

# Nutritional status of primary school children: A comparative rural & urban study 1976

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## Introduction

MALNUTRITION is one of the most serious public health problems affecting the developing countries today. Infants and toddlers are mostly affected followed closely by pre-school and primary school children. Their daily diet is poorly balanced, inadequate in calories, lacking in proteins, minerals and vitamins. Faulty feeding in the weaning and post weaning period due to lack of nutritional education, poor socio-economic status, poor environmental sanitation, parasitic infection, cultural beliefs and taboos, food customs and tradition are the pillars of malnutrition.

There is an increased awareness now than ever before, of the need to combat nutritional problems facing the developing countries. Various programmes, schemes and projects have been started by Governments, societies and organisations all over the world. There is an urgency for effective co-ordination in national and international work.

This comparative study was carried out with the object of assessing the nutritional status of primary school children of the major ethnic groups both in the rural and in the urban areas.

## Materials and methods

A total of 5,360 students were involved in this study. 3,107 were from the rural areas and 2,253 from urban areas. Out of the 17 rural schools, six were Malay medium schools, five Chinese medium and six Tamil medium schools. The Malay and Chinese medium schools were situated in villages and the Tamil schools were situated in Estates in

rural areas. The student from the urban areas were taken from two primary schools (English medium). The students in these two urban schools came mainly from upper income group. The students in the seventeen rural schools came mainly from the lower and middle income group, with same climatic conditions. Tables 1 and 2 show the age and sex distribution of the rural and urban school children investigated.

A team consisting of a Medical Officer of Health, a Public Health Inspector, 2 Probationer Public Health Inspectors visited the schools involved and took measurements of weights and heights of the primary school children.

Weights were taken using a "Detecto-Medic" platform beam type weighing machine (U.N.I.C.E.F.) made by Detecto Scales Inclusive Brooklyn, N.Y., U.S.A. This weighing machine had scales marked in kilograms and was checked frequently by the use of a known weight. The weight was recorded to the nearest 0.1 kilogram. Height measurements were read from a scale fixed along with the weighing machine, marked in centimeters up to a height of 2 meters and capable of measuring to an accuracy of 0.5 c.m. In recording the height measurement, the child was requested to stand barefeet on the centre of the platform fully erect with heels together. The Horizontal lever was lowered so as to rest firmly on the crown of the head. In recording the weight measurement the school child was asked to stand barefeet with minimum clothing (light shorts for boys, light dresses for girls) in the middle of the weighing scale.

The ages of the children were determined from Birth Registration Certificates. Age was recorded to the nearest year e.g. 6 yrs. and 5 months had been recorded as 6 yrs. and 7 yrs. and 9 months as 8 yrs. Ages at halfway point was recorded to the next higher unit (e.g. 8 yrs. and 6 months was recorded as 9 yrs.) The methods of measurements of weight and the heights and recording of age were those suggested by Jelliffe (1966).

Caution was taken to ensure accuracy in recording the weights and heights measurements. My assessment of nutritional status of primary school children is based on treating the data by 3 methods i.e. percentage prevalence with deficit weight for age, deficit height for age ("stunting") and deficit weight for height ("wasting") as suggested by

Waterlow (1973) and W.H.O. (1976). "Wasting" in this study has been taken as those children with less than 80% expected weight for height of Nelson standards. "Stunting" has been taken as percentage prevalence with less than 85% expected height for age. Protein energy malnutrition has been classified as suggested by Welcome working party. "Underweight" those with 80-60% expected weight for age with no oedema, "Marasmus" - those with <60% weight for age with no oedema. Kwashiorkor - those with 80-60% weight for age with oedema.

### Results and discussion

The mean weight and height trend lines of the 3 ethnic groups i.e. Malay, Chinese and Indian are shown separately for Males and Females in Figures 1 to 4. These trend lines are compared with the

Table I

The Number of Subject by Age and Ethnic Groups in Kuala Lumpur (Urban Areas) in 1976

AGE IN YEARS	ETHNIC GROUPS						TOTAL
	MALAY		CHINESE		INDIAN		
	Male	Female	Male	Female	Male	Female	
7	99	95	79	51	46	28	398
8	86	59	96	47	46	33	367
9	86	91	98	51	43	41	410
10	67	78	109	74	42	31	401
11	86	64	78	50	46	37	361
12	63	41	81	68	35	28	316
Total	487	428	541	341	258	198	2253

Table II

The Number of Subjects by Age and Ethnic Groups in Rural Areas in Klang District in 1976

AGE IN YEARS	ETHNIC GROUPS						TOTAL
	MALAY		CHINESE		INDIAN		
	Male	Female	Male	Female	Male	Female	
7	78	62	158	128	75	78	579
8	62	72	136	137	78	93	578
9	76	71	141	151	76	69	584
10	76	80	131	140	73	73	573
11	55	68	109	114	41	40	427
12	62	74	88	98	28	16	366
Total	409	427	763	768	371	369	3107

80% and the 60% of the Nelson standard Trend line. These have been taken as trend lines for growth between 7 and 12 years age group rather than the actual curve growth rates to simplify comparison.

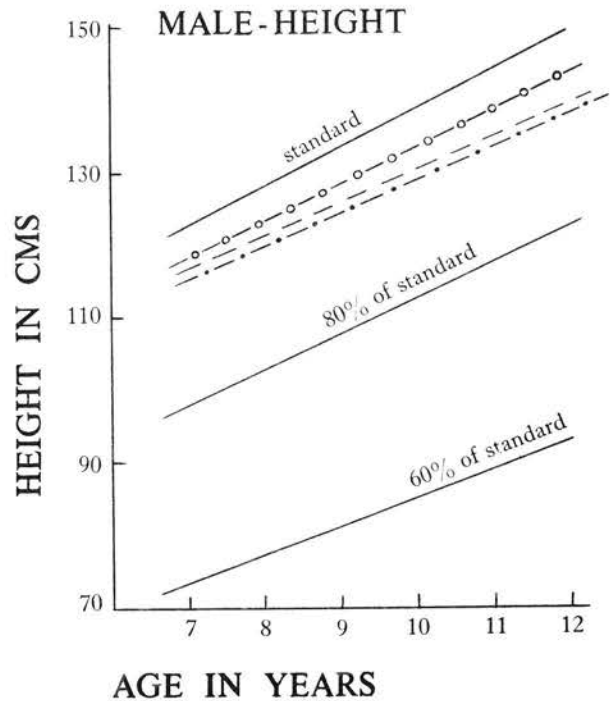
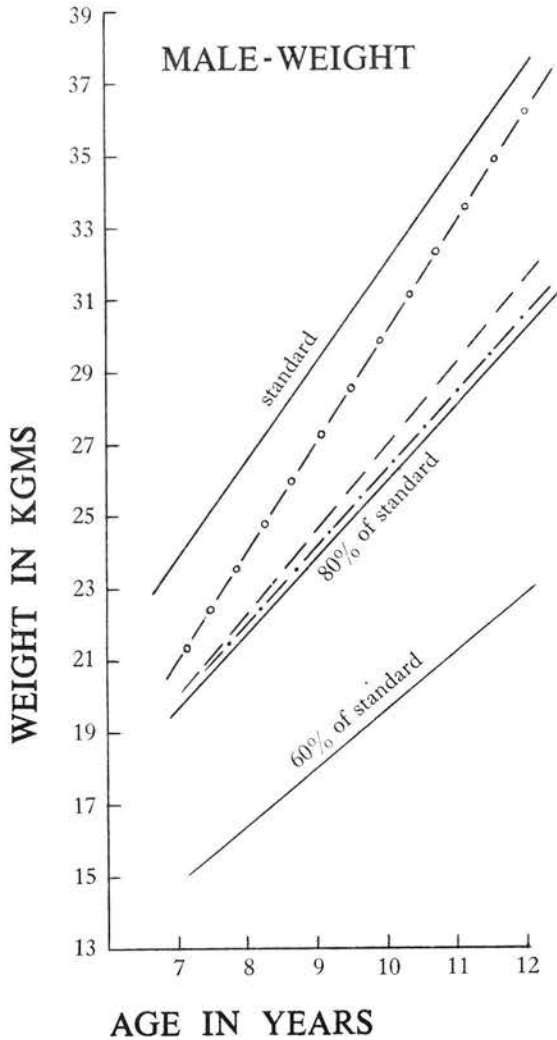
### Weights & Heights of Urban Boys

Urban Malay primary school children between the ages of 7 and 12 had the shortest stature and were generally lighter in weight than their Chinese and Indian counterparts.

Chinese urban primary school children were clearly heavier and taller than either the Malays or the Indians; the latter's growth achievement was intermediate between that of the Chinese and Malay.

### Weights & Heights of Urban Girls

Urban Malay girls like the boys had the least satisfactory growth achievement compared to the Chinese and the Indians; they were lighter and shorter than their Chinese and Indian counterparts. Chinese girls had the best weight achievement; with



Malay: -.-.-.-  
 Key: Chinese: -o-o-o-o-  
 Indian: - - - - -

**Fig: 1 Weight and Height trends of male primary school children by ethnic groups in the urban areas in Kuala Lumpur 1976**

Indian girls lying intermediate. Although Indian girls were lighter than the Chinese girls, there was very little difference between their heights.

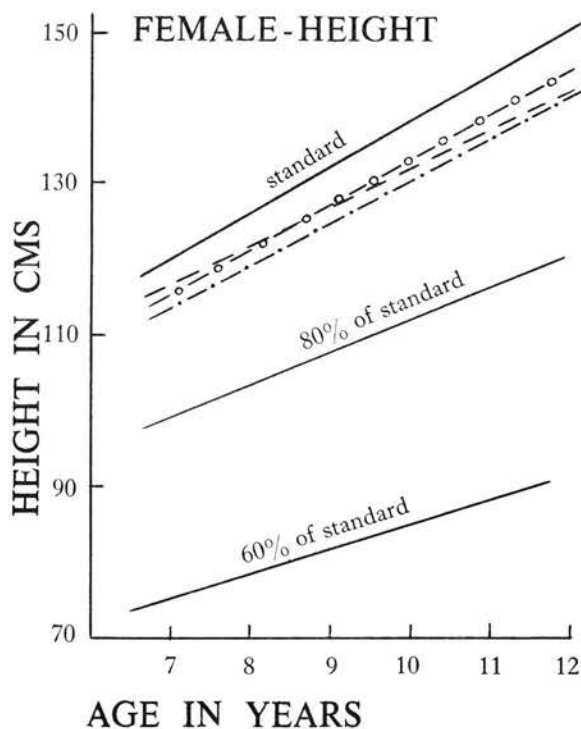
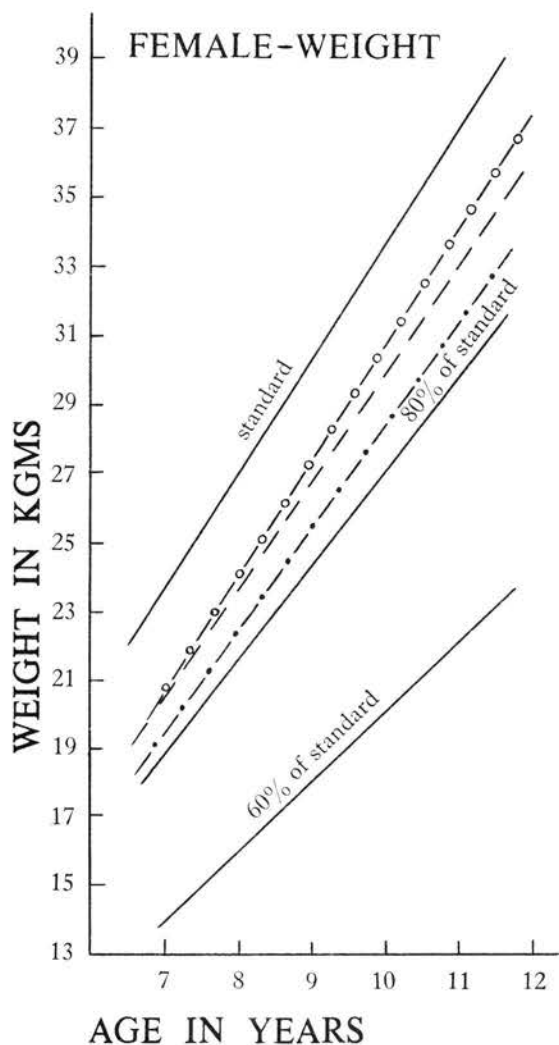
the most satisfactory growth achievement in terms of weight and height.

### Weights & Heights of Rural Boys

The weight of the rural Indian boys were the lowest recorded but their heights were no inferior to the Malays who were heavier than the Indians at all age groups between 7 and 12 years. Compared to the Indians and Malays, rural Chinese boys have

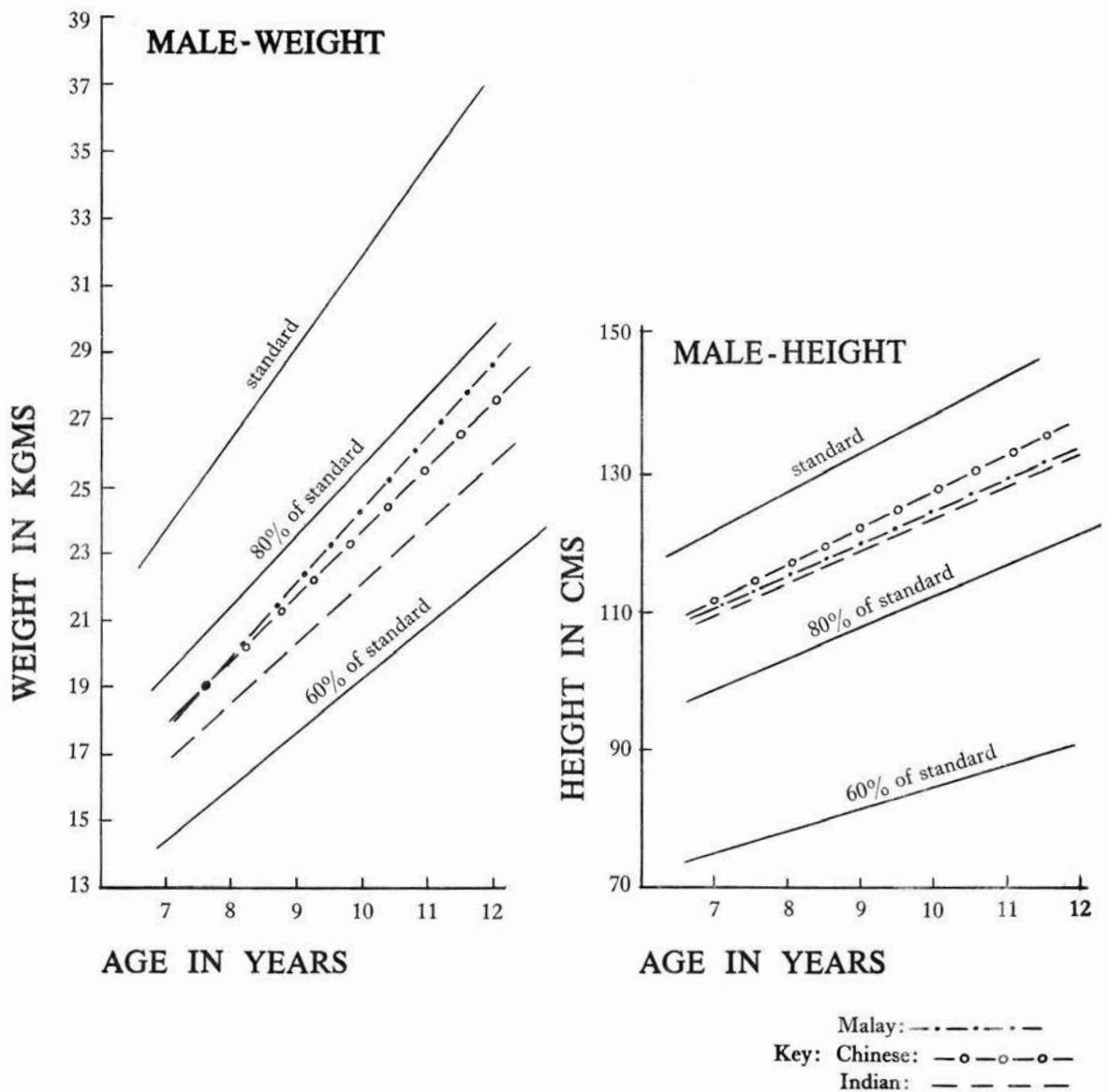
### Weights & Heights of Rural Girls

The weights and heights of the rural Indian girls were lower than their Chinese and Malay counterparts. However rural Chinese and Malay girls were almost identical in weight and height achievement.



Malay: - . - . - . -  
 Key: Chinese: - o - o - o -  
 Indian: - - - - -

**Fig: 2 Weight and Height trends of female primary school children by ethnic groups in the urban areas in Kuala Lumpur 1976**



**Fig: 3 Weight and Height trends of male primary school children by ethnic groups in the rural areas in Klang District 1976**

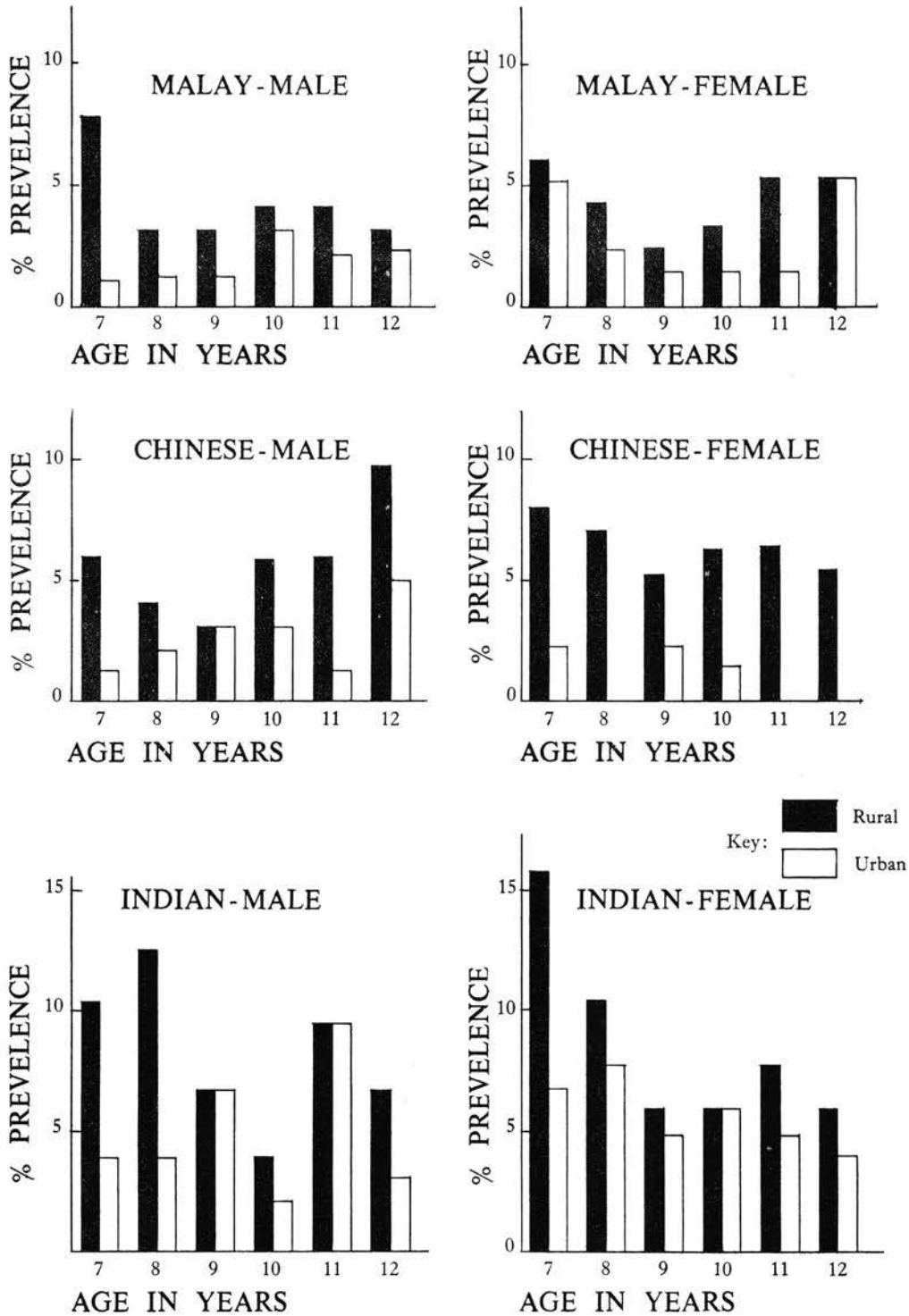
**Comparative Growth Achievement - Rural and Urban children**

Whereas in the urban area, Malay primary school children of both sexes had the least satisfactory growth, in the rural schools, the Indian were the worse off, compared either with the Malay or the Chinese.

Chen (1976) reported on the weights and heights of 3,312 urban primary school boys and girls around Kuala Lumpur and found that Chinese children

were taller than Malays and Indian children. This observation is similar to the present finding, based on 2,253 urban children. However, while Chen found that the urban Indian children had the least satisfactory growth achievement compared to the Chinese and Malay, this report can confirm this for the rural Indian. An explanation for this discrepancy may be due to sampling differences as the urban Indian children reported by Chen were in fact more similar in their growth pattern to the present rural Indian series.





**Fig. 5** Prevalence of Severe Acute Mal-nutrition - "Wasting" ( $< 80\%$  weight for height) in primary school children according to deficit weight for height by age and ethnic group in Rural and Urban areas 1976

**Table III**

**Prevalence of chronic malnutrition "Stunting" in primary school children according to deficit height for age by age, sex and ethnic groups in Kuala Lumpur, 1976**

AGE IN YEARS	ETHNIC GROUPS					
	MALAY		INDIAN		CHINESE	
	% of children with <85% height for age		% of children with <85% height for age		% of children with <85% height for age	
	Male	Female	Male	Female	Male	Female
7	2.0	1.1	0	0	0	0
8	5.8	0	0	0	0	0
9	5.6	0	6.8	0	2	1.9
10	1.5	2.5	2.4	6.5	1.8	0
11	2.2	2.9	0	0	0	0
12	3.2	2.3	0	3.3	0	1.3

**Table IV**

**Prevalence of "stunting" malnutrition in primary school children according to deficit height for age by age, sex and ethnic groups in rural areas in Klang District, 1976**

AGE IN YEARS	ETHNIC GROUPS					
	MALAY		INDIAN		CHINESE	
	% of children with <85% height for age "stunting"		% of children with <85% height for age "stunting"		% of children with <85% height for age "stunting"	
	Male	Female	Male	Female	Male	Female
7	8	3	6	15	3.8	2.3
8	14	11	15	13	6.6	3.6
9	14	6	15	7	9.2	6.5
10	14	10	16	8	5.8	2.1
11	12	5	9	18	3.6	5.1
12	21	13	17	9	3.4	15

by rural Malay boys (3-11%) and girls (1-6%) the rural Indian boys and girls had the highest prevalence of under-weight.

**Conclusion and summary**

Weight and height measurements are accepted as reliable indicators of growth and development and can be easily seen in a study group.

The weights and heights of 3,107 primary school children from the rural areas and 2,253 from

the urban areas, aged 7 to 12 years, belonging to the three main ethnic groups in Malaysia (namely Malay, Chinese and Indian) have been measured. The Chinese children were taller and heavier than the Malay and Indian children both in rural and urban areas. The rural Indian children had the least satisfactory growth achievement. The urban Malay children were shorter and less heavy than the urban Indian children.



Table V

## Prevalence of protein energy malnutrition in primary school children by age, sex and ethnic groups in Kuala Lumpur (Urban Areas) in 1976

AGE IN YEARS	ETHNIC GROUPS																	
	MALAY				INDIAN				CHINESE									
	% of children with 80-60% weight for age (underweight)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age with oedema (kwashiorkor)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age with oedema (kwashiorkor)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age (underweight)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age (underweight)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age with oedema (kwashiorkor)	% of children with <60% weight for age with oedema (kwashiorkor)						
7	Male 50.0	Female 49.5	Male 2.0	Female 0	Male 0	Female 0	Male 28.6	Female 28.6	Male 0	Female 0	Male 0	Female 0	Male 28.4	Female 29.4	Male 0	Female 0	Male 0	Female 0
8	Male 48.8	Female 50.9	Male 2.3	Female 0	Male 0	Female 0	Male 37.0	Female 24.2	Male 0	Female 0	Male 0	Female 0	Male 29.6	Female 23.4	Male 0	Female 2.1	Male 0	Female 0
9	Male 58.4	Female 50.6	Male 1.1	Female 0	Male 0	Female 0	Male 46.5	Female 26.2	Male 9.3	Female 2.4	Male 0	Female 0	Male 45.0	Female 30.2	Male 0	Female 0	Male 0	Female 0
10	Male 49.3	Female 38.5	Male 2.9	Female 0	Male 0	Female 0	Male 52.4	Female 54.8	Male 0	Female 3.2	Male 0	Female 0	Male 34.5	Female 34.7	Male 0	Female 0	Male 0	Female 0
11	Male 48.9	Female 21.4	Male 4.4	Female 0	Male 0	Female 0	Male 35.4	Female 26.8	Male 2.1	Female 0	Male 0	Female 0	Male 30.2	Female 22.2	Male 0	Female 0	Male 0	Female 0
12	Male 50.8	Female 40.9	Male 1.6	Female 4.6	Male 0	Female 0	Male 26.7	Female 30.0	Male 6.7	Female 10.0	Male 0	Female 0	Male 30.1	Female 20.0	Male 0	Female 1.3	Male 0	Female 0

Table VI

Prevalence of protein energy malnutrition in primary school children by age, sex and ethnic groups in Klang District, 1976

AGE IN YEARS	ETHNIC GROUPS																	
	MALAY				INDIAN				CHINESE									
	Male	Female	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age with oedema (kwashiorkor)	% of children with 80-60% weight for age (underweight)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age with oedema (kwashiorkor)	% of children with 80-60% weight for age (underweight)	% of children with <60% weight for age with no oedema (marasmus)	% of children with 80-60% weight for age (underweight)	Male	Female	Male	Female	Male	Female		
7	76.9	58	3.8	4	0	0	84	67	6	15	0	0	71.5	61.7	1.3	2.3	0	0
8	77	76	4	1	0	0	82	73	6	15	0	0	67.6	62.8	2.9	3.7	0	0
9	68	69	5	1	0	0	78	73	13	5	0	0	73	67.5	2.1	3.3	0	0
10	81	75	3	6	0	0	73	79	19	8	0	0	69.5	67.1	3.8	1.4	0	0
11	76	63	5	1	0	0	78	72	7	17	0	0	70	48	3	10	0	0
12	61	64	11	1	0	0	67	50	17	37	0	0	54	53	1	12	0	0

“Wasting and stunting” were more prevalent in the primary school children from the rural areas in Klang District compared with urban areas in Kuala Lumpur, particularly in the Indian and Malay ethnic groups. The poor growth achievement in the rural areas could be attributed to poor nutrition and relatively poor family income. The differences in the growth achievements for the various ethnic groups are probably due to socio-economic differences rather than the genetic differences.

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