

**NUTRITIONAL STATUS AND SOME RELATED FACTORS IN CHILDREN
UNDER 24 MONTHS AT THE GENERAL CLINIC
OF HOA BINH PROVINCIAL CENTER FOR DISEASES CONTROL 2023-2024**

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SUMMARY

Introduction: During the first two years of life, children have a high demand for essential nutrients that support physical growth and the gradual maturation of organ systems. Hoa Binh is a mountainous province in the Northwest region of Vietnam, characterized by complex terrain and difficult transportation. **Objectives:** 1. To assess the nutritional status of children under 24 months at the General Clinic of the Center for Disease Control, Hoa Binh Province, in 2023-2024. 2. To describe some factors related to the nutritional status of children under 24 months at the General Clinic of the Center for Disease Control, Hoa Binh Province, in 2023-2024. **Methods:** Cross-sectional descriptive study on Children under 24 months of age who visit the clinic or vaccination center in the study area and their moms. **Results:** The prevalence of underweight, stunting and wasting were 16.1, 13.8 and 8.7%, respectively. Birth weight less than 2500 grams, children older than 6 months old, not vaccinated enough for their age, and not breastfed have a statistically significant higher rate of underweight malnutrition. Maternal age over 35 and no breastfeeding early after birth have a statistically significant higher rate of stunting. Families with more than two children, those who are not fully vaccinated according to age, and those who do not breastfeed are groups with a significantly higher rate of wasting. **Conclusion:** The prevalence of malnutrition of study subjects was still high, some related factors of each type were showed. May be there is an urgent need to implement good interventions to improve children health.

Keywords: nutritional status, children, under 24 months, Hoa Binh provincial center for diseases control.

1. INTRODUCTION

Nutrition at each stage of life has significant impacts on a child's development, from the fetal stage to adulthood. During the first two years of life, children have a high demand for essential nutrients that support physical growth and the gradual maturation of organ systems. Proper nutrition during the first 1,000 days of life is recognized as one of the key practices for preventing malnutrition in children. If children are not properly and adequately nourished, it can lead to malnutrition, affecting their physical, mental, and intellectual development, and

resulting in severe consequences for society. [1],[3]

In Vietnam, according to statistics from the National Institute of Nutrition, the prevalence of underweight malnutrition among children under five years old in 2010 was 17.5%, with grade I malnutrition accounting for the highest proportion at 15.4%. The prevalence of stunting malnutrition was 29.3%. By 2018, the prevalence of underweight malnutrition had decreased to 12.8%, with grade I malnutrition comprising 11.4%, and the prevalence of stunting malnutrition stood at 23.2%. Malnutrition is not only caused by a

lack of food resources, poor socioeconomic conditions, and inadequate healthcare, but also by a lack of knowledge among mothers and family members, as well as inappropriate and unscientific child-rearing practices. [2],[3]

Hoa Binh is a mountainous province in the Northwest region of Vietnam, characterized by complex terrain and difficult transportation. It is home to many ethnic minorities. At the same time, Hoa Binh is undergoing industrialization and modernization, with active industrial zones and a significant proportion of women of reproductive age. To contribute to the nutritional care of children under 24 months in Hoa Binh, we conducted this study with two objectives: (1) To assess the nutritional status of children under 24 months at the General Clinic of the Center for Disease Control, Hoa Binh Province, in 2023-2024. And (2) To describe some factors related to the nutritional status of children under 24 months at the General Clinic of the Center for Disease Control, Hoa Binh Province, in 2023-2024.

2. METHODS

2.1. Study Subjects

- Children under 24 months of age who visit the clinic or vaccination center in the study

area.

- Mothers with children under 24 months of age (mothers of selected children) who are present in the area during the study period.

2.2. Study Design: Cross-sectional descriptive study.

2.3. Research Tools:

- Length board for measuring children under 2 years of age.

- SECA scale provided by UNICEF.

- Interview questionnaire.

2.4. Data Analysis Method

- WHO Anthro 2006 software was used to calculate children's Z-Scores.

- Data analysis was conducted using SPSS software version 18.0.

2.5. Research Ethics

- Mothers caring for children were fully informed and clearly explained the objectives and procedures of the study. Families had the right to decline participation. Children were only included in the study with the consent of their parents.

- The study solely aimed to assess nutritional status and did not impact on the health of the children.

- During data collection, participants had the right to withdraw from the study at any time.

3. RESULTS AND DISCUSSION

3.1. Nutritional status of children

Table 1. Information on average weight and average height distributed by age group and gender (n=298)

		Age group (month)			
		0 – 5 (n=120)	6 – 11 (n=89)	12 – 17 (n=57)	18 – 23 (n=32)
Weight (kg)	Male	6.1 ± 1.4	7.7 ± 1.1	9.5 ± 1.9	10.4 ± 2.1
	Female	6.0 ± 1.2	7.3 ± 1.4	8.3 ± 1.4	9.7 ± 1.1
	General	6.1 ± 1.3	7.5 ± 1.3	9.1 ± 1.8	10.2 ± 1.8
	p	0.708	0.046**	0.012**	0.748
Height (cm)	Male	59.9 ± 4.1	67.9 ± 2.9	75.1 ± 2.5	82.0 ± 3.8
	Female	58.4 ± 3.3	65.7 ± 3.9	72.8 ± 3.5	81.1 ± 3.1
	General	59.4 ± 3.9	67.0 ± 3.5	74.3 ± 3.1	81.7 ± 3.5
	p	0.05*	0.003*	0.005*	0.520

*: t – test independent **: Mann-Whitney

Table 1 shows that, at the age of children is statistically higher than that of under 18 months, the height of male female children; at the ages of 6-11 months

and 12-17 months, the weight of male children is higher. statistically significant than female children. These indicators all tend to be lower than the average level of children in the world [11]. This could be attributed to Hoa Binh being a mountainous

province with underdeveloped economic and social conditions, as well as a lower educational level, which contribute to certain limitations in childcare and upbringing.

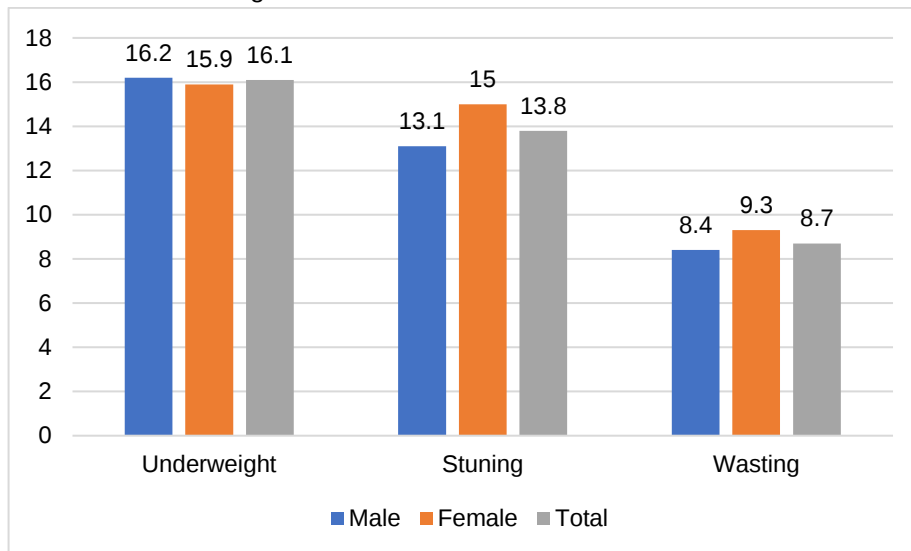


Figure 1. Malnutrition rate by type and gender (n=298)

Figure 1 shows that the most common form of malnutrition is underweight, and the least common is wasting. In 2016, according to estimates by WHO, UNICEF and the World Bank, from 1990 to 2014, malnutrition in children under 5 years old has decreased significantly: stunting malnutrition decreased from 39.6% to 23%, 8% (from 255 million children to 159 million children); Underweight malnutrition decreased from 25.0% to 14.3% (from 160.5 million children to 95.5 million children). Regarding wasting (acute malnutrition), in 2014 there were 50 million children (7.5%) worldwide, with 16 million children suffering from severe wasting, of which 67% of children in this group lived in Asian countries and 28% live in African countries [12],[13]. The obtained results were lower than the prevalence of malnutrition in children aged under 5 years admitted to the Pediatric Department of the National Lung Hospital in Hanoi, Vietnam,

from August to December 2018, which was 30.1%, 25.7%, and 17.8% respectively for underweight, stunting and wasting [10].

The highest prevalence of wasting occurs in young children (6–23 months). The prevalence of stunting and wasting among children aged 6–24 months were 58.1 and 17.0%, respectively [9]: The prevalence of stunting, wasting, and underweight was 20.1%, 4.3%, and 8.0%, respectively in Children living in Roma settlements in Central and Eastern Europe. Malnutrition is an important indicator of child health. A significant contributing factor to infant and child mortality, poor nutritional status during childhood also has implications for adult economic achievement and health. [8]

3.2. Some factors related to children's nutritional status

3.2.1. Some factors related to underweight children

Table 2. Some factors related to underweight (n=298)

Nutrition status	Underweight	OR (95%CI)	p
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Factor		Yes (n, %)	No (n, %)		
Birth weight	≥ 2500gr	39 (14.5%)	230 (85.5%)	2.7 (1.1 – 6.7)	0.037*
	< 2500gr	9 (31.0%)	20 (69.0%)		
Age in months	< 6 months	7 (5.8%)	113 (94.2%)	3.0 (1.2 – 7.6)	0.019*
	≥ 6 months	41 (23.0%)	137 (77.0%)		
Vaccination	Enough	20 (9.7%)	186 (90.3%)	2.6 (1.3 – 5.4)	0.007*
	Not enough	28 (30.4%)	64 (69.6%)		
Breast feeding	Yes	35 (13.7%)	221 (86.3%)	2.9 (1.3 – 6.1)	0.007*
	No	13 (31.0%)	29 (69.0%)		

*: Multivariable logistic regression

Table 2 shows that birth weight less than 2500 grams, children older than 6 months old, not vaccinated enough for their age, and not breastfed have a statistically significant higher rate of underweight malnutrition. Underweight refers to having a low weight for one's age. It can be a result of wasting, stunting, or both. In some Southeast Asian countries, particularly in rural and impoverished areas, the rate of underweight children remains high, although there has been some progress in recent years. Underweight children may either be wasted, stunted, or both [12],[13]. Underweight is the most dependable growth indicator for overall child growth. Tanzania has the highest rate of underweight children in East Africa, with 1.27 million children under the age of five suffering from the condition. A secondary analysis on a sample of 4,327 children aged 0–23 months in Tanzania showed

significantly higher risks of underweight were found for children born with a lower birth weight compared to other children born with an average or higher than average weight. Children in the age group of 18–23 months were significantly more likely to be underweight compared with other groups. This could be attributed to increased physical activity at this age when children can walk and run, as well as a decrease in mothers' care for these children due to the assumption that they are already grown up. Therefore, more training and counseling for mothers/child caretakers on proper and consistent feeding of all children under the age of 2 years when they attend postnatal clinics is needed to guarantee that children acquire weight (0.5 kg per month) as suggested by WHO. [6]

3.2.2. Some factors related to stunting children

Table 3. Some factors related to stunting (n=298)

Nutrition status		Stunting		OR (95%CI)	p
Fator		Yes (n, %)	No (n, %)		
Mother's age	18 - 35	33 (11.8%)	246 (88.2%)	7.9 (2.4 – 26.2)	0.001*
	> 35	8 (42.1%)	11 (57.9%)		
Early breastfed	Yes	21 (11.3%)	165 (88.7%)	2.7 (1.2 – 6.1)	0.020*
	No	20 (17.9%)	92 (82.1%)		

*: Multivariable logistic regression

Table 3 shows that maternal age over 35 and no breastfeeding early after birth have a statistically significant higher rate of stunting. Stunting occurs when a person has a low height for their age. It is caused by prolonged periods of insufficient nutrition, usually beginning in early

childhood or even before birth due to poor maternal nutrition. This is one of the most prevalent forms of malnutrition in Southeast Asia. In 2022, 22.3% of children under five globally were stunted [12],[13]. Stunting is a result of chronic undernutrition and often begins in early childhood or even during

pregnancy, affecting long-term growth and development. According to nutritionists' recommendations, the baby should be breastfed within the first hour after birth to help reduce the risk of malnutrition [4]. Stunting is a severe public health problem in the predominantly rural northwest Ethiopia. Mother's occupation, postnatal vitamin-A supplementation, source of family food and household wealth status were identified as determinants of severe stunting in Ethiopia. The prevalence of stunting among children aged 6–24 months were 58.1% [95% CI; 50.3, 65.9%]. Besides, the burden of stunting among

children aged 12–24 months was 44.6, while it was 13.5 in infants aged 6–11 months [9].

The discrepancy could be explained by the depth of the studies in that the latter reports were national with larger number of children. The multivariate logistic regression analysis detected that child age, maternal postnatal vitamin-A supplementation, latrine availability, main source of family food and household wealth status were remained significantly and independently associated with stunting. [7].

3.2.3. Some factors related to wasting in children

Table 4. Some factors related to wasting (n=298)

Nutrition status		Wasting		OR (95%CI)	p
Factor		Yes (n, %)	No (n, %)		
Number of children in their family	≤ 2	19 (7.3%)	243 (92.7%)	19.0 (1.9 – 188.5)	0.012*
	> 2	7 (19.4%)	29 (80.6%)		
Vaccination	Enough	10 (4.9%)	196 (95.1%)	2.6 (1.0 – 6.4)	0.043*
	Not enough	16 (17.4%)	76 (82.6%)		
Breastfed	Yes	16 (6.2%)	240 (93.8%)	5.0 (2.0 – 12.3)	0.000*
	No	10 (23.8%)	32 (76.2%)		

*Multivariate Logistic Regression

Table 4 shows that families with more than two children, those who are not fully vaccinated according to age, and those who do not breastfeed are groups with a significantly higher rate of wasting. Wasting occurs when a person has a low weight for their height and is often the result of acute food shortages or severe illness. As an indicator of acute malnutrition, wasting affected approximately 13.7 million children globally in 2022 [12],[13]. Southeast Asia has countries with some of the highest rates of wasting, indicating recent or severe weight loss, often due to insufficient food intake or repeated infections. For children under 12 months of age, breast milk is the most valuable food that no artificial food can compare to. Many studies have shown that the rates of malnutrition and respiratory infections or diarrhea are significantly higher in children whose mothers have

insufficient breast milk. Children need careful attention regarding hygiene, expanded vaccination, growth monitoring, love, education, and proper nutritional care when ill, such as during diarrhea or respiratory infections. The condition of having many children in a family may also limit the care provided, leading to potential malnutrition in children. Bivariate and multivariate analyses indicated that only diarrheal morbidity remained significantly and independently associated with wasting [7]. A study to estimate the prevalence of wasting in children aged 6-23 months in the Sahel region of Burkina Faso and to identify its associated factors. a total of 956 children participated in the study. The prevalence of wasting was 25% in the Sahel region. Only 24.37% of children received a minimum meal frequency and 13.38% received a minimum dietary diversification the day

before the survey. In the multivariate analysis, being male, breastfeeding the day before the survey and having a history of illness significantly increased the risk of acute malnutrition [5]. The prevalence of wasting among children aged 6–24 months were 17.0% [95% CI; 11.1, 22.9%]. Besides, the burden of wasting among children aged 12–24 months was 11.6%, while it was 5.4% in infants aged 6–11 months [9]. The discrepancy could be explained by the depth of the studies in that the latter reports were national with larger number of children. May be there is an urgent need to implement good interventions to improve children health.

4. CONCLUSION

The height and weight of children under 24 months at the General Clinic of the Hoa Binh Provincial Center for Disease Control in 2023-2024 are lower than global standards. For children under 18 months, the height of male children is statistically significantly higher than that of female children. In the age groups of 6-11 months and 12-17 months, the weight of male children is also statistically significantly higher than that of female children.

Several factors related to the nutritional status of children under 24 months at the General Clinic of the Hoa Binh Provincial Center for Diseases Control in 2023-2024 include: (1) Birth weight under 2500 grams, children older than 6 months, not receiving full vaccinations according to age, and not breastfeeding have a high rate of underweight malnutrition. (2) Mothers older than 35 and early breastfeeding after birth have a high rate of stunted malnutrition. (3) Families with more than two children, those who are not fully vaccinated according to age, and those who do not breastfeed are groups with a high rate of wasting.

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