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Prevalence of malnutrition among Vietnamese childrenunder five and the related socio-economic,environmental and child determinants

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Prevalence of malnutrition among Vietnamese children under five and the related socio-economic, environmental and child determinants

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Background : *It is interesting to study the nutritional status of Vietnamese children, as well as how related factors are different from in Thai children.*

Objective : *To determine the prevalence of malnutrition among under-five Vietnamese children and its relation with socio-economic, environmental and child factors.*

Setting : *Phong Dien District ,Thua Thien – Hue Province, Vietnam*

Research design : *Cross-sectional study*

Samples : *Two hundred and fifty children under five years of age were included in this study*

Methods : *Multistage sampling : In the first stage 8 from 15 villages were randomly selected and 30 - 40 under-five children were randomly recruited from each chosen village. Data on socio-economic, environmental and child 's background were collected. The nutritional status of the children was determined by using standard weight-for-age (WFA),height-for-age (HFA) and weight-for-height (WFH) tables.*

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Results : *The prevalence of malnutrition according to WFA standards was 48.8 percent in which 38.4 and 10.4 percent were first and second degree. HFA was 56.8 % under standard in which 26.4,20.0 and 10.4 % were mild, moderate and severely stunted respectively. Considering WFH, wasting was found in 8.8 % and all were of a mild degree. The majority of their parents were farmers, had completed secondary school and had low incomes. The numbers of third children and above were high. There was no association between socio-economic determinants and the nutritional status of the under-five children. A significant association was observed between availability of latrines and child nutritional status ($p = 0.003$). The association between age, sex, birth weight of the child and child nutritional status were also significant ($p = 0.000, 0.000$, and 0.034, respectively).*

Conclusion : *The prevalence of malnutrition among the under-five was still high when comparing Vietnam with Thailand. Apparently because of the male sex preference among Vietnamese, female children suffered from malnutrition more than males. Child health education, especially child nutrition, good sanitation and environmental control, should be provided to promote better child health.*

Key words : *Nutritional status, Under-five children, Sex preference, Birth weight, Sanitation.*

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ชุติมา ศิริกุลชยานนท์, Phan thi Bich Ngoc, ฉวีวรรณ บุญสุยา. ภาวะโภชนาการในเด็กวัยต่ำกว่า 5 ปี ปัจจัยทางเศรษฐกิจสังคม สภาวะแวดล้อมและเด็กในเขตชนบท ประเทศเวียตนาม. จุฬาลงกรณ์เวชสาร 2543 ก.ค; 44(7): 503 - 14

วัตถุประสงค์ : *เพื่อศึกษาความชุกของภาวะทุพโภชนาการในเด็กวัยต่ำกว่า 5 ปีและความสัมพันธ์กับปัจจัยด้านเศรษฐกิจสังคม สิ่งแวดล้อม และตัวเด็ก*

สถานที่ทำการศึกษา : *อำเภอ Phong dien จังหวัด Thua thein-Hue เวียตนาม ซึ่งอยู่ตอนกลางของประเทศเวียตนาม*

รูปแบบการวิจัย : *การศึกษาแบบภาคตัดขวาง*

กลุ่มตัวอย่างที่ศึกษา : *เด็กอายุต่ำกว่า 5 ปี จำนวน 250 คน*

วิธีการศึกษา : *ทำการสุ่มตัวอย่างแบบหลายขั้นตอน (Multistage sampling) ได้ประเมินภาวะโภชนาการโดยใช้น้ำหนักตามอายุ ส่วนสูงตามอายุ และน้ำหนักตามส่วนสูงโดยมาตรฐานขององค์การอนามัยโลก*

ผลการศึกษา : *พบว่า ร้อยละ 48.8 น้ำหนักต่ำกว่าเกณฑ์มาตรฐานอยู่ในระดับ 1 และ 2 ร้อยละ 38.4 และ 10.4 เมื่อพิจารณาส่วนสูงตามอายุ พบต่ำกว่าเกณฑ์มาตรฐานถึงร้อยละ 56.8 ซึ่งความรุนแรงระดับ 1, 2 และ 3 คิดเป็นร้อยละ 26.4, 20.0 และ 10.4 ตามลำดับ เมื่อเปรียบเทียบน้ำหนักตามส่วนสูงพบน้ำหนักต่ำกว่าเกณฑ์ร้อยละ 8.8 และเป็นระดับ 1 ทั้งหมด บิดามารดาของเด็ก ส่วนใหญ่มีอาชีพทำนา จบการศึกษาระดับมัธยม และรายได้น้อย ไม่พบความสัมพันธ์ทางสถิติระหว่างปัจจัยด้านเศรษฐกิจสังคมกับภาวะโภชนาการของเด็ก พบความสัมพันธ์อย่างมีนัยสำคัญระหว่างภาวะโภชนาการกับ อายุเด็ก เพศ น้ำหนักแรกเกิด และการมีส้วมใช้ในครัวเรือน (P = 0.000,0.000,0.034 และ 0.003 ตามลำดับ) พบปัญหาทุพโภชนาการสูงในเด็กวัย 1-3 ปี, เพศหญิง, น้ำหนักแรกเกิดต่ำกว่าเกณฑ์ และปัจจัยด้านสุขาภิบาลสิ่งแวดล้อม*

วิจารณ์และสรุป : *ภาวะทุพโภชนาการในเด็กวัยต่ำกว่า 5 ปีในประเทศเวียตนาม ยังพบในอัตราสูงมากเมื่อเปรียบเทียบกับ ประเทศไทย พบในเด็กหญิงมากกว่าชาย อายุ 1-3 ปีพบมากกว่าวัยอื่น การให้โภชนศึกษา การจัดการด้านสุขาภิบาลและสิ่งแวดล้อมจะช่วยส่งเสริมสุขภาพและภาวะโภชนาการในเด็กวัยนี้*

คำสำคัญ : *ภาวะโภชนาการ เด็กวัยก่อนเรียน อายุเด็ก เพศ น้ำหนักแรกเกิด สุขาภิบาล*

Nutrition is a global issue for the health and well - being of children. [1] The most critical periods are during the first two years of life since intrauterine. During this period the brain cells increase in quantity and development up to 80 % of total number. The period of myelinization of the brain continues through the first six years of life. [2] If the children are affected with malnutrition during this period, physical growth and brain development are apt to be damaged to some extent. If it is not corrected before the end of the preschool age, permanent brain damage will lead to poor physical and mental capability. Consequently, poor productivity for the family and community will lead to a socio-economic burden on the country. The nutritional status reflects the combined effects of economic, social, political, cultural and environmental factors. [3,4] Inadequate dietary intake due to poverty, ignorance of basic principles of nutrition and child care by mothers or caretakers and illness caused by poor environmental surroundings are the three main causes of malnutrition in developing countries.

Protein calorie malnutrition (PCM) is a significant nutritional problem in some developing countries. The prevalence of PCM among Thai children gradually declined from 23 percent in 1987 to around 10 percent in 1997. [5] Vietnam, a country near to Thailand, is also one of the developing countries in Southeast Asia. In past decades the country passed through the critical period of the Vietnamwar - a war which caused greatly decreased socio-economic status throughout the country. Consequently unhealthy environmental control and inadequate health services led to poor physical conditioning and mental illness for many Vietnamese. Moreover, children born during these periods were affected in their growth and development due to malnutrition. As a result of the attempts at economic management reforms, the economy has improved dramatically in recent years. However, the malnutrition rate of under-five children is still high. It is interesting to study the nutritional status of the Vietnamese children, as well as how its related factors differ from Thai children.

Objectives

1. To determine the prevalence of malnutrition in under-five children in Phong Dien District.

2. To identify the socio-economic factors, environmental factors, child factors and their association with the nutritional status of the under-five children .

Material and Method

This was a cross - sectional design study carried out at Phong Dien District- Thuathien- Hue Province. This district is situated in the north of Thuathien- Hue Province in central Vietnam on the bank of the O Lau river and 30 km. north of Hue city. It consists of 15 villages, and each village has a health station with 4 - 5 employees. The population in 1998 was 97,503 of which 11,300 were children aged under five. This district has culture and economy similar to many areas along the central coast of Vietnam, so it is a representative sample of this region.

Multistage sampling was utilized. From the 15 villages, 8 were randomly selected for the first stage and around 30 - 40 of each village's under-five children were randomly recruited . Data were collected by District Health Center staft and by health workers in the community. A total of 250 cases were included in this study. For assessment of nutritional status an

International reference population defined by WHO [6] was utilized and the three indices weight-for-age (WFA), height- for-age (HFA), and weight-for-height (WFH) were constructed based on the data and the child's age and sex. Each of these three indicators provides somewhat different information about the nutritional status of children. WFA indicates under-nutrition which is labelled underweight, whereas HFA and WFH indicators define nutritional status as stunted and wasted growth, respectively.Minus 2 Z score, which is equal to 80 % of standard WFA and WFH, and 90 % for HFA, were used as a cut-off points considered as malnutrition. Below minus 3 Z scores, which was < 70 % of standard for WFA and WFH, and < 80% for HFA, was a second cut - off point used to indicate severe malnutrition.

Results

The nutritional status of the under - five children is shown in Table 1. By using WFA, we found that 48.8 % of the 250 cases were underweight, and the first and second-degree malnutrition rates were 38.4 % and 10.4 %, respectively. By considering HFA as an indicator, the prevalence of stunting was 56.8 % of which 26.4 %, 20.0 %, and 10.4 % were first, second, and third degree, respectively. According to the WFH, 8.8% were malnourished (wasting) and all falling in the first degree.

Socio-economic factors and their association with malnutrition.

As shown in Table 2, statistical analysis indicated that there was no association between parents age, occupation, education and the nutritional status of the under - five children (p - value = (p-value = 0.794, > 0.212, 0.592 respectively). There was also no association among marital status, family income, family size, number of children and nutritional status of the under-five children (p = 0.958, 0.48 and 0.957 and 0.588 respectively).

Environmental factors and their association with nutritional status

As seen in Table 3, 48 % of the houses were made of tiles whereas those having latrines was only 62.8 %. Garbage and poultry feces were seen in and around 77.6 % of the houses. However, for food hygiene care , more than half of the households had covered food covered from flies or cockroaches .The association between type of house, garbage, food hygiene and nutritional status showed no significance (p = 0.3780, 0.106 and 0.119, respectively). However, a significant association was observed between availability of latrines and nutritional status (p = 0.003).

Table 1. Nutritional status of children classified by WFA, HFA, and WFH. (n = 250).

Anthropometric Variables	Nutritional status			
	Normal	Malnourished		
		1^0	2^0	3^0
WFA	51.2	38.4	10.4	-
HFA	43.2	26.4	20.0	10.4
WFH	91.2	8.8	-	-

Table 2. Socio-economic factors and their associations with nutritional status of under- five children.

Socio-economic variables	N (%)	Normal (%)	Malnourished (%)	
			1^0	2^0
Total	250 (100.0)	51.2	38.4	10.4
Age of mothers (years)			p-value = 0.794	
20 –24	26 (10.4)	50.0	42.3	7.7
25 – 29	80 (32.0)	56.3	32.5	11.3
30 – 34	52 (20.8)	42.3	42.3	15.4
35 – 39	58 (23.2)	51.7	41.4	6.9
40 – 45	34 (13.6)	52.9	38.2	8.8
Mothers' occupation			p-value = 0.212	
Farmer	200 (80.0)	49.5	41.0	9.5
Others	50 (20.0)	58.0	28.0	14.0
Fathers' occupation (*)			p-value = 0.984	
Farmer	169 (73.5)	51.5	37.9	10.7
Others	61 (26.5)	50.8	37.7	11.5
(*)valid cases: 230				
Total		51.2	38.4	10.4
Mothers' education			p-value = 0.592	
≥ Primary school	124 (49.6)	54.0	37.1	8.9
≥ Secondary school	126 (50.4)	48.4	39.7	11.9
(**)valid cases: 229				
Marital status			p-value = 0.958	
Married	228 (91.2)	51.3	38.2	10.5
Others	22 (8.8)	50.0	40.9	9.1
Family income/month			p-value = 0.480	
Very low	108 (43.2)	47.2	42.6	10.2
Low	142 (56.8)	54.2	35.2	10.6
Number of under-five children			p-value = 0.588	
1	160 (64.0)	50.0	38.1	11.9
≥ 2	90 (36.0)	53.3	38.9	7.8

Table 3. Environmental factors and their association with nutritional status.

Environmental variables	n (%)	Normal (%)	Malnourished (%)	
			1^0	2^0
Total	250 (100.0)	51.2	38.4	10.4
Type of houses (*)			p-value = 0.378	
Tile	158 (63.2)	48.1	39.9	12.0
Others	91 (36.8)	56.0	36.3	7.7
Availability of latrine			p-value = 0.003	
Yes	157 (62.8)	59.2	33.1	7.6
No	93 (37.2)	37.6	47.3	15.1
Garbage and feces in and around home			p-value = 0.106	
Yes	194 (77.6)	53.1	38.7	8.2
No	56 (22.4)	44.6	37.5	17.9
Food hygiene			p-value = 0.119	
Yes	135 (54.0)	55.6	32.6	11.9
No	115 (46.0)	46.1	45.2	8.7
(*) 1 family has no house				

The association between child factors and nutritional status:

As seen in Table 4, it was shown that children aged under one year had the highest rate of normal nutritional status (85.6 %). Children aged 1 to 3 years had the highest rates of malnutrition. There was a strong statistical association between age of child and nutritional status (p = 0.000). Malnutrition was present in 36 % of male children while for female children it was 59.6 %. In other words, girls were more malnourished than boys. Thus a strong association between sex of the child and nutritional status was revealed (p = 0.000).

Table 4. Child factors and their association with nutritional status of under-five children.

Child variables	N	Normal (%)	Malnourished (%)	
			1^0	2^0
Total	250 (100.0)	51.2	38.4	10.4
Age of child (months)			p-value = 0.000	
≤ 12	37 (14.8)	86.5	8.1	5.4
13 – 24	71 (28.4)	40.8	42.3	16.9
25 – 36	53 (21.2)	39.6	54.7	5.7
37 – 48	52 (20.8)	55.8	38.5	5.8
49 – 60	37 (14.8)	45.9	37.8	16.2

Table 4. Countinus.

Child variables	N	Normal (%)	Malnourished (%)	
			1^0	2^0
Sex			p-value = 0.000	
Male	114 (45.6)	64.0	31.6	4.4
Female	136 (54.4)	40.4	44.1	15.4
Birth order			p-value = 0.790	
1^{st}	60 (24.0)	50.0	40.0	10.0
2^{nd}	66 (26.4)	56.1	31.8	12.1
$\geq 3^{rd}$	124 (49.6)	49.2	41.1	9.7
Birth spacing (*)			p-value = 0.578	
$\leq$ 3 years	112 (57.4)	49.1	40.2	10.7
> 3 years	83 (42.6)	56.6	33.8	9.6
(*) first child =55				
Birth weight			p-value = 0.034	
< 2500 grams	23.8	28.6	47.6	23.8
$\geq$ 2500 grams	9.2	53.3	37.6	9.2

According to the birth order of the children, the highest malnutrition rate was observed in the third or later child (50.8 %). However, no association was found between birth order and nutritional status (p = 0.790). It was also shown that the shorter the interval between births, the higher the malnutrition rate, but no statistical significance (p = 0.578) was noted. In addition, low birth weight infants had higher rates of malnutrition than normal children, and there was a statistical association (p = 0.034).

Discussion

The prevalence of malnutrition among the subject under-five children was found to be 48.8 %, 56.8 % and 8.8 % for WFA, HFA and WFH, respectively. These rates of malnutrition are quite high and more than half of the cases suffered from chronic malnutrition. Considering the WHO reference [6] used for nutritional assessment among the Vietnamese children, it was a little bit higher than the Thai standard.[7] A 1997 report from Thai Ministry of Public Health showed that malnutrition among under- five Thai children was around 10 %. [5] Vietnamese children had higher rates of malnutrition compared with Thais and this is one of the national health problems of that country. This might be the consequence of the Vietnam war that played an important role in child health, as most budget was used for restoration of the country and people tended to remain in low socio-economic status.

Various studies on socio-economic determinants of nutritional status in under- five children have revealed that parental education was one of the risk factors for child malnutrition. [8-13] In addition, maternal

occupation as well as family income also played an important role. [14-16] Moreover, an increased risk of malnutrition among children of large family size was due to insufficient food, infections, etc. [17]

However, this study, as well as others [18-20] we were unable to demonstrate an association of parents' age, education, number of children, family size and child nutritional status. This might be a reason that our study group had quite similar socioeconomic backgrounds.

Considering levels of parents' education of Thai preschool children, these were not indicated in the previous report, [5] so we could not reveal the association of this factor and nutritional status of Thai children. This should be included in further study because it is one of those related factors that affects child nutritional status.

It was indicated in our study that the malnutrition rates were higher among those experiencing a non-availability of proper latrines ($p = 0.003$). This results in poor environmental sanitation, and the child raised in a contaminated environment is likely to be infected by parasites e.g. hookworm, ascaris, etc, or even suffer from diarrheal diseases as other studies indicate.[21,22] These have a considerable impact on health, especially on child's growth and development.[2] Poor water supply, [11] unhygienic latrines [21] and crowded living conditions with poor sanitation[35] were found to be significantly associated with malnutrition .

Age of children: The best nutritional status was seen in children in the under twelve months are group. This possibly could be due to better care being provided during the first year after delivery. In rural Vietnam, parents were mostly involved in agriculture and labor (80 % of mothers and 73.5 % of fathers). They had the older child taken care of the younger while they went to the fields to work. The children might not be properly fed or given adequate food leading to malnutrition after weaning. Similar finding was reported by Chang. [23] In Thailand, Sirikulchayanonta also reported that malnutrition rates were high among children aged 1 - 2 years after the mothers stopped breast feeding. [24]

Sex of children : It was revealed that female children were significantly more malnourished than the males ($p = 0.000$). This was apt to be an influential effect of male offspring sex preference among Vietnamese. Therefore, boys were better taken care of than girls in terms of food, time spent in caring and medical care. Saito, as well as Rousham, reported similar findings. [25,26] On the other hand, other studies revealed no association between gender and nutritional status [14,27] and a report from the Lao PDR indicated that girls were less malnourished than boys. [28]

Regarding birth order, malnutrition was usually seen in the first child due to lack of experience in child care. However, having many children or a large family size was also found to lead to higher rates of malnutrition among children, probably due to not enough food to share. [29] In addition, birth spacing of more than three years had lower rates of malnutrition, probably due to availability of time for child care. [30] However, our study could not demonstrate any statistical difference.

The low birth weight baby was more at risk for malnutrition than normal weight infants.[28] Intrauterine growth retardation as well as inadequate care after birth brought about a poor nutrition status. From our study, there was an association between

low birth weight and nutritional status (p = 0.034).

The study design only looked for association between such factors and child nutritional status, therefore multivariate analysis was not presented.

Conclusions

Malnutrition is still a problem for under-five children in Phong Dien District of Vietnam. The prevalence of malnutrition according to WFA was 48.8 % in which 38.4 and10.4 % were first and second degree. HFA was 56.8 % under standard in which 26.4, 20.0 and 10.4 % were mild, moderate and severe stunting respectively. Considering WFH, wasting was found in 8.8 % of cases and all were mild degree. The majority of the parents were farmers, had completed secondary school and had low incomes. Nearly half of the families had more than three children. There was no association between socio-economic determinants and the nutritional status of the under-five age children. A significant association was observed between availability of proper latrines and child nutritional status (p = 0.003). The association between age, sex, birth weight of the child and nutritional status were also significant (p = 0.000, 0.000, and 0.034 respectively).

Recommendations

1. Health education especially child nutrition for mothers, is important to promote child health.

2. Good sanitation and environmental control should be provided.

3. Similar studies should be applied to other urban and rural districts comparison with this study.

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