).

The questionnaire contained the first section of demographic data, and the other contains 15 questions, including 10 questions that assessed their awareness and five questions that assessed their practice patterns while caring for patients. The questionnaire was structured and self-administered, where the respondents could mark a single best answer (appendix 2). In addition, there was an option included at the end of the questionnaire for participants to add a note or ask a question if they wished to do so.

The questionnaire distribution started via email before the educational program, with each nurse assigned a unique serial number for questionnaire identification. Subsequently, the educational video was sent via email, and feedback was awaited upon the participants' attendance. The review was taken once the participants engaged with the educational video. Following this, the questionnaire was re-administered approximately one month later, utilizing the same serial numbers as before the educational program.

The educational program consisted of a 3-minute video developed in collaboration with four experienced ophthalmologists and head nurses from Al-Najah University Hospital. The video

content emphasized early nursing assessment, diagnosis, planning, implementation, evaluation, and recommendations.

The cut point is at least a 60% (good) level of nursing awareness satisfactory <60% (poor) inadequate degree of understanding (Ebadi, Saeid, et al. 2017). Nurses' practice evaluates current eye care practices with a ≥75% (good) competent and a <75% (poor) incompetent level of practice (Güler, Eşer, et al. 2017).

The tool was found valid and reliable, as used in many previous studies (Momeni Mehrjardi et al., 2021; Vidha et al., 2020). Content validity was done by five experts (Vidha et al., 2020). The internal consistency for the tool in this study is 73%.

3.8 Ethical Considerations.

Approval from the Institutional Review Board (IRB) from AAUP (appendix 3), & my supervisor Dr. Imad Fashafsheh, and all private hospital administrations and the consent for every nurse, subject to confidentiality, right to withdrawal and there is no harm for participants.

3.9 Statistical analysis.

The Statistical Package for Social Sciences (SPSS) version 27 was used for the study's statistical analysis, and descriptive statistics were used to determine the parameters' frequency distributions, means, and standard deviations. The differences between the variables were also evaluated using inferential statistics like t-tests. Furthermore, the Chi-square test was performed to investigate particular similarities and relationships between groups.

Chapter Four

Results

Introduction:

This chapter explains the findings related to the hypothesis, the study evaluates the effects of an intervention on nurses' awareness and practices for prevention and risk factors of exposure keratopathy in patients admitted to the intensive care unit (ICU). Significant variations were found in both awareness and practice using the chi-square test.

Characteristics of the Study Sample

A total of 109 nurses completed the study. More than half of the participants were males (54.1%) and 45.9% were females. The mean of work experience in the ICU was 1.6 (SD=1.12) years as shown in Table 1.

Table 1: Socio-demographic characteristics of the study participants (N=109)

Characteristic	**Categories**	**n (%)**
Gender	Male	59 (54.1)
	Female	50 (45.9)
	Mean (SD)	
Nursing experience/ years	1.6 (1.12)	

N: number; %: Percentage; SD: standard deviation

As shown in Table 2, only 25 nurses reported corrected answers, reflecting that nurses had a poor level of awareness about risk factors and prevention of keratopathy in patients admitted to the ICU at pre-intervention. Additionally, the highest correct response percentages were for Patients with long stays in ICU at a greater risk item and for ICU patients at higher risk of exposure keratopathy (75.2%, 60.6%) respectively. The lowest responses were for the level of awareness for Referring all patients in the ICU to an ophthalmologist item, for Cleaning the eyes of the patient using normal saline gauze, and Following a fixed eye care protocol for patients in ICU with the following correct responses (22%, 30.3%, 39.4%) respectively.

Table 2: Nurses' awareness of risk factors and prevention of exposure to keratopathy in patients admitted to the intensive care unit at pre-intervention (N=109)

Items	Pre-intervention		Correct answer
	Correct	Incorrect	
	N (%)	N (%)	
1.Inadequate eyelid closure in patients can lead to which of the following problems?	56 (51.4)	53 (48.6)	All of the above
2. ICU patients are at higher risk of exposure keratopathy	66 (60.6)	43 (39.4)	Yes
3. Patients with long stays in ICU are at a greater risk.	82 (75.2)	27 (24.8)	Yes
4. The groups of patients are at a greater risk of developing exposure to keratopathy.	60 (55.0)	49 (45.0)	All of the above
5. Following a fixed eye care protocol for patients in ICU.	43 (39.4)	66 (60.6)	Yes
6. Assessing the eyelid closure of patients in the ICU.	55 (50.5)	54 (49.5)	Yes
7. Referring all patients in ICU to an ophthalmologist.	24 (22.0)	85 (78.0)	Yes
8. Referring patients with incomplete lid closure to an ophthalmologist	58 (53.2)	51 (46.8)	Yes
9. Cleaning the eyes of the patient using normal saline gauze.	33 (30.3)	76 (69.7)	No
10. Using eye tape in patients with incomplete closure.	59 (54.1)	50 (45.9)	Yes
Total nurses' awareness % > 60% good	27 (24.8)	82 (75.2)	

N: number; %: percentage

Table 3 shows that the participant reported an unsatisfactory level of practice regarding risk factors and prevention of exposure keratopathy in patients admitted to the ICU at pre-intervention. Twenty-one nurses (19.3%) of participants responded with correct answers for the practice domain. The highest correct response was for item "Any special precautions to protect the eye while performing nursing care procedures" (45%), while the lowest correct response was for item "Using lubricating eye drops if the patient has exposure" (6.4%).

Table 3: Nurses' practices for prevention of exposure to keratopathy in patients admitted to the intensive care unit at pre-intervention (N=109)

Items	**Pre-intervention**		**Correct answer**
	Correct	**Incorrect**	
	N (%)	**N (%)**	
1- Assessing the patient has adequate eyelid closure.	33 (30.3)	76 (48.6)	Once every 6 hours
2- Cleaning the eyes of the patient.	44 (40.4)	65 (59.6)	Once every 6 hours
3- Using lubricating eye drops if the patient has exposure.	7 (6.4)	102 (93.6)	Once every 6 hours
4- The best action is when the patient has inadequate lid closure.	19 (17.4)	90 (82.6)	Start lubricants and taping the eye yourself
5- Any special precautions to protect the eye while performing nursing care procedures.	49 (45.0)	60 (55.0)	Yes
Total nurses' practices % ≥75% good	**21 (19.3)**	**88 (80.7)**	

N: number; %: percentage

As shown in Table 4, the participants endorsed a good level of awareness about risk factors and prevention exposure keratopathy in patients admitted to the ICU post-intervention. Ninety-two nurses (84.4%) responded with correct answers. One hundred and three nurses (94.5%) reported the highest response to the items "ICU patients are at higher risk of exposure to keratopathy" and "Patients with long stays in the ICU are at a greater risk". The item with the lowest response was "Following a fixed eye care protocol for patients in ICU" which was reported by seventy-three nurses (67%).

Table 4: Nurses' awareness of risk factors and prevention of exposure keratopathy in patients admitted to the intensive care unit at post-intervention (N=109)

Items	**Post-intervention**		**Correct answer**
	Correct	**Incorrect**	
	N (%)	**N (%)**	
1- Inadequate eyelid closure in patients can lead to which of the following problems?	85 (78.0)	24 (22.0)	All of the above
2- ICU patients are at higher risk of exposure to keratopathy.	103 (94.5)	6 (5.5)	Yes
3- Patients with long stays in the ICU are at a greater risk.	103 (94.5)	6 (5.5)	Yes
4. The groups of patients are at a greater risk of developing exposure to keratopathy.	95 (87.2)	14 (12.8)	All of the above
5. Following a fixed eye care protocol for patients in ICU.	73 (67.0)	36 (33.0)	Yes
6. Assessing the eyelid closure of patients in the ICU.	81 (74.3)	28 (25.7)	Yes
7. Referring all patients in ICU to an ophthalmologist.	81 (74.3)	28 (25.7)	Yes
8. Referring patients with incomplete lid closure to an ophthalmologist.	87 (79.8)	22 (20.2)	Yes
9. Cleaning the eyes of the patient using normal saline gauze.	86 (78.9)	23 (21.1)	No
10. Using eye tape in patients with incomplete closure.	88 (80.7)	21 (19.3)	Yes
Total nurses' awareness % > 60% good	**92 (84.4)**	**17 (15.6)**	

N: number; %: percentage

Table 5 illustrates that 94 nurses (86.2%) reported overall satisfactory practice post-intervention about risk factors and prevention exposure keratopathy. Ninety-five nurses (87.2%) reported taking special precautions to protect the eye while performing nursing care procedures. Eighty-six nurses (78.9%) reported that they assess the patient has adequate eyelid closure and act when the patient has inadequate lid closure.

Table 5: Nurses' practices for prevention of exposure keratopathy in patients admitted to the intensive care unit at post-intervention (N=109)

Items	**Post-intervention**		**Correct answer**
	Correct	**Incorrect**	
	N (%)	**N (%)**	
1- Assessing the patient has adequate eyelid closure.	86 (78.9)	23 (21.1)	Once every 6 hours
2- Cleaning the eyes of the patient.	93 (85.3)	16 (14.7)	Once every 6 hours
3-Using lubricating eye drops if the patient has exposure.	94 (86.2)	15 (13.8)	Once every 6 hours
4-The best action is when the patient has inadequate lid closure.	86 (78.9)	23 (21.1)	Start lubricants and taping the eye yourself
5- Any special precautions to protect the eye while performing nursing care procedures	95 (87.2)	14 (12.8)	Yes
Total nurses' practices % ≥75% good	**94 (86.2)**	**15 (13.8)**	

N: number; %: percentage

Table 6 reveals that there were significant differences between pre-intervention and post-intervention in terms of nurses' awareness toward exposure to keratopathy in patients admitted to the ICU; however, the Chi-square test reported a significant difference after the intervention (78.181, $p < 0.001$). All nurses (100%) post-intervention compared to twenty-seven (24.8%) pre-intervention responded with correct answers for the overall awareness domain. Such results indicated a significant improvement in the awareness among the participating nurses.

Table 6: Nurses' awareness of risk factors and prevention of exposure keratopathy in patients admitted to the intensive care unit at pre-post intervention (N=109)

Items	**Pre-intervention**		**Post-intervention**		**Chi-square**	**p-value**
	Correct	**Incorrect**	**Correct**	**Incorrect**		
	N (%)	**N (%)**	**N (%)**	**N (%)**		
1- Inadequate eyelid closure in patients can lead to which of the following problems.	56 (51.4)	53 (48.6)	85 (78.0)	24 (22.0)	20.22	<0.001
2- ICU patients are at higher risk of exposure to keratopathy.	66 (60.6)	43 (39.4)	103 (94.5)	6 (5.5)	36.03	<0.001
3- Patients with long stays in the ICU are at a greater risk.	82 (75.2)	27 (24.8)	103 (94.5)	6 (5.5)	36.039	<0.001
4. The groups of patients are at a greater risk of developing exposure keratopathy.	60 (55.0)	49 (45.0)	95 (87.2)	14 (12.8)	27.348	<0.001
5. Following a fixed eye care protocol for patients in ICU.	43 (39.4)	66 (60.6)	73 (67.0)	36 (33.0)	16.582	<0.001
6. Assessing the eyelid closure of patients in the ICU.	55 (50.5)	54 (49.5)	81 (74.3)	28 (25.7)	13.214	<0.001
7. Referring all patients in ICU to an ophthalmologist.	24 (22.0)	85 (78.0)	81 (74.3)	28 (25.7)	59.695	<0.001
8. Referring patients with incomplete lid closure to an ophthalmologist	58 (53.2)	51 (46.8)	87 (79.8)	22 (20.2)	21.866	<0.001
9. Cleaning the eyes of the patient using normal saline gauze.	33 (30.3)	76 (69.7)	86 (78.9)	23 (21.1)	51.979	<0.001
10. Using eye tape in patients with incomplete closure.	59 (54.1)	50 (45.9)	88 (80.7)	21 (19.3)	17.566	<0.001
Total awareness > 60% good	27 (24.8)	82 (75.2)	109 (100)	0 (0)	78.181	<0.001

N: number; %: percentage

As shown in Table 7, there were significant differences between pre-intervention and post-intervention in terms of nurses' practices about risk factors and prevention exposure keratopathy in patients admitted to the ICU; however, the Chi-square test reported a significant difference after the intervention (98.077, $p < 0.001$). Ninety-four nurses (86.2%) post-intervention compared to twenty-one (19.3%) pre-intervention responded with correct answers for the overall practice domain. Such results indicated a significant improvement in the practices among the participating nurses.

Table 7: Nurses' practices of risk factors and prevention of exposure keratopathy in patients admitted to the intensive care unit at pre-post intervention (N=109)

Items	**Pre-intervention**		**Post-intervention**		**Chi-square**	**p-value**
	Correct	**Incorrect**	**Correct**	**Incorrect**		
	N (%)	**N (%)**	**N (%)**	**N (%)**		
1- Assessing the patient has adequate eyelid closure.	33 (30.3)	76 (48.6)	86 (78.9)	23 (21.1)	51.979	<0.001
2-Cleaning the eyes of the patient.	44 (40.4)	65 (59.6)	93 (85.3)	16 (14.7)	47.168	<0.001
3-Using lubricating eye drops if the patient has exposure.	7 (6.4)	102 (93.6)	94 (86.2)	15 (13.8)	139.633	<0.001
4-The best action is when the patient has inadequate lid closure.	19 (17.4)	90 (82.6)	86 (78.9)	23 (21.1)	82.478	<0.001
5- Any special precautions to protect the eye while performing nursing care procedures	49 (45.0)	60 (55.0)	95 (87.2)	14 (12.8)	43.289	<0.001
Total nurses' practices ≥75% good	21 (19.3)	88 (80.7)	100 (0)	0 (0)	98.077	< 0.001

N: number; %: percentage

Table 8 revealed that no significant differences between awareness and practice toward exposure to keratopathy in patients admitted to the ICU based on gender ($p > 0.05$).

Table 8: Differences between awareness and practice toward exposure to keratopathy in patients admitted to the ICU pre and post-intervention according to gender: Independent t-test

Variables	Gender	
	t-test	p-value
Awareness Pre-intervention	1.199	0.233
Post-intervention	0.186	0.853
Practice Pre-intervention	1.212	0.228
Post-intervention	0.027	0.978

CI: Confidence interval

Table 9 revealed that no significant differences between awareness and practice toward risk factors and prevention of exposure keratopathy in patients admitted to the ICU based on experience ($p > 0.05$).

Table 9: Differences between awareness and practice toward risk factor and prevention exposure to keratopathy in patients admitted to the ICU pre and post-intervention according to experience: Independent t-test

Variables	Experience	
	t-test-	p-value
Awareness pre-intervention	-0.581	0.563
post-intervention	-1.852	0.069
Practice pre-intervention	-0.542	0.526
post-intervention	-1.529	0.115

CI: Confidence interval

Summary

Pre and post-test comparisons showed that the intervention greatly increased participants' awareness and practice. The intervention program had a significant effect on nurses' awareness and practice toward prevention and risk factors exposure to keratopathy in patients admitted to the ICU. Additionally, no significant difference between awareness and practice toward prevention and risk factors exposure to keratopathy in patients admitted to the ICU based on gender and experience.

Chapter 5
Discussion

Introduction:

The purpose of this study was to evaluate the effect of educational program on staff nurse's awareness and practices regarding risk factors and prevention of exposure keratopathy among unconscious and mechanical ventilated patients in Palestine.

The current study showed poor practice levels among Palestinian nurses on how to provide eye care regarding risk factors and prevention of exposure keratopathy in intensive care units before the educational program. This has a resemblance to three prior studies, one of which was carried out at BIH (Liem, 2019), the hospital in the Go Cat Area, Lai Thieu Ward, Thuan An Town, Binh Duong Province, Vietnam, the study included an initial cohort of 15 nurses employed in the ICU department, in another study. In another study, (Momeni Mehrjardi et al., 2021) conducted research in the Intensive Care Units (ICUs) of Dr.Shahid Rahnemoon Teaching Hospital, which is the primary hospital for neurosurgery in Yazd, Iran, the study involved a purpose sampling method to select a sample of 60 nurses, who were then divided into experimental and control groups. The final study, conducted by (Vyas et al., 2018b), focused on a convenience sample of 120 nurses employed in the ICU across six multispecialty hospitals in Chhattisgarh state.

The study also showed a poor level of practice among nurses who provide eye care regarding risk factors and prevention of exposure keratopathy in intensive care units, this study bears similarities to three previous studies. One of these studies was conducted at BIH (Liem, 2019), which is located in the Go Cat Area, Lai Thieu Ward, Thuan An Town, Binh Duong Province, Vietnam. The study involved an initial cohort of 15 nurses employed in the ICU department. Another study, conducted by (Sayed, 2022), focused on the Intensive Care Units (ICUs) of Beni-

Suef University Hospital, the study employed a purposive sampling method to select a sample of 50 critical care nurses. The ultimate study, carried out by (Vyas et al., 2018b), centered on a convenience sample of 120 nurses who were engaged in the Intensive Care Unit (ICU) inside six multispecialty hospitals located in the state of Chhattisgarh.

The study also revealed a significant improvement in nurses' awareness regarding risk factors and prevention of exposure keratopathy after the implementation of the educational program. This result is similar to the previous studies, the first study was carried out by (Cho et al., 2017), at the neurological Intensive Care Unit (ICU) of a University Hospital with over 1,000 beds. A total of 30 ICU nurses were chosen for the study. Also, quasi-experimental research was undertaken by (Elkasby et al., 2021), using a sample of 50 nurses employed at the Main Mansoura University Hospitals. Additionally, similar research was undertaken (Liem, 2019), which featured an initial cohort of 15 nurses engaged in the Intensive Care Unit (ICU) in Vietnam. And the last study, (Momeni Mehrjardi et al., 2021) conducted research in the Intensive Care Units (ICUs) of Dr.Shahid Rahnemoon Teaching Hospital, which is the primary hospital for neurosurgery in Yazd, Iran, the study involved a purposive sampling method for select a sample of 60 nurses, who were then divided into experimental and control groups.

Our study also revealed a significant improvement in nurses' practice after the implementation of the educational program. The findings of this study align with prior research conducted by (Cho et al., 2017), in the neurological Intensive Care Unit (ICU) of a University Hospital boasting a bed capacity exceeding 1,000. The research selected a cohort of 30 intensive care unit (ICU) nurses. Furthermore, (Elkasby et al., 2021) conducted a quasi-experimental study including a sample of 50 nurses who were working at the Main Mansoura University Hospitals.

Furthermore, a comparable study was conducted by (Liem, 2019), including an initial group of

15 nurses who were actively involved in the Intensive Care Unit (ICU) in Vietnam. In the aforementioned study, (Momeni Mehrjardi et al., 2021) employed a purposive sampling technique to select a sample of 60 nurses from the Intensive Care Units (ICUs) of Dr. Shahid Rahnemoon Teaching Hospital, the principal neurosurgery hospital in Yazd, Iran.

The study also revealed no significant statistical difference between nurses' practice regarding risk factors and prevention of exposure keratopathy and nurse's gender. This result is contrary to a similar previous study conducted by (Güler et al., 2017) at an educational hospital in Turkish. This may be due to the cultural differences between Palestine and Turkish. On the other hand, the study result showed no significant statistical difference between nurses' awareness regarding risk factors and prevention of exposure keratopathy and nurses' gender. The findings of this study are inconsistent with prior research done by (Alghamdi et al., 2018), The study used a sample of 55 nurses working in medical and surgical critical care units at a governmental hospital located in the Eastern Province of the Kingdom of Saudi Arabia.

The research conducted by (Vyas et al., 2018b), focused on a convenience sample of 120 nurses who were employed in the Intensive Care Unit (ICU) among six multispecialty hospitals situated in the state of Chhattisgarh. This may be due to the cultural differences between Palestine and other countries.

The study finds that there is no significant statistical difference between nurses' practices regarding risk factors and prevention of exposure keratopathy and years of experience. This result is inconsistent with the previous studies, A study was undertaken by (Güler et al., 2017), on a sample of 111 nurses working in nine different intensive care units (ICUs) across two educational hospitals, including both Palestinian and Turkish ICU nurses. Also,(Vyas et al., 2018b) performed a study that specifically examined a convenience sample of 120 nurses

working in the Intensive Care Unit (ICU) across six multispecialty hospitals located in the state of Chhattisgarh. The study also revealed no significant statistical difference between nurses' awareness and years of experience. This result is incongruent with the previous study, The research conducted by (Vyas et al., 2018a) focused on a convenience sample of 120 nurses employed in the Intensive Care Unit (ICU) among six multispecialty hospitals situated in the state of Chhattisgarh. These findings may be attributed to the lack of comparability in the years of experiences of the persons included in this research after the Inclusion Criteria were determined in our study.

The prevention and risk factors of exposure keratopathy are mostly dependent on the nursing team caring for patients in the intensive care unit and they have to know the disease concept very well following the intervention, we observed that the nursing staff's awareness levels were satisfactory in our study post-intervention. Similar findings were also seen in a multicentric research conducted in the Indian state of Chhattisgarh, where 93% of nurses were aware of the possibility of exposure keratopathy in ICU patients(Aditi et al., 2021). Another study conducted by (Vyas et al., 2018b), that within a medical college hospital's multidisciplinary Intensive Care Unit, there are a total of 51 ICU nurses.

According to this study, before the educational program, eye care practices were poor and were not effective in preventing risk factors exposure keratopathy. This result is similar to the previous study conducted by (Sayed, 2022), a purposive sample of 50 critical care nurses from the intensive care units of Beni-Suef University Hospital was selected. The study found that around 74% of the nurses surveyed were unaware of the risk factors associated with eye disorders. Post-intervention, the level of eye care practices is good regarding risk factors and prevention of exposure keratopathy among patients on a mechanical ventilator and unconscious,

this result is similar to the previous studies, there is increasing evidence that most corneal issues seen in the intensive care unit may be avoided by following well-executed eye care guidelines or participating in eye care educational programs (Comisso et al., 2018; Momeni Mehrjardi et al., 2021).

Easy eye care instruction significantly lowers the risk of corneal problems and exposure keratopathy. It is also quite simple to do (Cho et al., 2017; Elkasby et al., 2021). The current study revealed that there was no statistically significant difference between the training program and demographic data, this result is consistent with a previous study conducted (Liem, 2019) at BIH, the hospital in the Go Cat Area, Lai Thieu Ward, Thuan An Town, Binh Duong Province, Vietnam, the study included an initial cohort of 15 nurses employed in the ICU department.

A study conducted by (Kam et al., 2011) revealed that out of the 217 nurses in ICUs who participated, 34% of them did not assess eyelid closure, even though many of these units had established eye care guidelines. Upon reviewing the results of the study after the implementation of the education program, it was found that a majority of the nurses in the ICU showed a high level of awareness about the assessment of adequate eyelid closure in patients, the findings of this study were in line with research carried out by (Vidha et al., 2020) in a multidisciplinary Intensive Care Unit at a Medical College Hospital in India, using a sample of 51 ICU nurses.

.A previously conducted study found that the educational program provided for nurses who provided care for the ventilated and unconscious can lead to significant improvement in patient health conditions, which he conducted by (Narmawala & Jani, 2017) out of the 146 patients involved in this study, 40% had exposure keratopathy. The rate of exposure keratopathy dropped from 44% to 33% following the ICU staff's eye care instruction, exposure keratopathy was

linked to risk factors such as lid position, conjunctival edema, degree of sedation, and unfavorable patient outcomes.

Summary of the discussion

In summary, our study highlighted an initial lack of awareness and poor practices among Palestinian nurses regarding risk factors of Exposure Keratopathy among patients on a mechanical ventilator and unconscious. The implemented educational program significantly improved both awareness and practices, aligning with similar positive outcomes in previous research. These findings emphasize the vital role of targeted educational interventions in enhancing healthcare professionals' capabilities and ultimately improving patient care.

Limitation

1. Sample Collection: The study faced limitations in sample collection, particularly from private hospitals, with no data collected from government hospitals.

2. Hospital Transitions: Transitioning between hospitals proved challenging, requiring significant time and effort for approvals and permissions.

3. Educational Program Delivery: Face-to-face delivery of educational programs to nurses was not feasible due to work demands and logistical and security challenges in reaching all participants at the same time.

Strengths of the study

1. Innovation: This study fills a significant gap in the existing literature since few studies have been conducted in Palestine, proven by previously low awareness and practices in the field.

2. Effective Intervention: Through the implementation of an educational intervention, the study successfully elevated the level of awareness and improved practices among nurses, making a significant contribution to the field.

3. Significance of Findings: The findings underscored the significance and effectiveness of the educational program specifically tailored for ICU nurses, highlighting its crucial role in enhancing patient eye care.

Recommendations

1. Continuous Staff Training: Encourage ongoing awareness and practice sessions for ICU staff to develop and enhance their awareness and practice for patient eye care and management.

2. Expanded Research Scope: Promote further studies involving samples from nursing government hospitals to provide a more comprehensive understanding of the study in Palestine.

3. Enhanced Educational Programs: Strengthen educational activities within intensive care units across both private and government hospitals. Introduce a fixed protocol for eye care or establish clear policies to simplify nursing interventions, ensuring swift and effective care for ICU patients.

Conclusion:

The study showed that after the intervention, ICU nurses' awareness and practices regarding risk factors of Exposure Keratopathy among patients on a mechanical ventilator and unconscious had significantly improved. The results demonstrate how well the intervention program worked to improve nurses' understanding of and use of preventative measures. Additionally, there were no significant variations in awareness and behaviors according to experience or gender. This implies that the intervention has a universal effect and that it may be widely used to improve patient eye care in critical care environments. The study highlights how important focused educational interventions are in raising ICU nurse's awareness and enhancing their practices to improve patient outcomes.

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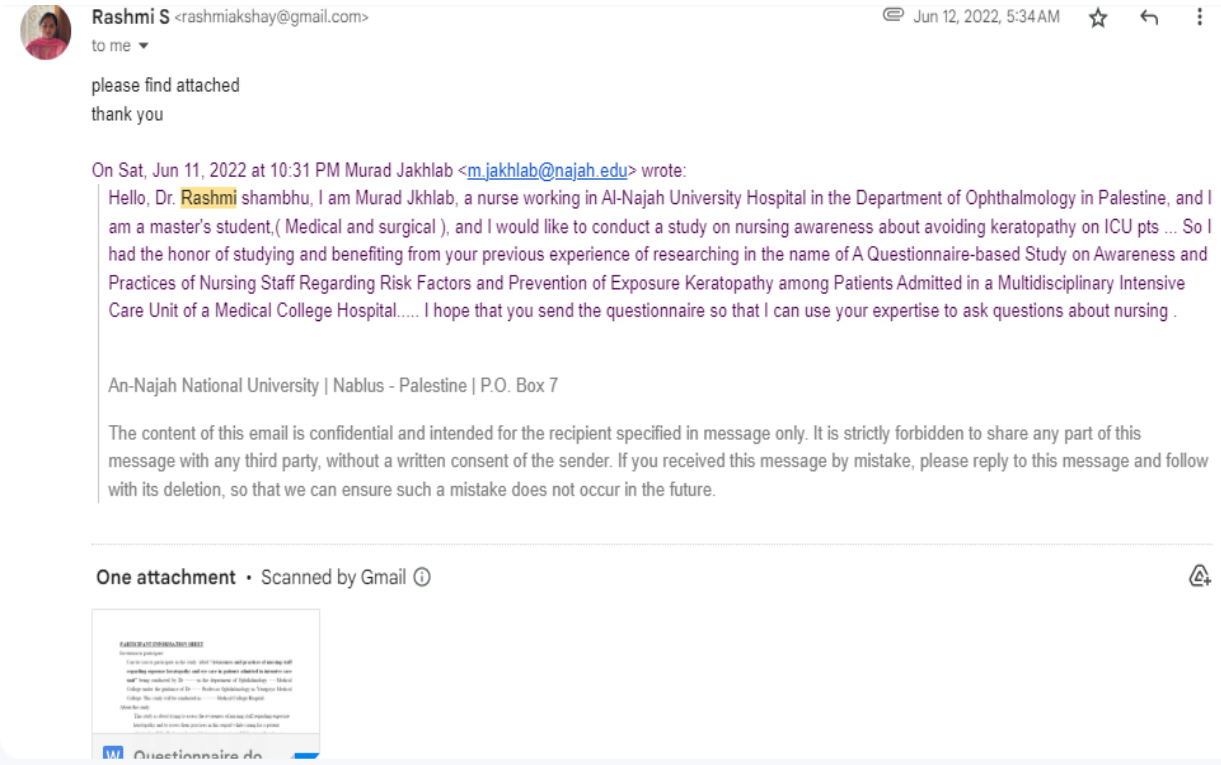
Appendices



Rashmi S <rashmiakshay@gmail.com> Jun 12, 2022, 5:34 AM

to me

please find attached
thank you

On Sat, Jun 11, 2022 at 10:31 PM Murad Jakhlab <m.jakhlab@najah.edu> wrote:

> Hello, Dr. Rashmi shambhu, I am Murad Jkhlab, a nurse working in Al-Najah University Hospital in the Department of Ophthalmology in Palestine, and I am a master's student,(Medical and surgical), and I would like to conduct a study on nursing awareness about avoiding keratopathy on ICU pts ... So I had the honor of studying and benefiting from your previous experience of researching in the name of A Questionnaire-based Study on Awareness and Practices of Nursing Staff Regarding Risk Factors and Prevention of Exposure Keratopathy among Patients Admitted in a Multidisciplinary Intensive Care Unit of a Medical College Hospital..... I hope that you send the questionnaire so that I can use your expertise to ask questions about nursing .
>
> An-Najah National University | Nablus - Palestine | P.O. Box 7
>
> The content of this email is confidential and intended for the recipient specified in message only. It is strictly forbidden to share any part of this message with any third party, without a written consent of the sender. If you received this message by mistake, please reply to this message and follow with its deletion, so that we can ensure such a mistake does not occur in the future.

One attachment • Scanned by Gmail

Questionnaire.do

Consent via email from the original study (appendix 1)

Questionnaire

Gender: Male/ Female

Total number of years of nursing experience -------

Please tick your single best response for the following nursing awareness questions:

1. Inadequate eye lid closure in patients can lead to which of the following problems?
   Corneal dryness □
   Exposure keratopathy □
   Increased risk of injury and infection□
   All the above □

2. Do you think that ICU patients at higher risk of exposure keratopathy?
   Yes □ No □ I do not know □

3. Are patients with long stay in ICU at a greater risk?
   Yes □ No □ I do not know □

4. Which of the following groups of patients are at a greater risk of developing exposure keratopathy?
   Unconscious □
   Semiconscious □
   Sedated □
   Ventilated □
   All the above □

5. Do you follow a fixed eye care protocol for patients in your ICU?
   Yes □ No □ I do not know □

6. Have you assessed the eyelid closure of your patient in your last ICU duty?
   Yes □ No □

7. Are all patients in your ICU routinely referred to ophthalmologist ?
   Yes □ No □ I do not know □

8. Are patients with incomplete lid closure referred to ophthalmologist?
   Yes □ No □ I do not know □

9. Have you cleaned the eyes of your patient using normal saline gauze during the last duty?

Yes □ No □

10. Do you use eye tape in those with incomplete closure?
Yes □ No □

Please tick your single best response for the following nursing practice questions:

11. How frequently you assess that patient has adequate eye lid closure?
Once Daily □
Twice daily □
Once in every 6 hours □
Hourly □

12. What do you do when you notice that your patient has inadequate lid closure?
Observation only□
Inform ICU in charge doctor □
Start lubricants and taping the eye yourself □
Send reference to ophthalmologist □

13. How frequently you clean the eyes of your patient?
Once Daily □
Twice daily □
Once in every 6 hours □
Hourly □
I have not cleaned at all□

14. How frequently you use lubricating eye drops if the patient has exposure?
Once Daily □
Twice daily □
Once in every 6 hours □
Hourly□
I have not used at all□

15. Do you take any special precautions to protect the eye while performing nursing care procedures (like tracheal suction, sponge bath etc)?
Yes □ No □

Questionnaire from the original study (appendix 2)

Arab American University- Palestine
Deanship of Scientific Research
IRB committee
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IRB Approval Letter

Study Title: Effect of Educational Program on Staff Nurse's Awareness and Practices Regarding Risk Factors and Prevention of Exposure Keratopathy among unconscious and mechanical ventilated patients in Palestine.

Submitted by: Murad Abdalkareem Hussin Jakhlab

Date received: 7th June 2023

Date reviewed: 14th August 2023

Date approved: 6th September 2023

Your Study titled "**Effect of Educational Program on Staff Nurse's Awareness and Practices Regarding Risk Factors and Prevention of Exposure Keratopathy among unconscious and mechanical ventilated patients in Palestine.**" with archived number 2023/B/140/N was reviewed by the Arab American University IRB committee and was approved on the 6th September 2023.

Ahmad Ayed, PhD
IRB Committee Member
Arab American University of Palestine

Sajed Ghawadra, PhD
IRB Committee Vice-chairman
Arab American University of Palestine

Reham Khalaf-Nazzal, MD, PhD
IRB Committee Chairman
Arab American University of Palestine

General Conditions:

1. Valid for 6months from the date of approval.
2. It is important to inform the committee with any modification of the approved study protocol.
3. The committee appreciates a copy of the research when accomplished.

IRB

لجنة اخلاقيات البحث العلمي في الجامعة العربية الامريكية

الملخص

مقدمة: في كثير من الأحيان قد لا يتم الإبلاغ عن المضاعفات البصرية لدى المرضى داخل وحدة العناية الحثيثة، مما يؤدي إلى تأثيرات خطيرة محتملة مثل اعتلال القرنية الناتج عن التعرض للبيئة الخارجية. وللحد من هذه المخاطر، من المهم التعرف الفوري على هذه المشكلات والوقاية منها وتثقيف ممرضي وحدة العناية الحثيثة حول هذه المشكلات. **المنهجية** التي استخدمت في الرسالة هي الشبه تجريبية للتقييم القبلي والبعدي وذلك لفحص مستوى الوعي والممارسة لدى ممرضي العناية الحثيثة. **عينة الدراسة**: تم جمع عينة الدراسة المكونة من 109 ممرض وممرضة العاملين في وحدة العناية الحثيثة في المستشفيات الخاصة في شمال فلسطين بعد احتسابها من بين 150 ممرض وممرضة بعد موافقتهم على المشاركة في الدراسة. **هدف الدراسة**: تقييم تأثير برنامج تعليمي حول العناية بالعين على وعي وممارسات الممرضين/ة العاملين في العناية الحثيثة فيما يتعلق بعوامل الخطر والوقاية من اعتلال القرنية بين المرضى الموصولين على أجهزة التنفس الصناعي والمرضى في حالة اللاوعي. **النتيجة**: بعد التدخل، تبين وجود تحسن كبير في الوعي الممرضين/ة بعد التدخل، وذلك حسب الاختبار الاحصائي Chi square test، ومع ذلك لم تكن هناك اختلافات كبيرة في القيم بما يخص التحسن بممارسات الممرضين/ة وفقا لسنوات الخبرة أو الجنس لدى الممرضين/ة. **الاستنتاج**: أدى التدخل إلى تحسن كبير في فهم الممرضين والممارسة حول اعتلال القرنية بما يخص عوامل الخطر والوقاية للمرضى في وحدة العناية الحثيثة. وقد ركزت الدراسة على فعالية التدخلات المستهدفة في تحسين وعي وممارسة تمريض الرعاية الحثيثة، بغض النظر عن الجنس أو مستوى الخبرة. وقد اكدت نتائج اعطاء مثل هذه البرامج على الحاجة إلى التعليم المستمر لتعزيز رعاية المرضى وضمان السلامة داخل بيئة الرعاية الحثيثة.