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Oral health and visual acuity conditions of students in a municipality of Baixo Amazonas

Condições de saúde bucal e acuidade visual dos estudantes em um município do Baixo Amazonas

Condiciones de salud bucal y agudeza visual de estudiantes en una ciudad de Baixo Amazonas

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Abstract

Objective: To evaluate the prevalence of dental caries and visual acuity deficiency in elementary school students of the public school system in the municipality of Barreirinha- AM and check the factors associated with these conditions. **Method:** Cross-sectional study with 1,828 students aged 6 to 17 in the public school system of the municipality-of Barreirinha-AM. The dental cavity evaluation followed the recommendations of the World Health Organization using the established criteria for dental conditions, for deciduous as for permanent teeth: decayed, missing and filled. The Significant Caries Index was used to measure the dental caries severity in the individuals most affected by this disease. Visual acuity was assessed and age, sex and school were analyzed. **Results:** It became evident high prevalence of dental cavities, inequality in its distribution, and relation between this disease and gender (p=0.005). The visual deficit frequency was low among the students. **Conclusion and implications for practice:** The study indicates a lack of dental restoration treatment and high dental cavity prevalence, highlighting the need for planning and development of oral health promotion actions, with the purpose of minimizing the aggravations caused by the disease.

Keywords: Visual Acuity; Oral Health; DMF Index; Students; Prevalence.

Resumo

Objetivo: Avaliar a prevalência da cárie dentária e da deficiência visual nos escolares do ensino fundamental da rede pública de ensino de Barreirinha-AM e verificar os fatores associados a estas condições. **Método:** Estudo transversal, com 1.828 estudantes entre 06 e 17 anos, da rede pública de ensino, Barreirinha. A avaliação da cárie dentária seguiu as recomendações da Organização Mundial da Saúde, utilizando os critérios estabelecidos para as condições dentárias, tanto para dentes decíduos, quanto para permanentes: cariados, perdidos e obturados. O índice *Significant Caries Index* mediu a severidade da cárie dentária nos indivíduos mais afetados com a doença. Realizou-se avaliação para acuidade visual e analisou-se idade, sexo e escola. **Resultados:** Evidenciou-se elevada prevalência de cárie dentária, desigualdade em sua distribuição e associação entre esta doença e sexo (p = 0,005). A prevalência de dificuldades visuais entre os escolares foi baixa. **Conclusão e implicações para prática:** O estudo sugere carência de tratamento odontológico restaurador e elevada prevalência de cárie dentária, evidenciando a necessidade de planejamento e desenvolvimento de ações de promoção de saúde bucal, com o intuito de minimizar os agravos provocados pela doença.

Palavras-chave: Acuidade Visual; Saúde Bucal; Índice CPO; Estudantes; Prevalência.

Resumen

Objetivo: Evaluar la prevalencia de caries dentales y discapacidad visual en estudiantes de la enseñanza primaria del sistema escolar público de Barreirinha-AM, y verificar los factores asociados con estas condiciones. **Método:** Estudio transversal realizado con 1.828 estudiantes entre 06 y 17 años, de escuelas públicas de Barreirinha-AM. La evaluación de las caries dentales siguió las recomendaciones de la Organización Mundial de la Salud, utilizando los criterios establecidos para las condiciones dentales, tanto para dientes temporales como permanentes: cariados, perdidos y obturados. El índice *Significant Caries Index* midió la gravedad de la carie dental en las personas más afectadas por la enfermedad. Se realizó la evaluación para agudeza visual y se analizó edad, sexo y nivel educativo. **Resultados:** Hubo alta prevalencia de carie dental, desigualdad en su distribución y asociación entre esta enfermedad y el sexo (p = 0,005). La prevalencia de dificultades visuales entre los estudiantes fue baja. **Conclusión e implicaciones para la práctica:** El estudio sugiere una carencia de tratamiento dental restaurador y una alta prevalencia de caries dentales, evidenciando la necesidad de planificación y desarrollo de acciones de promoción a la salud bucal, con el fin de minimizar los problemas ocasionados por la enfermedad.

Palabras clave: Agudeza Visual; Salud Bucal; Índice CPO; Estudiantes; Prevalencia.

INTRODUCTION

With a view to expanding prevention, promotion and health care actions for students of the public school system, the Programa Saúde na Escola – PSE (Health at School Program, in free translation) was instituted in 2007. The PSE determines that Family Health teams should establish, together with Basic Education, strategies for integration and permanent articulation between education and health policies and actions, with the participation of the school community. It is known that the school is a place of great relevance for the development of an education program for the health of children and adolescents. The Ministry of Health, through the PSE, has numerous actions, some of which are already well defined and, among the latter, are oral health and eye health, which can be considered important means of health surveillance for this population.[1]

In this sense, the Ministry of Health has been intensifying its activities in specific actions for the child population. In 2015, the Política Nacional de Atenção Integral à Saúde da Criança – PNAISC (National Policy for Comprehensive Child Health Care, in free translation) was instituted. Its actions are organized based on the Healthcare Networks (HN), with an emphasis on the Maternal and Child Health Care Network, with Primary Health Care (PHC) as the organizer of the actions, with strategies directed to the child, ensuring the right to life and health, universal access for all children to health, equity, comprehensive care, humanization of care and participatory management.[2]

Based on an expanded view of the health of the community and families, it is very important that the professionals who make up the health teams work interprofessionally, contributing to the improvement in the quality of life.[3] Actions to promote and prevent oral health and eye health contribute positively and help to minimize the negative impacts that such problems have on people's lives.[4,5]

Dental caries is one of the main problems faced by Dentistry[4] and is considered a priority in public health. Dental disease, once untreated, can lead to pain, in addition to difficulties in chewing, eating, smiling, as well as absenteeism at work and school.[6] In Brazil, the four major surveys with national scope, carried out in 1986, 1996, 2003 and 2010, showed a great decline in the prevalence of dental caries.[7] However, regarding its distribution, studies show great regional inequalities, disproportionately affecting the poorest and most marginalized groups in society,[6,8-13] making them susceptible to the concentration of higher levels of this disease.[6-8,10,14]

Indeed, it is essential to know the reality of the oral health conditions of the population,[15] because epidemiological analysis on dental caries allow to identify whether the actions taken were effective for its reduction,[12] as well as to identify groups that concentrate a higher prevalence of this disease, making it possible to visualize the groups with less access to restorative care.[15] Therefore, with the use of the Significant Caries Index (SCI), it is possible to obtain the impact of dental caries in the groups with the highest prevalence of the disease.[16]

In 2007, the Ministry of Health and the Ministry of Education instituted the "Olhar Brasil" Project. The "Olhar Brasil" aims to identify and correct vision problems in students enrolled in the public education network of Basic Education, prioritizing, initially, the attendance to elementary school, in literate people registered in the "Brasil Alfabetizado" Program and in the population aged 60 or over. This initiative, in addition to expanding access to eye health, aims to improve the learning of children and adults in school.[17]

Vision is essential for the individual's relationship with the environment around him/her, as it interferes with his/her intellectual and interpersonal development,[18,19] affecting 18.60% of the Brazilian population.[20] Studies indicate that schoolchildren with ocular disorders may have headache, red eyes, visual tiredness and dizziness, occurrences that negatively interfere in the evolution of learning and often result in school dropout.[1,17,20]

In view of the above, the performance of screening tests for visual acuity, as well as referral for possible treatments, is essential for the detection and early intervention in these changes, minimizing the damage caused and preventing more complex injuries.[5,9]

Considering that there are no previous studies on epidemiological information regarding the distribution of dental caries and visual impairment in the municipality of Barreirinha-AM, this study aimed to assess the prevalence of dental caries and visual impairment in elementary school students of public schools in this municipality and check the factors associated with these conditions.

METHODS

The study was carried out in the municipality of Barreirinha, in the Baixo Amazonas region, 326 km away in a straight line from Manaus (the state capital). It is accessed by river or air transport and, according to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística – IBGE), it had 27,355 inhabitants in the 2010 census, with 45.4% of this population residing in the urban area. It has a total of thirteen districts, counting with Barreirinha, the headquarters. The headquarters' health care network has a general hospital and four Basic Health Units (BHU), totaling four Oral Health Teams (OHT). Only six districts have BHU and of these, only four have OHT. It also has a Fluvial BHU, being composed, in terms of dentistry, by an OHT. It is estimated that the population coverage of OHT in PHC was only 34.81% in the municipality of Barreirinha, in 2014.[21,22]

This is a cross-sectional and observational study, started in August 2014 and completed in December 2017. We chose to evaluate students of both genders, between 6 and 17 years old, enrolled in the elementary school of municipal and state schools in the city of Barreirinha (urban area), Amazonas, regarding the prevalence of the number of decayed, missing and filled teeth, for permanent dentition (DMF-D), the number of decayed, missing and filled teeth, for primary dentition (dmf-d) as well as the visual impairment and check the factors associated with these conditions. According to information from the Municipal

and State Secretariats of Education, in 2014, the municipality's headquarters (urban area) had a total of 5 public schools in elementary education (03 municipal and 02 state), making a total of 2,807 students (1,325 and 1,482 students from the municipal and state schools, respectively). Because it is a municipality that does not have private schools, as well as having a Human Development Index (HDI) of 0.574, considered low, it was decided not to collect socioeconomic information.[23]

As it is a convenience study, the preference for the municipality of the study was due to its participation in the internship field of the discipline of Rural Internship in Public Health at the Universidade do Estado do Amazonas. This discipline is mandatory and involves academics of the last semester of the Medicine, Dentistry and Nursing courses who, at the moment, carry out activities in the PHC of some municipalities located in the interior of the state of Amazonas.

This study was approved by the Research Ethics Committee of the School of Health Sciences / Universidade do Estado do Amazonas (CAAE: 31319614.8.0000.5016). The 2,807 students were given the Free and Informed Consent Term and each student was invited to participate in the study through their free choices and in compliance with ethical principles. Only students who agreed to participate in the research and whose parents signed the informed consent form were evaluated for oral health and visual acuity. Students who used a fixed orthodontic appliance, patients with complete visual impairment (blind), who were over 17 years of age and those who did not agree to undergo the exam were excluded.

Therefore, a total of 1,859 Free and Informed Consent Terms were signed by the parents. Of these, 1,828 students met the inclusion criteria. However, the final convenience sample consisted of 1,828 students aged 6 to 17 years, who agreed to participate in the examination for dental caries, representing a response rate of 80.8% of students in the municipal network and 51. 1% of those enrolled in the state network. As for visual acuity, only 1,407 students aged 6 to 17 years agreed to participate, representing a response rate of 47.1% of students in the municipal network and 52.9% of those enrolled in the state network. The losses were due to the difficulty in contacting the parents, the refusal of the guardians to sign the authorization, as well as the absenteeism of the students at the time of the exam.

Epidemiological Surveyof Dental Caries

The evaluation of oral health was carried out through epidemiological examination in schools, under natural light and following the standardization of the World Health Organization (WHO).[24] For the evaluation of the oral health of children (6 to 11 years), the dmf-d index obtained by the sum of decayed primary teeth, missing and filled, was used. In relation to adolescents (12 to 17 years old), the DMF-D index obtained by the sum of decayed, missing and filled permanent teeth was used. A record of treatment needs for primary and permanent teeth was also used.[24]

To facilitate the comparison between primary dentition and permanent dentition, it was decided to separate the age groups of 6 to 11 years old (children) and 12 to 17 years old (adolescents).

The SC index was used to assess the severity of dental caries in the third of the group that had experienced the most cases of the disease. For the analysis, it was divided into two groups: the first with the third of the individuals with the highest caries rates (SCI group, high caries experience) and the second with the other individuals with the lowest caries rates (low caries experience).[12]

For data collection, a group of examiners, academics from the last semester of the Dentistry course, was previously trained, in the standardization of techniques, by a teacher with expertise in the area and who was part of the research group. The training for each evaluation team followed the WHO recommendations, comprising theoretical classes (4 hours) and practical training (8 hours). The Kappa value for intra-examiner and inter-examiner agreement for dental caries ranged from 0.70 to 0.89 and from 0.70 to 0.86, respectively.

Epidemiological Survey of Visual Acuity

For the assessment of visual acuity, following the standardization of the Ministry of Health,[1] the Snellen Chart was used in the school itself, installed in a calm environment, with good lighting (with the light being behind the student), removing the dispersive objects that were in the field of vision, poster with the Snellen Chart positioned on a wall at a distance of 5 meters so that the line of visual acuity 0.8 to 1.0 was at eye level of the examinee.[1,17]

The following variables of interest were evaluated: age, gender, type of school and dental caries. From the *age* variable, a new variable called *age group* was used with intervals of approximately 5 and 6 years (6-11 and 12-17), in order to characterize the groups of children and adolescents, respectively.

During the examination, the presence or absence of the use of glasses was observed, as well as signs and/or symptoms that indicate possible visual problems such as: burning, weeping, red eye, secretion, squeezing or opening the eyes to see better, head tilt, blurred vision, headache and strabismus.[17]

The training process of the group of examiners, academics from the last semester of Medicine and Nursing courses, was carried out by the same teacher with expertise in the area. It comprised a total workload of 16 hours (theory and practice), in order to standardize the technique in the same group of evaluators, who carried out both the evaluation of dental caries and visual acuity. As a unit of measurement, the values were from 0.1 to 1.0. Being classified as having normal Visual Acuity (VA), schoolchildren who presented VA greater than or equal to 0.8 in both eyes for all ages and establishing a deficit of VA values less than or equal to 0.7 in one or both eyes, following the standardization of the Ministry of Health.[1]

Statistical analysis

The data were presented using tables, where absolute, simple and relative frequencies were calculated for categorical data. In

the analysis of quantitative data, when the normality hypothesis is accepted through the *Shapiro-Wilk* test, were calculated the mean, the standard deviation (SD), and the parametric *t-student* and Analysis of Variance - ANOVA tests were applied. In the case of rejection of the normality hypothesis, it was decided to calculate the median, the quartiles (Qi) and apply the *Mann-Whitney* and *Kruskal-Waliis* non-parametric tests.

The univariate analysis was performed with the aim of observing an association between the dependent variables (DMF-D, dmf-d and VA) and the independent variables (age, gender and school), using Pearson's chi-square and *t-student* test.

The software used in the data analysis was the Epi Info program, version 7.2, distributed free of charge by the North American Centers for Disease Control and Prevention - CDC. The level of significance for the application of statistical tests was 5%.

RESULTS

Dental caries

A total of 1,828 students participated in the study for dental caries, of which 957 (52.4%) were female. The prevalence found was 67.2% (736 students) of those aged 6 to 11 years and 75.8% (556 students) of those aged 12 to 17 years.

The value of the dmf-d index was 2.65 (SD = 2.82), SCI was 6.04 and in the group with low caries experience it was 0.96, showing unequal distribution of the disease in the studied site. A significant association was found in the male group with those with the worst dmf-d and the worst of the decayed and missing (p = 0.005; p = 0.027; p = 0.003). At 6 years of age, 30.5% of students were free of caries (def= 0) (Table 1).

The value of the DMF-D index was 2.65 (SD = 2.64), SCI was 5.58 and in the group with low caries experience it was 1.19, showing unequal distribution of the disease at the research site. At 12 years of age, the DMF-D index was 1.94 (SD = 2.19). No significant association was found between sex with those who had the worst DMF-D and the worst of the decayed, missing and filled components (Table 2).

The need for dental treatment found was 72.9% (798 students) of those aged 6 to 11 years and 64.8% (475 students) of those aged 12 to 17 years, with the need for restoration in one or more surfaces the most evident both in the primary dentition and in the permanent dentition. However, it is noteworthy that the second greatest need for treatment in permanent dentition is tooth extraction (Table 3).

Visual acuity

A total of 1,407 students were submitted to the screening exam, of which 745 (52.9%) were female. Analyzing the two eyes separately, 86 students (6.1%) had altered VA in the right eye and 94 students (6.7%) in the left eye. There was no statistically significant association when relating the visual impairment variables for the right eye and the left eye with the age groups (p = 0.912 and p = 0.938, respectively) when performing the Person's chi-square test (Table 4). During the exam, 451 (32.1%) students noticed some signs and/or symptoms of vision problems.

In Table 5, the frequency of low acuity was 8.4% (118/1407), with 95% CI (7.0% - 9.9%), who were referred for medical-ophthalmological examination. A relationship was found between low visual acuity and the type of school variable (p = 0.097), however, not statistically significant. No significant association was found between low visual acuity and dental caries.

DISCUSSION

Dental caries is considered one of the major public health problems, because, in addition to causing negative impacts on the population, it imposes an economic burden capable of exacerbating the burden of other diseases.[4,6] The last national oral health survey, carried out in 2010, in Brazil, evidenced a decline in dental caries for all ages, however the North, Northeast and Midwest regions of the country showed higher averages of DMF-D.[7]

The high prevalence of dental caries found in this study is noteworthy. These results may be related to the low OHT coverage found in the municipality, since the work in multiprofessional teams in the Family Health Strategy (FHS), as well as educational, preventive and curative actions are compromised, hindering the integrality of health care and network work.[2] Thus, it is essential to carry out monitoring of oral health, since it makes possible to identify whether the actions taken are being effective, as well as contributing to essential measures to be traced.[10-12,25]

It should be noted that, in this study, the WHO target for 2010 was not achieved, which was to present DMF-D less than 1.0 for the age of 12 years and 90% free of caries at 5 or 6 years of age. These results should support policy makers, aiming to decrease the prevalence of dental caries and its impact on adulthood.[10] It is known that the increase in the population's contact with the most varied forms of fluoride contributed to the reduction of dental caries.[14] One of the widely known and successful strategies for the prevention of dental caries is the fluoridation of public water supply, which is why the universalization of this access will serve as a protective factor to health, while contributing to the reduction of inequality.[8,9,16,26,27] However, Barreirinha does not have fluoride in its water supply.

Polarization of dental caries was found in the present study, as a higher concentration of dental caries was proven in one third of the students evaluated. These results corroborate similar studies, such as those carried out in Barcelos (AM) dmf-d 2.96 (SC Index 6.39) for the ages of 6 to 11 years and DMF-D of 1.89 (SC Index 4.22) to 12 to 17 years old.[28] As well, found in Belo Horizonte (Brazil) dmf-d 1.48 (SC Index 3.37) and DMF-D 0.57 (SC Index 2.20) and in Córdoba (Argentina) dmf-d 2.38 (SC Index 5.56) and DMF-D 0.81 (SC Index 2.17), in the age group of 6 to 12 years old.[15] As well as in the study carried out in the state of São Paulo (SP) DMF-D 2.94 (SC Index 5.81) in cities that have fluoride in public water supply and DMF-D 3.89 (SC Index 7.19) in cities that do not have fluoride in the water supply, in the age group between 11 and 12 years old.[16] As

Table 1 - Distribution of age and gender according to the average of the dmf-d index and its components, Significant Caries Index (SCI), free of caries and standard deviation in Barreirinha - AM.

Age	Gender	n	dmf-d	SCI	Low Experience	dmf-d = 0	Components					
							Decayed tooth		Missing tooth		Filled tooth	
(years))			Average ± SD			f_i (%)	Q_1 - Med - Q_3	f_i (%)	Q_1 - Med - Q_3	f_i (%)	Q_1 - Med - Q_3	f_i (%)
6	Female	76	3.23 ± 3.33			20 (26.3)	0.0 - 2.0 - 4.5	55 (72.4)	0.0 - 0.0 - 0.0	12 (15.8)	0.0 - 0.0 - 0.0	5 (6.6)
	Male	75	3.01 ± 3.37			26 (34.7)	0.0 - 2.0 - 4.0	44 (58.7)	0.0 - 0.0 - 0.0	17 (22.7)	0.0 - 0.0 - 0.0	4 (5.3)
	Σ	151	3.12 ± 3.34	6.90	1.26	46 (30.5)	0.0 - 2.0 - 4.0	99 (65.6)	0.0 - 0.0 - 0.0	29 (19.2)	0.0 - 0.0 - 0.0	9 (6.0)
	p		0.683*				0.174**		0.274**		0.758**	
7	Female	100	3.66 ± 3.06			18 (18.0)	0.0 - 2.0 - 5.0	74 (74.0)	0.0 - 0.0 - 1.0	30 (30.0)	0.0 - 0.0 - 0.0	5 (5.0)
	Male	94	4.78 ± 3.16			11 (11.7)	1.0 - 3.0 - 5.0	80 (85.1)	0.0 - 0.0 - 2.0	46 (48.9)	0.0 - 0.0 - 0.0	9 (9.6)
	Σ	194	4.21 ± 3.15	7.89	2.39	29 (15.0)	1.0 - 3.0 - 5.0	154 (79.4)	0.0 - 0.0 - 1.0	76 (39.2)	0.0 - 0.0 - 0.0	14 (7.2)
	p		***0.012****				***0.039****		***0.011****		0.207**	
8	Female	107	3.28 ± 2.67			24 (22.4)	0.0 - 2.0 - 3.0	72 (67.3)	0.0 - 0.0 - 1.0	47 (43.9)	0.0 - 0.0 - 0.0	8 (7.5)
	Male	100	4.09 ± 2.69			12 (12.0)	1.0 - 2.0 - 4.0	78 (78.0)	0.0 - 1.0 - 2.0	53 (53.0)	0.0 - 0.0 - 0.0	9 (9.0)
	Σ	207	3.67 ± 2.71	6.74	2.14	36 (17.4)	0.0 - 2.0 - 4.0	150 (72.5)	0.0 - 0.0 - 2.0	100 (48,3)	0.0 - 0.0 - 0.0	17 (8.2)
	p		***0.031****				***0.032****		0.244**		0.668**	
9	Female	92	2.56 ± 2.42			24 (26.1)	0.0 - 1.0 - 3.0	57 (62.0)	0.0 - 0.0 - 1.0	42 (45.6)	0.0 - 0.0 - 0.0	7 (7.6)
	Male	89	2.80 ± 2.42			20 (22.5)	0.0 - 1.0 - 3.0	61 (68.5)	0.0 - 0.0 - 2.0	43 (48.3)	0.0 - 0.0 - 0.0	6 (6.7)
	Σ	181	2.68 ± 2.71	5.60	1.23	44 (24.3)	0.0 - 1.0 - 3.0	118 (65.2)	0.0 - 0.0 - 2.0	85 (47.0)	0.0 - 0.0 - 0.0	13 (7.2)
	p		0.520*				0.412**		0.496**		0.792**	
10	Female	102	1.41 ± 1.72			45 (44.1)	0.0 - 0.5 - 2.0	51 (50.0)	0.0 - 0.0 - 0.0	14 (13.7)	0.0 - 0.0 - 0.0	3 (2.9)
	Male	87	1.46 ± 1.89			38 (43.7)	0.0 - 1.0 - 1.0	45 (51.7)	0.0 - 0.0 - 0.0	16 (18.4)	0.0 - 0.0 - 0.0	7 (8.0)
	Σ	189	1.43 ± 1.79	3.52	0.39	83 (43.9)	0.0 - 1.0 - 2.0	96 (50.8)	0.0 - 0.0 - 0.0	30 (15.9)	0.0 - 0.0 - 0.0	10 (5.3)
	p		0.855*				0.780**		0.354**		0.114**	
11	Female	95	0.45 ± 0.98			72 (75.8)	0.0 - 0.0 - 0.0	22 (23.2)	0.0 - 0.0 - 0.0	3 (3.2)	0.0 - 0.0 - 0.0	1 (1.1)
	Male	78	0.70 ± 1.126			49 (62.8)	0.0 - 0.0 - 1.0	29 (37.2)	0.0 - 0.0 - 0.0	2 (2.6)	0.0 - 0.0 - 0.0	2 (2.6)
	Σ	173	0.57 ± 1.12	1.72	0	121(69.9)	0.0 - 0.0 - 1.0	51 (29.5)	0.0 - 0.0 - 0.0	5 (2.9)	0.0 - 0.0 - 0.0	3 (1.7)
	p		0.141*				0.063**		0.809**		0.450**	
6 - 11	Female	572	2.42 ± 2.71			203 (35.5)	0.0 - 1.0 - 3.0	331 (57.9)	0.0 - 0.0 - 1.0	148 (25,9)	0.0 - 0.0 - 0.0	29 (5.1)
	Male	523	2.90 ± 2.92			156 (29.8)	0.0 - 2.0 - 3.0	337 (64.4)	0.0 - 1.0 - 1.0	177 (33,8)	0.0 - 0.0 - 0.0	37 (7.1)
	Σ	1,095	2.65 ± 2.82	6.04	0.96	359 (32.8)	0.0 - 1.0 - 3.0	668 (61.0)	0.0 - 0.0 - 0.0	325 (29,7)	0.0 - 0.0 - 0.0	66 (6.0)
	p		***0.005****				***0.027****		***0.003****		0.158**	

f_i= simple absolute frequency; SD = standard deviation; Med = median; Q_i= quartiles; * Student's t-test; ** Mann-Whitney non-parametric test. *P*-value in bold italics indicates statistical difference at the 5% level of significance.

Table 2 - Distribution of age and gender according to the average of the DMF-D Index and its components, Significant Caries Index (SCI), free of caries and standard deviation in Barreirinha - AM.

Age	Gender	n	DMF-D	SCI	Low Experience	DMF-D = 0	Components					
							Decayed tooth		Missing tooth		Filled tooth	
(years)			Average± SD			f_i (%)	Q_1 - Med - Q_3	f_i (%)	Q_1 - Med - Q_3	f_i (%)	Q_1 - Med - Q_3	f_i (%)
12	Female	123	2.04 ± 2.40			40 (32.5)	0.0 - 1.0 - 2.0	72 (58.5)	0.0 - 0.0 - 0.0	24 (19.5)	0.0 - 0.0 - 0.0	16 (13.0)
	Male	108	1.83 ± 1.91			36 (33.3)	0.0 - 1.0 - 2.0	62 (57.4)	0.0 - 0.0 - 1.0	30 (27.8)	0.0 - 0.0 - 0.0	8 (7.4)
	Σ	231	1.94 ± 2.19	4.32	0.75	76 (32.9)	0.0 - 1.0 - 2.0	134 (58.0)	0.0 - 0.0 - 0.0	54 (23.4)	0.0 - 0.0 - 0.0	24 (10.4)
	p		0.473*				0.770**		0.187**		0.159**	
13	Female	117	2.42 ± 2.31			31 (26.5)	0.0 - 1.0 - 3.0	73 (62.4)	0.0 - 0.0 - 0.0	27 (23.1)	0.0 - 0.0 - 0.0	20 (17.1)
	Male	87	2.57 ± 2.64			18 (20.7)	0.0 - 1.0 - 3.0	57 (65.5)	0.0 - 0.0 - 1.0	30 (34.5)	0.0 - 0.0 - 0.0	14 (16.1)
	Σ	204	2.49 ± 2.45	5.19	1.13	49 (24.0)	0.0 - 1.0 - 3.0	130 (63.7)	0.0 - 0.0 - 1.0	57 (27.9)	0.0 - 0.0 - 0.0	34 (16.7)
	p		0.655*				0.894**		*0.072***		0.856**	
14	Female	95	2.66 ± 2.36			20 (21.0)	0.0 - 1.0 - 3.0	64 (67.4)	0.0 - 0.0 - 1.0	38 (40.0)	0.0 - 0.0 - 0.0	13 (13.7)
	Male	64	3.42 ± 3.18			14 (21.9)	0.0 - 2.0 - 3.0	44 (68.8)	0.0 - 0.0 - 1.0	25 (39.1)	0.0 - 0.0 - 0.0	11 (17.2)
	Σ	159	2.97 ± 2.74	6.13	1.39	34 (21.4)	0.0 - 2.0 - 4.0	108 (67.9)	0.0 - 0.0 - 1.0	63 (39.6)	0.0 - 0.0 - 0.0	24 (15.1)
	p		***0.087****				0.256**		0.889**		0.544**	
15	Female	26	3.23 ± 2.32			4 (15.4)	0.0 - 2.0 - 4.0	17 (65.4)	0.0 - 1.0 - 2.0	14 (53.8)	0.0 - 0.0 - 0.0	2 (7.7)
	Male	54	3.70 ± 3.21			7 (13.0)	0.0 - 2.5 - 4.0	39 (72.2)	0.0 - 0.0 - 1.0	20 (37.0)	0.0 - 0.0 - 0.0	9 (16.7)
	Σ	80	3.55 ± 2.95	6.73	2.02	11 (13.8)	0.0 - 2.0 - 4.0	56 (70.0)	0.0 - 0.0 - 1.0	34 (42.5)	0.0 - 0.0 - 0.0	11 (13.8)
	p		0.505*				0.300**		0.136**		0.291**	
16	Female	14	2.79 ± 2.42			2 (14.3)	0.0 - 1.0 - 2.0	9 (64.3)	0.0 - 1.0 - 2.0	9 (64.3)	0.0 - 0.0 - 0.0	-
	Male	25	4.24 ± 3.17			3 (12.0)	1.0 - 2.0 - 4.0	19 (76.0)	0.0 - 1.0 - 2.0	14 (56.0)	0.0 - 0.0 - 0.0	5 (20.0)
	Σ	39	3.72 ± 2.97	7.08	2.04	5 (12.8)	0.0 - 2.0 - 4.0	28 (71.8)	0.0 - 1.0 - 1.0	23 (59.0)	0.0 - 0.0 - 0.0	5 (12.8)
	p		0.145*				*0.059***		0.631**		*0.078***	
17	Female	10	3.70 ± 2.41			1 (10.0)	0.0 - 1.5 - 3.0	6 (60.0)	0.0 - 1.5 - 2.0	7 (70.0)	0.0 - 0.0 - 0.0	2 (20.0)
	Male	10	4.90 ± 4.95			1 (10.0)	0.0 - 1.0 - 3.0	6 (60.0)	0.0 - 0.5 - 2.0	5 (50.0)	0.0 - 0.0 - 0.0	4 (40.0)
	Σ	20	4.30 ± 3.84	9.0	2.29	2 (1.1)	0.0 - 1.0 - 3.0	12 (60.0)	0.0 - 1.0 - 2.0	12 (60.0)	0.0 - 0.0 - 1.0	6 (30.0)
	p		0.500*				0.969**		0.691**		0.400**	
12-17	Female	385	2.46 ± 2.38			98 (25.4)	0.0 - 1.0 - 3.0	241 (62.6)	0.0 - 0.0 - 1.0	119 (30,9) (30,9)	0.0 - 0.0 - 0.0	53 (13.8)
	Male	348	2.86 ± 2.89			79 (22.7)	0.0 - 1.0 - 3.0	227 (65.2)	0.0 - 0.0 - 1.0	124 (35,6)	0.0 - 0.0 - 0.0	51 (14.7)
	Σ	733	2.65 ± 2.64	5.58	1.19	177 (24.2)	0.0 - 1.0 - 3.0	468 (63.8)	0.0 - 0.0 - 1.0	243 (33,2)	0.0 - 0.0 - 0.0	104 (14.2)
	p		0.124*				0.191**		0.236**		0.731**	

f_i= simple absolute frequency; SD = standard deviation; Med = median; Q_i= quartiles; * Student's t-test; ** Mann-Whitney non-parametric test.

Table 3 -Frequency of treatment needs for dental caries in primary dentition in the age group of 6 to 11 years old and in permanent dentition in the age group of 12 to 17 years old in Barreirinha, Amazonas.

Age	n	No need	Restorations 1 Surface	Restorations 2 or more Surfaces	Pulpar Treatment plus restoration	Extraction	*p**
		f_i (%)	f_i (%)	f_i (%)	f_i (%)	f_i (%)	
6	151	50 (33.1)	80 (53.0)	54 (35.8)	4 (2.6)	44 (29.1)	
7	194	36 (18.6)	118 (60.8)	103 (53.1)	8 (4.1)	75 (38.7)	
8	207	50 (24.2)	108 (52.2)	83 (40.1)	16 (7.7)	80 (38.6)	
9	181	42 (23.2)	89 (49.2)	61 (33.7)	20 (11.0)	68 (37.6)	
10	189	66 (34.9)	87 (46.0)	44 (23.3)	12 (6.3)	51 (27.0)	
11	173	53 (30.6)	81 (46.8)	27 (15.6)	16 (9.2)	48 (27.7)	
Total	**1,095**	**297 (27.1)**	**563 (51.4)**	**372 (34.0)**	**76 (6.9)**	**366 (0.3)**	*0.00*
12	231	94 (40.7)	101 (43.7)	31 (13.4)	26 (11.3)	45 (19.5)	
13	204	72 (35.3)	107 (52.5)	19 (9.3)	23 (11.3)	49 (24.0)	
14	159	50 (31.4)	82 (51.6)	24 (15.1)	21 (13.2)	47 (29.6)	
15	80	24 (30.0)	40 (50.0)	11 (13.8)	15 (18.8)	30 (37.5)	
16	39	10 (25.6)	19 (48.7)	6 (15.4)	9 (23.1)	13 (33.3)	
17	20	8 (40.0)	7 (35.0)	2 (10.0)	1 (5.0)	7 (35.0)	
Total	**733**	**258 (35.2)**	**359 (50.0)**	**93 (12.7)**	**95 (13.0)**	**191 (26.1)**	*0.00*

f_i= simple absolute frequency; * Pearson's chi-square statistical test.

Table 4 – Distribution of students by age according to Visual Deficit (right and left eyes) in Barreirinha, Amazonas.

AGE GROUP	n	RIGHT EYE	p*	LEFT EYE	*p**
		<0.8 f_i (%)	0,911	<0.8 f_i (%)	0.938
6	24	3 (12.5)		4 (16.7)	
7	56	3 (5.4)		3 (5.4)	
8	126	9 (7.1)		9 (7.1)	
9	153	10 (6.5)		12 (7.8)	
10	156	12 (7.7)		11 (7.1)	
11	164	5 (3.1)		6 (3.7)	
6 to 11	679	42 (6.19%)		45 (6.63%)	
12	229	17 (7.4)		18 (7.9)	
13	202	12 (5.9)		10 (4.9)	
14	159	10 (6.3)		12 (7.6)	
15	79	3 (3.8)		6 (7.6)	
16	39	2 (5.1)		3 (7.7)	
17	20	-		-	
12 to 17	728	44 (6.04%)		49 (6.73%)	
TOTAL	1407	86 (6.11%)		94 (6.68%)	

* Pearson's chi-square statistical test.

Table 5 - Distribution of the frequency of students regarding sex, type of school and age according to Visual Acuity and Dental Caries in Barreirinha, Amazonas.

Variables	n	Low Visual Acuity (< 0.8) f_i (%)	Normal Visual Acuity (≥ 0.8) f_i (%)	*p*
Gender				0.288*
Female	745	68 (9.1)	677 (90.9)	
Male	662	50 (7.6)	612 (92.4)	
Total	**1,407**	**118 (8.4)**	**1,289 (91.6)**	
Schools				*0.097**
State	745	71 (9.5)	673 (90.5)	
Municipal	662	47 (7.1)	616 (92.9)	
Total	**1,407**	**118 (8.4)**	**1,289 (91.6)**	
Ages				0.318**
6-11 years	679	57 (8.4)	622 (91.6)	
12-17 years	728	61 (8.4)	667 (91.6)	
Average ± SD		11.2 ± 2.5	11.4 ± 2.5	
Total	**1,407**	**118 (8.4)**	**1,289 (91.6)**	
Dental cavity				
dmf-d < 1	262	18 (31.6)	244 (39.2)	0.256*
dmf-d ≥ 1	417	39(68.4)	378 (60.8)	
DMF-D < 1	177	14 (23.0)	163 (24.4)	0.796*
DMF-D ≥ 1	551	47 (77.0)	504 (75.6)	

f_i= simple absolute frequency; * Pearson's chi-square statistical test, ** Student's t-test for comparison of averages.

well as in Indaiatuba (SP) DMF-D 2.50 (SC index 5.97).[29]Being evidenced in this study an unharmonious distribution of dental caries and reinforcing the importance of planning appropriate strategies aimed at this group with the highest concentration of the disease, aiming to reduce the prevalence and the severity of tooth decay.[10,12]

The gender variable showed significance in relation to the studied outcome, diverging from the results found in other studies.[4,10,25,28,29] However, it is known that teeth eruption often occurs, first in females and, depending on the analyzed age and/or level of caries experience, differences can be found regarding gender according to the risk related to the time of exposure of the teeth.[30]

It is noteworthy that, in this study, the need for restorative treatment is the most evident. This can be explained due to a high repressed demand in the municipality without access to PHC, corroborating the results found in children and adolescents aged 2 to 13 years in Camaragibe (PE),[31] in twelve-year-old schoolchildren in Indaiatuba (SP)[29] and also in schoolchildren aged 6 to 11 and 12 to 17 years in Barcelos (AM), showing the need for more conservative dental treatment.[12] However, it was found regarding permanent dentition a significant percentage of adolescents with indication for pulp and extraction treatment, suggesting that these teeth stopped being restored at a certain moment and now need less conservative treatment,[12] which increases the occurrence of edentulism in the adult and elderly age of these young ones. In this sense, it is recommended to expand the coverage of the municipality's FHS and to strengthen the interprofessional work of health teams, contributing both to the prevention of the occurrence of the disease in children and adolescents, as well as minimizing the sequelae produced and the needs of invasive treatments. Until the year 2017, the headquarters of the municipality had only three OHT inserted in the FHS. Furthermore, although the municipality does not have the benefit of fluoridation of public water supply, this public health technology used for over half a century in Brazil must be implemented in order to reduce the burden of disease on the most affected pole, due to its proven preventive effectiveness.[26,27,32]

A study carried out in OHT throughout the country found that 45.1% of the Brazilian population has difficulties accessing dental appointments, 34.5% are unable to schedule appointments and 20.4% have never sought care. The study also informed that the demand organization is one of the problems found in public health services, since they are directed to attendance by free demand, whose main problems are mutilating assistance practice and those services in which the attendance only occurs in a programmed way, when access restriction is the main problem.[33] One of the great challenges of sectorial management is to produce mechanisms that induce the reorganization of the work process and to create participatory and integrated forms of entry that expand access, guaranteeing comprehensiveness, humanized care and health promotion.[33,34]

Visual screening is one of the most important tools for the prevention of blindness.[5] The greater the delay in detecting visual impairments, the lower the chances of recovery and correction of the problem, since it can be corrected with appropriate therapy.[35,36] Therefore, the implementation of programs related to the early detection of vision problems, in addition to being less costly than those represented by the care of patients with eye disorders, contributes to a healthier population.[9,35,37]

According to data from the census of the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística – IBGE),[21] in 2010, 23.9% of the Brazilian population is visually impaired, be it total or partially. The data found in this study (8.4%) are consistent with the work of Régis-Aranha et al.[38] 6.3%; Mello et al.[9] 12.8%; Granzoto et al.[35] 15.1%; Becker et al.[36] 17.4%; Lucena et al.[37] 29.1% and Schumaher and Gasparetto[39] 26.6%. Scientific studies show that the prevalence of low visual acuity ranges from 3.5 to 34.8%,[36] therefore the present study is within the expected average.

When low visual acuity was compared with the type of school, the result of the present study corroborates the work carried out in the municipality of Onça de Pitangui, in Minas Gerais, where 30.2% of children and adolescents from state schools were diagnosed with changes in visual acuity.[40]

Bearing in mind that some studies have been discussing visual impairment and the relationship with dentistry,[19,28] the present study did not show an association between visual impairment and the occurrence of dental caries. Future studies involving samples with other ages are necessary to better understand the relationship between dental caries and low visual acuity.

This study had the following limitations: it was carried out cross-sectionally, with a convenience sample and was conducted only in the urban area of Barreirinha, which may not correspond to the reality of the municipality as a whole.

Despite the limitations, the present study is relevant for being the first to collaborate for an initial diagnosis of oral health and visual health of these students surveyed, as well as providing support for the planning of educational, preventive and curative actions directed to the health needs of these young people, aiming to reduce the negative impacts that they can cause, contributing also for the teams to offer more and more comprehensive care to the oral health of the population and not only remedy the sequels produced by the diseases.

CONCLUSION

From the results of this study, a significant number of students had a high prevalence of dental caries, as well as found an association between this disease and sex. There was also a low prevalence of visual difficulties among students enrolled in public elementary school in Barreirinha, municipality in the state of Amazonas.

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REFERENCES

1. Ministério da Saúde (BR), Secretaria de Atenção Básica, Departamento de Atenção Básica. Cadernos de Atenção Básica - Saúde na Escola [Internet]. Brasília; 2009 [citado 2020 Mar 19]. Disponível em: http://189.28.128.100/dab/docs/publicacoes/cadernos_ab/abcad24.pdf
2. Ministério da Saúde (BR). Política Nacional de Atenção Integral à Saúde da Criança: orientações para implementação [Internet]. Brasília; 2018 [citado 2020 Ago 24]. Disponível em: https://portaldeboaspraticas.iff.fiocruz.br/wp-content/uploads/2018/07/Pol%C3%ADtica-Nacional-de-Aten%C3%A7%C3%A3o-Integral-%C3%A0-Sa%C3%BAde-da-Crian%C3%A7a-PNAISC-Vers%C3%A3o-Eletr%C3%B4nica.pdf
3. Garcia LC, Uchida TH, Lima JPG, Terada RSS, Pascotto RC, Fujimaki M. Práticas de educação em saúde para a prevenção da cárie dentária: um estudo qualitativo com cirurgiões-dentistas. Rev ABENO. 2018;18(3):62-74. http://dx.doi.org/10.30979/rev.abeno.v18i3.498.
4. Barros WRC, Nascimento LS, Fontes RBC, Aguiar NL, Silva Jr IF, Souza CNP. Prevalência de cárie dentária na adolescência em Belém do Pará: uma perspectiva Amazônica. Adolesc Saude [Internet]. 2015; [citado 2020 Jul 1];1(2):59-68. Disponível em: https://cdn.publisher.gn1.link/adolescenciaesaude.com/pdf/v12n2a07.pdf
5. Pereira CFA, Costa R, Ciampo LAD, Ferraz I. Triagem de acuidade visual reduzida em uma unidade de Atenção Primaria a Saúde. Rev Bras Oftalmol. 2019;78(4):250-4. http://dx.doi.org/10.5935/0034-7280.20190138.
6. Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR et al. Oral diseases: a global public health challenge. Lancet. 2019;394(10194):249-60. http://dx.doi.org/10.1016/S0140-6736(19)31146-8.
7. Ministério da Saúde (BR), Secretaria de Atenção à Saúde, Secretaria de Vigilância em Saúde. SB Brasil 2010: pesquisa nacional de saúde bucal: resultados principais [Internet]. Brasília; 2012 [citado 2020 Mar 19]. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/pesquisa_nacional_saude_bucal.pdf
8. Freire MCM, Reis SCGB, Figueiredo N, Peres KG, Moreira RS, Antunes JLF. Determinantes individuais e contextuais da cárie em crianças brasileiras de 12 anos em 2010. Rev Saude Publica. 2013;47(3, Supl. 3):40-9. http://dx.doi.org/10.1590/S0034-8910.2013047004322.
9. Mello MAFC, Rodrigues RM, Conterno SFR, Toso BRGO, Missio L. Avaliações de saúde de escolares no programa saúde na escola. Rev Interdisciplin Estud Saúde [Internet]. 2019; [citado 2020 Jul 1];9(2):261-77. Disponível em: https://periodicos.uniarp.edu.br/index.php/ries/article/view/1546/1083
10. Brito ACM, Bezerra IM, Cavalcante DFB, Pereira AC, Vieira V, Montezuma MF et al. Dental caries experience and associated factors in 12-year-old-children: a population based-study. Braz Oral Res. 2020;34:e010. http://dx.doi.org/10.1590/1807-3107bor-2020.vol34.0010.
11. Amaral RC, Fonseca EP, Lepri CP, Assis LC, Rocha CM, Tennant M. Cárie dentária em adolescentes do Estado de São Paulo, Brasil: uma análise espacial, 2015. Adolesc Saude [Internet]. 2019; [citado 2020 Jul 1];16(4):25-35. Disponível em: https://cdn.publisher.gn1.link/adolescenciaesaude.com/pdf/v16n4a04.pdf
12. Sousa MLR, Rando-Meirelles MPM, Tôrres LHN, Frias AC. Cárie dentária e necessidade de tratamento em adolescentes paulistas. Rev Saude Publica. 2013;47(Supl. 3):50-8. http://dx.doi.org/10.1590/S0034-8910.2013047004340.
13. Demeu AJM, Viudes LP, Barbosa LC, Nascimento VR. Prevalência de cárie em crianças do ensino fundamental de Umuarama, Paraná. Arch Health Invest. 2019;8(10):592-6. http://dx.doi.org/10.21270/archi.v8i10.3820.
14. Cardoso L, Rosing C, Kramer P, Costa CC, Costa Fo LC. Polarização da cárie em município sem água fluoretada. Cad Saude Publica. 2003;19(1):237-43. http://dx.doi.org/10.1590/S0102-311X2003000100026.
15. Gomes VE, Ferreira RC, Morais MAS, Houri LCLF, Bella MI, Cornejo LS et al. Cárie dentária na América do Sul: realidade entre escolares do Brasil e Argentina. J. Health Biol Sci. 2019;7(2):152-8. http://dx.doi.org/10.12662/2317-3076jhbs.v7i2.2570.p152-158.2019.
16. Antunes JLF, Narvai PC, Nugent ZJ. Measuring inequalities in the distribution of dental caries. Community Dent Oral Epidemiol. 2004;32(1):41-8. http://dx.doi.org/10.1111/j.1600-0528.2004.00125.x.
17. Ministério da Saúde (BR). Projeto Olhar Brasil: triagem de acuidade visual: manual de orientação [Internet]. Brasília; 2008 [citado 2020 Ago 24]. Disponível em: http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=1863-pse-manual-olharbrasil&Itemid=30192
18. Amaral A, Melão N. O perfil de saúde de crianças vigiadas em consultas de cuidados primários na cidade de Viseu, Portugal. Rev Port Saude Publica. 2016;34(1):53-60. http://dx.doi.org/10.1016/j.rpsp.2015.07.003.
19. Monteiro LPA, Pereira RM, Monteiro ACC, Costa ICC. O conhecimento de deficientes visuais em relação à saúde bucal. Rev Ciênc Plur [Internet]. 2018; [citado 2020 Jul 1];4(1):44-66. Disponível em: https://periodicos.ufrn.br/rcp/article/view/14476/9820
20. Secretaria Nacional de Promoção dos Direitos da Pessoa com Deficiência, Coordenação Geral do Sistema de Informações sobre a Pessoa com Deficiência. Cartilha do censo 2010 pessoa com deficiência [Internet]. Brasília: Secretaria de Direitos Humanos; 2012. p. 32 [citado 2020 Mar 19]. Disponível em: https://docplayer.com.br/239748-Cartilha-do-censo-2010-pessoas-com-deficiencia.html
21. Instituto Brasileiro de Geografia e Estatística. Censo demográfico 2010 [Internet]. Rio de Janeiro: IBGE; 2010 [citado 2020 Mar 19]. Disponível em: https://www.ibge.gov.br/pt/inicio.html
22. Ministério da Saúde. Informação e Gestão da Atenção Básica. Relatórios públicos dos Sistemas da Atenção Básica [Internet]. Brasília: Cobertura

da Saúde Bucal; 2017 [citado 2020 Mar 19]. Disponível em: https://egestorab.saude.gov.br/

23. Programa das Nações Unidas para o Desenvolvimento. Brasil: Ranking IDHM Municípios [Internet]. 2010 [citado 2020 Mar 19]. Disponível em: https://www.br.undp.org/content/brazil/pt/home/idh0/rankings/idhm-municipios-2010.html
24. World Healt Organization. Oral health surveys: basic methods. Geneva: WHO; 2013.
25. Frazão P, Santos CRI, Benicio DEDA, Marques RAA, Benício MHDA, Cardoso MA et al. Cárie dentária em escolares de 12 anos de idade em município sem água fluoretada na Amazônia Ocidental brasileira, 2010. Epidemiol Serv Saude. 2016;25(1):149-58. http://dx.doi.org/10.5123/S1679-49742016000100015.
26. Narvai PC, Frias AC, Fratucci MVB, Antunes JLF, Carnut L, Frazão P. Fluoretação da água em capitais brasileiras no início do século XXI: a efetividade em questão. Saúde Debate. 2014;38(102):562-71. http://dx.doi.org/10.5935/0103-1104.20140052.
27. Cruz MGB, Narvai PC. Cárie e água fluoretada em dois municípios brasileiros com baixa prevalência da doença. Rev Saude Publica. 2018;52:28. http://dx.doi.org/10.11606/S1518-8787.2018052016330.
28. Régis-Aranha LA, Santos STC, Magalhães WOG, Pinto ABS, Passos SMA, Monteiro AX. Dental caries and visual acuity of students in a town in west Amazon. Braz J Oral Sci. 2018;17:e18159. http://dx.doi.org/10.20396/bjos.v17i0.8653816.
29. Rihs LB, Sousa MLR, Cypriano S, Abdalla NM. Desigualdades na distribuição da cárie dentária em adolescentes de Indaiatuba (SP), 2004. Cien Saude Colet. 2010;15(4):2173-80. http://dx.doi.org/10.1590/S1413-81232010000400031.
30. Cypriano S, Hugo NF, Sciamarelli MC, Tôrres LHN, Sousa MLR, Wada RS. Fatores associados à experiência de cárie em escolares de um município com baixa prevalência de cárie dentária. Cien Saude Colet. 2011;16(10):4095-106. http://dx.doi.org/10.1590/S1413-81232011001100015.
31. Souza EHA, Oliveira PAP, Galvão PVM. Necessidade de tratamento odontológico em crianças do município de Camaragibe na faixa etária de 2 a 13 anos. Odontol. Clín. Cient [Internet]. 2012; [citado 2020 Jul 1];11(3):215-9. Disponível em: http://revodonto.bvsalud.org/pdf/occ/v11n3/a08v11n3.pdf
32. Peres MA, Liu P, Demarco FF, Silva AER, Wehrmeister FC, Menezes AM et al. Income trajectories affect treatment of dental caries from childhood to young adulthood: a birth cohort study. Braz Oral Res. 2018;32(0):e36. http://dx.doi.org/10.1590/1807-3107bor-2018.vol32.0036.
33. Casotti E, Contarato PC, Fonseca ABM, Borges PKDO, Baldani MH. Atenção em saúde bucal no Brasil: uma análise a partir da avaliação externa do PMAQ-AB. Saúde Debate. 2014;38(special):140-57. http://dx.doi.org/10.5935/0103-1104.2014S011.
34. Neves M, Giordani JMA, Hugo FN. Atenção primária à saúde bucal no Brasil: processo de trabalho das equipes de saúde bucal. Cien Saude Colet. 2019;24(5):1809-20. http://dx.doi.org/10.1590/1413-81232018245.08892017.
35. Granzoto JA, Ostermann CSPE, Brum LF, Pereira PG, Granzoto T. Avaliação da acuidade visual em escolares da 1a série do ensino fundamental. Arq Bras Oftalmol. 2003;66(2):167-71. http://dx.doi.org/10.1590/S0004-27492003000200010.
36. Becker TOF, Cortela DCB, Miura H, Matsuhara ML. Evaluation of visual acuity in municipal elementary school students. Rev Bras Oftalmol. 2019;78(1):37-41. http://dx.doi.org/10.5935/0034-7280.20190008.
37. Lucena BM, Machado LA, Barreto PMS, Tavares PM, Rodrigues AMH, Solari HP et al. Prevalência de fatores predisponentes de baixa visual em uma população de jovens do Colégio Universitário Geraldo Reis em Niterói – RJ. Rev Bras Oftalmol. 2019;78(6):380-3. http://dx.doi.org/10.5935/0034-7280.20190165.
38. Régis-Aranha LA, Moraes FH, Santos STC, Heufemann NEC, Magalhães WOG, Zacarias Fo RP et al. Visual acuity and academic performance of students in a Brazilian Amazon municipality. Esc Anna Nery Rev Enferm. 2017;21(2):e20170032. http://dx.doi.org/10.5935/1414-8145.20170032.
39. Schumaher MLN, Gasparetto MERF. Saúde ocular de escolares: atuação de enfermeiros. Rev Enferm UERJ [Internet]. 2016; [citado 2020 Jul 1];24(6):e15108. Disponível em: https://www.e-publicacoes.uerj.br/index.php/enfermagemuerj/article/view/15108/20984
40. Procópio MEN, Takahashi DM, De-Souza GFR. Avaliação da acuidade visual em escolares e adolescentes na cidade de Onça de Pitangui, Minas Gerais, Brasil. Rev Méd Minas Gerais. 2019;29:e-2033. http://dx.doi.org/10.5935/2238-3182.20190051.