The Knowledge of Nurses about Corneal Injury Prevention in an Intensive Care Unit

Conhecimento de Enfermeiros sobre Prevenção de Lesões na Córnea em Unidade de Terapia Intensiva

Conocimientos de Enfermeras sobre Prevención de Lesiones en la Córnea en una Unidad de Cuidados Intensivos

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How to cite: Santos DS, Brazileiro TNC, Carvalho RLR, Macie ML, Barros FL, Oliveira IM, et al. The Knowledge of Nurses about Corneal Injury Prevention in an Intensive Care Unit. REVISA. 2024; 13(3): 818-27. Doi: https://doi.org/10.36239/revisa.v13.n3.p818a827

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Received: 12/04/2024
Accepted: 23/06/2024

RESUMO

Objetivo: identificar o conhecimento dos enfermeiros assistenciais quanto à prevenção de lesões na córnea na unidade de terapia intensiva. **Método:** estudo transversal com a aplicação de um questionário desenvolvido pelos autores a enfermeiros assistenciais, atuantes em unidade de terapia intensiva adulto, em um hospital de grande porte. Realizada técnica de amostragem por conveniência, com número amostral mínimo de 75 participantes. **Resultados:** participaram da pesquisa 83 enfermeiros com tempo de experiência enquanto intensivista entre 1 a 4 anos, especialistas com predomínio em terapia intensiva e emergência. A maioria reconhece a importância dos cuidados oculares, com igual importância quanto ao potencial doador de tecido corneano. Todavia, a maioria apresenta dificuldade quanto ao reconhecimento dos fatores de risco correlacionados ao sistema respiratório, desconhecendo as principais medidas de prevenção baseada em evidências, principalmente envolvendo o uso de filme transparente. A maior parte demonstrou dificuldades com relação à operacionalidade do Processo de Enfermagem, desconhecendo as taxonomias disponíveis e baixa frequência de prescrição dos cuidados oculares. **Conclusões:** embora reconheçam a importância dos cuidados oculares, é preciso a introdução de protocolos e capacitação dos enfermeiros para operar tais protocolos devendo também, promover mudanças quanto a cultura do cuidado sistematizado por sua vez moldado pelo Processo de Enfermagem.
Descritores: Lesões da Córnea; Assistência de Enfermagem; Unidade de Terapia Intensiva.

ABSTRACT

Objective: To assess the knowledge of direct assistance nurses regarding the prevention of corneal injuries in an intensive care unit. **Method:** cross-sectional study with the application of a questionnaire developed by the authors to clinical nurses, working in an adult intensive care unit, in a large hospital. Convenience sampling technique was carried out, with a minimum sample number of 75 participants. **Results:** The research included 83 nurses who had worked in intensive care from one to four years. The majority of participants had specializations, in most cases in intensive care and emergency. Most nurses recognize the importance of eye care, including the care provided for the person who donated the corneal tissue. Nonetheless, most nurses have trouble recognizing risk factors associated with the respiratory system and do not know the main evidence-based preventive measures, especially those that involve the use of transparent polyurethane patches. Most of them also had trouble putting the nursing process into practice, lacking knowledge about the taxonomy and the frequency in which eye care should be prescribed and implemented. **Conclusions**: Even though nurses recognize the importance of eye care, protocols must be introduced, and nurses must be trained to adequately operate such protocols. Changes should also be implemented into the culture of systematized care, as shaped by the nursing process.
Descriptors: Corneal Injuries; Nursing Care; Intensive Care Units.

RESUMEN

Objetivo: Determinar el conocimiento de enfermeros sobre la prevención de lesiones corneales en una unidad de cuidados intensivos. **Metodo:** estudio transversal con la aplicación de un cuestionario desarrollado por los autores a enfermeros clínicos, que actúan en una unidad de cuidados intensivos para adultos, en un hospital de gran tamaño. Se realizó la técnica de muestreo por conveniencia, con un número mínimo de muestra de 75 participantes. **Resultados:** 83 enfermeros participaron de la investigación. Todos trabajaban con cuidados intensivos hacía de 1 a 4 años, y un gran porcentual de ellos eran especialistas, en la mayoría de los casos en cuidados intensivos y urgencias. La mayoría reconoció la importancia de cuidados oculares, incluso con los donantes de tejido corneal. Sin embargo, la mayoría presentó dificultades para reconocer los factores de riesgo asociados al sistema respiratorio, y no conocía las principales medidas de prevención basada en evidencia, especialmente aquellas que envuelven el uso de una película transparente de poliuretano. La mayoría tuvo también dificultades con el Proceso de Enfermería, no conociendo las taxonomías disponibles y raras veces prescribiendo e implementando cuidados oculares. **Conclusiones:** Aunque enfermeros reconozcan la importancia de los cuidados oculares, es necesario introducir protocolos y capacitación para que enfermeros sean capaces de practicarles. También es necesario promover cambios en la cultura del cuidado sistematizado, que, a su vez, debe ser orientado por el Proceso de Enfermería.
Descriptores: Lesiones de la Cornea; Atención de Enfermería; Unidades de Cuidados Intensivos.

ORIGINAL

Introduction

Patients admitted to intensive care units (ICU) have natural eye protection mechanisms impaired due to sedation, coma, mechanical ventilation, fluid imbalance and medication. The lack of this protection leads to the risk of injury to the ocular surface, the prevalence of which can reach up to 60% between the 2nd and 7th day of hospitalization.[1,2]

These are inflammatory or infectious lesions in the corneal tissue that can reach superficial or deep layers.[2] The lesions can be irreversible, causing severe impairment of visual perception, including blindness[(3)] This is recurrent in the sedated or comatose patient who is susceptible to incomplete eyelid closure, known as lagophthalmos. This condition can lead to lower tear quality and produce dryness of the surface mucosa and all corneal epithelial tissues.[4]

An estimated 75% of ICU patients have lagophthalmos, and of those, 70% develop keratitis because of corneal exposure, which can lead to secondary complications including microbial keratitis, scarring, and corneal perforation. Damage like this can form scar tissue or corneal opacity, which reduces the amount of light entering the eye and alters its refractive power, leading to visual loss.[3,5]

To reduce the incidence and prevalence of ocular surface changes, different measures have been instituted, which include the application of lubricating eye drops, ointments and polyethylene covering, the latter being replaced by transparent polyurethane film with ethylene polymers, since, in Brazil, polyethylene film is not approved as a health product.[4]

Nursing plays an important role in the prevention of eye injuries, acting from the recognition of complications involving the ocular surface to the promotion of eye care. However, it is common for this care to be relegated to the background in ICU protocols, since care is directed mainly to vital organs, such as the respiratory, cardiovascular and nervous systems, especially in the first days of hospitalization, a fact that may result from multiple factors, which include little knowledge of the nurse and the multidisciplinary team about anatomy and physiology, or lack of knowledge of the appropriate form of ocular evaluation and the care to be implemented. Another important point is the lack of consensus on eye care protocols for these patients.[1,4,6]

Data from the literature[7] indicate that the knowledge demonstrated by nurses is insufficient about corneal injuries, negatively impacting the operationalization of the Nursing Process (NP). In intensive care, the NP stands out for promoting risk reduction, since it operates using protocols as a tool to improve processes through care.[8]

It is important that the nursing team has knowledge about the prevention, recognition and management of ocular surface diseases in ICU patients. Likewise, it is necessary that actions be guided by the NP with the use of protocols, when available. Thus, it is also vitally important to deepen the knowledge about the factors that can influence the quality of nursing care for the prevention of eye injuries and that those involved in the process are aware of these factors. Therefore, this study consisted of identifying the knowledge of clinical nurses regarding the prevention of corneal injuries in the intensive care unit.

Method

This is a cross-sectional study guided by the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) tool. It was carried out in adult intensive care units in a large hospital, located in Bahia, developed between July and September 2023.

The sample was by convenience, all nurses allocated to adult ICUs, present on the dates of data collection, were invited to participate in the research, with inclusion criteria: working with direct care to the patient, and time of experience in intensive care equal to or greater than three months. Professionals who were on leave of any kind and/or vacation during the period included for data collection were excluded.

To obtain a representative sample, the minimum limit for collection was 75 participants, with a margin of error of 5% and a confidence level of 95% in a homogeneous population.

Of the total of 107 clinical nurses allocated to the adult intensive care units, all those present on the date and time of data collection were invited to this study, totaling 86, of whom 83 agreed to participate in the research. There was refusal in 3.48%.

For data collection, a questionnaire was developed by the authors due to the lack of an instrument on the variables of interest in this study. It is a self-administered instrument containing 18 questions, using the Likert scale, which measured the degree of importance and frequency of the variables investigated. The questionnaire was created in accordance with the diagnosis Risk of Corneal Injury, present in the Taxonomy of Nursing Diagnosis of the North American Nursing Diagnosis Association – NANDA International.[9]

The questionnaire used is divided into two parts: the first part, which sought to characterize the sample in terms of the socio-professional profile, which includes age, gender, length of service as a nurse, length of service as an intensivist, length of service in the institution, professional occupation and specializations. And the second part that evaluated the knowledge about corneal injuries and risk factors associated with intensive care, degree of importance of eye care, knowledge and mastery of nursing diagnoses related to the risk of ocular surface injuries and nursing care applicable to prevention, degree of importance of eye care applicable to the potential corneal donor, difficulties and barriers faced in the operationalization of the NP as a strategy for the prevention of corneal lesions, frequency of care prescription.

The data were organized in a database in the Microsoft Office Excel 2016 program, containing the information of each participant according to the variables studied, and submitted to descriptive analysis using the statistical package R, version 3.3.1.

The research participants were presented with the research proposal, the objectives, benefits and risks contained therein. After agreeing to participate in the research, the professionals signed the Informed Consent Form (ICF). Anonymity was guaranteed regarding the identity of the participants, as well as the use of the information only for scientific purposes.

This research is registered under favorable opinion through the CAAE number: 69679723.6.0000.5028 through the Research Ethics Committee of the Roberto Santos General Hospital, in the city of Salvador, Bahia.

Results

The study included 83 nurses, aged between 25 and 56 years (mean 39.36 years; SD ± 7.22), 64 (77.11%) female.

Regarding the length of experience, 36 (31.33%) reported time of experience as a nurse between 4 and 8 years, 33 (39.76%) time of experience as an intensivist between 1 and 4 years, and 41 (49.40%) time of experience in the field of study between 1 and 4 years. Most of them, 77 (92.77%), have specialization, 67 (79.26%), with a predominance in intensive care and emergency.

Table 1 presents the variables that represent the knowledge and degree of importance attributed by nurses about corneal lesions and eye care in the context of nursing care in the ICU. The participants reported knowing about corneal lesions (56; 67.4%) and understanding ocular exposure as a nursing problem (57; 68.6%). Likewise, they understand that ICU treatment increases the risk of corneal injury (72; 86.7%), considering eye care in the context of ICU nursing care as very important (68; 81.9%) and important (14; 16.8%). Regarding the evidence-based measures recommended for the prevention of corneal injury, the majority (39; 46.9%) stated that they were not aware of such measures, believing that it was necessary to institutionalize a protocol for standardizing eye care in the ICU (82; 98.8%).

Table 1- Knowledge and importance of corneal injury prevention, attributed by nurses. Salvador/BA, 2024.

Variables	n	(%)
Knowledge about corneal lesions		
Yes	56	67,4
No	25	30,1
No Response	2	2,4
Understanding ocular exposure as a nursing problem		
Yes	57	68,6
No	23	27,7
No Response	3	3,61
Understanding of ICU treatment increasing vulnerability to the risk of corneal injury		
Yes	72	86,7
No	11	13,2
Knowledge about the recommended evidence-based measures for the prevention of corneal injury in hospitalized patients		
Yes	34	40,9
No	39	46,9
No Response	10	12,0
Degree of importance attributed to eye care in the context of nursing care in the ICU		
Very Important	68	81,9
Important	14	16,8
Reasonably Important	1	1,2
Not very important	-	
Unimportant	-	

Judgment on the need to institutionalize a protocol for standardization of eye care in ICUs		
Yes	82	98,8
No Response	1	1,2
Total	83	100,0

The nurses were distributed according to their knowledge of the risk factors for corneal injury in the intensive care unit, among which, 71 (85.5%) stated that they understood the exposure of the eyeball as a risk factor, followed by 63 (75.9%) who recognized periorbital edema, 58 (69.9%) prolonged hospitalization, 48 (57.8%) pharmacological agent, with a lowered level of consciousness with a Glasgow scale lower than 6 points recognized by 43 (51.8%), blinking less than 5 times/minute for 38 (45.8%), mechanical ventilation for 37 (44.6%), intubation for 34 (41.0%), oxygen therapy for 23 (27.7%), and tracheostomy for 10 (12.0%), as shown in Figure 1.

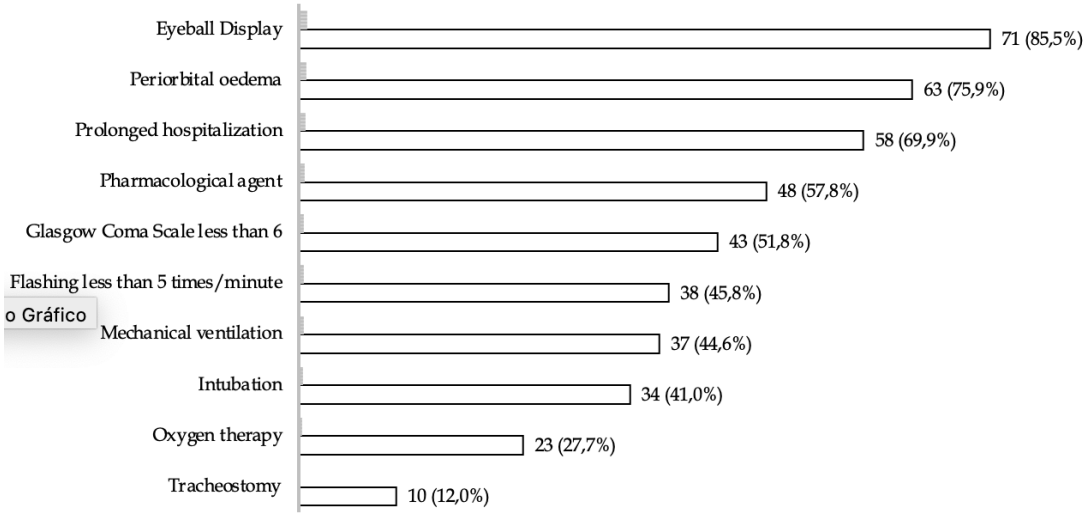

Figure 1. Risk factors for ocular surface injury, according to nurses. Salvador/BA, 2024.
*425 Replies.

Figure 2 shows the resources considered adequate for the implementation of eye care by nurses, 63 (75.9%) considered the use of hypromellose lubricating eye drops as a measure to prevent damage to the ocular surface, followed by 57 (68.7%) who considered 0.9% saline solution, 43 (51.8%) sterile simple gauze, 23 (27.7%) micropore tape, 6 (7.2%) plastic film (polyethylene), 3 (3.6%) transparent polyurethane film, 3 (3.6%) simple adhesive tape, and 3 (3.6%) reported considering or using other measures in their practice, and only 1 (1.2%) did not consider any resources.

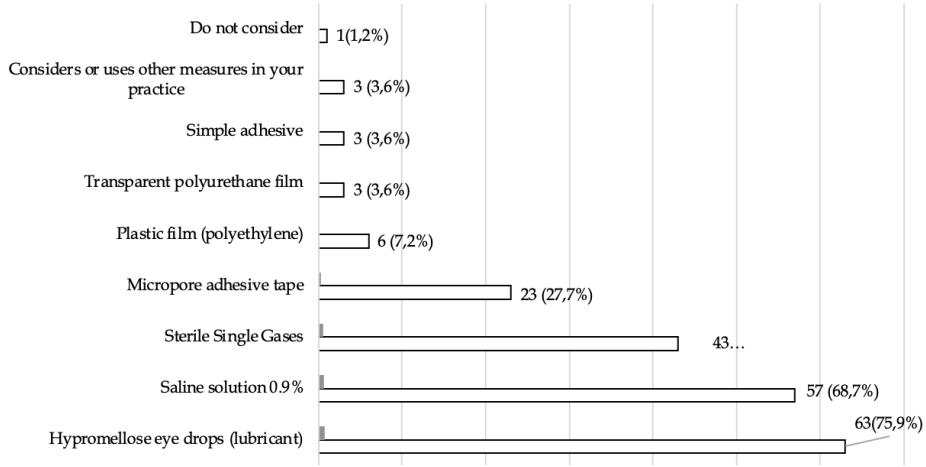

Figure 2. Resources understood as adequate for the prevention of damage to the ocular surface, according to the opinion of nurses. Salvador/BA, 2024.
*202 Replies.

Regarding the aspects involving the operability of the NP in the context of corneal injury prevention, as shown in Table 2, 43 (51.8%) of the nurses stated that they were unaware of the taxonomies pertinent to the description of the need for care to prevent damage to the ocular surface, approved by the North American Nursing Diagnosis Association – NANDA International,[9] 40 (48.2%) of the nurses who stated that they were aware of the taxonomies, 19 (47.5%) reported using nursing diagnoses occasionally and 9 (22.5%) frequently. Regarding the frequency of prescription of nursing care pertinent to the prevention of corneal injury, 31 (37.3%) of the interviewees reported that they never prescribe it, while 17 (20.5%) rarely prescribe it. When asked about the reasons why they do not prescribe nursing care pertinent to corneal injury prevention, 14 (40%) answers were indicated as the main reason not to consider it necessary or important, followed by 12 (34.3%) the printed materials or software used to manage the electronic medical record did not have the nursing diagnoses pertinent to corneal injury prevention.

Table 2 - Knowledge and importance of NP operability in the context of corneal injury prevention. Salvador/BA, 2024.

Variables		
Knowledge of taxonomies pertinent to the description of the need for care to prevent damage to the ocular surface, approved by NANDA International, Inc.		
	n	**%**
Yes	40	48,2
No	43	51,8
Total	83	100,0
Frequency with which nurses use the nursing diagnoses pertinent to the description of the need for care to prevent damage to the ocular surface, approved by NANDA International, Inc.		
	n	**%**
Never	1	2,5
Rarely	5	12,5
Occasionally	19	47,5
Frequently	9	22,5
Very often	6	15,0
Total	40	100,0

Frequency with which nursing care pertinent to the prevention of corneal injury is PRESCRIBED		
	n	**%**
Never	31	37,3
Rarely	17	20,5
Occasionally	20	24,1
Frequently	14	16,9
Very often	1	1,2
Total	83	100,0
Reasons why they do not prescribe nursing care pertinent to the prevention of corneal injury		
	n	**%**
Do not know the risk factors for corneal injury	6	17,1
The forms or software used to manage the electronic medical record do not have the nursing diagnoses pertinent to the prevention of corneal injury	12	34,3
I don't consider it necessary or important	14	40,0
The unit does not have an eye care protocol and/or resources	-	-
Other	3	8,6
Total	35*	100,0
Reasons why they do not IMPLEMENT nursing care for corneal injury prevention		
	n	**%**
Don't know when to implement eye care	3	12,5
Do not know the nursing care that can prevent corneal injury	3	12,5
Do not consider necessary or important	-	
The unit does not have an eye care protocol and/or resources	11	45,8
Other	7	29,2
Total	24*	100,0

* More than one nurse mentioned more than one reason .

Regarding the operability of the NP in the context of preventing corneal injury to potential donors, 80 (96.4%) nurses answered that they recognize the importance of applying eye care, 3 (3.6%) did not answer, and 29 (34.9%) indicated that they rarely prescribe, followed by 20 (24.1%) who frequently prescribe, 19 (22.9%) occasionally, 10 (12%) never and 4 (4.8%) very frequently. Only 1 (1.2%) did not answer.

Discussion

It was observed that most of the interviewees are women, young adults, corroborating other studies at the national level, which verify that women represent most nursing professionals.[10] Regarding education and time of experience in the ICU, most have specialized training for the care of critical patients with significant time of professional experience in intensive care.

Most nurses recognize the importance of eye care for the prevention of corneal lesions, with equal importance regarding the application of care to the potential corneal tissue donor, however, they present difficulties regarding the recognition of risk factors for corneal lesions that correlate with the respiratory system, such as tracheostomy (12%), oxygen therapy (27,75), intubation (41%) and mechanical ventilation (44.6%). These are intervening factors in ocular defense, while mechanical ventilation with positive pressure can lead to

conjunctival chemosis, due to the increase in venous pressure and fluid retention in the extracellular spaces, which hinders eyelid closure and leads to corneal exposure; The high flow of oxygen, in turn, through a mask, can lead to injury to the corneal epithelium, while tracheal aspiration through an orotracheal tube or tracheostomy can cause aerolization of respiratory tract pathogens in the corneal epithelium. Thus, patients using orotracheal tubes, mechanical ventilation, or tracheostomized patients have an estimated 117.11-fold risk of developing corneal injury.[5]

In addition, most are unaware of evidence-based prevention measures as they deem it necessary to institutionalize the protocol. Only 7.2% followed by 3.6% recognize the use of transparent film as an adequate resource to prevent damage to the ocular surface. This resource has been cited in the literature as a protective factor in cases of lagophthalmos, being scored as significantly more effective than other methods.[11,12]

Another important aspect concerns the use of saline solution, which 68.7% of the nurses rated as adequate. A study carried out with the objective of evaluating the effect of saline solution on the incidence of exposure keratopathy found that the use of saline solution as ophthalmological care in ICU patients can increase the incidence and severity of keratopathy and is not recommended.[1]

Regarding the operability of the care that should occur in a systematized way as guided by the NP, most of the interviewees do not know the taxonomies available to describe the diagnosis of risk for corneal injury, currently available by NANDA International,[9] compromising the other stages of the Process, thus, the frequency of both prescription and implementation varies mostly between never and rarely, Among the main reasons pointed out, not considering prescription necessary or important (40%), difficulties imposed by the unit itself, which does not have a printed form or software with a database that includes the pertinent diagnoses and care, according to 34.3% of the reasons listed by the nurses who reported never prescribing, as well as the lack of protocol and/or resources for implementing care, a ratio comprised in 45.8% among the reasons indicated to justify the non-implementation of care.

Similar results were described in a qualitative study[7] that demonstrated that most nurses did not prescribe corneal care, with the lack of care protocols, the lack of dissemination of this knowledge in the work environment, lack of knowledge of the nursing diagnosis, and the fact that it is not included in the standard forms used in the sector.

An important aspect in the prevention of eye injuries concerns the use of eye care protocols as a measure to be implemented in the ICU. A clinical trial13 carried out with patients admitted to the ICU submitted to a type of eye care protocol for five consecutive days, with eye hygiene, application of hypromellose eye drops and eyelid closure in the case of lagophthalmos, demonstrated that the use of eye care protocols as a method is capable of reducing the incidence of keratitis, conjunctivitis, dry eyes, and corneal ulcer.

In addition, it was observed that the frequencies of prescription and implementation increase when the patient is a potential corneal tissue donor, in which the frequencies vary from never and rarely, to rarely and frequently with a respective rate of 34.9% and 24.1% for prescription. This may be related to the existence of protocols for maintaining the potential donor in the context of multiple organ and tissue donation, which include corneal care, however, only

implemented after opening a Brain Death protocol, which may not have an impact considering that the potential donor sometimes has a prolonged hospitalization time and lesions involving the ocular surface can occur as early as 48 hours if the patient has risk factors.

Conclusion

It was observed that, although most nurses recognize the importance of eye care, it is necessary to introduce protocols and train nurses to operate such protocols and should also promote changes in the culture of systematized care, which in turn is shaped by the NP with a view to increasing the frequency of prescription and implementation of eye care for patients at risk of corneal injury.

Ackowledgment

This research was funded by the authors themselves.

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