ORIGINAL ARTICLE

Nutritional Status of Underfives at Balimbingan PTP VIII Simalungun Residence of North Sumatra

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ABSTRACT A cross sectional study was done on nutritional status of underfives at Balimbingan PTP VIII Simalungun residence of North Sumatra in 1992. The sample consisted of randomly selected 237 children, most of them were between 1-3 years age. Data were collected by using a questionnaire, physical examination, and anthropometric measurement. Using weight for age parameter, the percentages of children with good to moderately nourished, mildly malnourished, and severely malnourished were 69.6%, 23.7%, and 6.7%, respectively. Using height for age parameter, the percentages were 68.8%, 21.1%, and 10.1%, respectively. About half of the babies were breast-fed after 24 hours and 32,5% was breastfed at the age of 1-12 hours. There were 132 (78.1%) babies who got milk formula at the age of less than 4 months; of which 63.9% were given very diluted formula. Most babies (68%) were already given solid food at the age of less than 4 months. The relationship between number of children with nutritional status of underfives was statistically significant ($p<0.05$), however there was no relationship between nutritional status with parents' education, formula feeding, and time at which solid food was given. **[Paediatr Indones 1997; 37:114-123]**

Introduction

Children's nutritional status, especially below the age of five, is one of the indicators of community health. Besides, nutritional status also greatly dêtermines optimal children's development.[1] In developing countries the major causes of morbidity and mortality in children are chronic infectious diseases and malnutrition.[2,3] The prevalence of nutritional status was decreasing, from 13.06% in 1986 to 10.67% in 1989.[4] However, it seems that a considerable proportion of underfives are still malnourished, Many

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factors are associated with malnutrition, such as low socio-economic status, ignorance of nutritious food and chronic infectious diseases. These results in inadequate quality and quantity food intake, even if they are affordable. Malnutrition in underfives may cause disturbances in growth and development.[3,5] Breast-feeding is the primary nutritional source in the early months of life. It contains adequate nutrition for growth and energy supply.[5,6] Generally, breastfeeding can fulfill the nutritional need from birth to 4-6 months of age. It is recommended to give breast milk immediately after delivery and should be continued until the child reaches 2 years old.[6,7]

There are many estates in North Sumatra which are a source of income, for the community. Socio-economical improvement and technological advances in recent years is thought to give beneficial effects to the health status of the estate community. Health of the estate community has a close correlation with productivity. It is necessary to know how far progress has affected the health level in the estate community, especially of underfives. The purpose of this study was to determine the nutritional status of the underfives in Balimbingan PTP VIII Simalungun, North Sumatra, and factors that might associate with it.

Methods

A cross sectional study was conducted from November to December 1992 in Balimbingan PTP VIII Simalungun, North Sumatra. The plantation covers 12.633 km^2 of land divided in 16 sectors with a population of 7356. Base line data were collected including identity of parents: name, age, education, profession and number of children, and sex, and age of the child. Based on those data, the sample was selected at random on underfives. Later, a structured questionnaire was used to interview the child's mother concerning breast-feeding, formula feeding, the introduction of supplementary food, kind of supplementary food. Recall of the child's illness in the last 3 months was also sought for.

Physical and anthropometric measurements, i.e., the child's weight and height were done by using the beam balance principle. Body weight was measured up to 16 kg with a 0.1 kg accuracy for babies and Detecto-Medic for children. Body height was measured by using the measurement board for infants and microtoise for children over 2 years old.

The WHO-NCHS standard were applied as a reference of nutritional status.[8,9] Nutritional status was classified by using the recommendation the 1991 Anthropometrical Workshop in Ciloto.[10] Data such as weight/age (W/A), height/age (H/A) and weight/height (W/H) were interpreted according to WHO standard.[9] The Chi-square test and Chi square test for trend were used to relate two variables. A p value of less than 0.05 was considered significant.

Results

Out of 237 underfives there were 122 (51.5%) males and 115 (48.5%) females, the youngest was 2 month of age. Age and sex distribution is depicted in Table 1.

Table 1. Distribution of underfives according to age group and sex

Age (months)	Male		Female		Total	%
	No.	%	No	%		
0 -	34	27.9	27	23.5	61	25.7
12 -	31	25	27	23.5	58	24.5
24 -	23	18.9	26	22.6	49	20.7
36 -	17	13.9	14	12.2	31	13.1
48 -<60	17	13.9	21	18.2	38	16.0
Total	122	100.0	115	100.0	237	100.0

The nutritional status was depcted in Tables 2 to 4. Based on the parameters W/A, H/A, W/H, good to moderate nutritional status was found in 69.6%, 68,8% and 88%, respectively (Table 2). Based on W/A mild severe malnutrition has the biggest prevalence among the group of 12-36 months old which is 46 (64.4%) (Table 3). Using combination of 3 parameters, 65.3% of all children showed normal nutritional status (Table 4).

Most of the children (49.6%) begun breastfeeding > 24 hours after delivery (Table 5). Three babies were not breast-fed because of poor health condition of the mother, of the baby self and no breast milk secretion. Duration of breastfeeding ranges between 4-30 months age of initial of breastfeeding. Out of the 237 children, 132 (78.1%) received bottle-feeding out of the 237 children, 132 (78.1%) received bottle-feeding before 4 months old and 74 (49.6%) got full cream milk before reaching 1 year (Table 6). Looking to the nutritional status, 108 (63.9%) got bottle-feeding diluted improperly (Table 7).

One hundred and fifty-five (68%) of the children had been given solid before the age of 4 months. There was no significant difference on nutritional status with age at which the first solid food was given (Table 8). Most babies (48.7%) were initially given instant porridge, and 21.5% rice porridge (Table 9). During the last 3 months, 207 (87.3%) children were suffering from several diseases. Duration of illness was about 5.8 days (1-60 days), with a frequency of 2 times in last 3 months.

Table 2. Nutritional status according to parameters W/A, H/A, W/H

Nutritional status	W / A		H / A		W / H	
	No	%	No	%	No	Percent
Good/moderate	165	69.6	163	68.8	210	88.6
Mild	56	23.7	50	21.1	26	11
Severe	16	6.7	24	10.1	1	0.4

Table 3. Age distribution of malnutrition according to W/A, H/A,W/H parameters

Age (months)	W / A				H / A				W / H			
	M	%	S	%	M	%	S	%	M	%	S	%
0 -	3	5.4	1	6.3	-	-	1	4.1	1	3.8	-	-
12 -	23	41.1	5	31.3	11	22.0	6	25.0	13	50.0	-	-
24 -	13	23.2	5	31.3	20	40.0	7	29.2	4	15.4	1	100.0
36 -	7	12.5	3	18.8	8	16.0	3	12.5	5	19.3	-	-
48 - < 60	10	17.8	2	12.5	11	22.0	7	29.2	3	11.5	-	-
Total	56	100.0	16	100.0	50	100.0	24	100.0	26	100.0	1	100.0

M = mild; S = severe

Table 4. Interpretation of nutritional status using parameters combination W/A, H/A, W/H

Nutritional status	Number	Percentage
Normally fed with past history of malnutrition	39	16.5
Normal	155	65.3
Tall, normally nourished	3	1.3
Currently underfed ++	11	4.6
Currently underfed +	12	5.1
Currently underfed	4	1.7
Obese ++	-	-
Currently overfed with past history of malnutrition	4	1.7
Overfed but not necessarily obese	9	3.8
Total	237	100

Table 5. Age of initiation of breastfeeding

Age (hours)	Number	Percentage
0-	9	3.8
1 -	76	32.5
12 -	33	14.1
24 or more	116	49.6
Total	234	100.0

Table 6. Age of introduction of bottle-feeding and kinds of milk given

Age (months)	Formula	%	Full-cream	%	Total	%
0 -	71	92.2	61	66.3	132	78.1
4 -	4	5.2	13	14.1	17	10.1
12 -	2	2.6	9	9.8	11	6.5
24 -	0	0	9	9.8	9	5.3
Total	77	100	92	100	169	100.0

Table 7. Relationship between nutritional status and method of bottle feeding dilution

Dilution	Nutritional status				Total	Percent
	Good/moderate	%	Mild/severe	%		
Proper	46	41.1	15	26.3	61	36.1
Improper	66	58.9	42	73.7	108	63.9
Total	112	100.0	57	100	169	100.0

Most parents had primary school education consisting of 131 fathers and 136 mothers. Correlation of the parents education with the nutritional status of children was not statistically significant (p 0,05) (Table 11). There was a significant correlation between the number of children in the family and nutritional status of underfives. The higher the number of children, the greater is the rate of malnutrition (Table 12).

Table 8. Relationship between nutritional status and age of introducing solid food

Age of introducing solid food (mo)	Nutritional status				Total	%
	Good/moderate	%	Mild/severe	%		
0 -	106	68.0	49	68.0	155	68
4 -	32	20.5	12	16.7	44	19.3
6 -	18	11.5	11	15.3	29	12.7
Total	156	100.0	72	100.0	228	100.0

Table 9. Type of solid food given at first time

Type of solid food	Number	Percent
Instant porridge	111	48.7
Rice porridge	49	21.5
Cooked rice + vegetable	37	16.2
Cooked rice + vegetable +meat	16	7
Ground cooked rice	7	3.1
Milk porridge	6	2.6
Cooked rice + meat	2	0.9
Total	228	100

Table 10. Diseases suffered during the last 3 months

Disease	Number	Prosentage
No illness	30	12.7
Cough/cold	126	53.1
Fever	53	22.4
Diarrhea	19	8.0
Measles	1	0.4
Breathless	1	0.4
Other	7	3.0
Total	237	100

Table 11. Distribution of nutritional status (W/A) according to parents education

Education	Nutritional status		Total
	Good/moderate	Mild/severe	
Father			
▪ Higher education	6	0	6
▪ Senior high school	56	21	77
▪ Junior high school	17	6	23
▪ Elementary school	86	45	131
Mother			
▪ Higher education	0	1	1
▪ Senior high school	45	16	61
▪ Junior high school	27	12	39
▪ Elementary school	93	43	136

p = > 0.05

Table 12. Nutritional status according to number of children in family

Number of children	Nutritional status				Total	%	Odds Ratio
	Good/moderate	%	Mild/severe	%			
1 - 2	90	73.2	33	26.8	123	51.9	1.000
3 - 4	70	66.7	35	33.3	105	44.3	0.73
> 5	3	33.3	6	66.7	9	3.8	0.19

$x^2 = 4.439$ df = 1 p = < 0.05

Discussion

In this study, we obtained 69.6% (W/A) with good and moderate nutritional status from 237 underfives. This figure is higher than that reported by Lubis CP (1977) in Tobacco plantation in North Sumatra, Lubis[3] in Pakantan Southern Tapanuli and Sinuhaji[12] in 6 plantations in Northern Sumatra, 40.06%, 40.6% and 43.6% respectively. The difference is probably due to the parameters and the standard used, besides the Balimbingan plantation has 9 health centers (Posyandu) since 1985 which are performing the five Posyandu program.

Based on H/A, good/moderate nutritional status in this study was 68.8%. This finding was higher than that was found in the previous studies by Lubis[3] (60.9%) and lower than Siregar[13] (77.1%). According to W/H, it seemed that the good and moderate nutritional status had increased in comparison with the figure by Lubis[3] (65.6%) and lower than Suyitno[14] (89%) in Mijen, Semarang.

W/A and W/H are parameters used to evaluate nutritional status. Body weight is affected by acute conditions such as infection, diarrhea and low food consumption. It can be used to detect acute alteration of nutritional status while height is commonly used as an indicator of a long term history of nutritional status.[15]

In this study about 46,9% children were breast-fed 24 hours after delivery because of no milk secretion. Daulay RM reported that all babies delivered at Pirngadi hospital, Medan were breastfed 6 hours after delivery.[16] Duration of breastfeeding ranges between 4 to 30 months. Lubis[3] reported the duration as 9 to 30 months and Siregar[17] reported 9 to 24 months.

Formula or full cream milk was given to 78.1% before the age of 4 months (Table 6), because of insufficient breast milk or working mother. Bottle-feeding was given to 63.9% children with inappropriate dilution. Tarigan[18] and Sitanggang[19] found 33.8% and 63.4% respectively in the pediatric nutritional out patient clinic at Pirngadi Hospital Medan.

The babies fed with bottle-feeding were easily suffering from protein calorie malnutrition compared to those who are breastfed, because bottle-feeding was given too diluted or the baby get diarrhea frequently. Poor families tend to give bottle-feeding which is too diluted.[5,20]

In this study, 68% of children had been given solid food at less than 4 months (Table 8) and 31.4 % of them suffered from mild and severe malnutrition. Enoch et al[20] who made a study in East and South Jakarta, reported a percentage of 70% of children were given solid food at the age of 1-3 months.

Diseases very frequently occurring among the underfives in this study for the last 3 months were cough and cold (53,1%) whereas diarrhea accounts for 8% only.

Table 11 shows a high percentage in children with mild and severe malnutrition of parents with elementary educational level (fathers 57.4% and mothers 55.7%), Lubis[3] and Sinuhaji[12] reported for fathers 73.5%, 69.9% and for mother 79,7%, 71.94% respectively. Relationship between parents education and nutritional status of children was not significant.

In this study most parents were young, the mothers were 25-35 years old and the fathers were 25-40 years old with 1-2 children (51.9%). Families with 1-2 children had less underfives with malnutrition compared to families with 3-4 children or more. Nutritional status is probably significantly correlated in families with many children which is similar to the study by Lubis.[3]

Conclusions

At Balimbingan PTP VIII Northern Sumatra it was found that:

1. The nutritional status of the underfives according to W/A parameter for mild and severe malnutrition was still high (30,4%), especially in the age 1-3 year (63.9%).
2. More than 50% children was given very diluted bottle-feeding.
3. Nutritional status was significantly correlated with the number of children in the family, resulting in mild and severe malnutrition in the underfives ($p < 0,05$).

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