Programa Pincel Mágico: evaluation of health conditions of school children from the first and second years of elementary school

Programa Pincel Mágico: avaliação das condições de saúde de escolares dos primeiro e segundo anos do ensino fundamental

Programa Pincel Mágico: evaluación de las condiciones de salud de escolares de primero y segundo años de la primaria

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ABSTRACT

Objective: To identify signs, pathological tendencies or established diseases in first and second grade students in order to promote better health practices in the school environment.

Methods: A cross-sectional study was carried out with 1,332 school children enrolled in the first and second grades of 13 schools in the Southern region of São José dos Campos (Southeast Brazil). In order to establish the students' health status, the following evaluations were conducted: visual screening, nutritional assessment, blood hemoglobin count, stool examination for parasites, assessment of the children's immunization records, hearing assessment, blood pressure test, and a pediatric appointment.

Results: Low prevalence of anemia (8.4% of the group) and parasites in the stools (2.5%) were observed. Conversely, high prevalence of excessive body weight (21.7%) was found. Among the studied children, 94.7% had their vaccinations up to date.

Conclusions: Initiatives, such as the Programa Pincel Mágico, not only identified early health-related changes in schoolchildren, but also encouraged the cooperation between the healthcare and the educational sectors, helping to build a new preventive outlook of students' health.

Key-words: school health; anemia; nutritional status; hearing; eye health; blood pressure.

RESUMO

Objetivo: Identificar sinais, tendências patológicas ou doenças instaladas na população de alunos dos dois primeiros anos do ensino fundamental para promoção de saúde no ambiente escolar.

Métodos: Estudo transversal com 1.332 escolares matriculados no primeiro e segundo ano de 13 unidades escolares da região Sul de São José dos Campos. Para diagnóstico da situação de saúde dos escolares foram realizados os seguintes exames: triagem visual, avaliação do estado nutricional, dosagem de hemoglobina no sangue e protoparasitológico de fezes, avaliação de carteiras de vacina, avaliação auditiva, aferição de pressão arterial e realização de consulta pediátrica.

Resultados: Verificou-se baixa prevalência de anemia (8,4%), de parasitoses (2,5%), mas elevada prevalência do excesso de peso corporal (21,7%). Observou-se 94,7% dos escolares com vacinação atualizada.

Conclusões: Iniciativas como o Programa Pincel Mágico identificam precocemente alterações nas crianças, permitem aproximação dos setores saúde e educação e colaboram para a construção de um novo olhar preventivo à saúde do alunado.

Palavras-chave: saúde escolar; anemia; estado nutricional; audição; saúde ocular; pressão arterial.

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RESUMEN

Objetivo: Identificar señales, tendencias patológicas o enfermedades instaladas en la población de alumnos de los dos primeros años de la primaria de São José dos Campos (SJC), para la promoción de salud en el ambiente escolar.

Métodos: Estudio transversal con 1332 escolares matriculados en los primeros y segundos años de 13 Unidades Escolares de la Región Sur de SJC. Para diagnóstico de la situación de salud de los escolares, se realizaron los exámenes a continuación: evaluación visual, evaluación del estado nutricional, dosificación de hemoglobina en la sangre y protoparasitológico de heces, evaluación de las libretas de vacunación, evaluación auditiva, verificación de presión arterial y realización de consulta pediátrica.

Resultados: Se verificó baja prevalencia de anemia (8,4% del grupo), así como de parasitosis (2,5%) y elevada prevalencia de exceso de peso corporal (21,7%). Se observó que el 94,7% de los escolares están con la vacunación actualizada.

Conclusión: Iniciativas, como el Programa Pincel Mágico, identifican tempranamente alteraciones en los niños, permiten el acercamiento de los sectores salud y educación y colaboran en la construcción de una nueva mirada preventiva para la salud de los alumnos.

Palabras clave: salud escolar; anemia; estado nutricional; audición; salud ocular; presión arterial.

Introduction

The evaluation of the health conditions of school children is an important public health tool, since it enables the early identification of signs, pathologic tendencies, or established diseases in students, guiding the appropriate intervention and minimizing impairments in health status and school performance at present or in their future development[1].

The Health Promoting Schools initiative has been set up by the World Health Organization since 1992, and was implemented by the Pan American Health Organization in Latin America and the Caribbean in 1995 with the purpose of strengthening the partnership between the healthcare and educational sectors in the promotion of school health practices[2]. In this sense, the Brazilian Society of Pediatrics, through the Scientific Paper of the School Health Department (Basic Guidelines on School Health), as well as the Health at School Program (*Programa Saúde na Escola*, PSE), Decree Law no. 6286 of 5 December 2007, signed by the President of the Republic[3], suggested strategies to assess the health conditions of this population.

As the PSE contemplates municipalities with low Basic Education Development Index (*Índice de Desenvolvimento do Ensino Básico*, IDEB), the City of São José dos Campos, state of São Paulo, Brazil, developed an interdepartmental program involving the Departments of Health and Education, named Magic Paintbrush Program, aiming to identify health conditions through an interdisciplinary approach, including activities in the welfare, education and health surveillance fields. The Magic Paintbrush Program is based on a preventive perspective, with the intention of focusing all educational actions on health and not on disease, allowing students to acquire values that propagate behaviors related to health promotion and disease prevention and control. The implementation of the present Program is justified by the fact that actions in Basic Health Units (BHUs), as well as the own community's point of view, give priority to the care of preschool children, with emphasis on children under two years of age[4].

Hence, this study aimed to identify the occurrence of the most common health problems in children entering the first grade of elementary school, an age group poorly covered by the basic health care system; additionally, in this occasion children begin to learn the alphabet, which characterizes the beginning of the educational process. In this scenario, the early identification of health conditions leads to a better learning performance and a reduction in absenteeism and drop-out levels. Thus, the following examinations for diseases directly related with school performance were included: analysis of vaccination records for the assessment of immunization history, visual screening, nutritional assessment, hearing screening, laboratory tests for anemia and intestinal parasites, and blood pressure assessment, finishing with a pediatric appointment at the BHU.

This paper presents the results of the Pilot Project of the Magic Paintbrush Program in the City of São José dos Campos, Brazil, reflecting the guidance suggested by the Brazilian Society of Pediatrics and by the Health at School Program[3], aiming to identify the occurrence of the most common health problems in children entering the first and second grades of elementary school.

Method

A cross-sectional study was conducted with children enrolled in the first and second grades of 13 municipal schools from the southern region of São José dos Campos. This city is located in the State of São Paulo, more specifically in the Paraíba Valley region, and is 91km away from the state capital. In 2000, it was ranked at the 11th position among the State's municipalities according to the Human Development Index[5].

The Brazilian Institute of Geography and Statistics estimated that, in 2007, São José dos Campos had 594,948 inhabitants, representing the most important city in the Paraíba Valley region in terms of population and development index.

In 2008, the City's Department of Education had 39 schools, with 4,888 children enrolled in the first and second grades of elementary school. The Pilot Project of the Magic Paintbrush Program evaluated 1,332 children. The southern region was chosen because it was the most populous in this age group, since it represented 41% of the total of students enrolled in the first and second grades of municipal schools.

The study variables were: vaccination records, visual screening, laboratory tests, hearing screening, blood pressure assessment, and pediatric appointment.

The analysis of vaccination records was performed in an interdepartmental partnership between the Departments of Health and Education. Similarly to previous years, the records were sent to the nearest BHU from the school and were evaluated according to the vaccination schedule of the State Department of Health in effect in 2008. The children identified with a delay in vaccination were called for update.

In order to perform visual screening, educational advisors were trained according to the methodology proposed by the State Department of Health, with the use of the Snellen Chart, following the standards of the Ophthalmology Protocol adopted by the Ophthalmology Health Center of the São Paulo State Department of Health[6]. The following criteria were considered for referral to the Ophthalmologist[6]: vision equal or below 0.7 in one or both eyes with or without signs and symptoms; difference in vision of two or more lines of Snellen Chart (e.g.: RE=0.8 and LE=1.0) between the eyes; strabismus; normal vision (higher than or equal to 0.8) with the presence of ophthalmological signs and/or symptoms (tearing, bonding of the head, continuous blinking, strabismus, headache, other).

Weight and height measurements and body mass index (BMI) calculation were performed by Physical Education teachers, trained by the City's Department of Health, following the methodology proposed by Gordon *et al*[7]. A calibrated anthropometric scale was used and children were wearing light clothing and no shoes. The classification of BMI [BMI=weight (kg)/height^2 (m)] considered the reference population of the World Health Organization[8] according to sex and age, based on the following cut-off points: overweight when BMI was between the 85th and the 97th percentile, obesity when it was above the 97th percentile, and malnutrition when it was below the 3rd percentile.

Samples for laboratory tests were collected at the schools by an employee of the Central Laboratory of the City's Department of Health. The school community received guidance on the procedures for collecting the samples, which was given to the family members who remained with the students during collection, as specified below:

- Stool examination for parasites – stools were collected as one sample, in a proper flask provided by the laboratory, dully labeled, and handed by the families to the school. We used the following methods: Faust, Ritchie, Baermann and Hoffmann.
- Hemoglobin – the staff of the Central Laboratory of the City Hall of São José dos Campos came to the schools to collect venous blood samples. The material was analyzed using the CELL-DYM RUBY automated method. We adopted the cut-off values for anemia recommended by the World Health Organization[9] (hemoglobin <11.5mg/dl for the age group under study).

As for hearing screening, a preliminary survey was conducted using a questionnaire (available with the authors) developed by the speech therapists of the Rehabilitation Units of the City's Department of Health and completed by parents with the aid of the teachers during a meeting. The analysis of this instrument was performed by the Speech Therapy team. Students whose responses were suggestive of hearing problems were referred to audiometry. Patients with changes in audiometric results were referred to the otorhinolaryngologist and provided with treatment and/or hearing aid, according to clinical indication.

Blood pressure was measured by a previously trained nursing assistant before the pediatric appointment at the BHU according to the criteria of the Brazilian Society of Pediatrics[10], described as follows: normal BP values were defined based on percentiles. Systolic and diastolic BPs were considered normal when below the 90th percentile for age, sex and height. Pre-hypertension was defined as BP values equal to or higher than the 90th percentile and lower than the 95th percentile. Pediatric hypertension was considered if BP values were equal to or higher than the 95th percentile for age, sex and height, confirmed in three subsequent occasions.

As established by the Brazilian Society of Pediatrics[10], BP was taken preferably on the right arm, with the children seated after a three- to-five-minute rest. The cuff width should equal 40% of maximum arm circumference (MAC) and its length should be between 80 and 100% of MAC, measured at the midpoint between the acromion and the olecranon. In daily practice, we chose a cuff large enough to avoid the compression of the axilla and to leave the antecubital fossa free (at least 2cm above the elbow fold) and long enough to surround the arm as much as possible, with minimal superposition.

All the children had a previously scheduled pediatric appointment at the referral BHU, following the appointment form of the Magic Paintbrush Program. A total of 11 BHUs from the southern region which had municipal schools in their catchment area took part in the Program. Children with any diagnostic suspicion were followed by the pediatrician, underwent the required complementary examinations, and were referred to the specialists as indicated by the pediatrician.

Variables were described using mean values as a measure of central tendency and standard deviations as information on data dispersion. An univariate analysis was performed with the purpose of investing the associations between the categorical variables under study (chi-square test). Calculations were performed with the aid of the Epi-Info 2000 software, considering a 5% significance level for statistical tests.

The present project was settled between the Departments of Health and Education on June 30th, 2008 and was approved by the Research Ethics Committee of Universidade de Taubaté, in accordance with the rules of the Resolution 196 of the National Health Council enacted on October 10 1996, which regulate investigations involving humans (protocol CEP/ UNITAU 003/2010).

Because the study population was vulnerable and had reduced autonomy, parents and/ or legal guardians were previously asked to sign a written informed consent, in accordance with a Consent Form, an approval letter to the School Principals, and a Consent Form for the teachers involved.

Results

The students' mean age was 7.63±0.53 years, showing no difference between mean age values according to sex (p=0.62), with a mean value of 7.63±0.47 years for boys and 7.64±0.59 years for girls.

Table 1- School children distribution according to all actions implemented by the Magic Paintbrush Program, São José dos Campos, SP, 2008

	Boys n (%)	Girls n (%)	Total n (%)	*p*-value
Medical Appointment (n=1126)				0.57
Yes	402 (70)	396 (71.7)	798 (70.9)	
No	172 (30)	156 (28.3)	328 (29.1)	
Blood Pressure (n=791)				0.60
Normal	379 (95.0)	368 (93.9)	747 (94.4)	
Hypertension	08 (2.0)	07 (1.8)	15 (1.9)	
Risk	12 (3.0)	17 (4.3)	29 (3.7)	
Hemoglobin (n=990)	496			0.98
Anemia	42 (8.5)	41 (8.3)	83 (8.4)	
Normal	454 (91.5)	453 (91.7)	907 (91.6)	
BMI (n=1110)				0.73
Underweight	34 (6.0)	38 (7.0)	72 (6.5)	
Adequate Weight	408 (72.2)	389 (71.5)	797 (71.8)	
Overweight	61 (10.8)	65 (11.9)	127 (11.4)	
Obesity	62 (11.0)	52 (9.5)	114 (10.3)	
Immunization (n=1085)				0.86
Delayed	28 (5.0)	29 (5.5)	57 (5.3)	
Up to date	527 (95.0)	501 (94.5)	1028 (94.7)	
Parasitoses (n=823)				0.35
Negative	395 (96.8)	407 (98.0)	802 (97.5)	
Ascariasis	01 (0.2)	0.0 (0.0)	01 (0.1)	
Enterobiasis	0.0 (0.0)	01 (0.2)	01 (0.1)	
Schistosomiasis	01 (0.2)	0.0 (0.0)	01 (0.1)	
Giardiasis	11 (2.7)	07 (1.7)	18 (2.2)	
Hearing Screening (n=1332)				0.55
Abnormal	339 (49.8)	314 (48.1)	653 (49.0)	
Normal	341 (51.2)	338 (51.9)	679 (51.0)	
Vision Screening (n=1037)				0.16
Abnormal	116 (22.2)	134 (26.1)	250 (24.1)	
Normal	407 (77.8)	380 (73.9)	778 (75.9)	

BMI: Body mass index

Table 1 shows the distribution of school children according to all the actions implemented by the Magic Paintbrush Program. It can be noted that the universe of students varied according to the adherence to the different actions.

In view of the age group assessed, immunization coverage may be considered good, since only 5.3% of the students have a delay in vaccination, mostly related to five-year booster shots.

A total of 24.1% of the students referred to the ophthalmologist during visual screening had visual changes. As for hearing screening, there was some suggestion of impairment in 49% of the children, who underwent audiometry, which resulted in hearing changes in 6.4% of the children, distributed as follows: 0.6% of severe cases, 1.9% of moderate/severe, 3.2% of mild/moderate, and 0.07% of mild cases.

Intestinal parasites were found in 2.5% and anemia in 8.4% of students, with a higher proportion of anemia in underweight and overweight children (Table 2), but with no statistical significance.

Hypertension was observed in a small amount of children (1.9% of the group, n=15). In regard to the distribution of hypertension according to nutritional status, two children were found to be overweight, six were obese, seven had adequate weight, and none of the children was diagnosed as underweight. A significant difference ($p<0.001$) was observed among the children diagnosed with hypertension classified according to their weight appropriateness (Table 3).

Table 2 - Distribution of school children according to anemia diagnosis and nutritional status. São José dos Campos, 2008

	Anemia		
	Yes [n (%)]	No [n (%)]	*p*-value
Underweight	08 (11.9)	59 (88.0)	
Adequate weight	54 (7.6)	655 (92.4)	
Overweight	13 (12.1)	94 (87.9)	
Obesity	08 (8.1)	90 (91.9)	
Total	83 (8.4)	907 (91.6)	0.31

Table 3 - Distribution of school children diagnosed with arterial hypertension according to classification into adequate weight and obesity. São José dos Campos, 2008

	Arterial Hypertension		
	Yes [n (%)]	No [n (%)]	*p*-value
Adequate Weight	07 (1.3%)	543 (98.7%)	
Obesity	06 (8.6%)	64 (91.4%)	
Total	13 (2.1%)	607 (97.9%)	$p<0.001$

Discussion

In the City of São José dos Campos, it was observed that excessive body weight was the main health problem among the students, as it was identified in 21.7% of the children: 11.4% for overweight and 10.3% for obesity. The prevalences of anemia and intestinal parasites showed good results and the remaining examinations were within the expected values from the literature.

The findings of the present study, in which 24.1% of the children were below the established cut-off point for referral to the ophthalmologist, were similar to the results obtained by José & Temporini[11], who identified visual changes in nearly 25% of students during vision screening. Moreover, in the validation of the test applied by previously trained teachers, compared with the assessment performed by a specialist, the authors found that teachers were correct in 87.1% of the cases, which justifies the importance of this procedure in the school environment.

An evaluation of the School Health Program of Embu, metropolitan region of São Paulo City, Brazil, indicated that 21% of the preschool children screened by previously trained teachers were referred to an ophthalmologist, and 34% of these students missed the appointment. Of the students examined by the ophthalmologist, 31% received spectacles and 15%, besides receiving spectacles, were referred to orthoptic care, resulting in an eyeglass prescription for 1389 children, 6% of the universe under study[12].

The early identification of vision problems has shown to be a crucial tool to correct and minimize future severe problems related to health and school performance, such as amblyopia and strabismus, which can cause permanent and irreversible health conditions. It is known that amblyopia is considered one of the main preventable risk factors for blindness in the world and that this intervention, when performed in more advanced age groups, results in less satisfactory outcomes[13].

A study conducted in 12.6% of elementary schools in Ribeirão Preto, state of São Paulo, Brazil, identified visual changes in 9% of first grade students, using the difficulty in reading the Snellen Chart as a diagnostic criterion, and hearing disorders in 2% of the students, evaluated with a simplified portable audiometer[14]. The authors observed that the students' families were not aware of the diagnosed hearing or visual disorders, regardless of parents' educational level, which justifies the importance of screening for these conditions in the school environment.

The World Health Organization state that 10% of the world's population have hearing problems and that the onset of deafness can occur at any age, usually causing irreversible impairment. At school age, it can lead to consequences on learning and on the whole development. Thus, in 1999 the Interministerial Ordinance MEC/MS 1487 of the "Who hears well learns better" Campaign was published, with the purpose of identifying as

early as possible students with hearing impairments[15]. In the present study, the hearing screening revealed a suggestion of hearing changes in 49% (n=653) of school children, who were referred to audiometry. However, only 20% of them attended the Service, which raised a questioning on the responsibilities in child's health care and permeates the responsibility of the State (Health Sector), both in terms of surveillance and of health promotion; however, it leads to a reflection on family's adherence related to children's needs. Hence, the strategy adopted was reevaluated and we opted to perform the examination at the schools, in order to minimize losses. After this procedure, a coverage of 77% was achieved (n=501). Among those who underwent audiometry, 17% (n=85) presented with changes, resulting in a prevalence of hearing impairment of 6.4% (n=85) in the sample (n=1332), distributed as follows: 0.6% of severe cases, 1.9% of moderate/severe cases, 3.2% of mild/moderate cases, and 0.07% of mild cases.

Excessive body weight was identified in 21.7% of the children: 11.4% of overweight and 10.3% of obesity, which was consistent with the current worldwide obesity epidemics. In Brazil, the last population-based anthropometric survey showed that 33.5% of children aged 5 to 9 years were overweight and 14.3% were obese[16]. Due to the increased prevalence of childhood overweight, today's children may not reach the same life expectancy that their parents did, which has been achieved in the last decades thanks to the medical technological advances[17], a situation that would result in regression in the human trajectory. The findings of Franks *et al*[18] provide a good picture of the above mentioned statement. In a cohort of 4857 non-diabetic Indian Americans beginning at 11.3 years of age, it was found that, after 55 years, those in the highest quartile of BMI during childhood had a rate of mortality from endogenous causes 2.3 times higher compared with those in the lowest percentiles of BMI, leading to a higher incidence of premature death among individuals with overweight during childhood.

Although the proportion of children identified with anemia (8.4%) and intestinal parasites (2.5%) was low, such diagnosis is crucial for those affected by these conditions, especially at this age, when the attendance to BHUs is lower and children are less predisposed to prophylactic interventions such as iron supplementation and treatment of worm infections. Thus, a late diagnosis would lead to more severe consequences.

The importance and the magnitude of iron deficiency anemia in Brazil was illustrated in a study conducted in the State of Paraíba, Brazil, which identified an increase in the prevalence of anemia in preschool children in over a decade of evaluation, between 1982 (19.3% of anemic children) and 1992 (36.4% of anemia)[19]. A study conducted in Jequié, state of Bahia, Brazil, where infectious diseases correspond to the second main cause of death, found parasite infections by helminths in 12.4% of students aged 7 to 17 years; in addition, 36.8% of these children who were aged 7 to 9 years presented with anemia[20]. The authors concluded that examination for anemia in school children should be part of the health surveillance in municipalities with good school attendance, since it facilitates the logistics of this procedure. An study conducted in the Northern Coast of the State of São Paulo (Ilhabela) identified anemia in 25.6% of preschool children, observing that that the higher prevalence of anemia was found in children aged 5 to 5 years and a half (36% at this age range), and excessive body weight in 20.4% of the students[21]. A secular trend analysis of anemia in the City of São Paulo in children under 5 years of age identified a significant increase in the prevalence of anemia, which increased sharply from 35.6% in the survey conducted in 1984/85 to 46.9% in the research conducted in 1995/96; in addition, this finding was observed in all age groups, in both sexes and in all economic strata of the population[22]. Recently, the Brazilian National Demographic and Health Census (*Pesquisa Nacional de Demografia e Saúde*, PNDS)[23] found a 20.9% prevalence of anemia in children under 5 years of age at the national level.

The early identification of abnormal blood pressure in childhood and its intervention are essential elements in pediatric assessment, taking into account that its occurrence is related to renal and cardiovascular risk factors, whose adequate diagnosis and treatment will lead to a reduction in future morbidity and mortality[24,25]. In the present study, pre-hypertension was found in 3.7% and hypertension in 1.9% of children. A literature review indicates that prevalences of hypertension range between 1-13% according to the methodology used, and that the higher prevalences were observed in studies in which measurements were taken on a single occasion[24]. Students in the State of Mato Grosso[26], Brazil, aged from seven to ten years, enrolled in public and private schools in the urban area of Cuiabá, Brazil, showed a 2.3% prevalence of hypertension, with no statistical difference in relation to age, sex, skin color, and type of school.

Of the children with a pediatric appointment scheduled, 70.9% attended to the consultation, and a higher frequency of upper airway diseases was identified. In these appointments, the child was globally assessed by the pediatrician, who analyzed not only the data previously collected by the Program but also the child's records and the clinical picture presented at that moment. The diagnosed diseases received the necessary follow-up, which justifies the importance of

programs like this one, since the attendance to basic care is less common in this age group.

It bears emphasizing that the present study consists of the clinical findings of a Pilot Project of a school health program conducted in the State of São Paulo and that, although the study sample represented 40% of the children enrolled in the first and second grades of municipal public schools, it may not represent the health conditions of children in this age group both in the State of São Paulo and throughout the country. Thus, the authors suggest caution when extrapolating the results, especially in regard to the comparison with futures studies, which should consider factors such as population density and human development level of the municipality.

Even so, the findings of the present study present the main illnesses identified in children entering the school system, enabling public health policies aimed at this population to be adequately oriented, especially for this age group, which historically shows low attendance to routine appointments in basic care and high attendance to the Emergency Service, due to the curative point of view. Thus, initiatives such as the Magic Paintbrush Program not only identified early pathological tendencies and established problems in the children but also encouraged the cooperation between the healthcare and the educational sectors, helping to build a new preventive outlook on students' health, both for the family and the school community.

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References

1. Sociedade Brasileira de Pediatria. Cadernos de escolas promotora da saúde – I. Rio de Janeiro: SBP; 2003.
2. Moura JB, Lourinho LA, Valdês MT, Frota MA, Catrib AM. Pespective of historical epistemology and health promotion in schools. Hist Cienc Saude-Manguinhos 2007;14:489-501.
3. Brasil. Ministério da Saúde. Organização Pan-Americana da Saúde. Escolas promotoras de saúde: experiências no Brasil [Série Promoção da Saúde n° 6]. Brasília: Ministério da Saúde, Organização Pan-Americana da Saúde; 2006.
4. Ferriani MG, Cano MA. O programa de saúde escolar no município de Ribeirão Preto. Rev Latino-Am Enfermagem 1999;7:29-38.
5. Fundação SEADE [homepage on the Internet]. Município de São José dos Campos [cited 2005 Jul 25]. Available from: http://www.seade.gov.br
6. Secretaria de Estado da Saúde São Paulo. Coordenadoria de Controle de Doenças. Centro de Vigilância Epidemiológica"Prof. Alexandre Vranjac". Centro de Oftalmologia Sanitária. Informações básicas sobre saúde ocular. São Paulo: Secretaria de Estado da Saúde de São Paulo; 2005.
7. Gordon CC, Chumlea WC, Roche AF. Stature, recumbent lenght, and weight. In: Lohman TG, Roche AF, Martorell R, editors. Anthropometric standardization reference manual. Champaign: Human Kinetics Pub; 1988. p. 3-8.
8. World Health Organization [homepage on the Internet]. Growth reference data for 5-19 years [cited 2011 Jan 12]. Available from: http://www.who.int/growthref/en/
9. World Health Organization [homepage on the Internet]. Iron Deficiency Anaemia. Assessment, prevention, and control. A guide for programme managers [cited 2011 Jan 14]. Available from: http://www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/WHO_NHD_01.3/en/index.html
10. Sociedade de Pediatria de São Paulo [homepage on the Internet]. Recomendações - atualização de condutas em pediatria, nº 34 [cited 2011 Jan 13]. Available from: http://www.spsp.org.br/spsp_2008/materias.asp?sub_secao=111&id_pagina=428
11. José NK, Temporini ER. Avaliação dos critérios de triagem visual de escolares de primeira série do primeiro grau. Rev Saude Publica 1980;14:205-14.
12. Lapa MC, Freitas AM, Pedroso GC, Furusato MA, Ventura RN. Embu seeing better: a complete eye health program proposal for preschool children. Rev Paul Pediatr 2008;26:113-8.
13. Von Noorden GK. Prophylaxis of amblyopia. J Pediat Ophthal 1964;35-8.
14. Cano MA, Silva GB. Detecção de problemas visuais e auditivos de escolares em Ribeirão Preto: estudo comparativo por nível sócio-econômio. Rev Latino-Am Enfermagem 1994;2:57-68.
15. Brasil. Ministério da Educação [homepage on the Internet]. Portaria Interministerial MEC/MS "Quem Ouve Bem Aprende Melhor" n. 1487, de 18 de Outubro de 1999 [cited 2012 May 02]. Available from: http://www.forl.org.br/campanhas_detalhes.asp?id=3
16. Brasil. Ministério do Planejamento, Orçamento e Gestão; Instituto Brasileiro de Geografia e Estatística. Pesquisa de orçamentos familiares 2008-2009. Antropometria e estado nutricional de crianças, adolescentes e adultos no Brasil. Rio de Janeiro: IBGE; 2010.
17. Nonnemaker JM, Morgan-Lopez AA, Pais JM, Finkelstein EA. Youth BMI trajectories: evidence from the NLSY97. Obesity (Silver Spring) 2009;17:1274-80.
18. Franks PW, Hanson RL, Knowler WC, Sievers ML, Bennett PH, Looker HC. Childhood obesity, other cardiovascular risk factors, and premature death. N Engl J Med 2010;362:485-93.
19. Oliveira RS, Diniz Ad Ada S, Benigna MJ, Miranda-Silva SM, Lola MM, Gonçalves MC. Magnitude, geographic distribution and trends of anemia in preschoolers, Brazil. Rev Saude Publica 2002;36:26-32.
20. Brito LL, Barreto ML, Silva RC, Assis AM, Reis MG, Parraga I *et al*. Fatores de risco para anemia por deficiência de ferro em crianças e adolescentes parasitados por helmintos intestinais. Rev Panam Salud Publica 2003;14:422-31.
21. Costa JT, Bracco MM, Gomes PA, Gurgel RQ. Prevalence of anemia among preschoolers and response to iron supplementation. J Pediatr (Rio J) 2011;87:76-9.
22. Monteiro CA, Szarfarc SC, Mondini L. Secular trends in child anemia in S. Paulo city, Brazil (1984-1996). Rev Saude Publica 2000;34 (Suppl 6):62-72.
23. Brasil. Ministério da Saúde. Centro brasileiro de análise e planejamento. Pesquisa nacional de demografia e saúde da criança e da mulher – PNDS 2006: dimensões do processo reprodutivo e da saúde da criança [Série G. Estatística e Informação em Saúde]. Brasília: Ministério da Saúde; 2009.
24. Salgado CM, Carvalhaes JT. Arterial hypertension in childhood. J Pediatr (Rio J) 2003;79 (Suppl 1):S115-24.
25. Santos AA, Zanetta DM, Cipullo JP, Burdmann EA. The diagnosis of hypertension in children and adolescents. Pediatria (São Paulo) 2003;25:174-83.
26. Borges LM, Peres MA, Horta BL. Prevalence of high blood pressure among schoolchildren in Cuiabá, Midwestern Brazil. Rev Saude Publica 2007;41:530-8.