

# Socio-economic determinants of nutritional status of children in rural peninsular Malaysia

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The data presented is part of the findings from a four-year collaborative research project between Universiti Putra Malaysia, the Institute for Medical Research and the Ministry of Health Malaysia. The project assessed the nutritional status of the major functional groups in Peninsular Malaysia. Mukim Sayong and Pulau Kemiri in the District of Kuala Kangsar, Perak were two of the subdistricts selected to represent small rubber holdings in Peninsular Malaysia. This paper attempts to analyse the socio-economic profile of the households and the nutritional status of children below 9 years of age. A total of 307 households were studied. Approximately 63% of the households were involved in rubber activities and the majority of them were hired tappers. The average monthly income of the households was RM467 and the income ranged between RM30 to RM2120. Based on the per capita poverty line income of RM84.38, it was found that 14.1% of the households earned less than RM42.19, which can be considered as hard-core poor, while 32.7% were poor (monthly per capita income between RM42.19 and RM84.38). Slightly more than half (52.7%) earned income above the poverty line. The average family size was 4.5, ranging from 1 through to 16. The majority of the heads of households (56.6%) had between 3 and 6 years of education, and 14.5% did not receive any formal education. The prevalence of stunting among children 0–5 years of age was 26%, while 31.5% were underweight and 3.8% wasted. Among children aged between 5 and 9 years, almost the same pattern of nutritional status was noted. The overall percentages of stunting, underweight and wasting among these children were 29.2%, 26.1% and 0.62%, respectively. Analysis on nutritional status according to income level showed a noticeable difference in the prevalence of malnutrition in children above and below the poverty line income. The Student's *t*-test indicated significant differences in weight-for-age and weight-for-height between the two poverty line income for children below 5 years of age. Pearson's correlation coefficient showed a significant correlation between height-for-age with household size ( $r = -0.26$ ,  $P < 0.05$ ), and monthly per capita income with weight-for-height ( $r = 0.25$ ,  $P < 0.05$ ). There was a highly significant correlation between acreage of land cultivated and weight-for-height ( $r = 0.42$ ,  $P < 0.01$ ), and weight-for-age ( $r = 0.25$ ,  $P < 0.05$ ). The findings indicated the influence of socio-economic factors on the nutritional status of children.

**Key words:** malnutrition, children, poverty, income.

## Introduction

The changes in socio-economic development over the years in Malaysia have brought about an improvement in the overall nutritional status of the country. However, pockets of malnutrition still exist, particularly among the rural population.<sup>1–7</sup> One study carried out a decade ago in poor villages revealed a high prevalence of stunting (43%), underweight (37%) and wasting (5%) among children aged 1–6 years.<sup>1</sup> Recent studies showed that the prevalence of malnutrition is still high in rural communities.<sup>2,3</sup> A study on malnutrition and its risk factors among children aged 1–7 years in rural Malaysian communities showed that the overall prevalence of underweight, stunting and wasting among these children were 46.2%, 18.1% and 30.3%, respectively.<sup>2</sup> A high prevalence of malnutrition was also noted in a recent study on the nutritional status of functional groups in Peninsular Malaysia among children from the agriculture sector, namely padi (rice), rubber and coconut estates as well as fishing communities.<sup>3</sup>

The relationship between socio-demographic variables and the nutritional status of children in Malaysia have been reported earlier.<sup>2,4,5</sup> Variables such as income, parents' age, education, occupation, and household size have been investigated with various outcomes. It is the aim of this paper to analyse the socio-economic profile of the rubber smallholders and to examine the influence of this on the nutritional status of children.

## Subjects and methods

This study was part of a collaborative research effort funded by the Ministry of Science, Technology and Environment to assess the nutritional status of the major functional or occupational groups in the rural and urban areas of Peninsular

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Malaysia. It was carried out during 1992–95. The rural groups studied comprised padi farming, rubber smallholdings, coconut smallholdings, fishing and estate workers. A multistage random sampling was used to select each population of these agriculture groups as described by Chee *et al.*<sup>8</sup> and Khor and Tee.<sup>3,9</sup>

This paper presents data on rubber smallholders from two subdistricts, namely Mukim Sayong and Pulau Kemiri in the district of Kuala Kangsar in Perak. A total of 307 households were involved. The socio-demographic data was obtained from all households regardless of their economic activities using a set of questionnaires.

A total of 208 children aged 0–9 years were anthropometrically assessed. The weight of the children was obtained by weighing them without shoes using the TANITA or SECA beam balance to the nearest 0.1 kg. The height was measured in cm using the microtoise tape to the nearest 0.1 cm. The child was made to stand against a straight wall with a tape suspended 2 metres from the floor. The weight and height of the children were compared with the reference values of the National Centre for Health Statistics (NCHS) and their nutritional status was categorized according to the classification recommended by the World Health Organisation (WHO).<sup>10</sup> Children with height-for-age below minus 2 SD from the NCHS median were considered stunted, weight-for-age below minus 2 SD from the NCHS median were categorized as underweight, while wasting was weight-for-height below minus 2 SD from the reference median.

## Results

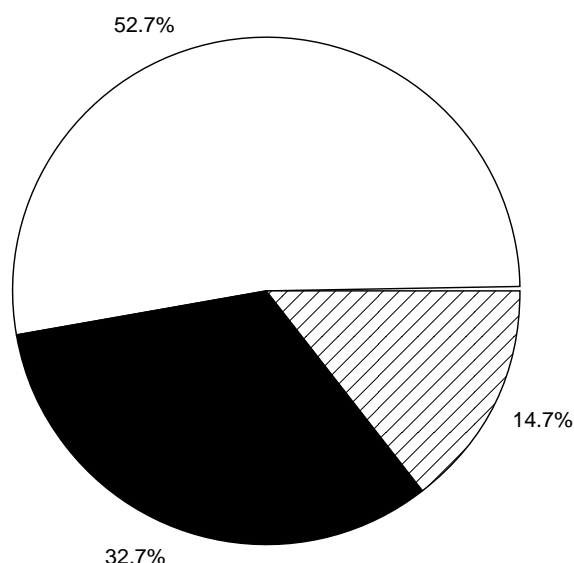
### Demographic characteristics

The majority of the households were Malay (99.7%) and 62.7% of these households practised rubber tapping as the predominant economic activity. Table 1 presents the socio-demographic characteristics of the households studied. The average age of the head of the household was  $54.3 \pm 13.7$ . Most of the heads of the households were within the 41–70 age group. The household size ranged from 1 to 16 individuals and the mean household size was  $4.5 \pm 2.5$ . Most of the heads of households (56.6%) had received less than 6 years of formal education, while 14.5% had no formal education. The average years of education received were  $4.5 \pm 2.9$ . The total household income was based on all sources of income. Based on the poverty line income of RM405 for a household size of 4.8, the per capita poverty line income would be RM84.38 and the hard-core per capita poverty line income would be RM42.19.<sup>11</sup>

The study showed that the mean monthly income was  $RM467.11 \pm 351.68$  and the mean monthly per capita income was  $RM111.56 \pm 74.70$ . Figure 1 showed the distribution of households according to the monthly per capita income, where 14.7% were found to be in the hard-core poor category, 32.7% in the poor category and 52.7% above the poverty line income.

### Nutritional status of children

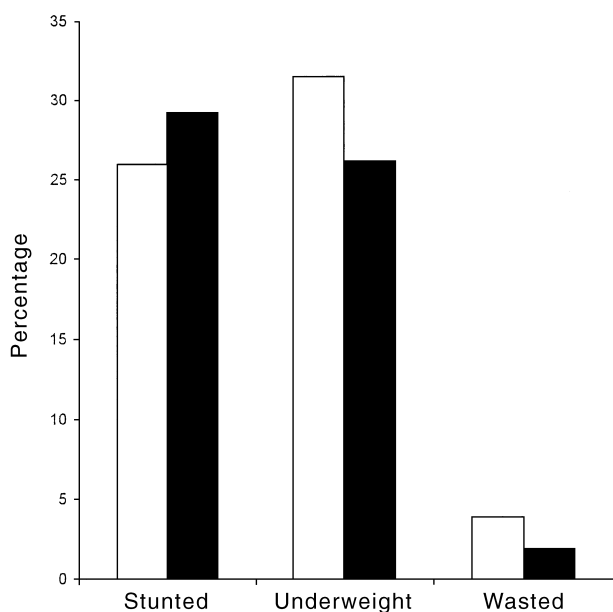
Out of a total of 208 children aged 0–9 years measured, there were 93 children in the 0–5 year-old group and 115 aged above 5–9 years. The prevalence of malnutrition is presented in Fig. 2. Stunting, which is an indicator of a long-term dietary inadequacy, was found in 26% of the children in the



**Figure 1.** Distribution of monthly per capita income (RM). □, < 42.19; ■, 42.19–84.38; ▨, > 84.38.

**Table 1.** Socio-demographic information on households

	No.	%	Mean	Range
Age of head of household (years)				
< 30	10	3.3		
31–40	39	12.9		
41–50	66	21.9		
51–60	76	25.2	54.31	
61–70	75	24.8		
71–80	29	9.6		
> 80	7	2.3		
Family size				
< 4	170	56.3		
5–8	112	37.1	4.52	1–16
9–12	18	6.0		
> 12	2	0.7		
Years of education				
0	43	14.5		
1–3	40	13.5		
4–6	168	56.6	4.8	1–17
7–9	31	10.4		
10–11	12	4		
> 11	3	1		
Status of occupation				
Employee	3	1		
Hired help	133	46		
Self-employment	114	39.4		
Housewife	3	1		
Pensioner	36	12.5		
Monthly income (RM)				
1–250	86	30.8		
> 250–500	100	35.8	467.17	30–2120
> 500–1000	71	25.4		
> 1000–1500	16	5.7		
> 1500	6	2.2		
Monthly per capita income				
> 0–42	44	14.7		
> 42–84	98	32.7		
> 84–150	86	28.7	111.56	13.33–525
> 150–250	59	19.7		
> 250	13	4.3		



**Figure 2.** Prevalence of malnutrition among children aged nine years and below. □, 0–5 years (n = 93); ■, > 5 to 9 years (n = 115).

0–5 age group and in 29.2% of the children above 5–9 years of age.

Prevalence of underweight was found in 31.5% of children below the age of 5 years and in 26.1% of children above 5–9 years of age. Only 2.2% and 0.87% of the children aged 0–5 and above 5–9 years, respectively, were overweight as indicated by weight-for-age above 2 SD NCHS median. Hence, one-quarter to one-third of these children could be considered to suffer from current malnutrition. Low weight-for-height indicates an acute episode of under-nutrition that results in wasting. In this study 3.8% of children aged 0–5 were found to be wasted, whilst the prevalence of wasting among the older children was 1.8%.

A comparison of anthropometric measurements of children in the above and below poverty line income groups were made. Table 2 indicated a higher prevalence (29.2%) of stunting among children aged 0–5 years from below poverty line income compared to 20.7% from above poverty line

**Table 2.** Prevalence of malnutrition among children aged 9 years and below according to poverty line income

	Below poverty line income	Above poverty line income
0–5 years		
Stunted	14 (29.2%) n = 48	6 (20.7%) n = 29
Underweight	22 (36.7%) n = 60	7 (21.9%) n = 32
Wasted	2 (4.2%) n = 48	1 (3.3%) n = 30
> 5–9 years		
Stunted	22 (30.1%) n = 73	11 (27.5%) n = 40
Underweight	17 (23%) n = 74	13 (31.7%) n = 41
Wasted	3 (4.1%) n = 73	4 (10%) n = 40

income. A similar finding was shown in the older children where the prevalence of stunting was 30.1 and 27.5% in the below and above poverty line income groups, respectively. The prevalence of underweight among children aged 0–5 years was higher (36.7%) in the below poverty line income group compared to the prevalence among the above poverty line income group (21.9%). The reverse, however, was noted in the older age group where 31.7% of the children in the above poverty line income group were underweight and 23% among those in the below poverty line income group.

In regard to the prevalence of wasting, 4.2% of children aged 0–5 years in the below poverty line income were found to be wasted compared with 3.3% in the higher income group. As for the older children, the prevalence of wasting was higher among those above the poverty line income, that is 10%, compared to 4.1% from below poverty line income. Perhaps the relatively small number of cases in the 5–9 years of age group from above the poverty line income gave rise to apparently higher percentages for underweight and wasting. Overall the levels of chronic and current malnutrition were high.

Table 3 shows the mean z-scores for the three anthropometric indicators. The Student’s *t*-test indicated that there were significant differences in weight-for-age and weight-for-height between the two poverty income lines for children 0–5 years, but no significant differences were noted for all anthropometric indicators of children aged above 5–9 between the below and above poverty line incomes.

The correlation coefficients between anthropometric measurements and selected variables are shown in Table 4. Among children aged 0–5 there was a significant correlation between height-for-age with household size ( $r = -0.26, P < 0.05$ ), and monthly per capita income with weight-for-height ( $r = 0.25, P < 0.05$ ). There was a highly significant correlation between acreage of land cultivated and weight-for-height ( $r = 0.42, P < 0.05$ ), and a significant correlation between acreage of land cultivated and weight-for-age ( $r = 0.25, P < 0.05$ ).

**Discussion**

In this study, the prevalence of stunting, underweight and wasting among children 0–5 years were 26.0%, 31.5% and

**Table 3.** Mean z-scores for height-for-age, weight-for-age and weight-for-height according to level of poverty

	Below poverty line	Above poverty line
0–5 years		
Height-for-age	-1.6 ± 1 n = 48	-1.2 ± 0.9 n = 29
Weight-for-age	-1.6 ± 1.0 n = 60	-1.0 ± 1.3* n = 32
Weight-for-height	-1.0 ± 0.8 n = 48	-0.56 ± 1.2* n = 30
> 5–9 years		
Height-for-age	-1.6 ± 0.8 n = 73	-1.4 ± 0.9 n = 40
Weight-for-age	-1.5 ± 0.8 n = 74	-1.5 ± 1.0 n = 41
Weight-for-height	-0.6 ± 0.8 n = 73	-0.9 ± 1.1 n = 40

\* $P < 0.05$ .

**Table 4.** Correlation coefficients for anthropometric measurements of children aged 5 years and below and selected socio-economic variables

	Monthly per capita income	Household size	Land cultivated
Height-for-age	0.15	-0.26*	0.02
Weight-for-age	0.20	-0.14	0.25*
Weight-for-height	0.25*	0.06	0.42**

\* $P < 0.05$ ; \*\* $P < 0.01$ .

3.8%, respectively. These levels were relatively lower than the findings in the poverty village study (43% of stunting, and 37% of underweight and 5% of wasting among children aged 1–6 years).<sup>1</sup> Compared with the other functional groups, prevalence of malnutrition in the rubber smallholding group was lower than that in the padi growing areas and fishing villages, but it was higher than the prevalence of malnutrition among children in the estates and coconut growing areas.<sup>3</sup> Along with the padi and fishing groups, the rubber smallholders' mean income was lower than that for the coconut growing and estate workers.<sup>8</sup> Economic factors are known to affect the nutritional status of children.

The Pearson's correlation coefficient showed relationships between some selected socio-demographic variables and the nutritional status of children. A similar finding in a recent study was the inverse relationship between income with prevalence of wasting.<sup>2</sup> The present study also showed that household size had a significant negative correlation with height-for-age.

The findings from this study showed the vulnerability of children aged 0–5 years. This is a period of weaning, of introduction to adult foods and also the age when children indulge in non-nutritious snacks. The older children appeared to be less affected by the various socio-economic variables. The supplementary feeding received by the older children in their preschools and schools through the food supplementary programs may have contributed to their better nutritional status.

### Conclusion

This study showed the influence of selected socio-economic determinants on the anthropometric status of young children. There are many other factors that are known to affect nutritional status of children, such as socio-cultural factors, psychological influences, dietary intake and health status, including infestation of parasites.

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