Original Research

NUTRITIONAL STATUS AMONG CHILDREN UNDER 5 YEARS OLD IN TWO COMMUNES IN YEN DINH DISTRICT, THANH HOA PROVINCE IN 2022

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ABSTRACT

Aims: To identify the nutritional status of children under five years in Yen Tam and Dinh Hoa communes of Yen Dinh district, Thanh Hoa province in 2022.

Methods: A cross-sectional study was conducted on 733 children aged under 5 years between January and May of 2022 in the communes. The nutritional status of the children was classified using World Health Organization standards in 2006.

Results: The stunting rate of the children was 22.1%, of which 19.4% were moderately stunted and 2.7% were severely stunted. Thirty four percent of the chilldren suffered from at least one form of malnutrition (stunting, wasting and underweight).The rate of manutrition was higher in boys as compared to girls and the highest rate of malnutrition was found in the group aged 25-48 months.

Conclusion: Malnutrition was predominant in the communes, especially stunting. It is important to pose in priotity the interventions to reduce malnutrition rates and focus on solutions to prevent stunting.

Keywords: malnutrition, children under 5 years old, Thanh Hoa province.

I. INTRODUCTION

Malnutrition poses a significant public health challenge in many developing countries, with Vietnam being no exception. According to the latest data from the World Health Organization (WHO), malnutrition among children under the age of 5 is particularly prevalent in the regions of South-Central Asia, Southeast Asia, East Africa, West Africa, and Central Africa. Specifically, countries such as India, Bangladesh, East Timor, Laos, Niger, Somalia, and Burkina Faso are experiencing high levels of malnutrition in children [1].

In recent years, Vietnam has seen substantial improvement in the general nutrition situation among children under 5 years old, largely due to the effective implementation of the Vietnam national nutrition strategy. The 2019–2020 nutrition census results, conducted by the National Institute of Nutrition in collaboration with the General Statistics Office indicated that the rate of stunting has decreased from 43.9% in 1995 to 19.6% in 2020. According to the World Health Organization's standards, this significant reduction is classified as an average level of malnutrition. This progress is a testament to the success of the concerted efforts to address malnutrition in the country [2].

The semi-mountainous district of Yen Dinh is located in Thanh Hoa province. The area is complicated, has a severe environment, is frequently threatened by natural calamities, has challenging economic circumstances, and is also impacted by the pandemic's overall effects. For the past two years, there has been an ongoing COVID-19 outbreak. Although the work of preventing malnutrition in children has been focused on and achieved encouraging results, the prevalence of childhood malnutrition remains quite high. The stuty was carried out to identify the nutritional status of children under five in two communes in the Yen Dinh district of the province of Thanh Hoa in 2022. By offering a more focused perspective, we can suggest malnutrition prevention solutions for children under 5 years old.

II. METHODS

2.1. Study design

A cross-sectional study has been approved by the Medical Ethics Committee of the Thai Binh University of Medicine and Pharmacy to identify the nutritional status of children under five in two communes, Yen Tam and Dinh Hoa, in Yen Dinh district, Thanh Hoa province, from January to May 2022 (Decision No. 488/QD-YDTB dated April 13, 2022).

2.2. Sample size

Sample size was estimated using the formula as follows:

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

Where n: the number of participants needed, $Z_{(1-\alpha/2)}$: standard normal variate at 5% type 1 error (p<0.05) it is 1.96, p: expected proportion in population based on previous study or pilot study. Based on the stunted children in General Nutrition survey in 2019 (p = 19.6%) [2]. *e:* absolute error or precision. The estimated minimum sample size was 700 children. We collected data on 733 children five-and-old-aged and 733 mothers through a multistage stratified cluster random sampling method.

2.3. Study population and selection of participants

Children under five at the time of the survey and their mothers residing in the study region were included in the study's participant pool. The inclusion criteria for participation in this study included (1) physiologically normal mothers and (2) children under the age of five at the time of the investigation, who had family consent, and voluntary study involvement. Exclusion criteria included: (1) those who were not willing to participate in the study, (2) children who had chronic diseases (e.g., asthma, type 1 diabetes, Thalassemia), congenital defects, or severe acute diseases at the time of investigation.

This strategy was used to choose subjects including: (1) Yen Dinh District was split into two regions: a delta region and a semi-mountainous zone. A random selection of Yen Tam commune was made from a list of 12 communes located in the semi-mountainous area. From the list of 12 communes in the Delta, randomly selected Dinh Hoa commune.

(2) Selecting research subjects: in Yen Tam commune, all 300 children under 5 years old who met the criteria was selected for the study. In Dinh Hoa commune, we randomly chose four of the six villages in Dinh Hoa commune and selected all 433 children under five in the selected villages who fit the study's eligibility requirements. (3) Choose mothers to interview: To identify any associated factors, we chose to interview all mothers whose children were under five years old as part of the nutritional status evaluation.

2.4. Data collection

A questionnaire was used for the data collection by trained investigators through face-to-face interviews to collect the children's information via their mothers. To calculate the BMI, children' weight and height were measured by trained investigators, and the BMI was calculated by dividing the weight (kg) by height (m^2). The recumbent length of a child who is less than 24 months old was measured by using a measuring board. The child was positioned lying down on the board with the head against the fixed headpiece, and the movable foot piece is brought to touch the child's heels. The length is then read from the ruler on the board. With children reaching 24 months and up of age, their standing height was measured with a tape measure stuck close to the wall so that the tape measure was perpendicular to the ground and the 0 mark on the tape measure touched the ground. The child must stand as straight as possible with his or her heels, buttocks, and shoulders touching the measuring device, looking straight ahead. The child's weight is measured using a scale.

The WHO uses anthropometric indices to identify and categorize nutritional status, which includes height-for-age, weight-for-height, and weight-for-age for measuring stunting, wasting, and underweight. These indices are measured and compared as standard deviation units (Z-scores) from the median of the reference population. Including: (1) Stunting (height-for-age) in a child is defined as too short for his or her age with a height-for-age Z-score less than −2 SD from the median of the reference population, (2) Wasting in a child is defined as low weight-for-height, where the weight-for-height Z-score is less than −2 SD from the median of the reference population, (3) Underweight among children under the age of 5 years is defined as low weight-for-age, with a Z-score of −2 SD from the median of the reference population. This condition is a composite extraction of both stunting and wasting, that is, an underweight child may be stunted, wasted, or both, and (4) Children are overweight and obese refering to a child whose weight-for-height Z-score is above two standard deviations (+2 SD) from the median of the reference population.

2.5. Statistical analysis

The data was entered using Epi Data 3.1 software and analysed using Stata 20.0 software. For categorical variables, frequencies (%) were used to present the characteristics of the study participants. For continuous variables, the median and interquartile range were used. The prevalence for underweight, stunting, and wasting were estimated. The Chi-square test was used to assess the bivariate association between the nutritional outcomes and the observed characteristics. A *p*-value under 0.05 was considered significant.

III. RESULTS

Table 1. *Classification of children's nutritional status (n = 733)*

Status	Frequency	%
Wasting (weight-for-height)	56	7.6
Stunting (height-for-age)	162	22.1
Underweight	103	14.1
Overweight and obese	45	6.1
Normal	484	66.0

Table 1 shows that stunting rate was the highest (22.1%), followed by underweight rate (14.1%).

Table 2 shows the stunting level by gender, age group, and commune. The rate of 19.4% of children were moderately stunted and severely stunted children represented only 2.7% of the all children.

Table 2. *Percentage of children with stunting by level (n = 733)*

Characteristics	n	Moderately stunted		Severely stunted	
		Frequency	%	Frequency	%
Gender					
Boy	403	74	18.4	13	3.2
Girl	330	68	20.6	7	2.1
Age group, month					
≤ 24	281	48	17.1	9	3.2
25-48	275	65	23.6	8	2.9
>48	177	29	16.4	3	1.7
Commune					
Yen Tam	300	56	18.7	7	2.3
Đinh Hoa	433	86	19.9	13	3.0
Total	733	142	19.4	20	2.7

Table 3 shows that moderately underweight affected 13.4% of malnourished children, whereas severely underweight affected 0.7% of children. Boys were more likely than girls to be malnourished (15.4% and 10.9%, respectively), with the largest rate occurring in the 25–48-month age group.

Table 4 shows that 5.2% of the children had moderately wasted and 2.5% had severely wasted. Malnutrition and severely wasting were more common in

the group ≤ 24 months old than in the others.

Table 5 indicates that 34.0% of children experienced at least one type of malnutrition, 8.0% had stunting, 11.6% had stunting plus underweight, and 1.0% had three forms of combined malnutrition.

Table 3. *Percentage of underweight by level (n=733)*

Characteristics	Moderate underweight		Severe underweight	
	n	*%*	*n*	*%*
Gender				
Boy	62	15.4	3	0.7
Girl	36	10.9	2	0.6
Age group, month				
≤ 24	33	11.7	2	0.7
25-48	45	16.4	2	0.7
>48	20	11.3	1	0.6
Total	98	13.4	5	0.7

Table 4. *Percentage of children with wasting by level (n=733)*

Characteristics	Moderately wasted		Severely wasted	
	n	*%*	*n*	*%*
Gender				
Boy	25	6.2	8	2.0
Girl	13	3.9	10	3.0
Age group, month				
≤ 24	16	5.7	12	4.3
25-48	17	6.2	4	1.5
>48	5	2.8	2	1.1
Total	38	5.2	18	2.5

Table 5. *Characteristics of combined forms of malnutrition by sex of child*

Form of malnutrition	Boy (n=403)		Girl (n=330)		Total (n=733)		*p*
	n	*%*	*n*	*%*	*n*	*%*	
At least one form	138	34.2	111	33.6	249	34.0	>0.05
Stunting	23	5.7	36	10.9	59	8.0	>0.05
Overweight and stunting	55	13.6	30	9.1	85	11.6	>0.05
Combined	4	1..0	3	0..9	7	1.0	>0.05

IV. DISCUSSION

Our research has revealed that the prevalence rate of underweight children under 5 years old in Yen Tam and Dinh Hoa communes was 14.1%. According to the WHO classification of malnutrition levels, these communes have an average malnutrition rate.

This result exceeds the national average of 11.5% in 2020, as reported in the 2019-2020 General Nutrition Survey as well as the overall rate in Thanh Hoa province in 2019. In comparison to other studies conducted around the same time, the rate of underweight in this study is very similar to the findings of Pham Thi Lan Nhi when assessing the nutritional status of children in various communes and districts such as Bat Xat, Lao Cai province was reported at 15.3% in 2019 [3]. However, in our research, we observed that the prevalence of underweight children was lower compared to findings from other studies. For instance, a study conducted by author Pham Hoang Thai Quang on 522 ethnic minority children aged 25 to 60 months in the Bao Yen district of Lao Cai province; 24.1% of children were underweight in 2 communes of the region in 2019 [4]. The prevalence of underweight children was 13.4% at moderately underweight and 0.7% at severely underweight. Notably, a higher prevalence was observed among boys compared to girls, with rates of 15.4% and 10.9%, respectively, with the highest prevalence recorded within the 25–48-month age group. However, the observed difference lacks statistical significance ($p > 0.05$). These findings were consistent with the results of most studies to date. Notably, analysis by Tran Quang Trung reveals a progressive increase in the prevalence of underweight malnutrition with advancing age, with rates of 8.3% and 8.7% for those under 12 months and between 13 and 24 months, respectively. Subsequently, a notable surge in prevalence becomes evident in the 25–36-month age bracket [5]. The rate of stunting in this study was 22.1%, which is higher than the global stunting rate of 21.3% before the emergence of COVID-19 in 2019. It is also higher than that in Latin America and the Caribbean, where the current rate is 11.3% [1, 6]. The prevalence of stunting was higher than the general stunting rate observed across Thanh Hoa province in 2019 (17.5%) [7], Additionally, it exceeds the findings by author Huynh Thi Minh in the research on 326 children at two public preschools in Hai Chau district, Da Nang City: 13.8% of children were malnourished and stunted [8]. This study discovered that 7.6% of the population in the studied areas is affected by wasting malnutrition. This type of malnutrition is characterized by a low weight-for-height ratio. According to the World Health Organization (WHO) classification, the prevalence of child malnutrition in these areas is relatively low. This study has found that the prevalence of wasting malnutrition in our population is higher than the global rate of 6.9% of wasted children in 2019 [1]. The findings are in line with similar studies conducted globally. For example, a study in the Philippines in 2017 reported a prevalence of 6.9%, which was higher than the national average of 7% in the same year [9]. Moreover, this rate exceeded the prevalence in the Central Highlands region at 8.9%. Additionally, in 2017, the

rates in several mountainous provinces, such as Cao Bang (10.4%), Tuyen Quang (11.3%), and Bac Kan (9.8%), also surpassed the national average, indicating a concerning trend in those areas [10].

In this study, we conducted an analysis of the overweight and obesity rates among children under the age of five. The findings revealed that the prevalence of overweight and obesity in this age group was 6.1%, which is notably lower than the national average for 2020 (7.4%). It is worth noting that this rate is also significantly lower than the prevalence observed in upper-middle and high-income countries, indicating a increasing trend in our study population [12]. Furthermore, in comparision with a previous study conducted by Huynh Van Dung in 2019 on children aged 6-36 months in Phu Hoa ward, Thu Dau Mot City, Binh Duong province, the comparison revealed that our study population exhibited a lower prevalence of overweight and obesity in contrast to the aforementioned study. Especifically, the study reported a prevalence of 14.3%, with 3.8% of children being classified as obese, highlighting a significant disparity between the two study populations [13].

According to our research, 34.0% of children were affected by at least one type of malnutrition. Among them, 8.0% experienced stunting alone, 11.6% had stunting combined with underweight, and 1.0% sufferred from all three types of malnutrition combined. In contrast, Ngo Trong Trung's study reported a higher prevalence, with 59.6% of children experiencing at least one form of malnutrition, 31.2% having simple stunting, 13% facing stunting combined with low birth weight, and 5.6% dealing with all three types of malnutrition [14]. The discrepancy in the findings can be attributed to the fact that Ngo Trong Trung's research was conducted in two communes in Moc Chau district, Son La province. One of these communes is a border commune with a high proportion of Mong and Thai ethnic groups, comprising over 95% of the population. In our study, we found that the rate of malnourished children did not exhibit a statistically significant difference between boys and girls. This suggests that malnutrition prevalence is consistent across genders.

V. CONCLUSION

The stunting rate among children under five in Yen Tam and Dinh Hoa communes was higher than the national average of 22.1%, with 19.4% of children experiencing moderate level and 2.7% having severe level. The rate of children suffering from at least one type of malnutrition was 34.0%; boys being affected more than girls. The highest percentage of malnourished children was in the age group of 25–48 months, accounting for 36.7% of cases. Additionally, the malnutrition rate in Dinh Hoa commune was higher than that in Yen Tam commune.

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