96 - DECLINE OF UNDERNOURISHMENT IN STUDENTS OF PUBLIC SCHOOLS ACCORDING TO CRITERION OF CDC

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Introduction

This century has experienced an urban explosion without precedent. In Brazil, the urban population is already at 75% of the total population (Organizacion Panamericana de la Salud, 1994 apud FERRARI, 1998). Protein-energy malnutrition is generally a major contributor to morbidity in these pockets of poverty.According to the World Health Organization (WHO), more than 30% of the world's infant population is malnourished (ONÍS, 1993 apud FERRARI, 1998). In our country the prevalence of chronic malnutrition varies, according to data from the National Health and Nutrition Survery (PNSN), between 8.1% and 27.3%, depending of the region studied (IBGE, 1992 apud FERRARI, 1998).Despite ample research and the emergence of methods able to combat malnutrition, it continues to be a challenge for health-care workers due to the multifactorial causes of this pathology (FERRARI, 1998). The countries, being developed or not, being homogeneous or not, are constituted by social classes whose vunerability to nacional nourishments disorders is eminent. Inside each social class, the magnitude of undernourishment and of obesity may to be very different to children and adults, to men and women. In the countries in development, the childish undernourishment is frequently found in many forms, being that a important indicator about the health conditions and life's quality of the people (Batista-Filho, 1991). In Brasil, even though the childish undernourishment have a biggest prevalence in areas from the Northeast, there are indications of special areas of increasement of the undernourishment in low rent families in the cities of Southeast (Monteiro, 1991). Generally, researches indicate that the prevalence of undernourishment in Brasil is declining. Regional researches show that the concerned indexes have been maintenanced in some regions, in general, cores of poverty, but also have been observed the decline of the undernourishment index in Brasil (Reicchenheim, 1990). According to the Regions, the Northeast and the North have the biggest rates of childish undernourishment. In the Northeast the rate of chronic undernourishment is 18%. If, in this hand, this is the biggest percent between the Regions, must be dinstincted that, ten years ago this Region showed rates around 28% (PNSMIPF-86), so, there was a decline of more than one third in this prevalence in Northeast, according to the indicator A/I (PNSMIPF-86 in PNDS, 1997). We realized taht according to many researches, the indexes of undernourishment is declining in the Northeast, therefore this research aims to verify the index of childish undernourishment in the city of Fortaleza.

Material and Methods

Population and Sample

In the statistic point of view, we consider population as a group from all the people, we want to verify them to develop the research.When we consider only a part of them, we have a sample. In the population we get the trustworthy parameters and in the sample its estimations. Is not wise to investigate as much people as possible in pattern survey, without to do a general avaliation of the problem before, because if you get too much people the research will be expensive and too long, in the opposite way will not have the needed precision. Must be searched a balance between both situations above, so as to collect a enough number of people to garantee a certain precision and trustworthy in the estimations without waste materials and financial resources. Pattern population or sample is a part of the population, choosed according to the criterion of representative “MATTAR (2001: 133 and 136)”. The appoint must have:

- Definition of elements specification of research;
- Definition of pattern unit;
- Comprehence geographic of research;
- Period of time.

In this research the population is constictuted by students, between 6 and 7 years old, from public schools of Fortaleza, belonging to six regions according to Prefeitura Municipal de Fortaleza and Secretaria Municipal de Educação (SEDAS), distributed in the form below:

Region	Quantity of students
I	6.965
II	3.607
III	5.672
IV	2.997
V	11.999
VI	11.901
Total	43.141

Calculation of the Pattern Size

One of the most important and complex parts of the pattern survey is the moment to decide how big will be the sample aiming to get dinstinct and truthworthy results. To this research was done a proportional estratified sample of the population, then this sample was divided in layers and finally selected in an aleatory way a sample of each layer. This strategy is usually applied when the event that is being studied have distinct characteristics to different classes to divide this population. The selection process of the estratified sample happened in an alleatory way, according to the number of students in each region of the city, aiming to get a sample that really will represent the population to the research. The choose of the pattern size must be according to:

a) Value of “d”, the error of estimation;
b) The confidence coefficient desired (1-);
c) The variability of the material to de researched, according to standard error or variation coefficient;
d) The selection's cost of units from population.

The determination of the pattern size was based on this form:

$$n = [N.(N_h P_h Q_h) / N^2 V] + (N_h P_h Q_h)$$

n= Pattern size
N= Population size
P_h = Estimated variation
Q_h = Complementary estimated variation
$V = d^2/z^2$
z= Number of standard errors in the Normal distribuction
d= Estimated error

So, based on population (N) of 43.141 students from public schools of Fortaleza, with the significance level defined as 5%, so the number of standard error based on the table of Normal distribuction (z) was 1,96. Was not possible to calculate the standard error for entire research, so the variability was fixed as 0,5, that represents 50%. Finally, the estimated error foi defined as 5% by the researches involved in the research, known that this value of error would result in a sample considered good enough to reach the goal of the research. With all these data, we got the result: A sample with 381 students to be researched, that is represented below:

Regions	Quantity of students
I	61
II	33
III	50
IV	26
V	106
VI	105
Total	381

Data collect

The technic material used was: a) A flexible rule, with graduation in 1 cm, brand Easyread, model Cateb. b) A digital scale, brand Plenna, model Wind, graduated in 100 g e capacity to 150 kg. To determinate the stature was followed this procedure: The child bare-foot, heels united and put closed to the wall, that was the rule, looking forward, with the *Frankfurt* line parallel to the floor and after a maximum inhalation. To determinate the weight was adopted this procedure: The child stood up, looking forward without touch anything, wearing only light clothes. After the data collect, was applied the form: BMI (weight / stature^2, then the result was inserted in the curves of the Centers for Disease Control and Prevention (CDC) the gives the BMI for age, following the result was classified as: Undernourishment, Normal, Overweight or as Obesity.

Procedure of Analysis and Data Treatment

The analysis is first presented to all the students, then the data were crossed with the variables considered as important to the research. Was used the program Statistical Package for Social Sciences (SPSS 13.0) to the development of the distribuction of frequences with the respectives percentages, using a descriptive statistic, as measures of central tendency (average, mode, median, standard error) with variable association, and inference of data, being this last one, to verify if there is any correlation between the data, to verify the trustworthy of the relaction between them.

Results

The research verified 381 children frim the public schools. It verified 195 (51,2%) girls and 186 (48,8%) boys. The table 1 shows the sample by age and sex. May be discern certain homogeneity in the distribuction connecting age with sex. The table 2 shows the sample distribuction by sex among the regions and we may discern a homogeneity between sex and the regions.

Table 1.
Sample Distribuction according to sex and age.

Age Group	Female/ Girls		Male/ Boys		Total	
	n	%	n	%	n	%
6 a 6,4 months	37	9,71%	38	10,0%	75	19,7%
6,5 a 6,11 months	56	14,7%	53	13,9%	109	28,6%
7 a 7,4 months	40	10,5%	43	11,3%	83	21,8%
7,5 a 7,11 months	62	16,3%	52	13,6%	114	29,9%
Total	195	51,2%	186	48,8%	381	100,0%

Table 2.
Distribuction of sample according to sex and regions

Regions	Male/ Boys		Female/ Girls		Total	
	n	%	n	%	n	%
Region I	38	9,97%	23	6,03%	61	16,01%
Region II	14	3,67%	19	4,98%	33	8,66%
Region III	22	5,77%	28	7,34%	50	13,12%
Region IV	13	3,41%	13	3,41%	26	6,82%
Region V	44	11,54%	62	16,27%	106	27,82%
Region VI	55	14,43%	50	13,12%	105	27,55%
Total	186	48,81%	195	51,18%	381	100%

The table 3 classifies the BMI of the children, according to CDC. According to the sex, in the table 3 we may discern the prevalence of the normality for both sex. Also verify an index of undernourishment (8,9%) and obesity (3,1%) bigger to boys when compared with the girls.

Tabela 3
Distribuction of sample according to sex and classification of BMI, according to CDC*

Classification	Male/ Boys		Female/ Girls		Total	
	n	%	n	%	n	%
Undernourishment	34	8,9%	28	7,3%	62	16,3%
Normal	129	33,9%	148	38,8%	277	72,7%
Overweight	11	2,9%	14	3,7%	25	6,6%
Obesity	12	3,1%	5	1,3%	17	4,5%
Total	186	48,8%	195	51,2%	381	100%

* ***Centers for Disease Control and Prevention***

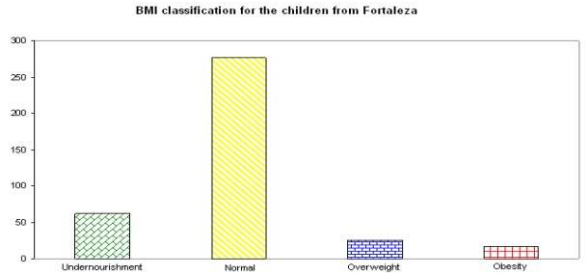
If we analyze the BMI between the regions, we find a prevalence of normality in every region of Fortaleza. About the undernourishment, was verified the biggest indexes in the regions V (3,9%) and VI (4,2%). About the overweight and obesity, we found low indexes in every regions, presenting even 0,0% as obesity index in the regions II and IV.

Table 4.
Distribuction of sample according to the Regions

Classification	Region I		Region II		Region III		Region IV		Region V		Region VI		Total N	
	n	%	n	%	n	%	n	%	n	%	n	%	%	
Undernouriment	11	2,9%	6	1,6%	13	3,4%	1	0,3%	15	3,9%	16	4,2%	62	16,3%
Normal	40	10,5%	25	6,6%	31	8,1%	22	5,8%	80	21%	79	20,7%	277	72,7%
Overweight	5	1,3%	2	0,5%	2	0,5%	3	0,8%	7	1,8%	6	1,6%	25	6,6%
Obesity	5	1,3%	0	0%	4	1%	0	0%	4	1%	4	1%	17	4,5%
Total	**61**	**16%**	**33**	**8,7%**	**50**	**13,1%**	**26**	**6,8%**	**106**	**27,8%**	**105**	**27,6%**	**381**	**100%**

Discussion

Establishing a comparation between the research developed in Feira de Santana-Bahia and this research we verify that: In Feira de Santana was found 27 (6,5%) children in overweight and 11 (2,7%) obese children, meanwhile here was verified 25 (7%) children in overweight and 17 (4%) obese children. Presenting that the incidence of obesity and overweight follows a normal parameter in some cities in the Northeast, according to bibliography (OLIVEIRA 2003). According to the *Associação Brasileira para o Estudo da Obesidade* (*ABESO*), must be expected a big number of children in undernourishment, but the research contradicted this thought, finding the number of normality bigger than the number of undernourishment, in children of the public schools of Fortaleza.



The index of undernourishment was considered high, eventhough the bibliography proves that this index is declining in the Northeast. Data from the *Instituto Brasileiro de Geografia e Estatística*(*IBGE*) shows that the undernourishment here in Northeast shows numbers similar to Guatemala, country inferior to Brasil, according to the *Índice de Desenvolvimento Humano* (*IDH*), published by United Nations in 2000. In our research, two regions got distincted by the high number of udernourished children. The regions V and VI reached togheter 31 (8%) undernourished children in all the research, the region VI was the one that verified the biggest number, 16 children in undernourishment. Even that the indexes of undernourishment have been bigger than the obesity and the overweight index, according to the bibliography the indexes reached in Fortaleza are lower than the verified in other regions of the Northeast (BENIGNA 1987,OLIVEIRA 2003,SOUZA LEÃO 2003). Meanwhile the increase of obesity should not be seen as good thing, like a kind of index of development. But particulary as the appearance of another epidemic disease, because this the way that many researchers describe the general increase of the chart of obesity that is happening nowadays (COOPER, 1992, BAR-OR, 2000, SOTELO, 2004, GUEDES 1997).

Therefore this research got to demonstrate that the index of undernourishment of the children from the public schools of Fortaleza present itself lower than in many regions of Northeast. Even this way there is not knowledge enough about the true reason for this index. They still can respresent a risk chart for children. Would be need a deeper research about the reasons of undernourishment, for then it be avoided.

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DECLINE OF UNDERNOURISHMENT IN STUDENTS OF PUBLIC SCHOOLS ACCORDING TO CRITERION OF CDC

Abstract

The undernourishment is a world problem of public health. Estimations indicate that about 100 millions of children suffer moderate or high undernourishment around the world. In some regions of Brasil more than a half of the child population shows undernourishment, mainly in the North and Northeast. Eventhough, researches in Brasil indicate a decline on undernourishment index in the Northeast from ten years ago to nowadays, from 28% to 18%. This research analizes the prevalence of normality and undernourishment in students from the public schools in metropolitan area of Fortaleza. The sample is constituted of 381 children from both sex, with age between 6 and 7 years old, selected by an aleatory way between the six regions of Fortaleza. The indexes of undernourishment, normality, overweight and obesity were done according to Centers of Disease Control and Prevention (CDC). The results showed 195 (51,2%) girls and 186 (48,8%) boys. According to Body Mass Index (BMI) was verified that; 4,6% of children are obese, 6,6% are overweight, 16,6% showed undernourishment and 72,2% are normal. Even analizing the results by regions and by sex, we verified that the normality was bigger than undernourishment, overweight and obesity. So we can conclude that Fortaleza shows a low index of undernourishment when compared to other cities of Northeast, according to bibliography. We suggest a causalistic research to identify the reasons of the undernourishment, then it can be avoided. But even with this decline, the undernourishment still constitutes a risk chart for children.

Uniterms: Undernourishment, BMI, Public Schools.

DECLÍNÍO DE DESNUTRIÇÃO EM ESCOLARES DA REDE MUNICIPAL DA CIDADE DE FORTALEZA SEGUNDO CRITÉRIOS ANTROPOMÉTRICOS DO CDC

Resumé

La dénutrition infatile est un problem mondial de la santé public. On estime que en tout le planète environ de 100 milions de enfants souffrient de la dénutrition modéré ou grave. Dans le quelques régions du Brésil plus de la moitié des enfants est desnourrie, elles sont principalment en régions Nord et Nord-Este du pays. Pourtant, études em tout le Brésil indiquent une tombe en index de dénutrition dans le région Nord-Este de dix ans derriére pour les jours d'aujourd'hui, de 28% pour 18%. Le present étude analise la prevalence de normalité et dénutrition en scolaires de la réseau municipal de Fortaleza(CE). L'amostre utilizé ces't de 381 enfants de lês deux sexs et avec âges entre 6 et 7 ans, sélectionnés de form aleatoire entre les six regionals de la ville. Les index de dénutrition, normalité, sur-poids et obésité avaient été defini d'acord avec *Centers for Disease Control and Prevention(CDC).* Les results encontrés motrent que 195(51,2%) sont du sex feminin et 186(48,8%) du sex masculine. D'acord avec le IMC nous constations que 4,6% des enfants sont obèse, 6,6% avec sur-poids, 16,3% desnourriées et 72,7% sont en bande de la normalité. Même avec analise des dés pour régionals et sex, nous constations que la normalité a éte toujours supérieur la dénutrition, sur-poids, e obésité. Donc, nous pussions conclure que la Ville de Fortaleza présente um bas index de dénutrition em comparasion avec autres villes du Nord-Este, seconde études réalisés. Nous suggérions aussi, um étude casuel pour l'identification des causes de la dénutrition pour que cette puísse etre evité, dejá qui même avec diminution de votre incidence elle encore constitue une situation de risque pour les enfants.

Mots clé: Dénutrition, Idex de Masse Corporel(IMC), Écoles Municipals

DECLÍNÍO DE LA DESNUTRICIÓN EN PERTENECER A LA ESCUELA DE LA RED MUNICIPAL DE LA CIUDAD FORTALEZA SEGUN CRITERIOS ANTROPOMÉTRICOS DEL CDC

Resumen

La desnutrición infantil es un problema mundial de la salud pública. Son la estima que en el mundo entero cerca de 100 millones de niños sufren de la desnutrición moderada o seria. En algunas regiones del Brasil más de la mitad de los niños es desnutrida, estando principalmente en las regiones norte y nordeste del país. Sin embargo, estudios en todo el Brasil detrás del punto a la caída en el índice de la desnutrición en la región nordestal de diez años con respecto al presente, del 28% para el 18%. El actual estudio analiza el predominio de la normalidad y de la desnutrición en pertenecer a la escuela de la red municipal de Fortaleza (CE). La muestra usada consiste en 381 niños ambos los sexos y con edades entre 6 y 7 años, el aleatoriamente elegido de los equipos entra en seis las regionales de la ciudad. Los índices de la desnutrición, de la normalidad, del exceso de peso y del obesidade habían sido definidos de acuerdo con Centers for Disease Control and Prevention (CDC). Os había divulgado que 195(51,2%) él está del sexo femenino y 186(48,8%) del sexo masculino. De acuerdo con el IMC, evidenciamos que 4,6% de los niños son obesas, 6,6% con exceso de peso, 16,3% estan desnutridas y 72,7% se presentan en la venda de la normalidad. Exactamente analizando los resultados por regionales y el sexo, verificamos que la normalidad era siempre superior la desnutrición, el exceso de peso y el obesidade. Por lo tanto, podemos concluir que la ciudad de Fortaleza esto que presenta un índice

bajo de la desnutrición al comparar con otras ciudades nordestales, según llevado con estudios. También sugerimos, un estudio del causalístico para la identificación de las causas de la desnutrición para poder prevenir esto, puesto que con la reducción de su incidencia todavía constituye exactamente una situación del riesgo para los niños.

Llave de las palabras: Desnutrición, índice municipal de Mass corporal (IMC), escuelas.

DECLÍNÍO DE DESNUTRIÇÃO EM ESCOLARES DA REDE MUNICIPAL DA CIDADE DE FORTALEZA SEGUNDO CRITÉRIOS ANTROPOMÉTRICOS DO CDC

Resumo

A desnutrição infantil é um problema mundial de saúde pública. Estima-se que no mundo inteiro cerca de 100 milhões de crianças sofram de desnutrição moderada ou grave. Em algumas regiões do Brasil mais da metade das crianças é desnutrida, sendo principalmente nas regiões Norte e Nordeste do país. Entretanto, estudos em todo Brasil apontam uma queda no índice de desnutrição na região Nordeste de dez anos atrás para os dias de hoje, de 28% para 18%. O presente estudo analisa a prevalência de normalidade e desnutrição em escolares da rede municipal de Fortaleza (CE). A amostra utilizada constitui-se de 381 crianças de ambos os sexos e com idades entre 6 e 7 anos, selecionados aleatoriamente entre as seis regionais da cidade. Os índices de desnutrição, normalidade, sobrepeso e obesidade foram definidos de acordo com *Centers for Disease Control and Prevention(CDC).*Os resultados encontrados revelaram que 195(51,2%) são do sexo feminino e 186(48,8%) do sexo masculino. De acordo com o IMC, constatamos que 4,6% das crianças estão obesas, 6,6% com sobrepeso, 16,3% desnutridas e 72,7% apresentam-se na faixa de normalidade. Mesmo analisando os resultados por regionais e sexo, verificamos que a normalidade sempre foi superior a desnutrição, sobrepeso e obesidade. Portanto, podemos concluir que a cidade de Fortaleza esta apresentando um baixo índice de desnutrição quando comparando a outras cidades do Nordeste, segundo estudos realizados. Sugerimos também, um estudo causalístico para a identificação das causas da desnutrição para que esta possa ser evitada, já que mesmo com a diminuição de sua incidência ela ainda constitui uma situação de risco para as crianças.

Palavras chave: Desnutrição, Índice de Massa Corporal(IMC),Escolas Municipais.