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Optometric scale for pre-schools: method for determination of regional figures*

ESCALA OPTOMÉTRICA PARA PRÉ-ESCOLARES: MÉTODO PARA DETERMINAÇÃO DE FIGURAS REGIONAIS

ESCALA OPTOMÉTRICA PARA NIÑOS PRE ESCOLARES: MÉTODO PARA LA DETERMINACIÓN DE FIGURAS REGIONALES

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ABSTRACT

Children often show difficulties to identify optotypes in the picture scale. An experimental quantitative study with a sample of 384 randomly selected children was developed in order to identify pictures known by them and create suitable optotypes for a local reality. According to children's drawings, it was possible to realize how much the drawings were related to their daily lives. Considering the most meaningful drawings, we can mention: sun, human figure, house, cloud, tree, car, ball, star and heart. The most frequent figures were synthesized in order to make them more similar to the optotypes; the pictures were validated based on 95% confidence interval for the number of right answers: car (100%), house (98%), heart (98%), star (95%), ball (89%), flower (85%), sun (83%) and human figure (78%). In conclusion, those pictures belong to local culture.

KEY WORDS

Child.
Eye health.
Optometry.

RESUMO

As crianças muitas vezes apresentam dificuldade na identificação dos optótipos da escala de figuras. Com o objetivo de identificar figuras conhecidas das crianças e construir optótipos adequados a uma realidade local, elaborou-se um estudo quantitativo experimental, com uma amostra aleatória de 384 crianças de seis escolas. Percebeu-se, com a confecção de desenhos pelas crianças, o quanto as figuras estavam atreladas ao seu cotidiano. Como desenhos mais significativos mencionam-se: sol, boneco, casa, nuvem, árvore, carro, bola, estrela e coração. As figuras de maior freqüência foram sintetizadas na tentativa de aproximá-las de optótipos, sendo validadas com base em intervalo de confiança de 95% para o número de acertos: carro (100%), casa (98%), coração (98%), estrela (95%), bola (89%), flor (85%), sol (83%) e boneco (78%). Conclui-se que estas figuras têm aderência à cultura local.

DESCRITORES

Criança.
Saúde ocular.
Optometria.

RESUMEN

Los niños muchas veces presentan dificultad en la identificación de los optotipos de escala de figuras. Con el objetivo de identificar figuras conocidas de los niños y construir optotipos adecuados a una realidad local, se elaboró un estudio cuantitativo experimental con una muestra aleatoria de 384 niños de seis escuelas. Se percibió, con la confección de dibujos realizados por los niños, cómo las figuras estaban relacionadas a sus cotidianos. Como ejemplo de dibujos más significativos pueden citarse: el sol, muñeco, casa, nube, árbol, carro, pelota, estrella y corazón. Las figuras de mayor frecuencia fueron sintetizadas con la intención de aproximar-las de optotipos, siendo validadas con base en el intervalo de confianza del 95% para el número de aciertos: carro (100%), casa (98%), corazón (98%) estrella (95%), pelota (89%), flor (85%), sol (83%) y muñeco (78%). Se concluye que estas figuras tienen adherencia a la cultura local.

DESCRIPTORES

Niño.
Salud ocular.
Optometría.

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INTRODUCTION

Optometric scales are developed according to angular progression, linear angular relation, resolution range of visual acuity, contrast, gap between optotypes and their number in the same line and between the lines, and the ability of noticing differential visual acuity[1].

These scales consist of a white board with black pictures of different diameters called optotypes; those pictures have different characteristics according to the scale [2] and are organized in a decreasing order. Optotypes of the same size are in the same horizontal line and each one corresponds to a variable visual coefficient, from 0.1 (10%) to 1.0 (100%). The acuity is determined by the number (decimal) of the last line in which the child was able to identify all the pictures; the capacity of reading the smallest letters is classified as one (100%), that is, total sight.

Visual acuity is the capacity of visualizing the environment; observing the smallest noticeable retinal image is a way of finding it and it is measured by the smallest object that can be clearly seen at a certain distance[1].

Visual acuity failure is common in children, especially in pre-schoolers, and the optometric scale of pictures is one of the most frequently used methods to identify it; visual coefficient is determined when children identify the optotypes after they have analyzed the picture[3]; thus the result depends on the appropriate picture selection.

The test is reliable when the pictures are real, otherwise it is impractical and the cognitive aspect will overcome the visual capacity[4]. As such, that the appropriate selection of pictures is as important as physiological optical aspects used when determining visual capacity; therefore, the current optotype boards try to use symbols that are common for the worldwide universe of the children, in order to improve the test among children up to 7 years old and to extinguish cultural tendency[5] .

The concept of universal picture shapes, i.e., there are picture shapes that can be used in any part of the world, is unacceptable, because using these kinds of symbols may contribute for the lack of appropriate scales in at least one specific region of a given country. According to the professionals, there are no sure amblyopia-detection tests that can be applied to a large amount of children. As such, they are using a group of tests with cards containing letters, numbers and pictures[2] in order to minimize those matters.

Some studies present difficulties when performing the test with the scale of pictures; for example, there were obstacles for identifying the optotypes of the pictures in the scale that was adapted for the Amazonian region in Brazil. There, some children would confuse the moon with a canoe, and others did not know the Brazilian flag; that shows that even when prototypes are culturally appropriate, they must be outlined in a way that children can realize what they are[6].

It is believed that regionally-appropriate scales of pictures are more effective to detect the visual acuity of pre-school children. Thus, it is important to develop an appropriate scale for the cultural aspect of the region where the optotypes fit, especially because, when using a scale like that, the children will not show inexistent changes and will not try to guess a picture that is different from their routine. As a consequence, the professionals will be benefited with reduced risks of obtaining wrong results.

Before creating the scale, it is necessary to develop a method to validate the pictures which are going to be optotypes, because there is no appropriate method for that in the literature. Thus the children must decide which are the best outlines to identify, because cultural diversity and its aspects in each region must be considered[7].

Therefore, knowing drawings of the pre-school children's routine, turning them into optotype pictures and validating them are the objectives of the study.

It is believed that regionally-appropriate scales of pictures are more effective to detect the visual acuity of pre-school children.

METHOD

The concepts derived from visual learning were used as theoretical and methodological reference in order to develop a method to validate the pictures that will become optotypes[7-8]. The process of visualization uses ophthalmic structures; it starts when the cornea, first point of eye refraction, receives luminous stimulus, and then it goes to the retina where it is transformed into nervous stimulus and sent to the brain by the optic nerve. When the visual and neurological systems are complete, the stimuli are appropriately decoded, according to each person's visual learning.

It is not necessary to be literate to speak or understand a language; we do not need to be visually literate to send or understand messages, it is simply inherent. Child learning happens with the first interactions with the world and continues, based on the socio-economical and cultural context. After the toddler stage, from 12 to 36 months, the pre-schooling period starts. The child undergoes typical changes of that stage and parents, community and school context are going to influence him/her. This stage lasts until the child is 6 years old, and over this period the child improves his/her knowledge according to his/her development and the environment where he/she lives[9].

Thus, an experimental quantitative study was performed from March to October, 2003, where the researcher actively intervened to produce a reality phenomenon in

order to find out factors producing such phenomenon or that are produced by it[10].

Forty-three thousand, nine hundred twenty-four preschool children from public schools in Fortaleza – CE participated in this study, according to the data from 2002 census of Municipal Education Secretary[11].

Student's t-test was used to calculate the sample; the size N of the school children population is considered infinite, and n was considered to be n < 0.05N after using the formula below:

- $n = (t^2_{5\%} \times P \times Q) / e^2$, where
- t is the value of Student's t distribution, at the 5%level (t = 1.96);
- P is the ratio of school children with visual variation (P = 20%);
- Q is school children population with no visual variation (Q = 80%);
- e is the sample error (e = 4%);
- N is the value of representative sample

The variable *visual variation*, selected to calculate the size of the sample, was considered very important for the study. Nearly 20% of the school children showed the following types of visual variation: refraction errors, conjunctivitis, strabismus, consequences of visual accidents and congenital malformation; the causes vary from ecological to social factors[12].

The sample was 384 children between 4 and 6 years old from a municipal school, with their parents' approval.

There were the following stages when selecting children: 1. Stratification, according to the terms of Regional Executive Secretaries; 2. Intentional selection of schools in each region according to the way to access them and the number of students participating in the sample; 3. Specification of the groups according to pre-school age, 4, 5, or 6 years old, trying to equalize the number of students and the age.

Ethical Aspects

Ethical issues were treated in a specific way during the development of the study, based on the Resolution 196/96 of Health National Council. First, the Municipal Education Secretary in Fortaleza approved the research project, followed by the Ethic Committee from the Hospital Complex at Federal University of Ceará (no. 50/03).

Afterwards, the school principal and the parents authorized the study after knowing its goals and methodology. Next, there were meetings with the teachers, requesting their help to get the children's parents or guardians to sign the Terms of Consent.

If a child did not want to participate in any of the stages of the study, even with the consent of their parents, his/her wish was respected.

After a pre-study was performed[13], four stages for data collection were established: 1. children draw pictures freely; 2. analysis and quantitative selection of the drawings; 3. Synthesis of the selected pictures and their similarity to the optotypes; 4. children validate the pictures.

Children's free drawing

Drawings reproduce reality. When the artist draws a bird or anything else that is visually registered, he/she tries to draw it as similar as possible to its natural model. Children register visual information on paper and they can be used as reference. In a certain way, photographs could be considered more similar to natural model, but the artist's work is brighter and cleaner because he/she can control and manipulate it. It is an abstract process that will emphasize different features and important details[7].

Thus, the study dynamics were developed by using children's free drawings in the classroom. They received a blank sheet of paper with the names of the student and school, student's age and year of education and several colored pencils.

At the beginning of the activity 4-6 year old children played in order to become motivated to draw. After 15 minutes (time based on a previous study with good results[4]) the drawings were discussed in order to explain their meaning.

Analysis and Quantitative Selection of the Drawings

The second stage considered the children's knowledge of the meaning of drawing – their cognition, which is fundamental for visual learning, in order to know the frequency and cognitive aspect. The term cognition refers to the process of in which a developing individual becomes aware of the world, objects and shapes, creating the memory that can help new discoveries; it is a lifelong process and it improves as the subject matures[8].

The numbers were counted manually and the drawings were divided in two groups: collective and individual. The collective group was the total amount of pictures in the page relating the themes to the context of life. After that, the drawing repetitions of individual group were summed according to the name and shape; indefinite drawings were excluded.

Concepts of diversity and universality were applied to analyze the shape of the drawings. Diversity is about the variety or difference of the basic shape of a drawing; it involves the symbolic expression of reality to explain different meanings, standards, values and ways of life. Universality is related to overall quality, similar drawings

from different regions and cultures. The more meaningful the visual information is, more specific is its reference; the more abstract it is, the more general and comprehensive it becomes[7].

The ten most common optotypes were selected because they represent the twice the amount of optotypes found in most optometric scales with the minimum number of optotypes.

Synthesis of Selected Pictures and Their Similarity to Optotypes

The shapes of the ten most common drawings were manually counted, and pictures were created according to their main shape. Besides, when the author was collecting data and analyzing them, she was in contact with the world of the children and was able to realize which shapes were most frequent.

The Corel Draw software was used to turn the pictures into possible optotypes and the most common shape of each drawing was re-drawn in black, in order to facilitate the necessary contrast to assess visual acuity.

Children Validating Pictures

In this stage there were only 142 four year old children who were part of the sample of 384 children, because it was possible to notice that age was directly related to the rate of correct answers in a previous study[13]; the older the child is, better the rate of correct answers. Since the authors are looking for pictures with the highest rates of correct answers, the pictures most often guessed correctly by the younger children can be considered to be validated. The higher the rate of correct guesses and the younger the child is, the higher the assurance of it being a good picture.

In this case the goal was to investigate the child's perception of the pictures and register the rate of correct guesses in a playful context, by using a *guessing game*. Since they are pre-school children, it is difficult to understand their messages only through oral context, so a stimulus is necessary to appropriately obtain data[14]. After elaborating the board, the children were approached in a playful contact in a separate room. The drawings were shown to each of them and they were supposed to answer what it was with no interference. The other children of the sample were with the teacher playing school games.

There was a 95% confidence interval for the number of correct guesses of the pictures in order to select which ones would participate in the scale; only pictures with higher or equal percentages of the interval were chosen. Spearman's r_s correlation coefficient was calculated to check whether or not there were correlations between the *drawings* and the *pictures*.

SPSS, version 10.1, was used to describe and discuss the results and to process the collected data; afterwards the results were analyzed and shown in tables–.

RESULTS

The results were presented according to the order of data collection.

Children's free drawings

There were 384 children creating their own drawings individually, but observing their colleagues' drawings and exchanging ideas. Besides, most children created their drawing by themselves. Even if two classmates drew a house, it would have different characteristics.

Many children drew more than one picture and if they were not repeated, they would have been selected. Even when a drawing looks like a house and the child says it is a church, the child's perception is considered. Few children had this kind of perception, though.

Some children, especially the 4-year-old ones, only scribbled on the paper during the activity, and, when questioned about their work, they answered that they did not know what it was or they were quiet. Other children's papers were left blank and they were also quiet; their attitude was respected because it is only possible to understand shapes or ordination if they are defined.

In this study, the drawings of children who were at least 5 years old start to show outlines and details, but most of these characteristics showed up in the works of 6-year-old children. Before that age, the child knows how to appropriately use all language elements, save exceptions to rules. He/she is able to define simple words, describe their use or general group of classification and not only their physical appearance[9].

Most six-year-old children from elementary schools created determined and meaningful drawings; it happens because, at that time, the child has good motor control, can write his/her first name and other words and can add three or more details to the drawings; they know 2,100 words, talk like adults and recognize primary colors; they can count to ten and they start to develop the ability of reasoning[9].

Analysis and Quantitative Selection of the Drawings

The drawings were divided according to life context, because it would be possible to relate the existence to the environment and culture of the children in the study belong.

There were 190 (100.0) types of drawings elaborated by 384 children. It is important to say that Table 1 mentions each drawing only once. For example, the group *celestial elements* represents the following drawings: sun, moon, cloud, star and meteor. In relation to how many times the drawings were in the paper, some of them were more common: the sun (216), the human figure (186), the house (166), the cloud (166) and the tree (106). So they were selected for the scale of pictures.

Table 1 - Groups of drawings made by 4 to 6 year old children from municipal schools - Fortaleza - 2003

	n	%
Household gadgets	33	17,4
Animals e arthropod	29	15,3
Geography	15	7,9
Food	14	7,4
Plants	14	7,4
Toys	14	7,4
Human being	13	6,8
Transportation	12	6,3
Children cartoons or stories	10	5,3
June festivals	7	3,7
Personal accessories	7	3,7
Letters, numbers and geometrical drawings	7	3,7
Visited places	6	2,5
Celestial elements	5	3,2
Others	4	2,0
Total	190	100,0

Since it had been pre-established that ten drawings would be selected for the next stage, the following pictures were included: flower (68), car (34), ball (25), star (24) and heart (21).

Synthesis of Selected Pictures and Their Similarity to Optotypes

The optotype shapes followed the children's designs with some adaptations in order to make them clearer and noticeable at a distance, as shown in Figure 1.

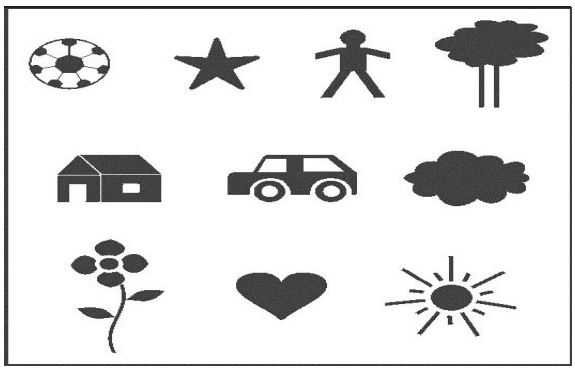

Figure 1 - Selected pictures and how similar they are to optotypes - Fortaleza - 2003

The shape of the drawing that was transformed into optotype depended on the amount of times it showed up on the paper. Two hundred out of 216 drawings of the sun were a ball surrounded by some rays; 186 drawings of human figures showed only the characteristics of the head, torso and limbs; the walls and the roof of 140 drawings out of 167 drawings of a house were the same; one hundred sixty-six drawings of the cloud were the same shape.

There were 106 drawings of the tree and all of them had the same stem and crown; there were 61 drawings of flowers, 58 of them were the same and three had different kinds of petals but similar stem and leaves; 34 children drew the car, but 30 of them had similar drawings.

There were 25 drawings of a ball and all of them were a circle, and 8 had some features lines inside. There were 24 stars and most of them had five points, which is very common in children books from schools in Fortaleza; twenty-one drawings of hearts had the same characteristics.

Children Validating Pictures

In this stage, there were 142 four year old children, but only 80 of them participated on the study, because 54 children missed the class on the day of the data collection, two had abandoned school, five did not want to participate and one was excluded because he/she did not answer any of the questions about the pictures.

Pictures were placed two by two on the level of the child's sight and he/she answered what the pictures were. Each child took a short time to answer and that helped the development of the study.

Table 2 shows 80 students in six schools and that corresponds to the highest number of correct answers per picture.

Table 2 - Number of correct answers according to the pictures of children from municipal schools - Fortaleza - 2003

PICTURES	RIGTH ANSWER			
	YES		NO	
	N	%	N	%
Car	80	100	-	-
House	78	98	2	2
Heart	78	98	2	2
Star	76	95	4	5
Ball	71	89	9	11
Flower	68	85	12	15
Sun	66	83	14	17
Human Figure	62	78	18	22
Tree	54	68	26	32
Cloud	33	41	47	59

After the analysis, it was possible to state that there was an average of 83.5% of correct answers, 87% of average value and 96.4% confidence interval. Pictures having that same interval percentage or higher were selected.

Table 3 shows the relation between the order of classification of the most common drawings and the order of the identification of the pictures.

Table 3 - Order of classification of children's drawings and the number of correct answers in public schools - Fortaleza - 2003

	Drawings	Pictures
Sun	1º	7º
Human figure	2º	8º
House	3º	3º
Cloud	4º	10º
Tree	5º	9º
Flower	6º	6º
Car	7º	1º
Ball	8º	5º
Star	9º	4º
Heart	10º	2º

According to this table, there was no statistically significant correlation between *drawings* and *pictures* ($r_s = 0.422$; $p = 0.089$).

DISCUSSION

Table 1 shows that the number of different drawings in each category was the lowest, that is, most children drew similar pictures and there was similarity among the shapes of the drawings, even though the children had enough time to create different pictures.

The largest parts of the drawings were related to the cultural context and that explains their repetition; primary experience was predominant, and the design of the drawings shows that there were universal, varied, linear and detailed pictures, adapted to specific regions. Only defined shapes or orders could be noticed, so the understanding depends on limits based on cognitive aspects, observation and perception[8].

At first, children copy the drawings of others, and little by little they include their own characteristics. Therefore, the pictures show their reality. When looking at anatomical drawing of a heart and its symbol, the child will probably identify the second one as being a heart, because of the learning of shapes; there are pictures that follow the characteristics of the environment, such as birds, while others are out of that context.

Birds belong to several classifications, because knowledge of more subtle details like color, proportion, size and specific signs is necessary to distinguish a gull from a stork, for example. The basic visual information of the shape of a bird can be universal, but if a branch of olive tree is added, then it becomes the symbol of peace; in this case, some education is necessary to so that the message can be understood clearly. All that visual information is given by different levels of the experience of seeing[7].

Pre-school age is the time of discoveries, imagination, curiosity and development of socio-cultural patterns of behavior that can be seen in the repetition of the drawings[9]. It is possible to base the frequency of the drawings of the car, house, heart, star, ball, flower, sun and human figure on the environmental context, because it is linked to children's life circle. Those drawings show the view of the world and social structure in several aspects, because sharing, transmission and standardization of learning were based on life experiences of the group.

According to some experts, intelligence is not inherited; it is something that will improve in contact with the environment. The results are cognitive structures which have similar roles throughout life[15].

Following that, the most common pictures were synthesized in order to be similar to optotypes according to Figure 1; the main characteristics of each shape were kept, because human perception eliminates superficial details since there is the need of establishing the balance and other kinds of visual rationalization[7].

At first, it is necessary to know the whole shape of the image with its concrete limits, the edges, in order to relate each one of them to its details; the intervals are as important as the pictures[8].

The child starts the process of visual education before learning how to read and write. Through it, he/she learns how to create the symbols shown in the drawings and recognize them using the pictures. It is not necessary to mentally create drawings in order to know them. It is possible that a child may not be able to draw a star, but if he/she sees it, he/she will quickly recognize it because noticing the reality by illusions facilitates the perception.

Table 2 showed the number of correct answers of each picture to state the children's ability of recognizing pictures in their drawings. The rate of correct answers for each picture among the 4-year-old children can be considered for the validation supported by a 95% confidence interval of correct answers for the optotypes. In the study the drawings

were free and had their own designs inside a context. The picture symbolically represented the draw-ings, out of its context and in a different color, but had the same shape in most cases.

Table 3 is elucidative. We learned that a good drawing is not always a good picture. Drawing a car can be more difficult for a developing child than identifying it. It was found that all pictures but the house are not classified the same way as the drawings because the drawings were created in a context where they would be identified easily. However, when the pictures were analyzed separately they lost their meaning and broke their relation with the drawings. Therefore, both stages are necessary while the scale is created.

Sight is the only element that is necessary for visual comprehension. It is not necessary to be literate in order to speak or understand a language; we do not need to be visually literate to send or understand messages; all of them are human beings' intrinsic skills[7].

Visual learning happens before literacy; a child can interpret a picture or a human gesture. A person can understand and talk about his/her own world before learning how to read and to write.

Those ways of communication learned at school become gradually different and more complex; they change from motor and sensory to symbolic, and afterwards they are understood through reading and writing[8]. Symbolic knowledge is an essential part of the learning process and it assures gradual learning of new ways of expression and recognition – representation of its world.

CONCLUSION

Picture scales are still valid if they adapt the picture to the studied children's universe. This study determined a model of picture selection to create optotypes. Pre-school children validated the pictures belonging to the local culture. In the future, picture scales will be validated by another group of children in clinical condition.

The authors proposed that the method used to identify optotypes can be a strategy to create regional picture scales and, thus avoiding the mass use of visual communication, started when children expressed themselves. When children talk about their reality and identify objects from their environment, they learn and understand their own world by communicating, acquiring knowledge and exchanging with the environment.

However, the appropriate use of the picture scale depends on the characteristics of the place of the test. There must be enough light, little noise, little or no visual pollution; the room must be painted in light colors and larger than 5 meters. Separate studies that can show the ways in which the tests must be applied should be developed so that all those aspects can be known.

Thus, the examiners will not have the need to improvise, the risk of wrong results is lower and the community may rely on the examiner. Therefore, optometric scale should be used as an efficient method to identify pictures for regional pre-school children.

REFERENCES

1. Vaughan D. Oftalmologia geral. 15ª. ed. São Paulo: Atheneu; 2003.

2. Repka MX. Use of Lea symbols in young children. Baltimore: Johns Hopkins University School of Medicine; 2005.

3. Vervloed MPJ, Ormel EA, Schiphorst SMA. Measuring everyday visual discrimination in visually impaired children with the Sonksen Picture Guide to visual function. Child Care Health Dev. 2001;27(4):365-76.

4. Dantas RA, Pagliuca LMF, Oriá MOB. Escala de figuras: avaliando o método. In: Forte BP, Alves MO, Oriá MOB, editoras. Pesquisas da graduação. Fortaleza: Fundação Cearense de Pesquisa e Cultura; 2001. p. 81-5.

5. Becker R, Hubsch S, Graf MH, Kaufmann H. Preliminary report: examination of young children with Lea symbols. Strabismus. 2000;8(1):209-13.

6. Carvalho R, Garrido C. Avaliação oftalmológica primária em escolares no Estado do Amazonas. Rev Bras Oftalmol. 1993;52(5):41-3.

7. Dondis DA. Sintaxe da linguagem visual. São Paulo: Martins Fontes; 1997.

8. Ostrower F. A construção do olhar. In: Novaes A, orga-nizador. O olhar. São Paulo: Companhia das Letras; 1993. p. 167-82.

9. Whaley LF, Wong DL. Enfermagem pediátrica: elementos essenciais à intervenção efetiva. 5ª ed. Rio de Janeiro: Guanabara Koogan; 1999. Idade pré-escolar; p. 342-54.

10. Leopardi MT. Metodologia da pesquisa na saúde. Santa Maria: Palloti; 2001.

11. Fortaleza. Secretaria de Educação e Assistência Social do Município. Coordenadoria de Políticas Públicas da Educação. Censo escolar SEDAS. Fortaleza; 2003.

12. Kara-José N, Alves MR. Veja Bem - Brasil: manual de orientação. Brasília: Imprensa Oficial do CBO; 2004.

13. Dantas RA, Cardoso MVLML, Pagliuca LMF. Seleção e validação de figuras para a construção de optótipos. Nursing (São Paulo). 2004;7(68):17-22.

14. Ribeiro CA, Angelo M. O significado da hospitalização para a criança pré-escolar: um modelo teórico. Rev Esc Enferm USP. 2005;39(4):391-400.

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