EYE CARE TO THE NEWBORN SUBJECTED TO PHOTOTHERAPY: KNOWING THE NURSING PRACTICE

ABSTRACT
Objective: to know the practice of nursing professionals pertaining the eye care provided to newborns exposed to phototherapy. Method: descriptive study, census-based, with quantitative approach and carried out from August to October 2014 through application of a form to 97 nursing professionals that make up the staff who assist NB in the sectors of NICU, NITCU and ROOM of two public teaching hospitals. Data were entered into Excel spreadsheets, sorted by professional category and sector and then formatted into a figure and tables that served to calculate the absolute and relative frequencies of variables for descriptive and analytical analysis. Results: most professionals showed to have partial know on the investigated eye care. It was also evident that they make reference to the improvisation of eye protector, not checking its position as routine, non-removal of the eye protector in relevant moments and non-realisation of eye hygiene. Conclusion: more attention from the nursing staff regarding eye care is needed, as the study suggests the possibility that the NB undergoing phototherapy is exposed to risks to the eye that could be prevented.

Descriptors: Phototherapy; Newborn; Eye Health; Nursing.

RESUMEN
Objetivo: conocer la práctica de los profesionales de enfermería quanto a la realización de cuidados oculares al recién-nacido expuesto a fototerapia. Método: estudio descritivo, tipo censo, con abordaje cuantiativo, no de agosto a octubre de 2014, por medio de la aplicación de formulario, con 97 profesionales de enfermería que asisten RN en los sectores de UCIN, UTIN y ALCON de dos hospitales-escolas públicos. Los datos fueron ingresados en planillas de Excel. En seguida, fueron formateados en una figura e en tablas, calculadas las frecuencias relativas y absolutas de las variables para las análisis descriptiva e analítica. Resultados: la mayoría de los profesionales mostraron conocer parcialmente los cuidados oculares investigados. Aún, ellos relatan a la improvisación de la protección ocular, a no verificación del posicionamiento como rutina, a no retirada del protector ocular en los momentos pertinentes y a no realización de la higiene ocular. Conclusión: necesita de mayor atención de la equipe de enfermagem quanto aos cuidados oculares, pois o estudo sugere a possibilidade de que os RN em fototerapia estão sendo expostos a riscos oculares passíveis de prevenção.

Descritores: Fototerapia; Recém-Nascido; Saúde Ocular; Enfermagem.

RESUMO
Objetivo: conhecer a prática dos profissionais de enfermagem sobre a realização dos cuidados oculares ao recém-nascido exposto à fototerapia. Método: estudo descritivo, tipo censo, com abordagem quantitativa, no período de agosto a outubro de 2014, por meio da aplicação de formulário, com 97 profissionais de enfermagem que assiste RN nos setores de UCIN, UTIN e ALCON de dois hospitais-escola públicos. Os dados foram inseridos em planilhas de Excel. Em seguida, foram formatados em uma figura e em tabelas, calculadas as frequências relativas e absolutas das variáveis para as análises descritiva e analítica. Resultados: a maioria dos profissionais demonstrou conhecer parcialmente os cuidados oculares investigados. Ainda, eles relatam a improvisação da proteção ocular, a não verificação do posicionamento como rotina, a não retirada do protetor ocular nos momentos pertinentes e a não realização da higiene ocular. Conclusão: necessita-se de maior atenção da equipe de enfermagem quanto aos cuidados oculares, pois o estudo sugere a possibilidade de que os RN em fototerapia estão sendo expostos a riscos oculares passíveis de prevenção.

Descritores: Fototerapia; Recém-Nascido; Saúde Ocular; Enfermagem.
INTRODUCTION

Neonatal jaundice is often found among pre-term, term and post-term newborns (NB), being this the main clinical manifestation of neonatal hyperbilirubinemia.¹

The main form of treatment used is phototherapy. The effect of this therapy comes from the photoisomerization and photooxidation of indirect bilirubin in soluble forms that can be eliminated when exposed to a light emission spectrum of 400 to 500 nm².

Although effective, phototherapy is not free from side effects, among which eye changes stand out. In this context, a study showed that among 13 newborns that showed changes in the red reflex test, six were subjected to phototherapy for six to 15 days. These authors also mention phototherapy as an important factor when investigating the neonatal history with respect to eye health.³

In this sense, eye modifications arising from phototherapy can be caused by accidental exposure to light energy due to the use and/or inappropriate positioning of the eye shield, and by non-adherence to eye care recommendations during therapy.

If the NB has constant contact with phototherapy rays, this can lead to drying of the cornea, as well as the constant light stimulus in the ocular region may prompt the detachment of the retina, because the vascularity of this component is still immature at this period.⁴

Besides injuries arising from exposure to light energy, the NB undergoing phototherapy is predisposed to the development of eye infections due to the use of eye protector, once that this is associated with the development of neonatal conjunctivitis.²

Thus, the NB subjected to treatment of phototherapy requires special care and relies on a multidisciplinary team, particularly a nursing team that follows the NB 24 hours a day. This requires professionals prepared to diagnose and intervene quickly and efficiently in case of complications.⁵ Thus, in order to maintain the eye health of newborns exposed to this therapy, the use of appropriate radiopaque protector is recommended to prevent exposure to light, as well as the constant monitoring of its position, the realization of hygiene for prevention of eye infections, the removal of the protector in relevant moments when therapy can be discontinued, and the monitoring of eye health.⁴,⁶

Because of the risks arising from phototherapy, it is of major importance that the eye care receive increased attention from the nursing team, once that the non-realization of such care may lead to loss of visual capacity which would be an adverse consequence for the individual and for society, and this is even more alarming by the fact that most of these cases could be avoided.⁷

In this sense, simple actions that have minimal cost and virtually no risk may prove to be efficient in promoting eye health of these newborns and may facilitate timely necessary interventions, including nursing care, constantly present in therapies directed to NB and that may have implications to the visual system, such as the use of medication, oxygen and phototherapy.⁸,¹⁴

OBJECTIVE

- To know the practice of nursing professionals pertaining the eye care provided to newborns exposed to this therapy.

METHOD

Descriptive study, census-based, with quantitative approach, developed in two reference teaching hospitals in the state of Alagoas that provide care to newborns at medium to high risk in the Unified Health System (SUS).

The survey was conducted in the sectors of Rooming-in (ROOM), Neonatal Intensive Care Unit (NICU) and Neonatal Intermediate Care Unit (NITCU) of these institutions and after approval from the Research Ethics Committee of the Federal University of Alagoas, Process nº 32108214.4.0000.5013.

The study population consisted of 182 professional nurses among which 38 were nurses and 144 were technicians and nursing assistants who provide direct care to newborns in different sectors. Professionals who were on vacation, on leave or whose name appears in the staff list but do not perform activities in the sector were excluded from the research. In addition, some employees who had link with the two institutions were counted only once.

From all these professionals, all those who willingly agreed to participate were included in the survey. They read and signed the Informed Consent (IC).

Data collection occurred from August to October 2014 through application of a form consisting of five questions, of which two were objective and three were objective-discursive, all related to the routine recommended for eye care of NB undergoing phototherapy.
Accordingly, we investigated the knowledge about the material that must be used in the production of the eye protector, if there is a routine for checking the position of the protector, in which moments this can be removed, and if hygiene of the eye and monitoring of eye health in NB are performed.

Collected data were entered into spreadsheets in Excel files, sorted by professional category and sector, then formatted into a figure and tables that served as bases to calculate the absolute and relative frequencies of the variables for descriptive and analytic analysis which were carried out with aid of the scientific literature used in the preparation of the survey instrument.

### RESULTS

Seventy-seven nursing technicians and assistants and 20 nurses of the abovementioned institutions agreed to participate in the study. Among these, 60 nursing technicians and assistants and 15 nurses perform their activities in NITCUs and NICUs, and 17 nursing technicians and assistants and five nurses in the Rooming-in.

Eighty-five nursing professionals did not participate in the study whether because they were absent at the time of collection, despite the constant presence of the researcher in the sector, or they were on vacation, on sick leave, the same employee sometimes working in two research institutions at the same time, also due to shift of employees to other sectors, and because of frequent shift changes among employees, leading to meet very frequently the same people performing activities on the site.

The results of this study were not separated by institution, for the routine of care provided to the newborn subjected to phototherapy in both institutions was similar. Thus, the results below were sorted only by professional category and sector.

With regard to the material that the eye protector should be made of, in NITCUs and NICUs, 82% of technicians and nursing assistants pointed out that this should be radiopaque, as for example those made of cotton with fixing tape, produced specifically for phototherapy. Only 17% said they need not necessarily be made of radiopaque material, and that wraps, sashes, cloth covers and gauzes could be improvised and would serve the purpose. Only one professional did not answer this question.

In the Rooming-in, a larger number of nursing technicians and assistants (29%) than in NITCUs and NICUs chose the option that the eye protector may be improvised wraps, sashes, cloth covers and gauzes. Seventy-one percent of them said that the eye protector should be radiopaque, such as those made of cotton with fixing tape, produced specifically for phototherapy.

With regard to nurses of NITCUs and NICUs, 94% indicated that the protector should be radiopaque, such as those made of cotton with fixing tape, produced specifically for phototherapy and only one professional (6%) said that the protector could be improvised. In Room, one of the nurses did not answer this question and all others pointed out that the protector should be radiopaque and that it is not ideal to improvise.

Regarding the existence of a routine of checking the position of the protector, in NITCUs and NICUs, 82% of technicians and assistants said that there is a routine, 8% said that there is not, and 3% said that they did not know. Among nurses, 94% said that there is this routine and only one professional said he did not know. As for how frequently they check the position of the eye shield, there was a wide variation in the response, as shown in the table below.
Table 1. Absolute and relative frequencies of the routine of checking the position of the eye protector in NB pointed by professionals of the NICUs and NITCUs studied.

<table>
<thead>
<tr>
<th>NITCUs/NICUs</th>
<th>Technicians/assistants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>%</td>
</tr>
<tr>
<td>Constantly</td>
<td>7</td>
</tr>
<tr>
<td>When necessary</td>
<td>0</td>
</tr>
<tr>
<td>Whenever handling the NB</td>
<td>4</td>
</tr>
<tr>
<td>2h/2h</td>
<td>1</td>
</tr>
<tr>
<td>3h/3h</td>
<td>1</td>
</tr>
<tr>
<td>Each shift</td>
<td>0</td>
</tr>
<tr>
<td>Daily</td>
<td>0</td>
</tr>
<tr>
<td>While measuring vital signs</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
</tr>
<tr>
<td>Did not answer</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
</tr>
</tbody>
</table>

In ROOM, nearly half of nursing technicians and assistants (47%) stated that there was a routine in the sector, 41% denied the existence of it, and 12% said they did not know. For nurses, two (40%) said that there is a routine of checking the position of the eye protector, two (40%) were unable to inform and one professional did not answer this question. Among those who reported the existence of a routine for checking the position of the eye protector, there was also a wide variation in the frequency that such verification is performed, as shown in Table 2.

Because this is a sector where the baby is all the time with the mother and the family, there were two responses stating that guidelines are given to the mother and the companions about monitoring the position of the protector. One professional yet answered that the work overload does not help for them to give this kind of attention.

Table 2. Absolute and relative frequencies of the routine of checking the position of the eye protector as informed by professionals of the ROOM.

<table>
<thead>
<tr>
<th>ROOM</th>
<th>Technicians/assistants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>%</td>
</tr>
<tr>
<td>Constantly</td>
<td>1</td>
</tr>
<tr>
<td>Guidelines to the mother</td>
<td>0</td>
</tr>
<tr>
<td>Daily</td>
<td>0</td>
</tr>
<tr>
<td>2h/2h</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
</tr>
</tbody>
</table>

Regarding the moments when the eye protector can be removed from newborns during phototherapy, in NITCUs and NICUs, most of the technicians and nursing assistants (40%) and nurses (67%) said the protector must be removed during bathing and breastfeeding, but 32% of technicians and assistants and 13% of nurses also pointed out the option that the eye shield should be used throughout all the time the NB is undergoing phototherapy, and that this should not be taken off, as shown in Figure 1.

In the Rooming-in, a different situation was observed. Most of the technicians and assistants (35%) chose the option that the eye protector should not be removed, 29% reported that they must be removed during bathing and breastfeeding and 24%, during bathing, breastfeeding and diaper change. As for the nurses in this sector, 40% pointed out the option that the protector should be used all the time, 40% said it should be removed during bathing, breastfeeding and changing diapers and the rest (20%) said it should be removed during the bath and breastfeeding, as shown in the figure 1.
Figure 1. Moments when the eye protector should be removed during phototherapy.

Regarding the routine of performing ocular hygiene, in NITCUs and NICUs, 78% of technicians and nursing assistants affirmed the existence of this practice in this sector, 18% did not know and 4% denied the existence of it. Regarding the solution used for cleaning, two professionals (4%) did not report what type of solution they use, 75% reported the use of saline solution, 13% reported distilled water, two professionals (4%) said they used tap water and two (4%), distilled water and saline solution.

Among nurses, 67% said there is a routine of performing ocular hygiene, 27% denied the existence of this routine, and one professional did not answer this question. Among those who responded positively, 40% reported using saline solution or distilled water, 30% said saline solution only, 10% said distilled water only, and 20% did not report which solution they used.

In the Rooming-in, most technicians and nursing assistants (59%) and nurses (60%) said that the routine of performing ocular hygiene in the baby exposed to phototherapy does not exist, 12% of technicians and assistants and 40% of nurses said that there is such routine and 18% of the technicians did not know about it.

As for the solution used, 60% of technicians and assistants said they use saline solution, 20% said to use tap water and 20% did not inform anything about it. In the group of nurses who reported holding this routine, only one professional specified which solution was used, which was saline solution, and the other nurses did not say anything about it.

Besides ocular hygiene, it was observed that monitoring the ocular health is also carried out. Fifty-four percent of technicians and nursing assistants of NITCUs and NICUs said that such monitoring is carried out, 30% could not inform anything about it, and 15% said that this is not carried out. Among those who said that the monitoring of eye health is performed, 7 (22%) did not report how this is made, 12 (38%) said the baby's eye is evaluated by a pediatrician or ophthalmologist, only two (6%) reported that the presence of eye secretion is assessed and one (3%) said that signs of inflammation and infection are observed, one professional said that eye movements are evaluated, and two (6%) also cited the 'little eye test' as an assessment tool.

Because this is an objective-discursive question, in addition to the answers cited above, there were inaccurate descriptions (22%) of the form of monitoring the eye health, such as the use of the ophthalmoscope but without specification on to what purpose this is used, and another professional stated that he communicates the doctor and the nurse any change found, a third professional wrote that he observes eye movements.

Sixty percent of the nurses in the NITCUs and NICUs said that there is a routine of monitoring the eye health, 27% denied the existence of such and 13% could not say anything about it. When asked how monitoring is performed, three (33.3%) professionals said that they evaluate the presence of secretions, three (33.3%) mentioned that this assessment is made by doctors, two (22.2%) said that monitoring is done through the 'little eye test' and only one professional said that the eyelid and sclera are observed to evaluate the presence of edema or injury.

In rooming-in, most of the technicians and nursing assistants (59%) reported that there is no routine of monitoring the eye health, 29% could not say anything about it, and only one
professional (2%) stated that there is such routine, but did not say how this is done. Most nurses (60%) denied the existence of monitoring, 40% said that this is performed, but when asked how such monitoring is done, only one of them responded by saying that this is carried out through consultation with the ophthalmologist.

**DISCUSSION**

Several precautions are settled aiming to protect the NB during phototherapy. One of the main precautionary measures must be directed to the eyes, particularly by the use of appropriate radiopaque protector, in order to prevent exposure to light. The eyepiece cover must have appropriate size and must be properly positioned to completely cover the eye. It is important, therefore, to constantly check its position.6

The eye shield is sorely needed because exposure to light may cause complications such as retinal degeneration.5

In the literature, some authors still recommend the production of eye protectors with improvised material such as bandages and adhesive tape6 but most of them indicate the use of a coverage specific for phototherapy produced with radiopaque material through layers of black velvet or black carbon paper wrapped in gauze.1,6

The use of radiopaque coverage is essential, for improvised protectors may cause allergic episodes and superficial irritation of the skin caused by the adhesive substance used in the adhesive tape or small injuries caused by the edges of the x-ray film cutouts in contact with the baby's skin.9

The majority of professionals who participated in the study knew about the importance of using eye protector produced with the appropriate material. However, 82% of the technicians and nursing assistants and 100% of the nurses NITCUs and NICUs pointed out that the protector must be radiopaque, as for example those made of cotton with fixing tape produced specifically for phototherapy.

In rooming-in, less nursing assistants and technicians (71%) said that eye protector should be radiopaque, as for example made of cotton with fixing tape, produced specifically for phototherapy. One of the nurses did not answer this question and all others pointed out that the protector should be radiopaque and that it is not ideal to improvise.

Regarding the frequent verification of the position of the eye protector, 77% of technicians and assistants and 100% of nurses from NITCUs and NICUs reported that there is a routine for this. When observing the frequency of verification informed by them, it is clear that despite the wide variety of answers, professionals do an adequate monitoring and used words such as “Always”, “constantly” and “often” to inform the frequency, what is in accordance to what the literature recommends.

In the Rooming-in, a study suggests a gap in the provision of this care because fewer than half (45%) of nursing professionals (nurses, technicians and assistants) reported that there is this routine in the sector, 36% denied the existence of it, and 14% did not know about it.

When the few professionals who said to check the position of the eye protector were questioned about the frequency they do this, only three (43%) defined the frequency as Always and only two said to give guidance to mothers and caregivers about the monitoring of the position of the protector and one professional mentioned that the frequency is daily.

In addition, one person said that the work overload does not facilitate this kind of attention, a fact that causes concern because this is an essential care to prevent irreversible damage to the NB, namely, the injury to the retina.

As for nurses, they responded that the frequency is every two hours during continuous assistance.

It is important to note that in this sector in particular, the NB is accompanied by the mother. It is the responsibility of the professional to guide the mother with respect to the care that is inherent to the newborn subjected to phototherapy, especially with regard to the constant monitoring of the position of the eye protector.

In this sense, one study mentioned that because of the prolonged therapy and the side effects caused by the treatment, it is necessary to adopt measures aimed at protecting the NB. These include providing education and information to the caregiver, reduction of side effects and prevention of sequelae.10

Thus, offering information to the caregiver is vital to the success of the therapy and the nursing staff mainly has the responsibility in sector such as rooming to communicate the mother and companions about the specific care that must be given to the NB subjected to phototherapy, especially with regard to the eye protector.

Another important point with regard to eye care is the existence of moments during
therapy when the eye protector can be removed from the NB, as for example it is recommend to take the protection off during breastfeeding, because this allows the opportunity to visual and sensory stimuli, besides the incentive to make contact with the mother during breastfeeding. It is recommended to take the protection off at the moment of bathing and visits, taking care to avoid taking the newborn out therapy for more than 30 minutes.\textsuperscript{2,3,6,11}

Despite these recommendations of current scientific literature, some professionals also stated in their responses that the eye protector should be used all the time throughout the therapy, in the NITCUs and NICUs such professionals were minority, in particular as regards nurses, with only 13% nurses choosing this answer. Most of the technicians and nursing assistants (40%) and nurses (67%) said that the protector must be removed during bathing and breastfeeding.

However, in the Rooming-in, most technicians and assistants (35%) chose the option that the eye protector should not be taken off throughout therapy, 29% reported that it must be removed during bathing and breastfeeding and 24%, for bathing, feeding and diaper change. In the group of nurses of this sector, a significant number (40%) also pointed out the option that the protector should be used at all times and should not be removed, 40% said that it should be removed during bathing, feeding and changing diapers and the rest (20%) said it should be removed while bathing and breastfeeding.

The non-removal of the eye protector in moments recommended by literature compromises the eye health of the NB and the sublime relationship established between the binomial when breastfeeding. However, the use the eye protector by the NB during phototherapy was appointed as causing suffering and distress in mothers who participated in a study, because this prevents eye contact between mother and child.\textsuperscript{12}

As important as the use of the protector and its removal at the recommended times is the realization of eye care in the newborn in order to prevent the installation of eye infections arising from the accumulation of secretions due to the use of the device. Eye protector is associated with higher incidence of neonatal conjunctivitis.\textsuperscript{2}

In this regard, it was observed that 78% of the technicians and nursing assistants and 67% of nurses in NITCUs and NICUs said that there is such practice in this sector and most use saline solution in the realization of this care.

Eye care to the newborn subjected to phototherapy...

In the Rooming-in, most technicians and nursing assistants (59%) and nurses (60%) denied the existence of a routine of performing ocular hygiene in the baby exposed to phototherapy in the sector. No professional mentioned providing guidelines to the mother with respect of the realization of this care, thus exposing the infant to the risk of accumulation of secretions and development of eye infections.

In addition to the use of eye protector produced with proper material, constantly checking its position, taking it off at the recommended moments, and properly sanitize the eyes of infants, it is essential to monitor the eye health of NB exposed to phototherapy.

Although the risk of eye damage is very high, the eye protection used to prevent retinal damage is associated with irritation, corneal abrasions and also the higher incidence of neonatal conjunctivitis\textsuperscript{2}, even the device used to prevent eye injuries may cause them if proper monitoring is not carried out, requiring extraordinary attention from the team.

Compromising the eye health of a NB brings many consequences for his development, because the vision is paramount for the development of the child. Vision is factor of motivation, guidance and control of movements and actions towards people and environment. Its improvement, as well as the improvement of other functions of the human body, permeates neurological maturation and learning, being influenced by both genetic and environmental factors.\textsuperscript{8}

In this sense, regarding the evaluation of eye health of newborns subjected to phototherapy, it is recommended that at every change of professionals on duty of the nursing staff the occurrence of eye secretions, excessive pressure on the eyelids or irritation of the cornea be checked.\textsuperscript{6}

In addition, the nursing staff should have sufficient knowledge to perform the external eye examination of the NB. This may contribute to the identification of visual changes and/or nursing staff, and should not be delegated to other members of the health team that do not have proper preparation.\textsuperscript{5}

This study suggests a lack of preparation in realization of that care by professionals in both sectors. However, in the rooming, most technicians (59%) and nurses (60%) denied the existence of monitoring eye health in the sector.
Eye care to the newborn subjected to phototherapy...

Among the undesirable effects of phototherapy, ocular changes are one of the more harmful to the patient, as there is a possibility to lead the patient to partial or complete visual impairment, committing all his development and future life.

It is known that these changes are highly preventable through effective nursing care based on scientific knowledge. In this context, this study shows that professionals perform the recommended care in a partial manner. Most professionals proved to know the importance of using radiopaque eye protection during therapy, but although small, a some professionals still regard the possibility to improvise this coverage, although the literature brings a number of disadvantages of this practice.

As for the verification of the position, it was noticed that most professionals perform this care at the recommended frequency, but there are still professionals, mainly in the rooming sector that demonstrate not to value this care when they say that there is no routine of verification of the position of the device and when they say that the work routine does not allow them to perform this kind of attention.

The realization of ocular hygiene seems to be held in NICUs and NICUs, but in a minority in the ROOM said to perform it. So, there is the possibility of exposing the NB to the risk of infection arising from secretions due to the use of eye protector.

Regarding the removal of eye protection during therapy, most said the withdrawal during bathing and breastfeeding, but a percentage also mentioned that the shield should not be removed at any time, especially in the rooming sector.

It was noteworthy in this study the result related to monitoring of eye health, that despite the majority of professionals in NICUs and NICUs informed that they perform this type of care, no one professional answered this question completely in accordance to literature recommendations. Moreover, many professionals associated this care with medical practice. As well as ROOM, most professionals said not to perform this care. In this context, more attention from the nursing team regarding eye care to newborns subjected to phototherapy is necessary. The study shows the possibility that NB in these sectors are being exposed to eye hazards that can be prevented. Such hazards may compromise the NB's entire development, and if such hazards are detected early, such harm can be reversed.

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