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# Reduced visual acuity screening in a Primary Care Unit

## *Triagem de acuidade visual reduzida em uma unidade de Atenção Primária à Saúde*

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## *Abstract*

***Objective:*** *to determine the frequency of reduced visual acuity in children and adolescents attending the child care program of a primary health care unit.* ***Methods:*** *A cross-sectional study was carried out with 290 children and adolescents aged 5 to 18 years attending a primary health unit in the city of Ribeirão Preto (SP) during the first half of 2018. A structured questionnaire Snellen's visual acuity table.* ***Results:*** *290 subjects were evaluated, 53.2% female. Of these, 66 (22.7%) were referred to ophthalmologists, 34 (51.5%) were male and 32 (48.5%) were female. We confirmed 31 cases of refractive errors: astigmatism (35.5%), associated astigmatism (25.8%), hypermetropia (29%) and myopia (9.6%). 24 (77.4%) of patients with reduced visual acuity received prescription for corrective lenses.* ***Conclusions:*** *the prevalence of low visual acuity in the studied sample was 10.7%, with a predominance of astigmatism, and with no statistically significant difference between the sexes. It is important to emphasize the importance of performing comprehensive evaluations in the Primary Health Care programs, especially ophthalmologic screening as one of the most important tools for blindness prevention.*

***Keywords:*** *Visual acuity/diagnosis; Basic Health Unit; Eye health; Child; Adolescent.*

## Resumo

**Objetivo:** Determinar a frequência de acuidade visual reduzida em crianças e adolescentes que frequentam o programa de puericultura de uma unidade de atenção primária à saúde. **Métodos:** Estudo transversal com 290 crianças e adolescentes na faixa etária dos 5 aos 18 anos, atendidos em uma unidade básica de saúde da cidade de Ribeirão Preto (SP) durante o primeiro semestre de 2018. Para as avaliações foram utilizados um questionário estruturado e a tabela de acuidade visual de Snellen. **Resultados:** Foram avaliados 290 indivíduos, sendo 53,2% do sexo feminino. Desse total, 66 (22,7%) foram encaminhados para consulta com oftalmologista, sendo 34 (51,5%) do sexo masculino e 32 (48,5%) do sexo feminino. Foram confirmados 31 casos de erros refracionais: astigmatismo (35,5%), astigmatismo associado (25,8%), hipermetropia (29%) e miopia (9,6%). 24 (77,4%) dos pacientes com acuidade visual reduzida receberam prescrição para uso de lentes corretivas. **Conclusões:** A prevalência de baixa acuidade visual na amostra estudada foi de 10,7%, com predomínio de astigmatismo, e sem diferença estatisticamente significativa entre os sexos. Destaque-se a importância de se realizarem avaliações completas nos programas de Atenção Básica à Saúde, principalmente a triagem oftalmológica como uma das ferramentas mais importantes para a prevenção da cegueira.

**Descritores:** Acuidade visual/diagnóstico, Unidade Básica de Saúde; Saúde ocular; Criança; Adolescente

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## Introduction

The most integrative sense of the human being to his outer world is sight, comprising a set of complex interconnected functions, with visual acuity being the most important among them.[1,2] Normal sight is vital for the choices and performance of work activities in humans, and the visual impairment developed in childhood will have a great influence on these choices, bringing profound disadvantages to the individual, their family, and society, with great emotional, social and economic costs.[3] There may also be impairments in learning, social contacts, and in the child's adaptive process.[4-6] Among adolescents, visual impairment may be a risk factor for understanding subjects related to sexuality and risk behaviors due to failures in the advertisement material, and the lack of training of people who can act in the orientation of these individuals.[7]

When detected early, low visual acuity makes it possible to adopt measures to avoid severe and late consequences of ocular disease, both in childhood and in adolescence.[6,8,9] In relation to other types of hearing and physical impairments, visual impairment is the most prevalent one, with morbidity equivalent to heart diseases, rheumatology, and diabetes, and also has profound limitations in daily life.[10]

Globally, more than 285 million people are visually impaired, of which 250 million suffer from low vision, and almost 39 million are blind.[11] In Brazil, it is estimated that the prevalence of blindness is 0.6 per thousand children, which results in almost 30,000 children deprived of the sense of sight.[12]

The distribution of low visual acuity is not uniform worldwide, with developing countries being the countries where most of the cases are found.[13] In Latin America, refractive error is one of the most frequent eye diseases, and the use of glasses is among the most economical and effective treatments to return the vision to its normality.[3,14-16]

Visual acuity measurement is the most important instrument for assessing sight, and is among the most used procedures in ophthalmology clinics and in visual tracking programs. [17,18] The visual acuity table is inexpensive, reliable, non-invasive, of rapid application, and does not require a long time of examiner training.[19] This method can initially be applied to 5-year-old children, a common practice in developed countries, as the optimal range for detection and treatment of ophthalmological impairments ranges from birth to six years of age, when the visual development is complete.[18,20]

Primary Care has the role of highlighting the most prevalent population diseases, providing continuous and well-structured health services, being committed to the quality of life of the users. Some examples of ocular conditions that may be followed by the primary health care team to reduce the overload of specialized services are visual acuity measurement, conjunctivitis, social rehabilitation of the visually impaired, guidance to loyalty to ocular treatment, screening, and referral of people and risk groups for certain diseases, guidance on correct use and side effects of some medications.[13,21]

## Objcetives

To know the frequency and causes of low visual acuity among patients treated in a Basic Health Unit.

## Materials and Methods

This is a cross-sectional descriptive study carried out at a primary health unit (UBS) in the city of Ribeirão Preto (SP) including users aged between 5 and 18 years. The data was evaluated by a descriptive analysis of ratios, medians, and standard deviation of the confidence interval. The population sample was statistically scaled considering the prevalence of 17.5%, with an error of estimation of 2.5%, and confidence level of 95%, making a total of 259 patients.[22-24]

Two instruments were used to carry out the study: 1) a questionnaire validated as a screening method, which included questions related to gender, age, place of residence, self-perception of sight, and whether the subject had already had an ophthalmologic examination[4,15]; 2) a Snellen table installed in a quiet environment with good lighting and positioned on a windowless wall and at a distance of 5 meters from the patient.

The line of optotypes corresponding to 0.8 and 1.0 was positioned at the eye level of the examinee. Before starting the test, the patients learned to correctly identify the position of the optotypes. The test was carried out on each eye separately with the use of an occluder, and the patients who previously wore glasses were examined with optical correction. For the standardization of the exam, the correct reading equal to or greater than 2/3 of the optotypes was considered the final visual acuity. For example, in a line with six optotypes, the child should correctly interpret at least four of them.

The criteria used to refer patients for specialized ophthalmologic appointment were: 1) visual acuity equal to or less than 0.7 in one or both eyes; 2) visual acuity test result with difference of two lines or more (example: right eye = 0.8, and left eye = 1.0); 3) suggestive signs of low visual acuity and/or presence of anatomical alterations; 4) difficulty in carrying out the exam due to lack of understanding of the patients.[8,25]

The study included individuals aged between 5 and 18 years who attended the appointment in the ambulatory of child care/pediatric or hebiatrics, and who agreed to participate authorized by the Free and Informed Consent Term. Individuals with symptoms compromising their general condition were not included in the study. All individuals with ocular alterations detected in the study had their data recorded in the medical records for continuity of follow-up in Primary Care.

The study was approved by the Research Ethics Committee of Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo, CAAE 56551216.6.0000.5440.

## Results

During the evaluation period in the first half of 2018, all 329 users were invited to participate in the study, being aged between five and 18 years who attended routine appointments at the outpatient of childand adolescent care during the study period, in order to reach the minimum number of individuals that could comprise the sample calculated of 259 individuals. Of these, 39 (11.8%) individuals refused to submit to the evaluations, resulting in 290 individuals comprising the sample, of which 136 (46.8%) were males and 154 (53.2%) were females. After the initial procedures, 22.7% (66/290) were referred for ophthalmologic appointment, being 34 (51.5%) males and 32 (48.5%) females, as they presented some visual problem during

screening (low visual acuity and/or other ophthalmological diseases). Among the 66 individuals referred, 59 (89.4%) attended the appointment scheduled with an ophthalmologist. Of these, 24 (40.7%) were considered emmetrope and received medical discharge; 31 (52.5%) presented refractive errors thus distributed: hypermetropia = 9 (29.0%), myopia = 3 (9.6%), astigmatism = 11 (35.5%), and associated astigmatism = 8 (25.8%), as can be observed in table 1. Among the 31 individuals with refractive errors, 24 (77.4%) required corrective lenses. We also diagnosed 1 (1.6%) case of calyx, 1 (1.6%) of conjunctivitis, and 1 (1,6%) of hordeolus.

Among all the individuals evaluated, 7(2.4%) reported having had an ophthalmologic examination before 6 years of age, and 11 (3.8%) reported having good sight but presented low visual acuity in the tests.

**Table 1**
**Distribution of confirmed diagnoses of reduced visual acuity according to gender after specialized evaluation. Ribeirão Preto, 2018.**

| | Male | | Female | | p-Value |
|---|---|---|---|---|---|
| **Diagnosis** | **n** | **%** | **n** | **%** | |
| Astigmatism | 7 | 46.6 | 4 | 25.0 | 0.384 |
| Hypermetropia | 4 | 26.6 | 5 | 31.2 | 0.834 |
| Associeted Astigmatism | 3 | 20.0 | 5 | 31.2 | 0.581 |
| Myopia | 1 | 6.7 | 2 | 12.5 | 0.617 |
| **Total** | **15** | **100** | **16** | **100** | |

## Discussion

The present study showed that 66 (22.7%) individuals participating in the study had ocular complaints (reduced visual acuity and/or other ophthalmological problems), and required referral for evaluation with an ophthalmologist. Other studies described in the literature evaluating similar populations of individuals reported lower frequencies of referral to the ophthalmologist, varying between 15.1% in Pelotas-RS[4] and 17.1% in the city of Londrina-PR.[26] Even lower frequencies were found (8.1%), as in the study carried out in the city of Botucatu-SP,[27] and another (10.8%) in the city of Passo Fundo-RS.[28] On the other hand, a study carried out in Guarulhos-SP detected higher frequencies of ocular complaints and referral to the ophthalmologist.[29]

In the global context, a survey conducted in Turkey[30] showed that 17.5% of elementary school students had ocular worsenig, whereas another study in Canada[31] also with children younger than 10 years of age found prevalence ranging from 10, 5% and 13.8%.

The literature has recorded discussions about differences in the prevalence of visual problems in view of methodological variations, evaluation tools, and also population characteristics related to social, biological and nutritional factors.[9,32] Different methodologies used for visual screening and referral to specialized services may prejudice the comparison between the different studies. However, this is not an obstacle to the continuity of preventive programs.[20,33] It should be emphasized that these tests are easy to perform, inexpensive, and effective for detecting eye problems and providing information to demonstrate the regional realities.[6,34]

Of the individuals referred to the ophthalmological service, 81.8% attended the specialized appointment, which represents a failure rate of 18.2%. This absence rate was lower than those found in studies carried out in the states of Rio Grande do Sul(27) (48%), Paraná (21), and São Paulo(35).

In some countries such as South Korea, absence to the ophthalmological appointment reached 56.6%.[34] In the present study, the high rate of attendance at the ophthalmologic appointment can be related to factors such as awareness on the importance of sight emphasized to the parents by the researcher during the application of the tests, and also the possible formation of a closer bond with the patient that is usually established in the Child Care Programs. Such an attendance rate values the preventive action of the study, since most ocular worsenings can be treated or minimized with simple and effective actions.[36]

The evaluation carried out by specialist found 40.7% emmetropic individuals. Among the other 59.3%, visual worsenings were confirmed, with more than half (52.5%) diagnosed with refractive errors. The present study demonstrated agreement with other authors who found refractive error as the most common cause of reduced visual acuity in childhood.[9,30,37] The most common refractive error was astigmatism (35.5%), followed by hypermetropia (29%), associated astigmatism (25.8%), and myopia (9.65). Regarding distribution by gender, no statistically significant difference was found. Astigmatism associated with hypermetropia was found in 22.5%, and astigmatism associated with myopia in 3.3%. These data was similar to that observed in a study carried out in Santa Catarina where astigmatism was also more prevalent, followed by hypermetropia and myopia.[38] Similar results were also observed in a study carried out in Rio Grande do Sul, where hypermetropia was was the most common refractive error, followed by astigmatism and myopia.[28] Astigmatism associated with hypermetropia represented 30.6% of refractive errors, and 9% when associated with myopia.

Another study carried out in São Paulo reinforced the need to change the concept that hypermetropia would be the most prevalent refractive error, presenting different data from the present study with hypermetropic astigmatism being the most common refractive error, followed by myopic astigmatism, astigmatism, hypermetropia, and myopia.[27] In a survey carried out in Turkey[30] the most common refractive disorders were astigmatism and hypermetropia, whereas in Tanzania it was observed that almost all students with refractive errors had myopia.[33] In South Korea, astigmatism was the most prevalent ametropia among students, reaching almost 78% of the population sample.[34]

Regarding gender, studies with a prevalence similar to the current one can be found, with 49.2% for males and 50.8% for females,[29] although some authors show a higher prevalence in females,[4,39] whereas others in males. [38,39]

The prevalence of individuals who wear glasses (9.2%) found in the present study was higher when compared to a study carried out in Londrina- PR,[21] which was between 2.4% and 3.6%. Another study showed that in Rio Grande do Sul 3%(4) of the subjects wore glasses, whereas in the city of Tubarão-SC[37] the use of corrective lenses was reported by 4.9% of subjects. At international level, a study carried out in Turkey found 12.1% of individuals wearing glasses.[30]

The characteristics of the population of the present study may help explain the difference in the frequency of corrective lens use compared to the other studies mentioned, since most of the participants were regularly followed in a child care program

at the health unit, which would allow more frequent and early detection of various health problems, including the visual ones.

In the present study, 2.4% of individuals who reported good sight but with reduced visual acuity underwent screening tests. This prevalence was lower when compared to studies carried out in Brazil(4) and Turkey(30), with frequencies of discrepancies between what was reported by the individual and what was found during the examination, of 14.2% and 10.6% respectively. Once again, regular follow-up in the basic health unit making it possible to diagnose health problems including the visual ones could explain these findings.

The fact that only 7(1.5%) individuals report the ophthalmologic examination before the age of 6 confirms existing data in the literature pointing out that preventive ocular health campaigns are practically nonexistent in this age group, delaying and even even making it impossible to diagnose ocular diseases such as strabismus and amblyopia.[40-42]

The results obtained in the present study show that the screening test of reduced visual acuity can be carried out in Primary Care and should have its place in the health care programs of children and adolescents. Although this study presents some limitations such as the non-representativeness for the city of the population sample using the health services of this UBS and the use of the Snellen scale for the detection of low visual acuity (which may have influenced the frequency of the visual worsenings observed), a moderate prevalence of low visual acuity was observed, and refractive errors constituted the most common cause of the worsenings detected. Said results may help disseminating the importance and need of having comprehensive evaluations in Primary Health Care programs, emphasizing ophthalmologic screening as one of the most important tools for the prevention of blindness. Thus, getting Ophthalmology and Primary Care closer can be a proposal for the prevention of visual problems.[17,22] Methods of care can be developed for physicians with general training (pediatricians, family physicians, and clinicians), and periodic appointments of their patients to detect deviations from normality.[23]

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