ISSN: 1676-4285

OBJN Online Brazilian Journal of Nursing
ENGLISH
Federal Fluminense University
AURORA DE AFONSO COSTA NURSING SCHOOL
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Original Articles

Profile of critical patients with risk of dry eye: a cross-sectional study

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ABSTRACT

Aim: characterize the sociodemographic and clinical profile of patients with the diagnosis of dry eye risk nursing in intensive care unit. **Methods:** this is a cross-sectional study carried out at the intensive care unit of a university hospital located in the northeastern region of Brazil between January and July 2016. **Results**: it was observed that 51% of the patients were male, the mean age was 59.5 years, and 65.6% had a partner. Regarding the reasons for hospitalization, 53.1% were in the postoperative period and 46.9% were clinical patients; 49% were on invasive mechanical ventilation. **Conclusion:** to know the characteristics of patients with the diagnosis of dry-eye risk nursing in an intensive care unit becomes important in order to direct care for the prevention and early detection of the problem in order to reduce ocular complications.

Descriptors: Dry Eye Syndromes; Intensive Care Units; Nursing diagnosis; Nursing.

INTRODUCTION

The World Health Organization launched the plan called Universal Eye Health: a Global Plan of Action for 2014-2019 aimed at reducing preventable visual impairment by 25% by 2019, since, globally, 80% of all impairment can be prevented or cured[1].

It should be noted, among the pathologies involving ocular health in this study, dry eye syndrome, also known as dry keratoconjunctivitis multifactorial origin which surrounds the ocular surface and tear film. It is evidenced by inflammation of the ocular surface and increased osmolarity of the tear film, with the potential to generate damages that limit the activities of daily living and impairment of quality of life[2-3].

Patients hospitalized in an intensive care unit (ICU) are at high risk for the development of ocular alterations due to the serious situation and because they require ventilatory assistance, sedation, use of several medications, among other life-sustaining technologies, being more likely to lose the natural mechanisms of eye protection. In addition, environmental factors such as low temperature and humidity are characteristics present in these units and can influence the occurrence of dry eye[3-4]. A cohort study found that the overall incidence of dry eye in intensive care patients was 53%[3].

Previous studies have shown that the epidemiological profile of ICU patients is characterized by males and age between 61 and 70 years; and the presence of air conditioning is a feature of most hospitalizations[5-6]. In this sense, the nursing team, when inserted in this environment, becomes responsible for the identification of risk factors and the adoption of preventive measures for the accomplishment of ocular care with the purpose of avoiding later irreversible complications, such as blindness.

The diagnosis of dry-eye risk nursing is found in Domain 11 and Class 2 of NANDA International with the definition: "vulnerability to ocular discomfort or damage to the cornea and conjunctiva due to reduced amount or quality of tears to hydrate the eye, which can compromise health". It presents the following risk factors: ocular surface damage, vitamin A deficiency, autoimmune disease, aging, environmental factors, female sex, history of allergy, neurological lesions, hormonal change, lifestyle, treatment regimen, use of contact lenses, and mechanical ventilation[7].

Therefore, this study is justified by the need to know the sociodemographic and clinical profile of patients with risk of dry eye admitted to the ICU. Thus, it will be possible to infer with greater efficiency the referred nursing diagnosis and to strategize quickly and effectively for the prevention of the phenomenon.

In addition, there is a priority that should be given to patient safety, as explicitly stated in Administrative Rule No. 529, of April 1, 2013, with the objective of contributing to the qualification of care in all health facilities in the national territory for the reduction to a minimum of unnecessary harm related to health care[8].

In this sense, this study aims to characterize the sociodemographic and clinical profile of patients hospitalized in an ICU with the diagnosis of dry eye risk nursing.

METHOD

This is a cross-sectional, quantitative study, carried out in a university hospital located in northeastern Brazil. The design was

based on the use of the initiative Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

The population was comprised of patients admitted to the ICU's adult hospital setting study scenario. It should be noted that this research is part of a larger study, carried out on the same subject, with a population of 925 patients, of which a sample of 206 patients was obtained by means of a calculation of finite populations. From the latter group, the patients with the diagnosis of dry-eye risk nursing were identified for the sample composition of the present study, which totaled 98. These patients were consecutively selected and assigned to the study when they were hospitalized in the ICU for more than 24 hours, and when they met the eligibility criteria, and signed the informed consent form.

The inclusion criteria were to be hospitalized in the ICU of the hospital scenario of the study and to be 18 years or older. Patients who were on topical ocular medication and patients with agitation or in life-threatening emergencies during data collection were excluded.

In order to reduce the calibration bias, training was conducted prior to the eight-hour data collection period to train the team responsible for the collection and clinical evaluation of the patients. The training addressed from the anatomy and physiology of the eye to the way the Schirmer test was applied. The team consisted of nurses and nursing students, who performed theoretical and practical evaluations. Participants who obtained averages above seven were considered eligible to attend class.

The original Schirmer test (Schirmer I) allows the measurement of total lacrimal secretion. It is made through standard millimeter filter paper strips. The tape is placed on the lower eyelid between the middle and outer thirds, and after five minutes with the patient's eye closed, the reading is performed, in which the amount in millimeters of wetness of the paper is measured. The values considered normal are above 10 millimeters[9,10].

Doubles were formed for the collection and evaluation of patients; thus, there was assurance regarding ocular evaluation and confirmation of the millimeters after the application of the Schirmer test. Data were collected between January and July 2016.

The instrument used to perform data collection was a form with variables related to socio-demographic characterization data, general and specific clinical data (neurological, ventilatory, and hemodynamic support, medications in use, and environmental factors) and risk factors for the diagnosis of nursing risk of dry eye, according to NANDA International.

For the diagnostic inference, two nurses diagnosed with masters and doctoral degrees participated. The main characteristics of a diagnostician were considered, including clinical and scientific knowledge, clinical experience and cognitive development, respectively, with experiences in the ICU and in the use of the Nursing Process. The cases of discordance were solved by consensus.

To participate in the study, nurses should have research on diagnosis, results and nursing interventions, directly involving the subject related to dry eye/ocular dryness, have a specialization/residency in ICU or teaching or clinical experience of at least six months in ICU. The data collected were organized into a database from the Statistical Package for Social Science program version 22.0 for testing.

To guarantee reliability in the data transcription, these were tabulated with double entry for further analysis. For the descriptive analysis the frequencies, measures of the dis-

tribution center and their variabilities were considered. To verify the normality of the data, the Shapiro-Wilk test was used.

The study complied with the formal requirements contained in the national and international norms regulating research involving human beings of Resolution 466/2012 of the National Health Council (CNS)[11] and obtained a favorable opinion from the Research Ethics Committee of the Federal University of Rio Grande do Norte under number 918.510 and CAAE 36079814.6.0000.5537.

RESULTS

Regarding the sociodemographic profile, 51.0% of the patients admitted to the ICU were male, 65.6% had a partner, 60.8% were residents of the interior of the state, and 39.4% had the level of education related to incomplete primary education. In addition, 40.9% were retired and 88.2% declared themselves religious practitioners. The family income was 1,760.00 Reais (median) and three was the number of dependents (median). The mean age was 59.5 (± 14.6) years.

Table 1. Clinical characterization of the type of hospitalization, reason for hospitalization, type of postoperative, sector of origin and days of hospitalization of patients with the Diagnosis of Nursing Risk of dry eye in Intensive Care Unit. Natal, 2016.

Variables	n (%)					
Type of hospitalization						
Clinical	46 (46,9)					
Emergency surgery	30 (30,6)					
Elective surgery	22 (22,5)					
Reason for hospitalization						
Postoperative	52 (53,1)					
Heart Disorder	18 (18,4)					
Shock	12 (12,2)					
Pulmonary Disorder	12 (12,2)					
Neurological Disorder	7 (7,1)					
Renal Disorder	4 (4,1)					
Infectious Disorder	3 (3,1)					
Postoperative type						
Cardiac surgery	14 (14,3)					
Abdominal surgery	12 (12,2)					
Neurological surgery	11 (11,2)					
Coronary angioplasty	5 (5,1)					
Invasive procedures (insertion of catheters)	5 (5,1)					
Thoracic surgery	2 (2,0)					
Vascular surgery	1 (1,0)					
Sector of origin						
Surgery Center	37 (37,8)					
Medical clinic	28 (28,6)					
Hemodynamics	15 (15,3)					
Another hospital	13 (13,3)					
Surgical Clinic	3 (3,1)					
Outpatient clinic	2 (2,0)					
	Mean	Standard deviation	Median	Minimum	Maximum	P value *
Days of hospitalization	3,48	4,75	1,00	1	26	<0,001

Regarding the reason for hospitalization, 53.1% of the participants were in the postoperative period and 46.9% were clinical patients. The median days of hospitalization were one day (24 hours) (Table 1).

With regard to associated comorbidities, the highest prevalence was systemic hypertension (63.3%), followed by diabetes mellitus (36.7%), chronic renal failure (21.4%), neoplasms (18.4% %) and coronary diseases (10,2%).

As for the drugs, there were predominant inhibitors/protectors of gastric secretion and antibiotics, used by 74.5% and 64.3% of the participants, in this order. The use of anticoagulants (50%), anti-inflammatories (44.9%), electrolytes (43.9%), vasoconstrictors (38.8%), opioids (36.7%), diuretics (23,5%) and neuromuscular blockers (8.2%) were also identified.

Table 2, which shows data on neurological, ventilatory and hemodynamic support, shows that 37.8% of the patients were under sedation. The association between midazolam and fentanyl was found in 13.3% of the participants. The endotracheal tube, found in 42.8% of the participants, was the most used ventilatory device; 49% were using invasive mechanical ventilation and the most prevalent ventilatory mode was pressure-assisted ventilation. In addition, 43.9% were using intravenous vasoactive drugs.

Table 2. Characterization of clinical variables related to neurological, ventilatory and hemodynamic support of patients with the Nursing Diagnosis Dry eye risk in the Intensive Care Unit. Natal, 2016.

Variables	n (%)
Use of sedatives	
Yes or residual effect	37 (37,8)
No	61 (62,2)
Type of sedative	
Midazolam + Fentanyl	13 (13,3)
Others**	12 (12,2)
Fentanyl	11 (11,2)
Midazolam	1 (1,0)
Ventilation device	
Endotracheal tube	41 (41,8)
Ambient air	22 (33,7)
Venturi mask	9 (9,2)
Nasal catheter	8 (8,2)
Tracheostomy	7 (7,1)
Invasive mechanical ventilation	
Yes	48 (49,0)
No	50 (51,0)
Ventilatory mode	
PCV	31 (31,7)
PSV	16 (16,3)
CPAP	1 (1,0)
Use of intravenous vasoactive drugs	
Yes	43 (43,9)
No	55 (56,1)
Types of intravenous vasoactive drugs	
Noradrenaline	34 (34,7)
Dobutamine	6 (6,1)
Sodium nitroprusside	5 (5,1)
Sodium nitroprusside	4 (4,1)

*Subtitles: **narcosis or residual effect of sedation off (<6 hours); BIPAP: Bilevel Positive Pressure Airway; PCV (acronym in Portuguese): Pressure controlled ventilation; PSV (acronym in Portuguese): Ventilation Support Pressure; CPAP: Continuous Positive Airway Pressure.*

Table 3 presents the main risk factors identified in patients with the diagnosis of dry-eye risk nursing, among which stands out the environmental factors and treatment regimen seen in 100% of participants, aging (55.1%), mechanical ventilation (50%) and females (49%).

Table 3. Characterization of the risk factors identified in the patients with the Nursing Diagnosis Dry Eye Risk in the final sample. Natal, 2016.

Variables	n (%)
Environmental factors	98 (100)
Treatment regimen	98 (100)
Aging	54 (55,1)
Mechanical ventilation therapy	49 (50,0)
Females	48 (49,0)
Neurological lesions with sensory loss motor reflex	46 (46,9)
Lifestyle	38 (38,8)
History of allergies	10 (10,2)
Autoimmune diseases	6 (6,1)

DISCUSSION

Reduced lacrimal production or increased evaporation can cause irreversible damage to the ocular surface. Thus, the inference of the nursing diagnosis risk of dry eye is essential for the planning of interventions that make minimal exposure of patients to the risk factors that predispose such phenomenon[6].

Knowing the sociodemographic and clinical characteristics that can fit the risk factors of a given condition helps define quantitative and qualitative means to improve health care. This enables an easy and quick identification of the patient's health conditions, with the objective of preventing health problems and promoting rehabilitation[5].

When observing the sociodemographic and clinical profile of patients hospitalized in ICU in other studies, it is evident the need to develop research aimed at the diagnosis of dry eye risk nursing in this sector, since they present certain conditions that can lead to the development of this phenomenon, such as the patients' own characteristics and the hospitalization environment that affect the efficiency of the tear film[5-6,12-13].

The mean age of participants in this study (59.5 years) is similar to that found in two other studies: 60 years[3,14]. Thus, hormonal changes may be the factor that justifies the involvement of individuals in this age group, together with the atrophy of meibomian glands that make up the tear film[15]. It should be mentioned, however, that lower age averages, between 40 and 50 years, have already been observed in other studies[14-16].

The majority of patients identified in this study were males, which is in line with data from cohort and cross-sectional studies, the results of which demonstrated a greater number of dry eye occurrence in male patients[3,14-16].

Although such a finding points the male population as prevalent, the literature has evidenced a higher frequency of the phenomenon in female subjects. This is probably due to changes in postmenopausal sex hormones[15].

Regarding the occupation, 40.9% of the patients were retired. This datum may be related to aging[13], but also to the environmental risk factors of the workplace, which may have contributed to eye disease and, consequently, to occupational disability. The literature has already seen a significant increase in the number of people affected by diseases of the ocular surface due to exposure

to environmental factors (pollutants and/or adverse climatic conditions). One of the environments that promote the development of this phenomenon is the ICU[17].

Regarding the type of hospitalization, 46.9% of the participants came from the clinic, followed by emergency and elective surgeries. The most frequent reason for hospitalization was the postoperative period, mainly of cardiac surgeries. Regarding this, surgeries may influence ocular dryness due to the use of anesthetics, since they promote the inhibition of sensory and motor reflexes[18].

In agreement with other studies, alterations in the ocular surface are already present during the first days of hospitalization[17]. An experimental study demonstrated an average of three days for the appearance of ocular lesions and identified that the length of ICU stay is relevant to predispose to the appearance of ocular disorders[12].

According to the general comorbidities presented, systemic hypertension, diabetes mellitus and chronic renal failure were the most prevalent. These data corroborate a review study that demonstrated a greater probability of hypertensive patients developing dry eye symptoms[19].

The drugs most frequently used by the patients were inhibitors/protectors of gastric secretion, antibiotics, anticoagulants and anti-inflammatories. Another study confirmed that patients taking anticoagulants had increased risk for the development of dry eye[3].

In addition, on the use of sedatives, the study identified that 60.0% of the patients admitted to the ICU, after staying for more than 48 hours under sedation, developed corneal abrasion and, subsequently, the risk of ulcerations[14]. Sedation inhibits the active contraction of the orbicularis oculi muscle, resulting in incomplete eyelid closure (lagophthalmia), corneal exposure and consequent ocular dryness[12].

Regarding ventilatory support, a cohort study pointed to intubation and mechanical ventilation as risk factors that predispose the dry eye[2]. Mechanical ventilation therapy affects the muscles that assist in palpebral closure in addition to causing fluid retention and consequent palpebral and conjunctival edema, resulting in alterations in the tear film, which favors the risk of dryness of the ocular surface[20].

Regarding hemodynamic support, 43.9% of the patients used intravenous vasoactive drugs and, among them, noradrenaline was the most frequent. These data confirm the findings of another prospective cohort study, in which it was observed that the use of vasoactive drugs had a significant association with the risk of corneal lesions[16]. Vasodilators promote vasodilation by activation of the parasympathetic nervous system, with consequent stimulation of salivation and lacrimal secretion. However, vasoconstrictor drugs inhibit parasympathetic activity and are related to signs and symptoms of ocular dryness and dry mouth[21].

The limitations of the present study are due to the fact of the design itself, since they do not allow inferences of cause and effect. Thus, it is pointed out the need to operationalize other studies with longitudinal delineations aimed at the Nursing Diagnosis of Dry Eye Risk, in order to identify other risk factors that lead to the development of ocular dryness to define means to enhance, improve and direct health care, and reduce injuries.

CONCLUSION

In view of the above results, the environmental factors (humidity and temperature), certain sociodemographic (sex and age) and clinical characteristics (hospitalization, comorbidities, treatment regimen, and neurological, ventilatory and hemodynamic support) are considered as risk factors that can predispose to the development of ocular dryness in patients admitted to the ICU.

In this sense, the nurse must be scientifically backed to offer integral and quality assistance that utilizes the operationalization of the Nursing Process, in order to implement preventive actions against ocular dryness and ocular lesions from the identification of the risk factors for the Diagnosis of Nursing Risk of dry eye.

This study contributes to the advancement of knowledge related to sociodemographic and clinical characterization of patients with the Nursing Diagnosis Dry eye risk admitted to the ICU. It should be emphasized the importance of the assistance directed to the prevention and identification of risk factors, which is the role played by the nurses, to develop interventions aiming at reducing posterior ocular complications and other injuries.

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All authors participated in the phases of this publication in one or more of the following steps, in according to the recommendations of the International Committee of Medical Journal Editors (ICMJE, 2013): (a) substantial involvement in the planning or preparation of the manuscript or in the collection, analysis or interpretation of data; (b) preparation of the manuscript or conducting critical revision of intellectual content; (c) approval of the version submitted of this manuscript. All authors declare for the appropriate purposes that the responsibilities related to all aspects of the manuscript submitted to OBJN are yours. They ensure that issues related to the accuracy or integrity of any part of the article were properly investigated and resolved. Therefore, they exempt the OBJN of any participation whatsoever in any imbroglios concerning the content under consideration. All authors declare that they have no conflict of interest of financial or personal nature concerning this manuscript which may influence the writing and/or interpretation of the findings. This statement has been digitally signed by all authors as recommended by the ICMJE, whose model is available in http://www.objnursing.uff.br/normas/DUDE_eng_13-06-2013.pdf

Received: 10/12/2017
Revised: 12/13/2018
Approved: 12/14/2018