

# Eye test profile: study in reference institution in the State of Paraíba

## *Perfil do teste do olhinho: estudo em instituição de referência no Estado da Paraíba*

Rodrigo Finizola<sup>1</sup> <https://orcid.org/0000-0003-3238-1971>

Milena Nunes Alves de Sousa<sup>2</sup> <https://orcid.org/0000-0001-8327-9147>

Nilson Neto de Araújo Morais<sup>2</sup> <https://orcid.org/0000-0001-7722-1635>

### ABSTRACT

**Objective:** To analyze the profile of the eye test in a reference institution in the State of Paraíba, and to identify the municipalities that refer their patients, prevalence of care and distribution of the test according to age and gender. **Method:** Documentary research, retrospective, descriptive research with quantitative approach. Data collection involved all newborn care (newborns), population of 418 patients. Inclusion criteria were newborns born or referred to the locus of the research, both sexes. Newborns born outside the period from January to December 2018 were excluded. Data collection occurred at the ophthalmology service, including variables such as: date of examination, city of origin of the newborn, age, sex, monthly quantity and test result. **Results:** The most prevalent city of origin was Santa Luzia (42.58%), with regard to age showing a higher rate in the age group of 1 to 2 months (64.83%). Regarding gender, males were in greater proportion (50.96%). Regarding the months, November had the highest prevalence (15.31%). Regarding the diagnoses, the red reflex test was present in 100% (n = 418). **Conclusion:** The service was able to trace and analyze the profile of pediatric patients who underwent the red reflex test, which had their satisfactory results, yet it was crucial in the possibility of early, effective and safe treatment, with their cognitive and physical development assured. The consolidation of the action of the service strengthens the program and involvement of the multiprofessional team, bringing improvement, learning and *saúde ocular*.

**Keywords:** Eye test; Infant newborn; Visual acuity; Eye health

### RESUMO

**Objetivo:** Analisar o perfil do teste do olhinho em instituição de referência no Estado da Paraíba, além de identificar os municípios que encaminham seus pacientes, prevalência dos atendimentos e distribuição do teste de acordo com faixa etária e sexo. **Método:** Pesquisa documental, retrospectiva, descritiva com abordagem quantitativa. A coleta dos dados envolveu todos os atendimentos aos recém-nascidos (RNs), população de 418 pacientes. Os critérios de inclusão foram RNs que nasceram ou foram encaminhados para a instituição lócus da pesquisa, ambos os sexos. Excluíram-se os RNs nascidos fora do período de janeiro a dezembro de 2018. A coleta de dados ocorreu no serviço de oftalmologia, contemplando variáveis como: data do exame, cidade de origem do RN, idade, sexo, quantitativo mensal e resultado do teste. **Resultados:** A cidade de origem de maior prevalência foi Santa Luzia (42,58%), quanto à idade foi evidenciado um maior índice na faixa etária de 1 a 2 meses (64,83%). Em relação ao sexo, o masculino se mostrou em maior proporção (50,96%). Já referente aos meses, novembro apresentou maior prevalência (15,31%). Em relação aos diagnósticos, o teste do reflexo vermelho esteve presente em 100% (n=418). **Conclusão:** O serviço conseguiu traçar e analisar o perfil dos pacientes pediátricos que realizaram o teste do reflexo vermelho, esses tiveram seus resultados satisfatórios, mesmo assim foi fundamental na possibilidade de tratamento precoce, eficaz e seguro, tendo seu desenvolvimento cognitivo e físico assegurado. A consolidação da ação do serviço fortifica o programa e envolvimento da equipe multiprofissional, trazendo melhoria, aprendizado e *saúde ocular*.

**Descritores:** Teste do olhinho; Recém-nascidos; Acuidade visual; Saúde ocular.

<sup>1</sup>Medical Student, Patos University Center, UNIFIP, Patos, PB, Brazil.

<sup>2</sup>Patos University Center, UNIFIP, Patos, PB, Brazil.

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## INTRODUCTION

According to the World Health Organization (WHO), 4.25% of the world's population is affected by some visual impairment degree; 80% of cases are preventable or can be cured. Severe visual impairment was the type that most affected the Brazilian population<sup>1</sup>. Vision is one of the main sources of stimulus for humans, since it enables individuals' physical and intellectual development since the beginning of their lives. Thus, it is an essential factor for the development of gestures and social behavior<sup>2</sup>. The evolution of human learning is deeply associated with the sensory knowledge deriving from vision. Thus, the integrity of this sense plays a fundamental role in human socialization and learning processes<sup>3</sup>.

Full visual aptitude is the main factor necessary to enable children's cognitive and physical development in a healthy and positive way. Preventive examinations and effective treatments allow minimizing, or even eliminating, visual issues in order to improve children's quality of life and well-being<sup>2</sup>. Children's health requires attention and care so they can grow in an effective and efficient way, in compliance with privileged healthcare aspects<sup>4</sup>.

Motor development and communication skills are often impaired in children with visual impairment, since gestures and social behavior are learned through visual feedback. Early disease analysis, effective treatments and programs focused on enabling early visual stimulation allow children to better interact with their environment<sup>2</sup>. Briefly, it is possible stating that visual changes can be avoided at different life stages, although there is greater concern about the ones affecting children, either in intrauterine life or after birth, when children's functional and organic stability is in intense development<sup>5</sup>.

In case of suspicious results, pediatricians should refer their patients to an ophthalmologist to be more accurately examined, based on other resources, in order to confirm or exclude the previously reported diagnosis<sup>6</sup>. This conduct is essential, since eye development is only complete in children's sixth year of life and visual impairment delays child development<sup>7</sup>.

Infantile cataract is the most frequent cause of changes in red reflex (eye test) observed in children; it is a treatable disease that presents favorable visual outcome when it is diagnosed and treated early<sup>8</sup>. Abnormal red reflex test results observed in newborns require performing eye screening procedures in the maternity ward or even during childcare consultations<sup>9</sup>.

Nowadays, statistical data in Brazil remain unsatisfactory, although the aforementioned examination started to be carried out in maternity hospitals in recent years, based on the legislation in force. Rio de Janeiro State has passed the first law addressing eye test implementation in maternity hospitals on September 5th, 2002. Thus, several cities and states have been developing local and state laws focused on turning this test into a mandatory procedure<sup>8</sup>.

The eye test has been increasingly used as mandatory procedure, as required by State Health Departments and by the Brazilian Ministry of Health. In addition, it has been gradually established as an eye health promotion method that requires the commitment and engagement of healthcare teams to help minimizing preventable blindness cases<sup>10</sup>.

Scholars have emphasized the importance of conducting

further studies about red reflex test application in maternity wards. According to the American Academy of Pediatrics, this examination is recommended in pediatric consultations and routine examinations conducted in 1, 2, 4, 6 and 9-month-old babies, as well as in 1, 2, 3, 4, 5, 6, 8, 10 and 12-year-old children<sup>8</sup>.

In light of the foregoing, it is necessary better analyzing the profiles established in reference maternity hospitals capable of enabling ophthalmological actions, such as performing the Red Reflex test in an early, safe and effective way. Although it is a simple test that has been performed for some time, the literature lacks recent studies in this field.

Based on the need of conducting further research on this topic, the aims of the current study were to analyze the eye test profile in a reference institution in Paraíba State, to identify the counties whose healthcare services refer their patients to specialist doctors, to analyze eye test findings and the prevalence of medical consultations/month in 2018, as well as to investigate red reflex distribution based on age and sex.

## METHODS

The current study is a documentary, retrospective and descriptive research based on quantitative approach, which was conducted at Sinhá Carneiro Hospital and Maternity Clinic (HMSC - Hospital e Maternidade Sinhá Carneiro) in Santa Luzia County, Paraíba State. Data collection comprised all medical consultations with 418 newborns (NBs) at HMSC. Inclusion criteria comprised male and female NBs who were born at, or referred to, HMSC. NB who were not born from January to December 2018 were excluded from the study.

A formal and structured instrument in the form of Excel spreadsheet was used for data collection purposes; it took into consideration the following variables: examination date, NB's city of origin, age, sex, number of examinations conducted per month and eye test result. This procedure was performed in the ophthalmology service of HMSC, which performed the eye test, by taking into consideration data inserted in the recommended spreadsheets, based on descriptive and evaluative statistics.

The current study did not require project submission to the Research Ethics Committee, since the type of data used in it did not require what is called for by the National Health Council Resolution 510/2016.

## RESULTS

As shown in Table 1, 42.58% (n = 178) of the examined newborns lived in Santa Luzia County.

With respect to age group, 1-to-2-month-old babies recorded the highest medical consultation index (64.83% - n = 271), as shown in Table 2.

Boys prevailed among NBs (50.96% - n = 213), as shown in Figure 1 and in Table 3.

As shown in Table 4, November/2018 was the month recording the highest medical consultation rate (15.31% - n = 64).

With respect to diagnoses, examination results came back normal and the red reflex test was applied to all newborns (100% - n = 418) assessed in that period.

**Table 1**  
**Eye test frequency based on location**

Location	N	%
Santa Luzia	178	42.58
Junco do Seridó	93	22.25
São Mamede	56	13.4
Várzea	38	9.09
São José	26	6.22
Tenório	19	4.54
Patos	3	0.72
Assunção	3	0.72
Souza	1	0.24
Salvador	1	0.24
<b>Total</b>	<b>418</b>	<b>100</b>

**Table 2**  
**Frequency of medical consultations based on age group**

Age	N	%
0 – 29 days	113	27.03
1 – 2 months	271	64.83
3 – 4 months	26	6.22
>5 months	8	1.92
<b>Total</b>	<b>418</b>	<b>100</b>

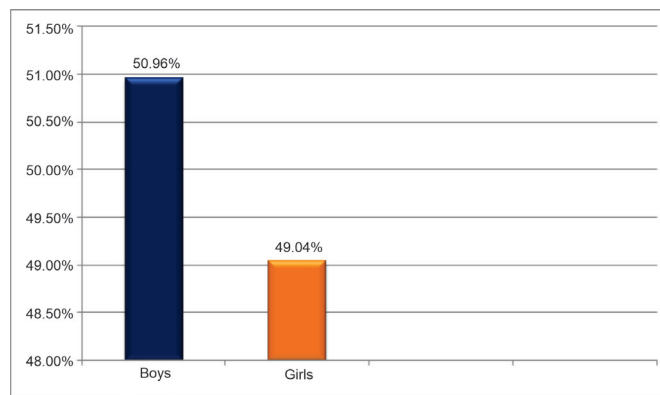
**Table 3**  
**Frequency of medical consultations based on sex**

Sexo	N	%
Boys	213	50.96
Girls	205	49.04
<b>Total</b>	<b>418</b>	<b>100</b>

As shown in Table 4. November/2018 was the month recording the highest medical consultation rate (15.31% - n = 64).

**Table 4**  
**Prevalence of medical consultations in 2018**

Months/2018	N	%
January	21	5.02
February	22	5.26
March	40	9.57
April	32	7.66
May	36	8.61
June	18	4.31
July	34	8.13
August	27	6.46
September	47	11.24
October	45	10.77
November	64	15.31
December	32	7.66
<b>Total</b>	<b>418</b>	<b>100</b>



**Figure 1** – Prevalence based on sex

## DISCUSSION

Vision becomes the primary source of child development, both physically and in cognitive terms, right after babies are born. Thus, it is essential evaluating its importance, both individually and collectively. Impaired vision development affects children’s learning process, knowledge, as well as their physical and psychological integrity. Therefore, it is essential identifying this issue as early as possible<sup>(13-14)</sup>.

According to the 2013 Children’s Eye Health Care Guidelines by the Ministry of Health and by the Brazilian Society of Pediatric Ophthalmology, the red reflex test must be repeated 2 to 3 times a year during patients’ first three (3) years of life, as well as 1 time a year from their third to tenth year of life<sup>(9)</sup>. Changes in red reflex, such as intensity and color asymmetry, whitish spot or lack of reflex, may suggest a pathological process affecting patients’ lens, retina or vitreous membrane<sup>(11)</sup>.

For decades, the World Health Organization (WHO) has been giving increasing attention to the formation of programs and groups focused on preventing blindness; however, despite many efforts, resources remain scarce. The eye test can help combating several diseases even in patients younger than six months. Consequently, it can considerably increase the likelihood of finding a cure or help reducing disease features<sup>(2,12)</sup>.

WHO has suggested the program called “VISION 2020: The Right to Sight” in order to revive and strengthen the existing programs and groups, as well as to form new groups. The program refers to collaborative effort between WHO and several collaborators - such as governmental and non-governmental organizations, groups and institutions – in order to eliminate preventable blindness by 2020<sup>(12)</sup>.

Therefore, the consolidation of effective actions taken in the children’s eye health field emphasizes the importance of having a multidisciplinary team formed by ophthalmologists and other medical professionals, health educators, managers, nurses, teachers, social workers, occupational therapists, among others, by taking into consideration professional specificities and local operation conditions<sup>(12)</sup>. Based on this perspective, the project involved the whole team in order provide better analysis and conduct, as well as to enable early disease diagnosis.

The service was provided by a reference center that, despite being located in Santa Luzia County (Paraíba State), also

treats patients from nearby cities. The multidisciplinary team comprised two physicians (specialists in ophthalmology and pediatrics), one speech therapist, one nurse and three nursing technicians, who worked 24 hours a day in the “Neonatal Tests” project, a fact that assures the quality and trustworthiness of the service. The multiprofessional team showed confidence and emphasized the fact that a large number of patients are referred to their service. One of the probable reasons for such referral lies on the presence of doubtful red reflexes resulting from the hard time inexperienced professionals have at the time to conduct the test, a fact that can delay disease diagnosis<sup>(8)</sup>. Even patients who lived in cities equipped with larger hospital complex - such as Patos/PB - were referred to this service, which started receiving newborns from different regions, regardless of their place and/or city of birth. This process reaffirmed professionals’ proposal and commitment to provide healthcare service in compliance with principles of the Brazilian Unified Health System (SUS - Sistema Único de Saúde).

It was possible noticing that the investigated service was more requested than others in certain periods, a fact that was justified by two demand types, namely: spontaneous and non-spontaneous. The spontaneous demand is explained by the fact that parents and/or family members are overburdened in certain periods; thus, they often choose to take their child to the service during vacation months, or when they have more than one child, they do it during the school year because they often do not have anyone to take care of the other children while they take the affected child to the service. On the other hand, the non-spontaneous demand is based on transportation availability, which is often made available by the local government due to parents’ lack of resources. This is a concerning fact, since studies conducted in the field have shown that, despite the available knowledge and technology, many visual changes taking place during childhood are identified later in life. Consequently, depending on the diagnosis, the intervention may have low effectiveness. However, the highest rates of childhood blindness observed in developing countries are preventable, whereas others can be prevented and/or treated to a lesser extent<sup>(13)</sup>.

Male sex prevailed among newborns treated in the service, although without statistically significant difference; thus, if managers needed to promote programs, they would not be focused on one of the sexes.

The analysis based on age group has indicated that most patients were only taken to the service 29 days after birth, mainly between 1 and 2 months. It should have been done earlier, since the early diagnosis of diseases associated with visual impairment enables the implementation of effective treatments. In addition, in case of scarring disease or injury, i.e., untreatable cases, it is necessary prescribing optical aids and an early visual stimulation program to enable children to have greater integration with their environment<sup>15</sup>. However, they are in compliance with what is recommended by the American Academy of Pediatrics for routine investigations in months and years<sup>(8)</sup>.

Preventing visual acuity reduction in childhood requires primary care support. Thus, highly complex tertiary services may be necessary in cases requiring rigorous and broad follow-up by a multidisciplinary team capable of taking actions focused on preventing health issues, on promoting health, on enabling diag-

nosis and treatment as early as possible, as well as on continuously promoting awareness<sup>(16)</sup>.

However, it is necessary promoting greater awareness, active search and commitment by professionals and managers in order to enable any program focused on detecting and preventing visual complications to be successful<sup>(8)</sup>.

## CONCLUSION

The current study has effectively traced and analyzed the profile of pediatric patients subjected to the red reflex test (eye test) in order to enable treatment application in an early, effective and safe way, as well as to help children’s cognitive and physical development in the best way possible. The implementation of programs such as the herein investigated one is less expensive than treatment application in late diagnosis cases; besides, it helps avoiding visual damages, which are often irreversible and can even lead to psychological impairment and make it difficult for patients to enter society.

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To God, who never gave up on me;

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**Corresponding author:**

Rodrigo de Medeiros Finizola  
Rua Prof<sup>a</sup> Alaide Vieira, 81. Salgadinho, Patos/PB  
Contato: (083)98822-1505  
rodrigo.finizola@hotmail.com