RESULT OF RED REFLEX TEST IN NEWBORNS
RESULTADO DO TESTE REFLEXO VERMELHO EM RECÉM-NASCIDOS
RESULTADO DEL TEST REFLEJO ROJO EN RECIÉN NACIDOS

Érica Carine Rodrigues¹, Maria Vera Lúcia Moreira Leitão Cardoso², Adriana Sousa Carvalho de Aguiar³,
Kariane Gomes Cezario⁴

ABSTRACT

Objective: to evaluate the results of the red reflex test in newborns. **Method:** this is a quantitative, exploratory study with a sample of 32 newborns attended at the nursing consultation in childcare in the Family Health Strategy. Direct ophthalmoscope and color gradient were used to perform and classify the test result. Data analysis and presentation was through absolute and relative frequency construction. **Results:** of the 32 newborns, 94% (30) presented normal red reflex and 6% (2) were suspected to have it. The gradient indicated red eye (R01-R05) in 53% (17) of newborns in the right eye and 59.3% (19) in the left eye; (L01-L05), being 40.6% (13) in the right eye and 34.3% (11) in the left eye. Newborns whose ocular reflex was considered suspect were referred to an ophthalmologist. **Conclusion:** early identification of altered red reflex cases reinforced the relevance of nurses' actions in the prevention of childhood blindness, whose impact is significant in children's quality of life. **Descriptors:** Newborn; Primary Health Care; Child Care; Neonatal Nursing; Eye health; Disease Prevention.

RESUMO

Objetivo: avaliar o resultado do teste reflexo vermelho em recém-nascidos. **Método:** estudo quantitativo, exploratório, com amostra de 32 recém-nascidos atendidos na consulta de enfermagem em puericultura na Estratégia Saúde da Família. Usou-se oftalmoscópio direto e gradiente de cores para realizar e classificar o resultado do teste. Análise dos dados e apresentação mediante construção de frequências absoluta e relativa. **Resultados:** dos 32 recém-nascidos, 94% (30) apresentaram reflexo vermelho normal e 6% (2) suspeitos. O gradiente indicou reflexo ocular na cor vermelha (R01-R05) em 53% (17) dos recém-nascidos no olho direito e 59,3% (19) no esquerdo; vermelho-alaranjado (L01-L05), sendo 40,6% (13) no olho direito e 34,3% (11) no esquerdo. Os recém-nascidos cujo reflexo ocular foi considerado suspeito foram encaminhados para oftalmologista. **Conclusão:** a identificação precoce dos casos de reflexo vermelho alterado reforçou a relevância da atuação do enfermeiro na prevenção da cegueira infantil cujo impacto é significativo na qualidade de vida das crianças. **Descritores:** Recém-Nascido; Atenção Primária à Saúde; Cuidado da Criança; Enfermagem Neonatal; Saúde Ocular; Prevenção de Doenças.

RESUMEN

Objetivo: evaluar el resultado del test reflejo rojo en recién nacidos. **Método:** estudio cuantitativo, exploratorio, co una muestra de 32 recién nacidos atendidos en la consulta de enfermería en puericultura en la Estrategia Salud de la Familia. Se usó oftalmoscópio derecho y gradiente de colores para realizar y clasificar el resultado del test. Análisis de los datos y presentación mediante construcción de frecuencias absoluta y relativa. **Resultados:** de los 32 recién nacidos, 94% (30) presentaron reflejo rojo normal y 6% (2) tuvieron sospechas. El gradiente indicó reflejo ocular en el color rojo (R01-R05) en 53% (17) de los recién nacidos en el ojo derecho y 59,3% (19) en el izquierdo; rojo anaranjado (L01-L05), siendo 40,6% (13) en el ojo derecho y 34,3% (11) en el izquierdo. Los recién nacidos cuyo reflejo ocular fue considerado sospecho fueron enviados para oftalmólogo. **Conclusión:** la identificación precoz de los casos de reflejo rojo alterado reforzó la relevancia de la actuación del enfermero en la prevención de la ceguera infantil, cuyo impacto es significativo en la calidad de vida de los niños. **Descriptor:** Recién Nacido; Atención Primaria de Salud; Cuidado del Niño; Enfermería Neonatal; Salud Ocular; Prevención de Enfermedades.

¹Resident in Neonatal Nursing, School of Public Health Ceará. Fortaleza (CE), Brazil. E-mail: ericacarine@yahoo.com.br ORCID iD: <http://orcid.org/0000-0002-0959-2378>; ²Ph.D., Federal University of Ceará/UFCE. CNPq Researcher. Fortaleza (CE), Brazil. E-mail: cardoso@ufc.br ORCID iD: <http://orcid.org/0000-0002-0481-6440>; ³Master degreee, Faculdade Integrada da Grande Fortaleza. Fortaleza (CE), Brazil. E-mail: adrianaufc@gmail.com ORCID iD: <http://orcid.org/0000-0002-2726-8707>; ⁴Ph.D., Estácio do Ceará University Center. Fortaleza (CE), Brazil. E-mail: kariane.gomes@yahoo.com.br ORCID iD: <http://orcid.org/0000-0002-2097-2478>

INTRODUCTION

The Red Reflex Test (RRT) or “blind test” is the physical examination of the newborn, aiming at the early ocular evaluation to identify changes and prevention of childhood blindness. The nursing consultation in childcare in the context of the Family Health Strategy is one of the scenarios for this screening test, and nurses are trained and applied it in their routine.¹⁻²

The first consultation of the newborn should occur in the first week of life, with the evaluation of the ocular area performed by inspecting the external structures and performing the red reflex test.³⁻⁴ Such assessment is relevant since the development of the ocular device ends only in the sixth year of life and its impairment represents an inhibitor of child development.⁵ Also, the earlier the identification of ocular changes, the greater the impact on children's quality of life.

Thus, RRT is a tool for tracking changes that may compromise the transparency of ocular media, such as cataract, with altered lens transparency; glaucoma, with alteration in the optic nerve and opacification of the cornea; toxoplasmosis, with altered vitreous transparency by inflammation; retinoblastoma, altered vitreous transparency by intraocular tumor and retinal displacement.⁶⁻⁷

Intrauterine infections, such as syphilis, rubella, toxoplasmosis, and cytomegalovirus; hereditary factors; traumas; prematurity; urinary tract infections; use of medications and idiopathic causes are among the risk factors that lead the child to present these visual changes.⁶ With this, it is observed the need for care and adoption of preventive measures of visual changes from prenatal and therefore in the neonatal period.

Nursing consultation in the area of Primary Health Care has a significant place in health promotion, injury identification, and health education.⁸ Nurses are included in this scenario and should deepen their clinical practice so the achievement of the Red Reflex Test is included in the child care actions in the Family Health Strategy.²

Primary Health Care is the first scope of access to the health system by the user since it assumes the role of receiving, listening and offering a positive response to solve the health problem and/or to minimize harm, or to refer to other points of network attention. Thus, it is significant to perform the red reflex test in its context and the nurse must

incorporate such practice in the field of childcare.

Although recommended by the Ministry of Health, the red reflex test is not performed in most Brazilian maternity hospitals and more than 50% of the cases of pathologies are discovered late, with a great association with childhood blindness.² However, there are several Brazilian states and cities sanctioning state laws, making RRT mandatory throughout the country.⁴ The Regional Council of Nursing of Ceará, through opinion number 12/2015, ratifies the practice by technically trained and constantly improving nurses.⁹

It is empirically observed and also in the literature that there is little mention of the application of RRT, especially in Primary Health Care, although visual evaluation is recommended in this context.^{2,4} Given the relevance of studies in the area of ocular health for Nursing, it is necessary to awaken to the need to insert the visual evaluation in the newborn by the professional nurse in the routine of care. In this way, he will be joining efforts with other professionals to prevent and reduce preventable blindness.

OBJECTIVE

- To evaluate the result of the Red Reflex Test in newborns.

METHOD

This is a quantitative, exploratory study, carried out from December 2016 to February 2017, in four primary health care units in the city of Quixeramobim-Ceará, Brazil. The study included newborns (NB) at term, who attended the basic health unit for the first consultation of child care performed by the nurse. Babies with congenital malformation were excluded. Thus, the sample for consecutive convenience counted on 32 participants attended during the collection period.

The RRT was performed with the newborns positioned on the lap of one of the parents or on a stretcher in a darkened room to facilitate the visualization of the ocular reflex. The test was performed without dilation of the pupils and the direct ophthalmoscope was used directing the beam of light at a distance of about 30-40 cm from each eye of the baby.

For this examination, some aspects were considered: 1) Handwashing; 2) Dark environment; 3) NB conditions for the red reflex test; 4) Positioning of the NB; 5) External ocular inspection; 6) Test of the ophthalmoscope cells; 7) Adjusting the ophthalmoscope; 8) Relationship of

ophthalmoscope, examiner, and NB; 9) Observation of the red reflex; 10) Information of the test result to parents; 11) Registration in the child's book¹⁰

The “eye test” is based on the perception of the red reflex that appears when a beam of light is focused on the retinal surface. For the reflex to be visualized, it is necessary that the visual axis is free, that the ocular means is transparent (cornea, crystalline, vitreous) and that the retina and optic nerve do not change. It is a simple, quick and painless exam.¹¹

The normal red reflex should be seen easily, be symmetrical and homogenous in both eyes. The test was considered altered when the red reflex was absent or had a whitish (leukocoria) reflex, with an abnormal brightness of shade different from orange-red, or with spots.¹²

An instrument called “Red Reflection Test Color Gradient” was used to evaluate the observed ocular reflex as a way to help in the description and classification of the test result and in its recording. According to characteristics of the reflex observed in the performance of the test, a correlation was made with the instrument.

The creation and validation of the “Red Reflection Test Color Gradient” in a previous study was the result of research with the red reflex test in newborns. In this instrument, the color nuances are distributed in the gradients of red, orange and yellowish varying in intensity, light to dark; and homogeneity, presence or absence of whitish spots. Such color variations are grouped into normal, suspect and altered ocular reflex and at each nuance, a code for identification was assigned, such as R1... R9 for red gradients, L1... L12 for gradations in orange and A1... A6 for gradations in yellow.¹³

To complement the evaluation of the red reflex test, some variables of maternal and neonatal history were collected in the records: type of delivery, gestational diseases and neonatal factors (APGAR 1st and 5th minute, birth weight and gestational age).

The results of the evaluation of the red reflex test were described and presented in a table with simple and absolute frequency. The analysis was supported by the literature.

The parents of the newborns were informed about the importance of performing the test and that there would be no direct risk to the baby's physical health, and there may be some discomfort at the time of ocular palpation when the risks are minimal. All the people in charge signed a Free and Informed Consent Form, and the project was approved

after examination by a research ethics committee with opinion number 1,857,237.

RESULTS

The results show the profile of the newborns evaluated and the evaluation of the RRT. The characteristics of the maternal history had 31 maternal histories investigated. The number was different from the newborns due to twin delivery. Regarding the type of delivery, 51.0 (16) were normal (via vaginal) and 48.0% (15) were a cesarean section (via surgery). It was also verified that 19.0% (6) mothers presented specific hypertensive pregnancy disease (DHEG), 6% (2) prenatal urinary infection, 9.0% (3) exanthematous diseases (zika and chikungunya type) and 6.0% (2) used illicit drugs.

Regarding the characteristics of the neonatal history of the 32 newborns evaluated, 44.0% (14) were male and 56.0% (18) were female, 100.0% (32) were born at term and suitable for gestational age (SGA). APGAR scores ranged from 7-9 in the first and fifth minutes.

On the result of RRT of the 32 newborns, as shown in Table 1, 94.0% (30) presented normal ocular reflex, that is, with color ranging from red to orange-red, with a homogeneous appearance, symmetrical in both eyes. Two infants presented a suspicious result, with a dull or opaque coloration of the reflex, different from normal reflex characteristics, which were referred to an ophthalmologist.

As shown in Table 1, the color intensity of the red reflex varied either in the right eye or sometimes in the left eye. Thus, due to this color variation in the observed ocular reflex, the instrument was recorded with reference to the instrument “Color Gradient of the Red Reflex Test”. Extracted from this instrument, codes R01-R05 correspond to the red reflections of light to dark intensity, and L01-L05 in orange color correspond to the light to dark intensity. Both represent color variations of normal eye reflex.

It can be observed in Table 1 that the frequency (56.3%) the ocular reflex R01-R05 was observed was greater than the corresponding to the reflex L01-L05 in (37.5%).

Also in Table 1, the two babies with a suspicious result had a gray or opaque appearance, equivalent to the code P01 in the instrument “Color Gradient of the Red Reflex Test”.

Table 1. Result of the Red Reflex Test in relation to the color gradation of the reflex in each eye. Fortaleza (CE), Brazil, 2017.

Red Reflection Test Color	Right eye	Left eye	Total
Gradation	n (%)	n (%)	n (%)
Red (R01-R05)	17 (53.2)	19 (59.5)	36 (56.3)
Orange (L01-L05)	13(40.6)	11(34.3)	24 (37.5)
Greyish or Opaque (P01)	2(6.2)	2(6.2)	4 (6.2)
Total	32(100.0)	32(100.0)	64(100.0)

DISCUSSION

The Red Reflex Test is simple, practical and did not interfere with the routine of the basic health unit, but in each newborn, its practice occurred in a particular way. The mothers’ interest at the time of the test was a significant aspect of the study since most of them were receptive, curious and attentive to the test and considerations about ocular health, a fact that contributed to the data collection. Therefore, they lead to the reflection about the importance of systematic and early visual screening, since late screening implies a risk of greater visual impairment or even loss of vision.¹⁴

The RRT as an exam that is part of the neonatal screening, when performed in childcare consultations in Primary Health Care, can collaborate for the early detection of changes and decrease the risk of blindness in early childhood.

In childcare consultations, the nurse cooperates effectively for this test to be performed. The contribution of this professional is fundamental in tracking observed changes. With adequate training and continuous improvement of their professional skills, the nurse can improve their clinical consultations with the test and find any type of alteration, send him to follow up in ophthalmologic consultation. Early access to diagnosis and correct treatment is essential.^{9,13}

Although the recommendation is to perform the examination still in the maternity, as soon as they are born, still many babies are discharged without the “eye test”. When this occurs, the professional should do it in the first consultation of childcare, preferably before the first 30 days of life. This reinforces the importance of the incorporation of this test in the basic care, in the routine of the nursing consultation in exams of newborns.

As part of the semiology, the ocular examination should be performed on both premature and full-term newborns. Composed by the red reflex test, inspection of the external ocular structures, pupillary response and ocular observation, it is compulsory for all

children weighing more than 1,500 grams and the baby must be followed up to three years of life.^{15,10}

Patients younger than 1500 g birth weight and/or younger than 32 weeks of gestational age are assessed by retinal mapping, following the protocol for the evaluation of retinopathy of prematurity.⁶

The application of the red reflex test is an important tool in the prevention of avoidable blindness. As part of the ocular examination, the importance of this test is the early detection of leukocoria, a clinical sign frequently present in ocular conditions such as congenital cataract, retinoblastoma, vitreous diseases; which differs from the normal ocular reflex, because it is not possible to observe the reflex or its quality is poor, whitish.¹⁶

It is important to investigate the red reflex in newborns and its relationship with factors of maternal and neonatal history. There are several risk factors for these visual changes in newborns, such as maternal history of infectious diseases during pregnancy, such as toxoplasmosis, rubella, and cytomegalovirus, and conditions of prematurity and low birth weight, as well as severe hypoxia.¹³

In a study investigating the association of these factors and the performance of the red reflex test in neonates hospitalized in an intensive care unit, it was observed that two of the 123 infants evaluated by the red reflex test, presented a change in reflex ocular.⁶

Comparison of the reflexes of the two eyes also provides important information, such as differences in degree between eyes or strabismus. The color of the red reflex may vary according to the patient’s ethnicity. People with low pigmentation, white race, the reflex has a bright red color; in people of the black race, the reflex has a brownish-red coloration, which is paler, without this being characteristic to consider an altered exam.^{1,17}

Research with the red reflex test shows that there is no standard color of the reflected reflection, although the term may mistakenly suggest that the observed reflex is only red. In fact, it may present variations depending on some factors, such as the gestational age of the baby and the retinal

vascularization that will imply the characteristics of the fundus of the eye. Actually, the shape of the red reflex should also be observed because it reflects the integrity of the pupil.^{11,13}

In a study of 190 newborns from a public maternity hospital, evaluated through the red reflex test, there were 187 presenting unaltered results and three were suspected to have it. Different shades of ocular reflex color were observed: in 50 (26.3%) the color of the reflex was red; in 34 (17.9%) was orange-red; in 92 (48.4%) was orange; in 11 (5.8%) was light yellow and three (1.6%) with whitish spots. From the suspected cases, the reflex was light yellow with whitish spots.¹ When this data is contrasted with that of the present study, it is also identified that the majority of the newborns had red or orange-red reflex color.

The instrument "Color Gradient of the Red Reflex Test" used in this research to aid in the description of the clinical finding was in previous studies, validated and used in training of nurses for the accomplishment of the examination. Its applicability to the test was considered positive because it was a didactic material.¹³

The use of technologies combined with scientific knowledge complements and facilitates the work of nurses and improves the quality of the care they provide. In this context, the use of color gradients, in practice with the red reflex test, an object of study of the present research, is proposed as a facilitating resource for the evaluation of the clinical findings and registration of this test, is a very useful material, configured as a nursing care technology.

In view of this importance of the "blind test" in the screening and early detection of signs that can lead to diseases that are impacting the eyes, it is necessary to discuss and implement public health policies aimed at children.

After all, the role of vision in the child's physical and cognitive development is critical. In addition, experiences like this, allow awakening to the importance of the work of the nurse in the Primary Care. In this way, they will perform better when inserting the practice of the red reflex test in the routine of the care, with a view to promoting the prevention of visual changes soon in childhood.

CONCLUSION

With reference to the result of the Red Reflex Test of the 32 participating infants,

most of them had normal reflex, the color ranged from red to reddish orange. Only two newborns presented altered reflexes, which were referred to specialists for indication of ophthalmologic diagnosis.

The use of the color gradient allowed, in a didactic way, the registration of the colors of the altered or not altered reflex, being a nursing technology pertinent to the clinical practice in the consultation of childcare in the Primary Attention to Health.

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Corresponding Address

Erica Carine Rodrigues
Rua Murará, 101, Ap. 401, Bl. 15
Bairro Messejana
CEP: 60872690 – Fortaleza (CE), Brazil