

ORIGINAL ARTICLE

Nutritional Status of Children in Three Pre-elementary Schools in Medan, North Sumatera Abstract

by

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Abstract

Anthropometric measurements have been taken on 162 children of Methodist, Dharma Wanita USU and Aisyiah pre-elementary schools in Medan to assess their nutritional status. This study was done cross sectionally from January to February 1990.

The nutritional status of those children were then compared among those schools with the assumption that father's income and educational level of mothers were different. By the parameters of W/A, H/A and W/H it showed that the nutritional status of children in the pre-elementary schools were generally quite good. Using parameters W/A and W/H there was a significant difference between the children in Methodist and in Aisyiah ($p < 0.001$).

University graduated mothers could be found in Dharma Wanita USU, whereas in Methodist and Aisyiah pre-elementary schools the mothers were mostly secondary high school graduates.

Father's income above Rp. 150.000,- could be found in Methodist pre-elementary school subsequently followed by Dharma Wanita USU pre-elementary schools, whereas in Aisyiah pre-elementary school the father's income was mostly between Rp. 100.000,- and Rp. 149.999,-.

By using the Waterlow classification we found 9.88% children with acute Protein Calorie Malnutrition, whereas chronic Protein Calorie Malnutrition only 2.46% .

The nutritional status of children in the three pre-elementary schools could be concluded as good.

Introduction

Nutritional status of infants and underfive children is an indicator of the health status of the community. The better the nutritional status of the children the better the health status of the community. Whereas, the height of school children of age 7 to 12 years is a parameter of the nutritional status and also indicates socio-economic changes. The improvement of socio-economic levels may produce an increase in children's height [1,2].

Pre-elementary school children are those between pre-schools and school age. This group is increasing in number,

especially in urban areas. The nutritional status of children in this age group is not fully recognized.

The nutritional status in pre-elementary school children may reflect the nutritional status of infants and children 2 to 3 years later. This study is designed to assess the nutritional status of children in three pre-elementary schools in Medan and compare among the three pre-elementary schools with the assumption that father's income and mother's education were different in those three pre-elementary schools.

Materials and methods

The subjects of this study were children in three pre-elementary schools in Medan, namely :

- Pre-elementary school Methodist with 82 children, of which 58% were Chinese Indonesian children. The school fee was Rp. 24.000,- per month.
- Pre-elementary school Dharma Wanita University of North Sumatera (USU) with 40 children, all of them are Indonesians. The school fee was Rp. 5000,- per month.
- Pre-elementary school Aisyiah with 40 children all of them are Indonesians, with a school fee of Rp. 2500,- per month.

This study was a cross-sectional observation and conducted from January to February 1990 by using :

- Questionnaires to identify the children i.e. name, age, sex, father's income and

mother's education.

- Physical examination to find signs of malnutrition.
- Anthropometric measurements i.e. weight and height.
The weight was measured using a Dectecto balance with a sensitivity of 0.1 kg and the height was measured by a Microtoise with a sensitivity of 0.1 cm.
- The age was obtained from the school records.
- The nutritional status was assessed using anthropometric parameters of weight/age (W/A), Height/age (H/A) and weight/height (W/H).

Classification of Protein Calorie Malnutrition was based on "Rekomendasi Loka-karya Anthropometri 1975" and the Table of the Directorate of Nutrition were used. To classify acute, chronic-acute and chronic malnutrition, the Waterlow classification was used.

Classification of Nutritional status based on the Recommendation of Lokakarya 1975 and the Table by Directorate of Nutrition [3].

Category	W/A (%)	H/A (%)	W/H %
Wellnourished	100 - 80	100 - 95	100 - 90
Moderate malnutrition	80 - 60	95 - 85	90 - 70
Severe malnutrition	60	85	70

Standard Harvard, percentile 50th Harvard standard is normal

Classification of Protein Calorie Malnutrition (PCM) according to Waterlow [4]

Category (H/A)	Category (W/H)	
	0 and 1 (80%)	II and III (80%)
Normal (0)	> 90 % normal	acute
Mild (I)		
Moderate (II)	90 % chronic	acute - chronic
Severe (III)		

For statistical analysis the Chi Square test was used.

Results

Distribution of 162 pre-elementary school children by age and sex (Table I).

The majority (53.7%) of pre-elementary school children was in the age group of 5-6 years, followed by children in the age group of 4-5 years (35.80%).

The male-female ratio was 73 : 89.

Mother's education showed that secondary high school graduates appeared predominantly (50.00%) followed by primary high school (22.20%). Mothers who were University graduates appeared pre-

dominantly in the pre-elementary school Dharma Wanita USU (50.00%), while elementary graduates found in Methodist and in Aisyiah pre-elementary Schools namely 4.88% and 7.75%, respectively (Table II).

The educational levels of the mothers different significantly amongst the three pre-elementary schools ($p < 0.001$), namely between Methodist and Dharma Wanita USU ($p < 0.001$), between Methodist and Aisyiah and between Dharma Wanita USU and Aisyiah ($p < 0.05$).

Table I. *Distribution of Children by Age and Sex*

Age Group (Years)	Pre-elementary school											
	Methodist			Dharma Wanita			Aisyiah			Total		
	M	F	N	M	F	N	M	F	N			
3 - 4	1	1	2	2	1	3	-	2	2	3	4	7
- 5	14	13	27	10	8	18	5	8	13	29	29	58
- 6	26	22	48	2	17	19	9	11	20	37	50	87
> 6	3	2	5	-	-	-	1	4	5	4	6	10
Total	44	38	82	14	26	40	15	25	40	73	89	162

* M = Male F = Female N = Number

Table II. *Educational Level of Mothers*

Pre-elementary school	Number	Educational level							
		* ES	%	PS	%	SHS	%	UG	%
Methodist	82	4	4.88	23	28.03	42	51.22	13	15.85
Dharma Wanita	40	-	-	1	2.50	19	47.50	20	50.00
Aisyiah	40	7	17.50	12	30.00	20	50.00	1	2.50
Total	162	11	6.80	36	22.20	81	50.00	34	21.66

$$X^2 = 42.918$$

$$df = 6$$

$$P < 0.001$$

* ES = Elementary School
PS = Primary High School

SHS = Secondary High School
UG = University Graduate

Less than half of the fathers (45.67%) have income of more than Rp.150.00,-. However, this relative high income appeared predominantly in Methodist (57.30%). In Dharma Wanita USU, 55.00%

of fathers had a moderate income, while in Aisyiah most of fathers (55.00%) had an income of between Rp.100.00 and Rp.149.999 (Table III).

The father's income per month in

Table III. *Income of Fathers*

Pre-elementary schools	Number	Father's income / month (Rupiah)					
		50.000-99.999		100.000-149.999		150.000	
		Number	%	Number	%	Number	%
Methodist	82	7	8.53	28	34.14	47	57.31
Dharma Wanita USU	40	8	20.00	10	25.00	22	55.00
Aisyiah	40	13	32.50	22	55.00	5	12.50
Total	162	28	17.28	60	37.03	74	45.67

$\chi^2 = 27.226$

df = 4

p < 0.001

Table IV. *Nutritional Status of Children by weight/age*

Pre-elementary school	Number	Nutritional Status					
		Wellnourished		Moderate Malnutrition		Severe Malnutrition	
		Number	%	Number	%	Number	%
Methodist	82	70	85.36	12	14.63	-	-
Dharma Wanita USU	40	26	65.00	14	35.00	-	-
Aisyiah	40	22	55.00	17	42.50	1	2.50
Total	162	118	72.83	43	26.54	1	0.61

$\chi^2 = 16.196$

df = 4

p < 0.05

those three pre-elementary schools children significantly differed from each other ($p < 0.001$), namely between Methodist and Aisyiah ($P < 0.001$) also between Dharma Wanita USU and Aisyiah. Whereas between Methodist and Dharma Wanita USU there was no significant difference ($p > 0.05$).

Most of the pre-elementary school

children (72.83%) were wellnourished while moderate and severe malnutrition were found predominantly in Aisyiah pre-elementary school (Tabel IV).

There was a significant difference of the nutritional status among children in the three pre-elementary schools ($p < 0.05$), i.e. between children from Methodist and Aisyiah (Tabel IV).

Table V. *Nutritional Status of Children by height/age*

Pre-elementary schools	Number	Nutritional Status					
		Wellnourished		Moderate malnutrition		Severe malnutrition	
		Number	%	Number	%	Number	%
Methodist	82	77	93.90	5	6.09	-	-
Dharma Wanita-USU	40	40	100.00	-	-	-	-
Aisyiah	40	34	85.00	5	12.00	1	2.50
Total	162	151	93.20	10	6.172	1	0.61

p < 0.05

Table VI. *Nutritional Status of Children by weight/height*

Pre-elementary schools	Number	Nutritional Status					
		Wellnourished		Moderate malnutrition		Severe malnutrition	
		Number	%	Number	%	Number	%
Methodist	82	78	95.12	4	4.87	-	-
Dharma Wanita USU	40	30	75.00	10	25.00	-	-
Aisyiah	40	25	62.50	14	35.00	1	2.50
Total	162	133	82.09	28	17.28	1	1.61

$\chi^2 = 22.804$

df = 4

p < 0.001

By using H/A parameter, 151 children (93.20%) were wellnourished. All children in Dharma Wanita USU were wellnourished (100%), while in Methodist 5 (6.09%) and in Aisyiah 5 (12.00%) had moderate malnutrition ($p > 0.05$) (Tabel V).

By using W/H parameter, 133 children (82.09%) were wellnourished. In Metho-

dist, Dharma Wanita USU and Aisyiah moderate malnutrition was found in 4.87%, 25.00% and 35.00%, respectively. Whereas in Aisyiah, 2.50% showed severe malnutrition (Tabel VI)

Statistically, the nutritional status in children of the three pre-elementary schools showed significant differences ($p < 0.001$).

Table VII. *Waterlow Classifications*

Pre-elementary schools	Wellnourished		Acute PCM		Chronic PCM		Acute & Chronic PCM		
	Number	%	Number	%	Number	%	Number	%	
Methodist	82	78	91.12	1	1.21	1	1.21	2	2.43
Dharma Wanita USU	40	30	75.00	8	20.00	-	-	2	5.00
Aisyiah	40	25	62.50	7	17.50	3	7.50	5	12.50
Total	162	133	82.10	16	9.88	4	2.46	9	5.60

PCM = Protein calorie malnutrition

By the Waterlow classification, 133 (82.10%) pre-elementary school children were wellnourished. In Dharma Wanita USU 8 (20.00%) had acute PCM, whereas

in Aisyiah 3 (7.50%) were in chronic PCM, and 5 (12.50%) were in acute-chronic PCM (Tabel VII).

Discussion

Generally by using the parameters W/A, H/A and W/H, children in the three pre-elementary schools were wellnourished although by the W/H parameter moderate malnutrition still appeared in 28 (17.28%) and severe malnutrition in 1 (0.61%).

Based on W/A and W/H criteria a significant difference of the nutritional status was found between the children in Methodist and Aisyiah pre-elementary schools, while no significant difference was found between Methodist and Dharma Wanita USU pre-elementary schools. The significant difference between Methodist and Aisyiah pre-elementary schools may be associated with the father's income. Most of the father's income in pre-elementary school Methodist was Rp.150.000,-/month (57.31%), while in Aisyiah pre-elementary school it was Rp.100.000 to Rp.149.999 (55.00%). This finding is similar with that

found by Puslitbang Gizi Bogor in Indonesia (rural and urban areas) that higher levels of social economy may produce lower rates of PCM (5).

In Dharma Wanita USU pre-elementary school, where 50% of the mothers were University graduates, 25% children still suffered from moderate malnutrition. Whereas in Methodist pre-elementary school, mothers were senior high school graduates and most of the children were wellnourished. The mother's education level seemed to have less important influence on the children's nutritional status. Similar findings were found by the study of the Puslitbang Gizi Bogor in some cities of Sumatera where the level of educations of the mothers did not affect the degree of PCM of under-five children (5).

By using H/A, 6.17% of children had moderate malnutrition, and 0.61% severe.

This condition indicated malnutrition in the past. No significant difference was found in the three pre-elementary schools although the father's income in Methodist pre-elementary school was higher. This limited study had failed to follow the increase in height in the future

by the on going improvement of socioeconomic level.

Using the Waterlow classification we could differentiate acute PCM from chronic PCM. Presently acute PCM and acute-chronic PCM in the three pre-elementary schools need prompt treatment.

Conclusion

1. Using the parameters of W/A, H/A and W/H, children of the three pre-elementary schools in Medan were generally wellnourished.
2. Using the parameters of W/A, W/H, there were significant differences of nutritional status between Methodist and Aisyiah pre-elementary schools ($p < 0.001$).
3. University graduate mothers could be found in Dharma Wanita USU pre-elementary school, whereas in Methodist and Aisyiah pre-elementary

schools the mothers were mostly secondary high school graduates.

4. Father's income above Rp.150.000,-, were mostly found in Methodist pre-elementary school subsequently followed by Dharma Wanita USU pre-elementary school, whereas in Aisyiah pre-elementary school the father's income was mostly between Rp.100.000,- and Rp.149.999,-.
5. By the classification of Waterlow, 9.88% children had PCM, and the chronic type was found only in 2.46% of those children.

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