

Visual acuity of children 6 to 10 years of age: study in two public schools of sertão da Paraíba

Acuidade visual de crianças de 6 a 10 anos de idade: estudo em duas escolas públicas do sertão da Paraíba

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ABSTRACT

Objective: To evaluate the visual acuity of children from 6 to 10 years of age in two public schools in the city of Patos, Paraíba. **Methods:** Cross-sectional, quantitative study in schools E.M.E.F. Dom Expedito de Oliveira and CIEP II Anésio Leão / Miguel Mota, which involved a total of 195 students. The data collection was performed with the aid of an instrument to collect information, conduct interviews with the students and visual acuity was measured using the Snellen Test. The study was carried out between January and May of 2018. Data from the collection instruments used were compiled in the Statistical Package for Social Sciences (SPSS - version 21.0), and a descriptive statistical analysis was done. **Results:** Of the total of 195 students from the selected schools, 154 participated in the visual acuity tests performed through the Snellen Table and 28 of them presented low visual acuity and were referred to the ophthalmologist. **Conclusion:** The main refractive errors found were myopia, astigmatism and hypermetropia. In addition, it was observed that the prevalence of low acuity had a significant decrease according to studies published since 2003 to 2017.

Keywords: Visual acuity; Refractive errors; Eye Health; Preschool; Child development.

RESUMO

Objetivo: Avaliar a acuidade visual de crianças de 6 a 10 anos de idade em duas escolas públicas do município de Patos, Paraíba. **Métodos:** Estudo transversal, quantitativo, nas escolas E.M.E.F. Dom Expedito Eduardo de Oliveira e CIEP II Anésio Leão/Miguel Mota, que envolveu um total de 195 alunos. A coleta dos dados foi realizada com o auxílio de um instrumento para a coleta das informações, realização de entrevista com os alunos e a acuidade visual foi aferida pela utilização do Teste de Snellen. O estudo foi realizado entre os meses de janeiro e maio de 2018. Os dados provenientes dos instrumentos de coleta utilizados, foram compilados no Programa Statistical Package for the Social Sciences (SPSS - versão 21.0), em que foi feita uma análise estatística do tipo descritiva. **Resultados:** Do total de 195 alunos das escolas selecionadas, 154 participaram dos testes de acuidade visual realizados por meio da Tabela de Snellen e 28 destes apresentaram baixa acuidade visual e foram encaminhados para a consulta com o oftalmologista. **Conclusão:** Os principais erros de refração foram encontrados: miopia, astigmatismo e hipermetropia. Além disso, foi observado que a prevalência de baixa acuidade e teve um decréscimo bastante relevante de acordo com os estudos publicados entre 2003 e 2017.

Descritores: Acuidade visual; Erros de refração; Saúde ocular; Pré-escolar; Desenvolvimento infantil

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INTRODUCTION

According to the International Agency for the Prevention of Blindness, there are approximately 29,000 blind children due to vision problems that could have been diagnosed and treated early. Due to the Brazilian diversity and different levels of socioeconomic development, it is estimated that the prevalence of childhood blindness in Brazil is an average of 0.5-0.6 per thousand children. According to the Brazilian Institute of Geography and Statistics - IBGE (2014), the prevalence of blindness in Brazil is approximately 24%.⁽¹⁾

The red reflex testing needs to be done while the baby is still in the maternity ward. Besides being very simple, it helps in the detection of some diseases like cataract and congenital glaucoma, intraocular tumors, inflammations and hemorrhages in the ocular globe of the child. Many cities in the country already have a law requiring testing on all newborns before discharge, and Agência Nacional de Saúde Suplementar has already included it in its portfolio of exams covered by the major health insurance plans.⁽²⁾

The ophthalmologic screening is very important for the detection of diseases and prevention of childhood blindness, besides making possible the evaluation of visual acuity and detection of refractive errors present in the population, a positive point for public health. The ideal age to enroll the children in screening campaigns to detect refractive errors is between 0-6 years of age, a period reflecting the child's complete ocular development.⁽³⁾

In the first years of the child's life, vision plays an extremely important role in their development, being considered a stimulus for the accomplishment of tasks, communication with other people, and even responsible for about 85% of their learning.⁽⁴⁾

Visual acuity problems may result from sensory alterations in vision, with triggering factors called blindness or visual impairment. Low visual acuity is defined as a change in the functional capacity of vision; on the other hand, blindness is the lack of light or even total loss of sight.⁽⁵⁾

With the beginning of school activities, children need to engage in many social and intellectual activities which relate to their visual and psychomotor skills. During the learning process, the binocular vision and the visual function are primordial functions, because it is with the aid of the sensorial organs that information can be obtained for correct reading, even the latter being considered a cognitive capacity.⁽⁶⁾

Reading problems have a prevalence of 15-20% in primary and secondary school children. Thus, individuals with such problems have learning difficulties and face other health problems when compared to the rest of the population. Among the more serious problems developed in individuals with learning disabilities, premature death is the most worrying one, as the chance is up to 55 times more likely to die before 50 years of age. This way, learning difficulties can influence the potential of the children in approximately 80% of the cases. Children with limited reading skills in basic education will be poor readers in the future.⁽⁷⁾

In view of the above, the present study aims to evaluate the visual acuity of children from 6 to 10 years of age in two public schools in the city of Patos, Paraíba. Additionally, we aimed to identify the prevalence of low visual acuity in elementary school students in the city of Patos-PB, and evaluate their degree of visual acuity from the use of the Snellen test.

METHODS

This is a cross-sectional study with a quantitative approach carried out in the schools E.M.E.F. Dom Eduardo Expedito de Oliveira and CIEP II Anésio Leão/Miguel Motta located in the city of Patos, Paraíba. Said study is part of a project called "Ver e Aprender 20/20", carried out in partnership with Faculdades Integradas de Patos and with the support of a local optic store for the manufacture and delivery of glasses for children who took the ophthalmologic tests.

Data was collected with the aid of an instrument containing the child's name, school, age, place of birth, gender, questions regarding the child's ocular health, medication use, history of previous surgeries, and the visual acuity was assessed by using the Snellen Test adapted to the limitations of each age group, where it was used with substitution of letters by numbers or drawings previously known by the children.

The study was carried out between January and May, 2018. The inclusion criteria were children with visual acuity worse than 20/40 in at least one eye, Exclusion criteria: children with acuity better than 20/40 in both eyes. A total of 195 students from both schools were selected, 154 of which participated in visual acuity tests, and 41 were not tested. Of the students who participated, 124 were from Dom Expedito school, and 30 from CIEP II. This decrease in the number of students was due to the dropout that occurred during the days the tests were carried out in the schools.

For the data collection, students participated in an interview, and their parents signed the consent term. Data was analyzed by statistical analysis with the Statistical Package for the Social Sciences (SPSS).

The study was approved by the Research Ethics Committee of Faculdades Integradas de Patos under number 81101717.0.0000.5181. Therefore, the study was based on Resolution 510/2016 of the National Health Council.

RESULTS

Of the 154 students who took the Snellen test, 83.53% were female, 71 (46.10%) were male, and 28 (18.1%) had low visual acuity. From the results obtained, the students were referred to the appointment with the ophthalmologist to diagnose refractive problems that would be causing the low visual acuity. The appointments were held in the morning of 02/12/2018, and 10 students were absent for the exam. According to the data obtained, 15 were from E.M.E.F. Dom Eduardo Expedito de Oliveira, and only 3 from CIEP II Anésio Leão/Miguel Motta (Table 1). Of the students who took the eye exam, 10 (55.6%) were male and 8 (44.4%) were female (Table 2). In addition, the age with the highest frequency of low visual acuity, of the total of 28 students, was 8 years.

The main refraction problems found were Myopia, Astigmatism and Hypermetropia. Some children presented only one type of alteration, but others had an association between two refractive errors (Figure 1).

After the consultation, all the children were attended by a team of one partner who did all the necessary tests and provided the glasses and lenses for all the children. According to graph 1, two of the male children presented only Myopia, one only Astigmatism, one presented an association between Astigmatism and Hypermetropia, and six presented an association of Myopia with Astigmatism. Of the female children, three presented only Myopia, four only Astigmatism, none presented an association

Table 1
Students diagnosed with low visual acuity

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Dom Expedito	15	83.3	83.3	83.3
CIEP		3	16.7	16.7	100.0
Total		18	100.0	100.0	

Table 2
Diagnosis according to sex

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Válido	Male	10	55.6	55.6	55.6
	Female	8	44.4	44.4	100.0
Total		18	100.0	100.0	

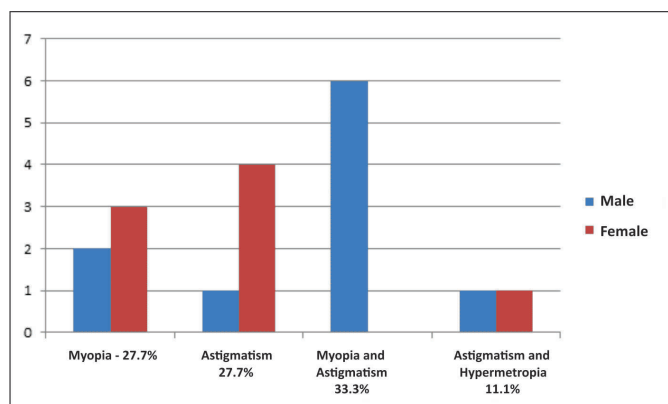


Figure 1: Number of children who had refractive errors according to gender.

between Myopia and Astigmatism, and one presented an association between Astigmatism and Hypermetropia.

Of the 18 children who underwent eye examination, 27.7% were diagnosed with Myopia only, 27.7% with Astigmatism only, 33.3% had an association between Myopia and Astigmatism, and 11.1% had an association between Astigmatism and Hypermetropia.

DISCUSSION

School is an environment requiring a lot of attention and visual ability for the child's better learning, making it the environment where eye problems develop and become more evident. In addition, low visual acuity is one of the greatest losses, as it impairs the student's learning and their relation with colleagues.⁽⁸⁾

In the public school system, approximately 20% of children can monitor their eye health with an ophthalmologist, and approximately 15% of children in the first grade already have low visual acuity, so it is important to screen these children, and ideally they should be treated by the ophthalmologist before starting their school life and have already been tested for red eye in the maternity hospital. In recent years, it has been observed that there

is a growing concern about the performance of the test due to several campaigns being carried out in schools to track low visual acuity in schoolchildren.⁽⁹⁾

From the present study, it was observed that 18.1% had low visual acuity, which is within the expected average of 20%. Dom Expedito school had a more significant result of 15 students with low visual acuity, which represented 83.3% of total when compared to the 3 students of CIEP II, which represented only 16.7%.

When comparing the frequency of refractive errors with the gender of the children, it was observed that when they appeared isolated, Myopia and Astigmatism were more frequent in the female children. However, when there was an association between Myopia and Astigmatism, none of the girls presented this association, being it restricted only to boys. The association between astigmatism and hypermetropia had an equal frequency for both genders.

According to the studies of Fissmer et al.⁽¹⁰⁾ the 8-year-old children were more affected by the refractive errors, but in the work of Netto and Oechsler,⁽¹¹⁾ there was a higher prevalence in 9-year old children, and Granzoto,⁽¹²⁾ in the age group of 7 years. Given this, the discrepancy of results is clear, evidencing that there was no higher prevalence in a certain age group. Besides, Netto e Oechsler⁽¹¹⁾ studies showed that the greater the age of the child the greater the prevalence of visual impairment and the fact that the time spent in school influences the results.

In a study involving 318 children, 50.3% of males and 49.6% of females, 9.4% (n = 30) had low visual acuity. The prevalence was higher in 8-year old children, and males were more frequent.⁽¹³⁾

According to a study conducted in Rio de Janeiro with 118 individuals, the prevalence of low acuity was 5%; of these, 16.6% presented visual alteration only in the left eye, 33.3% in the right eye, and 50% had bilateral involvement.⁽¹⁴⁾ In a recent paper published by Régis-Aranha et al.⁽¹⁵⁾ evaluating the visual acuity of 1,050 students from a city of Manaus - MA, only 6.3% (n = 66) had low visual acuity, and the female involvement was slightly higher when compared to the males, being 35 girls and 31 boys affected.

In general, it was observed that the works differ in relation to the age of involvement and the more affected gender. However, the refractive errors that appear most in schoolchildren are Myopia, Astigmatism and Hypermetropia, which are often listed as a cause of low acuity in these children.

CONCLUSION

The main refraction errors found were Myopia, Astigmatism and Hypermetropia. The frequency of involvement was higher in male children, even though females was higher when the total number of 154 students taking the Snellen Test was observed. However, the association between Myopia and Astigmatism was only observed in males; the association between Astigmatism and Hypermetropia was the same in both genders, and Hypermetropia was not diagnosed in isolation.

Of the 18 children who took the ophthalmological examination, 17 received glasses in a ceremony held at Faculdades Integradas de Patos in the presence of the coordinator, professors and students of the medicine course, in addition to the presence of the directors responsible for the schools and the person representing the optical store who provided the glasses. The eighteenth child preferred to buy the glasses.

In view of the results presented, it is of great importance that there is a training of educators to carry out the Snellen Test in schools, in order to make the screening and early treatment of children with low visual acuity, since it is a simple, inexpensive procedure which can be performed by any person dully trained. Then, the children should be referred to the Ophthalmologist at Unidades Básicas de Saúde (UBS), in order to continue with treatment and follow-up.

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