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Prevalence of predisposing factors of low visual acuity in a youth population of the Geraldo Reis University College in Niterói – RJ

Prevalência de fatores predisponentes de baixa visual em uma população de jovens do Colégio Universitário Geraldo Reis em Niterói – RJ

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Abstract

Purpose: *To determine the prevalence of predisposing factors of low visual acuity among the students of the Geraldo Reis University College in Niterói-RJ.* ***Methods:*** *This was a cross-sectional observational study during which the visual acuity of the volunteer students who adhered to the assent term was measured. Those students whose visual acuity did not exceed 0.8 in at least one eye or who presented a difference between the eyes of two lines or more in the Snellen table were selected for the next stage of the study and were referred for complete ophthalmologic evaluation in the Service of Ophthalmology of the Antônio Pedro University Hospital / Fluminense Federal University.* ***Results:*** *Of the total of 325 students enrolled, 134 (41.2%) participated in the first stage of the study and of these, only 39 (29%) presented visual impairment. Of the 39 students selected for the second phase of the study, only 14 (36%) volunteered to proceed for a complete ophthalmologic evaluation, with ametropias (57.14%), amblyopia (21.42%) and strabismus (14, 28%) as the main causes of visual impairment identified.* ***Conclusion:*** *The prevalence of visual impairment for this community was 29% and the main causes identified were ametropias, amblyopia and strabismus. Awareness campaigns and problems of adherence to screening programs should be considered in new studies.*

Keywords: Visual acuity; Kid; Prevalence; Refraction; Eye health

Resumo

Objetivo: Determinar a prevalência de fatores predisponentes de baixa acuidade visual entre os alunos do Colégio Universitário Geraldo Reis em Niterói-RJ. **Métodos:** Trata-se de um estudo observacional transversal realizados em duas etapas. A primeira realizou-se a medida da acuidade visual dos alunos voluntários que aderiram ao termo de assentimento. Na segunda etapa foram selecionados aqueles alunos cuja acuidade visual não ultrapassaram 0,8 em pelo menos um dos olhos ou que apresentaram diferença de acuidade visual entre os olhos de duas linhas ou mais na tabela de Snellen, sendo encaminhados para avaliação oftalmológica completa no Serviço de Oftalmologia do Hospital Universitário Antônio Pedro / Universidade Federal Fluminense. **Resultados:** Do total de 325 alunos matriculados, 134 (41,2%) participaram da primeira etapa do estudo e, destes, apenas 39 (29%) apresentaram baixa visão. Dos 39 alunos selecionados para a segunda etapa do estudo, apenas 14 (36%) se voluntariaram a prosseguir para avaliação oftalmológica completa, tendo as ametropias (57,14%), a ambliopia (21,42%) e o estrabismo (14,28%) como as principais causas de baixa visual identificadas. **Conclusão:** A prevalência de baixa visão(low vision=baixa visão tem definição, não se chama baixa visual) para essa comunidade foi de 29% e as principais causas identificadas foram as ametropias, as ambliopias e o estrabismo. Campanhas de conscientização e os problemas de adesão aos programas de triagem devem ser considerados em novos estudos.

Descritores: Acuidade visual; Criança; Prevalência; Refração; Saúde ocular

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Introduction

School is a favorable environment for primary eye care, as it accounts for large numbers of children for screening for visual acuity. Thus, ocular health promotion actions are welcome in this context.[1]

It is known that in many schools in developed countries there is a requirement to have an ophthalmic examination for school entry at 4 and 7 years of age. In contrast, in Brazil only 10% of students in this age group have ever had an ophthalmic examination,[2] possibly due to socioeconomic difficulties and poor access to health services.[3] This condition reflects directly on low school performance, and accounts for 22.9% of dropouts among elementary students in public schools.[4]

Also, about 20% to 25% of individuals at school age have some type of ocular problem, with ametropia (myopia, hyperopia and astigmatism), strabismus and amblyopia being more relevant.[5]

In our country, a survey carried out on 40873 school-age children in the state of Alagoas showed that the prevalence of refractive errors was 5.2%, and 10.38% of anisometropes.[6] Considering that anisometropia is the cause of amblyopia, the study reveals the importance of considering such assessments and early detection in the preschool and school population. Strabismus is another important risk factor for amblyopia affecting 3-5% of the world's population.[7]

In addition, a child with low vision may become an blind adult or with low vision, and therefore partially or totally unable to work, impacting the public social security budget and hampering his or her own socioeconomic development.[8]

The difficulty of children access to ophthalmological examination can still be influenced by socioeconomic factors, and screening campaigns are an opportunity to understand this reality. Nevertheless, many studies show that a large number of children referred for screening campaigns do not attend the appointment due to lack of interest or information. Therefore, campaigns are needed to reinforce the importance of regular eye care and to establish the school-family-health link.[9]

Then, the current demand for eye health education is directed not only to teachers, but also to the general community in which students and their families are included.[1]

The objective of the present study was to determine the prevalence of low vision predisposing factors among the students of Colégio Universitário Geraldo Reis in Niterói-RJ.

Methods

A cross-sectional observational study was conducted to detect the prevalence of low vision predisposing factors among students from 6 to 19 years old from Colégio Universitário Geraldo Reis in Niterói-RJ. During the project's planned stages, the guidelines contained in the Medical Code of Ethics (CEP), the World Medical Association standards, as well as the Declaration of Helsinki and Resolution 466 of 12 December 2012 of the National Health Council were respected.

The first stage of the visual screening was carried out by medical students after contact and authorization of the school board. Using the Snellen visual acuity chart with type "E" opposites facing the 4 possible directions, and considering a standardized examination distance of 6 meters, those students whose visual acuity did not exceed 0.8 in at least one eye or who presented a difference between the eyes of two lines or more were selected for the next stage of the study.

An analysis by age group in three levels (7 - 10 years, 11 - 14 years, 15 - 19 years) was carried out in the 1st and 2nd phases of the study.

The students selected were then referred to the ophthalmology service of Hospital Universitário Antônio Pedro (HUAP), where they underwent a complete ophthalmological evaluation with directed anamnesis, visual acuity test (Snellen), refraction examination with cycloplegia, ocular motility, biomicroscopy, applanation tonometry and indirect ophthalmoscopy.

The Ministry of Health (Ordinance 3,128 of 12/24/2018) considers low vision or subnormal vision when the corrected visual acuity in the best eye is less than 0.3 and greater than 0.05, or its visual field is less than 20o in the best eye with the best optical correction.[8]

Results

A total of 134 students were examined, of which 76 (56.7%) were female and 58 (43.2%) male. According to Table 1, the prevalence of low visual acuity (LVA) in the first screening stage was 24 among girls (17.9% of total) and 15 among boys (11.2% of total). The distribution of the individuals studied per LVA measured at screening is shown in Table 2.

At the time of the exam, 11 students wore glasses, including 6 whose VA did not exceed 0.8 even with this correction, and 5 with correct refractive correction, acconting respectively for 4.4% and 3.7% of the total screened students.

After screening, 39 individuals (29.1% of total) were selected for the second stage of the study, of which 25 (64.1%) did not attend the ophthalmological appointment.

Among the 14 (35.9%) students selected for the second stage of the study and who attended the ophthalmologic evaluation, 10 were female (71.4%)and only 4 male (28.6%), as shown in Table 1.

The sorting by age of the screened pupils covered a range of 7 to 19 years, predominantly students from 7 to 10 years (44.8%) during the first phase of the study, from 11 to 14 years (50%) during the second phase of the study, as seen in Table 3.

The causes of LVA diagnosed after ophthalmologic examination are shown in Table 4, including only 1 student who presented an ophthalmic examination without abnormalities and achieved greater visual acuity than during screening.

Discussion

After active initial screening in a school environment, the recruitment dynamics for the second stage at Hospital Universitário Antônio Pedro (HUAP) occurred by telephone call to schedule a date available for study progression.

VA was measured both at school and in the second stage using the Snellen table. Although one of the inclusion criteria for students for the second stage of the study was defined by a VA lower than or equal to 0.8, studies show that the most appropriate would be to use the VA cut of 0.7, as this would decrease the chances of false positives and reduce the expenses of unnecessary exams.[10]

However, the methodology adopted does not invalidate the study because in addition to the examination being performed by trained medical students, the cutoff point adopted for VA ensured

Table 1
Distribution of volunteers by gender in the different grades of Colégio Universitário Geraldo Reis, Niterói-RJ

Gender	Female	%	Male	%	Total
Students tested (1to stage)	76	56.7	58	43.3	134
Students called (2to stage)	15	38.5	24	61.5	39
Students attending HUAP	10	71.4	4	28.6	14

Table 2
Distribution of volunteers by visual acuity of Colégio Universitário Geraldo Reis, Niterói-RJ

	Right eye		Left eye	
Visual acuity*	**n****	**%*****	**n**	**%**
> 0.8	101	75.37	111	82.83
> 0.8	33	24.62	23	17.16
Total	134	100	134	100

**Snellen; **number of volunteers; ***percentage of volunteers

Table 3
Distribution of volunteers by visual acuity of Colégio Universitário Geraldo Reis, Niterói-RJ

Age	Total students	Relative frequency %	Total students with LVA	Relative frequency %	Total students atteding	Relative frequency %
7 a 10	60	44.8	15	38.5	4	28.6
11 a 14	37	27.6	13	33.3	7	50.0
15 a 19	37	26.6	11	28.2	3	21.4
Total	134	100.00	39	100	14	100

Table 4
Distribution by causes of low visual acuity detected in the volunteers of Colégio Universitário Geral Reis, Niterói-RJ

Diagnostic considerations	Occurrence	% of total
Ametropia	8	57.14
Amblyopia	3	21.42
Exotropy	2	14.28
No visual alterations	1	7.14
Total diagnostics	14	100

a lower number of false negatives, increasing the screening sensitivity. In addition, other studies acknowledged in the scientific field have already used this criterion, as shown in a study with preschool and school children in the favela of Alto da Boa Vista, in Rio de Janeiro.[5]

The total number of students enrolled in the school was 325, of which only 134 (41.2%) participated in the survey. This data shows the need for awareness about the importance of preventive health at elementary level.[9] In this sense, teachers and families are important for the proper stimulation of the child to participate in ophthalmological screening campaigns.

It is also noteworthy that the role of teachers can be extended to active agents in the screening process. This can be accomplished with specific programs as shown in Plano de Oftalmologia Sanitária Escolar realizado in São Paulo, in which eye health educators were used to train teachers for the screening examination. From this plan, it was also inferred that the examination carried out by an ophthalmologist should be only at a more advanced level of complexity, evaluating and correcting the problems detected. After all, a large-scale medical examination by a highly skilled professional turns out to be more costly.

The result of the screening shows a percentage trend in which the prevalence of low vision in relation to gender was higher among girls than among boys. In fact, visual impairments seem to be more frequent in females, as shown in a study carried out in Sorocaba, [11] in which the ratio was 18.6% for females and 9.7% for males.

For those screened, the ages that were more representative were 8, 9 and 10 years. However, ages 8 and 11 had the highest prevalence of LVA. If we consider that older children correspond to the higher grades, we should expect lower prevalence of referral at older ages. This hypothesis is sustained as children from higer grades already have greater psychomotor development than those from lower grades, and are more capable of understandinf the instructions of the eye examination. Or that older children may have already been subjected to the Snellen optometric chart, making the examination easier due to their familiarity with the test.

In addition, we have to relate the lower grades with a higher prevalence of LVA, as visual impairments are likely to be responsible for keeping students longer in a given grade due to poor school performance. Corroborating this statement, a survey of 700 children found that 22.1% of them could have their visual impairments as the cause of poor school performance.[12] Another study carried out in Colombia with 832 schoolchildren showed that 60% of students who failed had visual disorders. [13] Also, a Brazilian study showed that 25% of students with visual problems had low performance.[4]

The prevalence of LVA found in the present study from the screening exam was 29.1%. In another study carried out with children aged 8 to 10 years, said prevalence was 20%,[14] and in a third study the prevalence was 34.8% of the students examined. [4]These values vary with the methodology offered, and with the possibility that the school has already undergone previous ophthalmic assessment programs. Based on these references, the present study is within the prevalence range established by these literatures.

Of the research participants, 11 wore glasses at the time of the exam, but 6 needed refractive adjustment. In a study carried out with 4359 Chinese children aged 5-15, half of them needed new refractive prescription.[15] In another analysis, LVA was more prevalent among those who used correction (42%) against those who did not (12.1%).[11]

Skipping a medical appointment delays the diagnosis and correction of visual deficits. It is not uncommon for children

who need glasses not to have a prescription, because even when they are diagnosed they are not followed up, and treatment is disturbed. In a study carried out with students in the first grade of elementary school, almost half of those with a prescription never had refractive correction.[16]

In the present study, 25 out of 39 selected children did not go to the appointment, accounting for 64.1%. It was noted that in the National Eye Rehabilitation Campaign "Olho no Olho", 368,748 schoolchildren were referred, but only 177,175 (48.0%) went to the appointment, against 52% of absences.[9]

Thus, we can emphasize that the possibility of access to medical appointment does not ensure complete care to the eye health of students. Information on the importance of treating diseases causing LVA in children is needed in order to improve understanding of eye morbidities and potential complications or sequelae.

The distribution among the students invited for ophthalmic examination at HUAP and those who went to the appointments showed a difference between the parameters of gender and age. Twenty-four young women and fifteen young men were invited, but those who actually went to the appointment were 10 girls and 4 boys, showing a higher proportional adherence of girls compared to boys. This fact may reflect an already early and cultural trend towards greater attention to women's health in contrast to the behavior adopted by men about their own health.

The ordering by age of those who were invited in relation to those who attended comprised in both cases values ranging from 7 to 19 years old, in the first case the age group of 7 to 10 years old (60 students), from 11 to 14 years old (37 students), and from 15 to 19 years old (37 students). In the second case, the respondents from 11 to 14 years old effectively responded to theinvitation, with 7 attendances to HUAP. When considering the adherence rate for this age group, 50% of these students screened and invited were present at the service, which may reflect a specific behavior of the parents of these young people.

The results of the disgnostic impressions follow a standard in which the ametropias are in first place, data that was also present in the study of the ocular alterations in preschool children and living in the city of Duque of Caxias – RJ3. In our study, this value represented more than half of the disgnostic impressions, corresponding the 8 investigated (57.1%) of the 14 who answered the invitation. Following the findings, we have 3 cases (21.4%) of ambliopia. Two patients were diagnosed with exotropy, representing 14.3%. Finally, one of the patients referred by the screening to the ophthalmology service did not present ocular alterations, being a false positive of the screening, a fact that is consistent with the low specificity of the examination.

Conclusion

The prevalence of low vision in the community of a laboratory school was 29%. Among the causes of low vision we found ametropia (57.14%), amblyopia (21.42%), and strabismus (21.4%). We note 64.1% absenteeism, and community-wide engagement measures need to be considered in further studies to increase adherence.

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