

The Current Situation of Anemia and Zinc Deficiency of Children Ages 6-59 Months with Anorexia WHO Examined at National Institute of Nutrition

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ABSTRACT

Nowadays, children have lots of diseases, esp in field of nutrition. The purpose of this study is to determine the status of anemia and zinc deficiency of children with anorexia aged 6-59 months at the Department of Nutrition Counseling No2, National Institute of Nutrition in 2014. Through using proper research methods and subjects such as cross-sectional study and the description was conducted on 466 children with anorexia aged 6-59 months at the Department of Nutrition Counseling No2, National Institute of Nutrition in 2014. Research results indicate that 47% of anorexia children had anemia and 43.8% Anorexia children have zinc deficiency and 21% of anorexia have both anemia and zinc deficiency.

Keywords: Anorexia, anemia, zinc deficiency, National Institute of Nutrition

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INTRODUCTION

Anorexia is a common situation among children around the world. There are many concepts about unusual eating behaviors in children such as eating disorders, anorexia, and difficulty feeding. The vast majority of authors agree that the concept of anorexia and eating difficulties have in common with regard to eating less. Some authors define anorexia as inadequate eating, picky food, frequent slow eating and lack of interest. According to studies of the Institute of Nutrition, anorexia is also one of the most common reasons that parents bring their children to the Center for counseling, nutritional rehabilitation and obesity control accounting for 40-45%. There is evidence that anorexia leads to a reduction in the diet of nutrients and is the cause of slow growth, malnutrition, nutrient deficiency (anemia and zinc deficiency ...). In Vietnam, there are a few studies on the nutritional status of anorexia children and no studies on micronutrient status of anorexia children. However, studies have shown that malnutrition is a common condition among children who lack anorexia. Some studies in the country have shown that the rate of anorexia in children ranges from 38-77% depending on study subjects.

Previous studies

Moreover, some studies also showed that zinc deficiency, anemia is a fairly common condition in children under 5 years old in the community. Research by Nguyen Van Nhien (2008) shows that the rate of zinc deficiency among children under 5 years old in rural areas is 86.9%. The results of the SEANUTS study showed that the rates of anemia among children under 6 years old in cities and rural areas were 19.3% and 38.8% respectively. Research by author Truong Tuyet Mai (2013) on 112 stunted malnourished subjects 1-3 years old showed that the rate of serum zinc deficiency is 23.7%.

For the above reasons, we conducted the topic: "Evaluation of anemia and zinc deficiency status of children aged 6-59 months with anorexia at the National Institute of Nutrition in 2014".

Bains et al (2015) showed that 65% of 2- to 5-year-old children had dietary zinc adequacy. Serum zinc values below normal values were 17.9%, whereas 84.6% and 71.8% of children had low serum iron and serum ferritin levels, respectively. The raised soluble transferrin receptors were found in 79.8% of children. Anemia was

found in 55.8% children, of which 20.2%, 33.0%, and 2.9% of children were mildly, moderately, and severely anemic, respectively.

In addition, Atasoy and Bugdayci (2012) implicated that anemia associated with zinc deficiency could not be simply an anemia from iron deficiency but an anemia from deficiency of zinc itself. The results pointed out the concept of zinc deficiency anemia in healthy school children which was not described before. Smaller head circumferences in zinc deficient children might contribute to cognitive deficiencies.

Then, Ergun et al (2018) found that Fe deficiency and Fe deficiency anemia increased in patients with zinc deficiency. Besides, Palacios et al (2019) suggest that micronutrient deficiencies coexist in Guatemalan rural children, and zinc deficiency is associated with anaemia in children <24 months, highlighting the need of continued multidisciplinary interventions with multiple micronutrients. Further research examining how household composition, feeding practices, and accessibility to micronutrient supplements and to animal source foods is needed to incorporate strategies to improve the nutritional status of Guatemalan children.

RESEARCH METHODS

1. Research subjects

* Standard selection:

Children from 6-59 months old who came to consult and consult about nutrition at the Department of Nutrition Counseling No2, National Institute of Nutrition in 2014 were diagnosed with anorexia during the study period, and their parents agreed to participate in the study.

Anorexia diagnosis: if the child has 1 of the following 4 criteria:

-Anorexia is a decrease or loss of appetite in young children, preventing the child from getting enough food as needed.

-When eating does not meet the required amount of age,

-The eating time lasted for more than 30 minutes

-Often picky about food, eat slowly and not enjoy eating

Only taking data for the first time for children who visited many times during the study period.

* Exclusion criteria:

Children of inappropriate age, with defects ...

2. Research method

2.1. *Research design:* Cross-sectional descriptive study

2.2. *Sample size:* Formula

$$n = Z^2(1-\alpha/2) \frac{p(1-p)}{d^2}$$

n: sample size needed

p: malnutrition rate

$\alpha/2$: statistical significance level

Z $1-\alpha/2$: Limit value of confidence

Estimated child malnutrition rate is 31% based on research results of LTK Dung in 2013.

The limit value of confidence: Z(1- $\alpha/2$) = 1,96 at which $\alpha = 0,05$

Accuracy desired (d): 0,05

n= 423 children

The estimated dropout rate = 10%

The sample size needed to assess the nutritional status of children with anorexia under 6-59 years old visited at the Department of Nutrition Counseling No2, National Institute of Nutrition is 466 children.

2.3. *Biochemical indicators of blood*

+ Blood sample collection:

The subjects were taken 3 ml of venous blood and divided into 2 tubes: one tube with anticoagulant for Hb test and 01 tube was centrifuged after 3 hours at the rate of 3000 rpm for serum collection. Serum samples were kept at 40 ° C and transported during the day to the laboratory for zinc analysis.

The analytical instruments used for zinc quantification were rinsed with 1% hydrochloric acid and dried before use to eliminate zinc contamination from the environment.

+ Biochemical indicators of blood:

Hemoglobin (Hb), Iron, and zinc serum were analyzed at Labo Dr Lab (91, Nguyen Ngoc Vu, Trung Hoa, Cau Giay, Hanoi)

Hb: determined by the Cyamet-hemoglobin method, using the Walko reagent (Japan).

Serum zinc: quantified by turbidity measurement.

Result comment:

Anemia when Hb <110 g / l [15]

Low serum zinc or zinc deficiency when <10.71 $\mu\text{mol/L}$ in morning and < 9,9 $\mu\text{mol/L}$ on afternoon.

2.4. *Study location and time*

Research location: Department of Nutrition Counseling No2, National Institute of Nutrition at 91 Nguyen Ngoc Vu, Trung Hoa, Cau Giay, Hanoi.

Time for data collection: from July 2014 to November 2014.

3. Data analysis

Data after being collected and cleaned are entered and processed on Epi-data software. Data are analyzed and presented by means, rates, frequency tables, and charts. Use suitable parametric and non-parametric statistical tests.

When p <0.05 is considered statistically significant.

4. Ethical consideration

The research procedure was approved by the ethical commission of the National Institute of Nutrition, Hanoi, Vietnam. Written informed consent was provided by each participant before entering the study.

RESEARCH RESULTS

Table 1. The incidence of anemia, zinc deficiency and iron deficiency anemia among children with anorexia by age group

Indice	Age group (n=466)											
	06-11 months		12-23 months		24-35 months		36-47 months		48-59 months		Total	
	n=140	%	n=166	%	n=64	%	n=56	%	n=40	%	n=466	%
Anemia	62	44,3	78	47,0	29	45,3	30	53,6	20	50,0	219	47,0
Zinc deficiency	68	48,6	66	39,8	34	53,1	23	41,1	13	32,5	204	43,8
Anemia and zinc deficiency	30	21,4	28	16,9	15	23,4	20	35,8	5	12,5	98	21,0

Table 1 showed that: 466 children participated in the study, there were 219 children with anemia, accounting for 47.0%, 204 children with zinc deficiency accounting for 43.8%, 98 children with zinc deficiency and iron deficiency accounting for 21%.

Table 2. Rate of anemia and zinc deficiency among anorexia children by nutritional status (n = 466)

Indice	Nutrition status						Total	
	Normal		Malnutrition		Overweight - obesity		n=466	%
	n=344	%	n=118	%	n=4	%		
Anemia	168	48.8	51	43.2	0	0	219	47.0
Zinc deficiency	151	43.9	51	43.2	2	50.0	204	43.8
Anemia and zinc deficiency	58	16.9	40	33.9	0	0	98	21.0

Table 2 showed that the rates of anemia, zinc deficiency and zinc deficiency anemia in children with normal

nutritional status were 48.8%, 43.9% and 16.9%, respectively.

The rates of anemia, zinc deficiency and zinc deficiency anemia among children with malnutrition were 43.2%, 43.92% and 33.9%, respectively.

Children who are overweight have a reported zinc deficiency of 50%.

Table 3. Prevalence of anemia and zinc deficiency among children by anorexia classification (n = 466)

The analysis results in Table 3 noted that the rate of anorexia related to food conversion with anemia was 48%, zinc deficiency was 20% and both zinc and anemia deficiency were 20%. The rate of children with anorexia with unknown with anemia was 49.2%, zinc deficiency was 46.8% and both zinc and anemia deficiency were 29.4%. The rate of children with anorexia related internal

children aged 7-24 months. Some of our comments suggest that the reason that zinc deficiency anemia is common at the age above is because babies are given weaning food earlier than recommended (should only feed babies after 6 months), this condition has There are many reasons, but the most common cause is not enough breastmilk, or the baby is slow to gain weight, or feed the

Indice	Related to food conversion.		Undefined reason		Anorexia related internal medical disease.		Anorexia related to stress.		Food aversion		Total	
	n=50	%	n=252	%	n=102	%	n=20	%	n=42	%	n=466	%
Anemia	24	48.0	124	49.2	47	46.1	10	50.0	14	33.3	219	47.0
Zinc deficiency	10	20.0	118	46.8	54	52.9	10	50.0	12	28.6	204	43.8
Anemia and zinc deficiency	10	20.0	74	29.4	12	11.8	6	30.0	2	4.8	98	21.0

medical disease with anemia was 46.1%, zinc deficiency was 52.9% and both zinc and anemia deficiency were 11.8%. The rate of children anorexia related to stress with anemia was 50%, zinc deficiency was 50% and both zinc and anemia deficiency were 30%. The rate of children anorexia food aversion with anemia was 33.3%, zinc deficiency was 28.6% and both zinc and anemia deficiency were 4.8%.

DISCUSSION

Out of 466 children participating in the study, there were 219 children with anemia accounting for 47.0%, 183 children with iron deficiency anemia accounted for 39.3%. This result is quite similar to the results of the SEANUTS study, which indicated but higher than the rate of anemia among children under 6 years old city is 19.3%. Our study also recorded high anemia among children aged 36-59 months. We found that our study population is a population of children with anorexia going to the nutrition clinic, different from the research population of the total nutrition survey. Furthermore, the sample size in our group of children aged > 24 months was not large enough, 64 children 24-35 months, 56 children 36-47 months and 40 children aged 48-59 months compared with the total number of children participating in the study. 466 children. Therefore, our recognition of the results of this study is inconsistent with national census data on micronutrients 2014-2015 on the prevalence of anemia in the age group <24 months and declining gradually in age group > 24 months. The results of our study with 204 children with zinc deficiency accounting for 43.8%, higher than the research results of the author Truong Tuyet Mai (2013) on 112 stunted malnourished subjects aged 1-3 years old, the rate of zinc deficiency in serum is 23.7% and lower than the study by Nguyen Van Nhien (2008) showed that the rate of zinc deficiency of children under 5 years old in rural areas is 86.9% respectively.

In children with anemia, the rate of anemia, zinc deficiency and iron deficiency anemia were seen in

baby firmly or practice food first in case the mother goes to work. Whatever the reason, this is also a contributing factor to the increased risk of malnutrition for children, as studies have shown that feeding babies before 6 months after birth increases the risk of food allergies, increases the risk of digestive disorders and does not receive the recommended amount of breast milk.

Our study also noted that the rates of anemia, zinc deficiency and zinc deficiency anemia in children with malnutrition were 43.2%, 43.92% and 33.9%, respectively, quite similar to those with Normal nutritional status is 48.8%, 43.9% and 16.9% respectively. Children who are overweight have reported zinc deficiency rate of 50%. These are figures that need to be taken into account for both healthcare workers as well as parents, as well as caregivers to have more attention on the child's micronutrient deficiencies due to diet as well as Anorexia and other possible causes to a child.

CONCLUSION

There are 47% of anorexia children and 43.8% of anorexia children with zinc deficiency and 21% of anorexia children with both anemia and zinc deficiency. From there, propose solutions for communication, education and nutritional interventions for children with anorexia as well as timely improvement of micronutrient deficiency so that children can develop to their maximum potential, including in this way, developing height can improve the stature of the Vietnamese youth in the future as expected by the project 641 of the Government, as well as of the National Institute of Nutrition and of the child's families. And we also can see that anorexia leads to a reduction in the diet of nutrients and is the cause of slow growth, malnutrition, lack of nutrients (anemia and zinc deficiency). In Vietnam, there are still few studies on the nutritional status of children with anorexia and no studies on micronutrient status of anorexia children.

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