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## CORNEAL INJUIRES IN INTENSIVE CARE PATIENTS: CONTRIBUTIONS TO THE SYSTEMATIZATION OF NURSING CARE AND PATIENT SAFETY

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### ABSTRACT

**Objective:** to reveal the knowledge of nurses regarding corneal injuries and preventive care and to analyze the Systematization of Nursing Care as a prevention strategy and safety measure for the patient in the Intensive Care Unit (ICU).

**Method:** descriptive and qualitative research, performed at an oncology and organ transplantation hospital, in the State of Belém do Pará, Brazil. Twelve nurses were interviewed using a semi-structured script.

**Results:** insufficient knowledge about corneal injuries was evidenced; the systematization of nursing care is not fully applied; the standardized form of the sector does not contemplate the diagnosis of dry eye risk; there are no eye care protocols, related to the implementation and execution of preventive care.

**Conclusion:** the incomplete and superficial knowledge of nurses regarding corneal injuries, associated with the difficulties in developing the nursing systematization, entails ethical and care problems, culminating in the failure to perform appropriate care for the prevention of corneal injuries, and compromising patient safety during intensive care.

**DESCRIPTORS:** Intensive therapy units. Corneal diseases. Nursing processes. Patient safety. Nursing care.

## LESÕES NA CÓRNEA EM USUÁRIOS SOB OS CUIDADOS INTENSIVOS: CONTRIBUIÇÕES À SISTEMATIZAÇÃO DA ASSISTÊNCIA DE ENFERMAGEM E SEGURANÇA DO PACIENTE

### RESUMO

**Objetivo:** desvelar os conhecimentos de enfermeiros sobre lesões na córnea e cuidados preventivos e analisar a Sistematização da Assistência de Enfermagem como estratégia de prevenção e medida de segurança ao paciente em Unidade de Terapia Intensiva.

**Método:** estudo descritivo com de abordagem qualitativa, realizada em hospital de oncologia e transplante de órgãos, em Belém do Pará, Brasil. Foram entrevistados 12 enfermeiros, com uso de roteiro semiestruturado.

**Resultados:** evidenciaram-se conhecimentos insuficientes sobre lesões na córnea; a Sistematização da Assistência de Enfermagem não é aplicada na sua plenitude; o impresso padronizado do setor não contempla o diagnóstico de risco de olho seco; não há protocolos de cuidados aos olhos, com impacto na prescrição e execução de cuidados preventivos.

**Conclusão:** o conhecimento incompleto e superficial dos enfermeiros sobre lesões na córnea, associado às dificuldades em desenvolver a sistematização de enfermagem, acarreta problema ético e assistencial, que culmina na realização de cuidados inadequados à prevenção de lesões na córnea, comprometendo a segurança do paciente na unidade de terapia intensiva.

**DESCRIPTORIOS:** Unidades de terapia intensiva. Doenças da córnea. Processos de enfermagem. Segurança do paciente. Cuidados de enfermagem.

# LESIONES EN LA CÓRNEA EN USUARIOS BAJO LOS CUIDADOS INTENSIVOS: CONTRIBUCIONES A LA SISTEMATIZACIÓN DE LA ASISTENCIA DE ENFERMERÍA Y SEGURIDAD DEL PACIENTE

## RESUMEN

**Objetivo:** desvelar los conocimientos de enfermeros sobre lesiones en la córnea y cuidados preventivos y analizar la Sistematización de la Asistencia de Enfermería como estrategia de prevención y medida de seguridad al paciente en Unidad de Terapia Intensiva .

**Método:** estudio descriptivo de abordaje cualitativo, realizada en hospital de oncología y trasplante de órganos, en Belém do Pará, Brasil. Se entrevistaron 12 enfermeros, con uso de guión semiestructurado.

**Resultados:** se evidenciaron conocimientos insuficientes sobre lesiones en la córnea; la sistematización de la asistencia de enfermería no se aplica en su plenitud; el impreso estandarizado del sector no contempla el diagnóstico de riesgo de ojo seco; no hay protocolos de atención a los ojos, con impacto en la prescripción y ejecución de cuidados preventivos.

**Conclusión:** el conocimiento incompleto y superficial de los enfermeros sobre lesiones en la córnea, asociado a las dificultades en desarrollar la sistematización de enfermería, acarrea problema ético y asistencial, culminando en no realización de cuidados apropiados a la prevención de lesiones en la córnea, comprometiendo la seguridad del paciente en la prevención unidad de terapia intensiva.

**DESCRIPTORES:** Unidades de terapia intensiva. Enfermedades de la córnea. Procesos de enfermería. Seguridad del paciente. Cuidados de enfermería.

## INTRODUCTION

The cornea is the clear transparent structure located in the anterior part of the eye that refracts light onto the lens which is essential for vision. It consists of five layers, the second layer is the stroma, the largest of all five layers and contributes to the mechanical resistance and stiffness of the cornea.<sup>1</sup>

The eyebrows, eyelids, conjunctiva and lacrimal apparatus provide physiological protection to the cornea. Deformities in any region of the corneal tissue can generate injuries and compromise visual acuity; such injuries can be inflammatory or infectious and occur due to multiple factors. Infectious diseases may be due to infections caused by fungi, bacteria, viruses or protozoa, as well as immunological mechanisms.<sup>2</sup> Corneal injuries can be identified by the loss of transparency, especially in the absence of adequate treatment, and are considered ophthalmic emergencies which can cause irreversible damage and loss of vision.<sup>3</sup>

In the Intensive Care Units (ICUs), the cornea exposure of patients submitted to intensive treatments - mainly due to the lowered consciousness levels and the use of drugs that suppress the central nervous system - is common, causing a decrease in the physiological functionality of the globe leaving the patient vulnerable to the onset of injuries, and is aggravated by inadequate eye care.<sup>4-5</sup>

Patients on mechanical ventilation are vulnerable to developing corneal edema related to the adverse effects of this therapy, which can lead to hemorrhage.<sup>4</sup> A prospective cohort study of 301 patients admitted to the ICU showed that the position of the eyelids, and duration of ventilation were strongly associated with the development of

keratopathy,<sup>6</sup> one other study performed in Iran, with 87 patients from four ICUs from two different hospitals, showed dry eyes and corneal abrasion on the fifth day of admission.<sup>7</sup>

A study carried out in the ICU of a public hospital in Brazil showed the incidence of corneal injuries and identified the risk factors in adult patients as, due to the clinical conditions and treatment to which they are submitted, the physiological mechanisms responsible for lubrication and eye protection were compromised.<sup>8</sup>

ICU nursing care requires a set of intensive care procedures related to the environment, equipment, infection control - in addition to proper cleaning and disinfection - this is because treatment in the ICU increases vulnerability to the risk of corneal abrasions and infectious keratitis due to increased exposure to pathogenic microorganisms.<sup>5,9-11</sup>

In addition to the above, direct patient care aimed at difficult eyelid closure, reduced blinking reflex, and most importantly the care of the corneas, in view of the ocular alterations which predispose patients to risks, especially when patients are sedated or in a medically induced coma.<sup>8,11</sup>

The National Patient Safety Program advocates reducing avoidable harm to patient health an acceptable minimum. Therefore, preventing corneal injury in ICU patients is expressed as a patient safety measure in these units. The association of health care actions that seek to protect patients from secondary grievance and contributes to the end of the treatment / hospitalization with physical, psychological and social well-being in accordance with their clinical conditions.<sup>12</sup> Thus, the health care actions are based on the promotion of a better quality of life, with the goal of improving the quality indicators of the

service.

Prioritizing the immediate care of the critical patient may result in professionals not paying attention to other indispensable care, such as eye care.<sup>8</sup> The Systematization of Nursing Care (SAE) promotes continuity of care and qualifies the actions of nurses, assisting them in decision-making for the execution of care.<sup>13</sup> In this sense, both the care related to monitoring and other equipment necessary for the maintenance of life, as well as those that promote comfort, well-being and those related to the physical evaluation of the patient, including the cornea, are important.

In 2014, a diagnosis related to corneal injury was proposed: dry eye risk, present in the NANDA taxonomy. Based on the diagnoses, the nurse can act more safely and accurately in proposing patient care - especially in the case of corneal evaluation, standardizing criteria in the evaluation - classifying the risks, monitoring the interventions to prevent and treat the injuries. However, there is a lack of scientific work on the subject.<sup>14</sup>

Another implication of neglecting care aimed at preventing corneal injury is preventing possible future transplants as these patients are generally potential organ donors; therefore, preventive care increases the chances of finding qualified donors.<sup>8</sup>

A study evidenced the lack of knowledge of research on the development of eye care for hospitalized patients in the ICU and its culture of its implementation by the nurse, either through care protocols or the use of nursing diagnoses. The scarcity of studies on this subject, and absence of factors that make it difficult to elaborate systematized nursing activities for eye care, hinder the standardized scientific advances.<sup>8</sup>

Therefore, studies that address the application of SAE for the prevention of corneal injuries in ICUs are relevant and advisable, especially when there is a specific nursing diagnosis to support nursing assessment and implementation. Generating knowledge contributes to the elaboration of actions aimed at improving and optimizing nursing care in the ICUs, as well as enhancing existing and future scientific knowledge.

Furthermore, the need to provide reflections, together with nurses, on the implications of corneal injuries during and after the patient's hospitalization is emphasized, both for the maintenance of the patient's integrity, comfort and well-being, and to ensure the preservation of the organ in case of death and subsequent donation.

The objectives of this research are: to reveal the knowledge of nurses regarding corneal injuries and preventive care and to analyze the Systematization of Nursing Care as a preventive strategy and ICU patient safety measure.

## METHOD

A descriptive study with a qualitative approach was chosen as the investigated object refers to the understanding of subjective processes apprehended through the experiences and meanings created by the professionals in their natural context.<sup>15-16</sup>

The study was developed in the ICU of a large public hospital, which serves as a referral hospital for oncology treatments, located in the city of Belém, in the state of Pará, Brazil, which offers medium and high complexity health care services, teaching, and research. The hospital has a team which is qualified and accredited by the Ministry of Health to harvest and perform kidney and corneal transplants. The only Eye Bank in the state of Pará is located in this hospital and this justifies the choice of location for this research.

The hospital has 281 beds which are divided among 20 specialties; 32 beds belong to the Intensive Care Unit (ICU), which includes three ICUs - one surgical (ICUs I) and two medical (ICUs II and III), each have ten intensive care beds and two isolation beds. However, at the time of this research, the ICU II was deactivated. Therefore, each shift has three nurses, two of whom work in the medical ICU and one in the surgical ICU. The ICU has a total of 15 nurses, 14 nurses and one manager; one member of the team is part of the research project that gave rise to this article. Therefore, the sample consisted of 14 nurses.

The inclusion criteria were: nurses of both sexes, ICU team member with assistance or management positions, with any length of professional experience, from all shifts: morning, afternoon or night. Exclusion criteria were: absent nurses due to leave of any nature or vacation and those with health problems that made verbal communication impossible.

All nurses who met the inclusion criteria were personally invited to participate. The project, with the respective ethical care standards, was presented to the 14 nurses of the team who met the inclusion criteria. The sample was composed of 12 nurses as two claimed to be unavailable due to an exhausting workload. Therefore, exhaustive sampling was used in this research, as all the eligible participants were approached and integrated into the research.<sup>16</sup>

An interview with a semi-structured script was used as the data collection technique, the script contained questions about the age, sex and length of professional experience of the participants in the institution. The interview also contained open questions about the anatomico-physiological knowledge of the cornea, types of injuries and risk factors for these conditions, implementation and application of SAE in the ICU and the care protocols and preventive care for corneal injuries. The interviews were performed between August and September 2015, in places previously established with the participants of the study. The interviews were recorded, and were between seven and 24 minutes in duration. After being transcribed, the interviews were identified by alphanumeric codes with the letter E followed by an ordinal number, according to the sequence of interviews.

Thematic content analysis was performed, with the selection of the occurring and recurring themes identified in the records units extracted from the statements, using the criteria of exhaustivity, homogeneity, exclusivity, objectivity and pertinence which allowed the validation of the internal quality of the collected material.<sup>17-18</sup> Three thematic categories emerged for the description and discussion of the results: Nurses' knowledge of corneal injuries; eye care and the systematization of nursing care in an intensive care unit; and care protocol for the standardization of eye care in an intensive care unit.

The project was approved by the Research Ethics Committee of the Undergraduate Nursing Course of the State University of Pará, according to Opinion No. 1,188,683. All participants signed the Informed Consent Form.

## RESULTS

### Participant profile

Eight of the 12 nurses were female and four were male, and ranged between 26 to 50 years of age. The length of professional experience in the institution coincides with the ICU capacity with the majority being experienced in intensive care, according to the following distribution: three with two months of experience, one with two years, two with four years, three with five years, two with ten years and one with 20 years. Considering the sample of this study, there was no significant difference in the responses between nurses with less professional experience in the ICU and the others who had worked there for longer periods, which justified a cut in this variable.

### Nurses' knowledge of corneal injuries

This category emerged from the questions that explored the anatomico-physiological understanding for the development of corneal injuries. The knowledge was related to the injuries themselves, and the structures of the eye or cornea are mentioned generically, without mentioning its components, alluding to some anatomical parts that make up the eye and the tissues of its surroundings, such as the mucosa, pupil, eyelid, and the cornea itself, without specifically mentioning its layers.

The mention of such parts was accompanied by mentioning the protective function of the eyelid and the mucosa and the attention that must be paid to the dilation of the pupil. In this category, the nurses' knowledge on corneal injury and its different types of presentation is described, as well as the risk factors inherent to intensive care therapy which lead to the development of these conditions.

The nurses reported that the corneal injury is an open, infiltrative wound, which causes some impairment to the visual acuity of the hospitalized ICU patient. Regarding the types of injuries, the nurses did not express distinctions between corneal injuries, the classifications of these injuries or their stages of evolution, nor did they describe the characteristics that distinguish them from other types of injuries.

*It would be those infiltrative injuries only [...] I will be very honest, I do not have much experience with this type of injury, I can associate injury with sclera edema, dryness, I think it's more or less that, I can't tell you for sure (e2).*

*Injury to the cornea is, precisely, something that affects the cornea (e3).*

*Injury to the cornea is nothing more than an eye injury caused by contact, bacteria, you handle it, clean... it can also cause some bacteria in that eye (e8).*

*An open wound on the cornea (e11).*

Nine of the 12 professionals mentioned the critical environment of the ICU and the pathological conditions of the patients in this unit as risk factors for the appearance of corneal injuries, without specifying the implication of the invasive practices that can lead to the development of these conditions.

*The patient's prolonged stay in the ICU, their pathology, depending on the pathology they have, these injuries can develop [...] the environment is quite critical, prone to infection in general (e1).*

*The air conditioning [...] Just the fact that the patient needs to go to the ICU, everything contributes.*

*Because it means that he is a patient who is not well, who requires care and that he is immunologically depressed on some level, and low immunity can predispose you to anything (e6).*

Predominant associations between corneal injury and corneal tissue infection were evident in the participant's reports, acquired due the patient's prolonged stay in the ICU, causing an infection due to some infectious agent and how the injury occurred.

### **Eye care and the systematization of nursing care in an intensive care unit**

This category emerged from questioning the importance of the SAE in the ICU and the difficulty in its application. It describes how implementation in the nursing process occurs and the existence of eye care. All nurses reported adopting SAE. Eight of them emphasized that SAE is an important work tool in the ICU, and helps the organization of care.

*Yes, we evaluate our patient in advance, and then, according to our evaluation, we elaborate a care plan for our patient [...], so we have an instrument to make this kind of evaluation (e2).*

*Yes, we use it, we have a form to establish the diagnoses within the profile of the intensive treatment, within the profile of the patients from the hospital, we establish the care plan and we establish a deadline for the schedules so that the technical team does the checks according to the diagnosis that we establish and the care we prescribe (e5).*

The problems in the application of SAE occurred partially or incompletely in the ICU under study, not all Nursing Process stages were not performed, specifically the first phase:

*[...] we perform the SAE partially, our service loses because we don't perform the first step, or we don't do it completely; for example, the patient arrives from the Surgical Center, comes from the street, comes from the other ward and we do not have the opportunity to take a detailed history (e9).*

When questioned about the inclusion of corneal care in ICU patient care during the implementation phase, ten nurses reported not performing it, pointing out several factors, mainly: the lack of care protocols that recommend this care in the ICU; the lack of research on the subject; the lack of dissemination of this knowledge in the workplace; and because it is not included in the standardized SAE form used in the sector.

*Why don't we include cornea care here? Good ques-*

*tion, I do not know to answer. I think it's due to the lack of a protocol, due to the lack of research, this SAE form is already quite old, it hasn't been updated, and so that's why we do not include it and why it doesn't exist yet (e1).*

*This subject about the eyes is not included, you will not see, you can look here, I will not lie ... we do not include it. No one includes it here (e3).*

Regarding this, all nurses reported that the greatest difficulty in the implementation of the nursing process was the inclusion of eye care in the SAE due to the lack of knowledge and subsequently the nursing diagnosis related to corneal injuries. Therefore, there are difficulties in the implementation of the nursing care related to directing and organizing individualized care regarding eye care, in particular the prevention of corneal injuries.

*Our standard form covers the nursing diagnosis, but it has no diagnosis concerning the corneas ..." how will I implement care without a diagnosis? (e10).*

### **Care Protocol for the standardization of eye care in an intensive care unit**

This category describes the implications of protocols for eye care in ICUs and its relationship with the absence of standardization nursing care. However, the statements show the inexistence of these protocols in the ICU service under study.

*Honestly, I did not see any protocol, I'm telling you about this hospital, unfortunately. We like to follow protocols [...], but here we do not follow [...] if they want a care protocol for cornea care in the morning, afternoon and night, they will not find one (e3).*

*There is no standard operating protocol, I do not know if there is any (e5).*

The data clearly shows that there is no care focused on the patient eye care, and that this organ is not seen as a priority in nursing care in the ICU, to the detriment of other organs and technical equipment.

*[...] it's not very likely that you pay attention to the eyes, you're more careful with a tracheal tube, than with the patient's eye, you are more careful about things that you handle a lot. We don't usually look at the patient's eyes, we take care of the other things; for example, the urinary catheter, which is a visible thing that can come out, we take care of the aspirations, the mouth, the intracath that is in that region, things that we are used to handling (e3).*

*[...] when there is no protocol that can somehow give special attention, it ends up really being in the background (e5).*

*There is no standardization, these would be care protocols aimed at this direction; No, no, there really isn't any. We identify the problem, the risks and we implement the care, it varies a lot from professional to professional, the evaluation is subjective, and it's very personal. It is up to the professional to define the way of proceeding since there is no protocol, acting to minimize these problems (e9).*

These results show how important it is to implement the SAE and care protocols in the ICU for the purpose of quality of care, especially regarding eye care and the prevention of related risks to the eyes.

## DISCUSSION

The results showed that the corneas are symbolically invisible in the eyes of the professionals and, because they do not arouse their attention, they go unnoticed during the clinical assessment and do not receive the required care necessary to maintain their integrity and functionality.

Corneal injury can extend to the superficial or deep layers, classified as: traumatic, superficial, infectious, degenerative, keratoconus and miscellaneous. Each type has a characteristic representative of the degree of injury of the corneal tissue, which, moreover, presents itself differently and with different levels of aggravation of visual acuity, with these being the determinants factors for treatment.<sup>8</sup>

Thus, the nurse's lack of knowledge regarding the structure of the cornea, its layers and functions, and what exactly is an injury in this organ and its types, compromises care. Nevertheless, care to the structures that physiologically protect the eye and the cornea, mucosa and eyelid, were mentioned, but in order for the nurse to implement and perform preventive care it is necessary to have a deeper knowledge as their lack of knowledge makes the nursing diagnosis impossible and, consequently adequate intervention.

Perhaps because of this, nurses do not realize that the relevance of eye care in the ICU is beyond the existence of protocols, but rather, it is inherent to the patients' condition because they are in intensive care. However, to diagnose and implement care, it is necessary to have anatomo-physiological, pathological, technical and clinical knowledge. Such knowledge, especially anatomy and physiology knowledge of vision, greatly contributes to patient care quality and safety, especially those undergoing intensive therapy and who are vulnerable to injuries that may compromise the function of this

important organ.

Systematic literature reviews emphasize that ocular exposure may occur in hospitalized ICU patients, from 48 hours to one week of hospitalization.<sup>13</sup> Corneal exposure of patients being submitted to intensive therapy was also a common occurrence. It is known that up to 60% of patients admitted to ICUs who received sedation for more than 48 hours developed corneal abrasion.<sup>4</sup> In addition, corneal injuries in the ICU are related to several factors, ranging from the involvement of preventative actions to the use of certain drugs.<sup>19</sup>

Some types of nursing care provided to ICU patients can protect the patient from corneal injuries by means of simple measures, such as: eye hygiene, prevention of eye dryness and eye closure. A review study recommends preserving the integrity of the protective layers, regular examinations and patient evaluation- both by physicians and the nursing staff - and to consider the standard of care in the ICU, so that the eyes are not neglected in the treatment of the intensive care patient.<sup>5</sup> In this research, it is argued that the most efficient way of providing this specific care and valuing the integrity of the patient is when the SAE is developed and included in the ICU.<sup>13</sup>

The implementation of the systematization of nursing care in the ICU implies the organization of nursing actions, through the application of its inter-related phases<sup>13</sup> and the execution of care activities supported by specialized knowledge related to this sector.<sup>20</sup> Thus, as it is an activity based on theories, the SAE supports the decision-making of the nurse based on clinical reasoning, focusing on the results, aimed at improving patient recovery.<sup>21</sup>

It was evidenced that failure to perform the SAE, especially the first phase of the nursing process, directly jeopardizes its success in the ICU as it causes issues in the assessment phase. An accurate physical examination allows the nurse to give the nursing diagnosis - in this case, identify the risks for corneal injury -, and, consequently, to implement nursing care aiming at preventive care.

In this context, the standardized forms, prepared together with the team members involved and updated according to the team's requirements, unit, patient profile and institution<sup>22</sup> for the application of SAE in the ICU can be an important ally.

The inexistence of care protocols for cornea care in the sector was evidenced in this research, affecting specific procedures and care to these organs, a fact that can directly harm the health of the eyes and the patient in general, as well as safeguarding the organ in case of potential donation.

The results show that the nursing implementation is not done due to the absence of a pre-conceived diagnosis in the protocol of the sector, revealing the necessity to advance the permanent education of the professionals regarding the SAE.

The lack of knowledge and qualification of the professionals in the implementation of nursing care has been evidenced in studies carried out in Brazil,<sup>13,21,23-24</sup> serving as a warning to training institutions, directorates and the managers of the care institutions.

The reason for not implementing care due to the absence of a pre-conceived diagnosis is worrying, since both diagnoses and implementation come from clinical situations detected at the moment of the physical assessment; therefore, the daily evaluation of the patient will determine and reorient the daily care and also indicate the need for changes in the forms in the sector. If there are no determined diagnoses in the standardized forms applied at the research institution, it is the nurses responsibility to analyze the pertinence of these forms and update them in order to meet the care needs of ICU patients.

The implementation of SAE requires nurses to periodically evaluate the patients under their care, since only by doing so can the implementation of nursing care be defined in accordance with the need of the ICU patient. From this it can be deduced that the SAE assists nursing care, but it is the professional who sustains it, with the daily assessment of the patient, by means of nursing diagnoses that will guide the implementation of care.

Furthermore, the many advantages of SAE implantation are considered, both for patients and for professionals and institutions. However, there are many challenges still to be overcome which relate to the knowledge of nurses, the reduced number of professionals and the consequent work overload, as well as other internal aspects of the institutions that impede nurses in their implementation of care.<sup>23-25</sup>

Review studies show that there is still no consensus as to the best care practices for the prevention of corneal injuries in intensive care patients. In recent years, several treatments have emerged, but the evaluation of their efficacy is limited by heterogeneous results and a low number of comparative studies.<sup>8,26-27</sup> A study with 87 patients in four ICUs from two hospitals in Iran used masking tape and found that patients who received adhesive tape as an eye care method were twice as likely to develop corneal abrasion.<sup>6</sup>

Another study in Iran conducted with 96 ICU patients showed that the use of polyethylene cover

is significantly more effective in preventing keratopathy than the other two methods used, recommending it as a non-pharmacological nursing care method to prevent corneal abrasion.<sup>28</sup> A Brazilian review study also recommends the placement of a head device, with controlled humidity made from polyethylene that aims to prevent eye dryness and corneal injuries.<sup>26</sup>

This same review study also recommends the elaboration of a NANDA-I nursing diagnosis, corneal injury risk, so that there is more precision in nursing evaluation and interventions, given the scope of the definition of the concept of "dry eye" as a diagnosis, which leads to imprecise treatment.<sup>26,29</sup>

Nevertheless, the nursing diagnosis and the preventive care of already widespread injuries provide patient safety and qualify nursing care in intensive care. However, as evidenced in the results, this is a great challenge for nursing professionals - since they are unaware of the nursing diagnosis for corneal injury, nor are they aware of specific aspects of this type of injury - detection of risk factors that predispose injuries related to the clinical condition and treatment of patients,<sup>14</sup> as well as to the implementation of preventive care.

The need for investments in order to qualify care in the ICU with regard to the prevention of corneal injury is not restricted to Brazil. A study carried out with 111 nurses in nine types of ICUs in two university hospitals in Turkey and Palestine showed that eye hygiene with normal saline is the most used by Palestinian nurses and gauze soaked in normal saline or sterile water, by Turkish nurses. Although it was shown that such nurses take preventive precautions for ocular complications in critically ill patients, the study showed gaps and insufficiencies in the ophthalmological care of patients, and recommended continued training.<sup>30</sup>

When knowledge is updated, improvements in patient care are evident, as shown in the results of a quasi-experimental study with 35 critical-care nurses from a hospital in Northern Palestine. These nurses presented deficits in knowledge and practices regarding eye care, and improved their care considerably after educational intervention and the use of protocols. This intervention resulted in a decrease in the percentage of eye health complications in the unit, which led to the recommendation of creating an updated protocol for the eye care assessment through continuing education with the intention of providing sufficient knowledge and safe care practices.<sup>31</sup>

Similarly, a study conducted with nursing

teams caring for critical patients in a hospital in Saudi Arabia, whose objective was to compare old and new practices of eye care in order to reduce complications in patients on mechanical ventilation, showed that when eye care is done according to protocols, the risk of corneal complications in this type of patient can be reduced.<sup>31</sup>

Studies carried out in Brazil and throughout the world highlight that corneal injury prevention care is fundamental in order to maintain the patient integrity in the ICU, and in order for that to be a reality, the nursing knowledge on the subject needs to be deepened, both with regard to the clinical specificity regarding the necessary nursing diagnosis and implementation. Therefore, the SAE and the care protocols are shown as important allies of the nursing profession.

## CONCLUSION

The nurses' knowledge regarding corneal injuries was incomplete and superficial, by only associating the presence or absence of eye infections and/or some localized open injury, and did not consider the main risk factors for the development of these injuries, nor the potential risks inherent in invasive procedures specific to intensive care.

The nurses' difficulties in developing SAE were evident both in the failure of adequately performing the first phase of the nursing process and in the existence of forms that did not include the nursing diagnosis related to the risk of corneal injury and care for organ protection and injury prevention, coupled with restricted knowledge about corneal injuries and their implications to the patients and consequently not fully addressing the patient's care needs.

Corneal injury is a secondary grievance to care arising from ICU admission, and the absence of mentioning preventive care compromises the patient's safety, thus evidencing an ethical-assistance issue.

The inclusion of a diagnoses for dry eye risk in the SAE forms of this ICU is necessary and advisable, as the results reaffirm the need for greater attention by the nurse regarding the inclusion of patient eye care to, made possible through care protocols aimed at this purpose.

It is essential that the intensive care nurse provide eye care, incorporating it into their activities in order to be an example to the technical staff and other professional categories in the ICU. Discussions about these practices and their clinical implications

in continuing education activities for ICU professionals is recommended, as well as establishing a partnership with the Eye Bank and its professionals in order to disseminate knowledge about practical corneal care of potential donors.

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