

# THE NUTRITIONAL STATUS OF CHILDREN IN RESETTLEMENT VILLAGES IN KELANTAN

Zulkifli A<sup>1</sup>, Khairul Anuar A<sup>2</sup> and Atiya AS<sup>2</sup>

<sup>1</sup>School of Medical Sciences, Universiti Sains Malaysia, Kota Bharu, Kelantan;

<sup>2</sup>Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

**Abstract.** A cross-sectional survey of the nutritional status of children aged 1-10 years old from the Kuala Betis resettlement villages was carried out. A total of 620 children were examined, of which 329 were preschool children and 291 were schoolchildren. The age was determined and anthropometric measurements such as weight, height and MUAC were taken. The nutritional status was assessed by looking at the distributions of the z-scores of weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) in relation to the growth charts of the National Center for Health Statistics reference population. It was found that the nutritional status of the Orang Asli children was poor, with a prevalence of 33.7-65.3% underweight, 55.3-74.4% stunting and 4.4-29.7% wasting based on the NCHS reference values. The prevalence of malnutrition among the Malay children was lower, underweight - 7.3-34.1%, stunting- 9.8-34.1% and wasting - 1.7-17.1%. The nutritional status of the Orang Asli children were poorer compared to the Malay children. More preschool Orang Asli children were stunted compared to the Orang Asli schoolchildren. This may be due to the poor economic base of the Orang Asli community during the transformation period after resettlement. A comprehensive primary health care program is essential, especially targeting the preschool Orang Asli children in these resettlement villages.

## INTRODUCTION

Malnutrition is still a major health and social problem in many developing countries. In Malaysia, tremendous progress in the nutritional situation has improved the health status of the population. While GNP and food availability have increased substantially in the country, underweight, stunting and deficiencies of iron and iodine are still common, especially among the children in rural under-served communities. Marginal communities such as the Orang Asli, are still prone to develop malnutrition. A number of studies have looked into the nutritional status of the Orang Asli communities and these are summarized in Table 1. It was reported that the growth achievement of the Orang Asli children was worse than that of children from a Felda scheme (government land scheme), squatter areas and remote villages (Chee, 1995). As part of development and improving this community, the government has embarked on resettling the Orang Asli community to special land schemes. A transformation is being made from a nomadic culture of hunting and gathering to a permanent cash crop agriculture in a land scheme. Often, they are resettled near to existing Malay villages, made up of Malays who had open up land at the jungle fringes. The Kuala Betis resettlement scheme is one such scheme. It was started in 1978 and consist of 15 Orang Asli and 2 Malay villages. The settlers were provided with a house, land and

work as rubber tappers in the scheme. This study was undertaken to assess the nutritional status of the Orang Asli children and to compare it with the Malay children, aged 1 to 10 years old, living in the Kuala Betis resettlement scheme.

## MATERIALS AND METHODS

Our study was carried out in the Kuala Betis resettlement scheme in Gua Musang, Kelantan. All the children 1-10 years living in RPS Kuala Betis were included in the study. Visits were conducted to each village and all the children 1-10 years were invited to join the study. The preschool children were examined in the village while most of the schoolchildren were examined in school. A total of 451 Orang Asli and 169 Malay children were examined (Table 2). The age of the children were determined from the birth certificate, child health card or from the school register. For children with only the year of birth recorded, the mid-year age was taken. Children without any recorded date or year of birth were excluded from the study. Children with chronic diseases and major deformities were also excluded from the study.

The anthropometric measurements were taken by trained assistants. The weight and height were measured with the children barefooted and wearing minimal clothing. The body weight was measured

Table 1  
A comparison of studies on malnutrition among Orang Asli children in Malaysia.

Year of study	Authors	Population and place	Age group (year)	Sample Size (n)	Prevalence of			
					Under-weight (%)	Stunting (%)	Wasting (%)	
1997	Khoo TE	Fort Kemar, Perak	<7	na	11.4 to 21.7	28.6	na	
1985	Khor GL	Semai, Batang Padang District, Perak	Male					
			0-1	49	24	42	8	
			1-6	234	53	73	0	
			6-12	226	51	71	6	
			Female					
			0-1	40	23	44	9	
1986	Ismail MN <i>et al</i>	Semai, RPS Betau (non-schoolers) (schoolers)	4-6	25	52	60	8	
			7-10	38	18	47	5	
			7-10	48	27	35	6	
1989	Sham K, <i>et al</i>	1. Cameron Highlands	0-10	94	32.0	50.0	na	
		2. Jernang Post, Perak	0-10	55/58	58.0	58.0	na	
		3. DARA, South East Pahang	0-10	99/97	65.0	71.0	na	
		4. West Pahang	0-10	189/186	65.0	81.0	na	
		5. Betau Post	0-10	58	65.0	71.0	na	
1992	Massita	Semai, RPS Betau	0-1	14	57	50	7	
			>1-4	30	30	47	3	
			>4-7	52	38	46	na	
			>7-8	33	18	15	na	
1995	Osman A, <i>et al</i>	Lanai Post	0-7	39	n.a	66.7	2.7	
		Betau Post	0-7	55	n.a	80.0	0.0	
		Hulu Sungai	0-7	34	n.a	41.2	8.8	
		Felda Koyan	0-7	55	n.a	25.5	7.3	
1997	Nasir M, <i>et al</i>	Traditional	1-12	53	32.3	54.7	13.2	

na = not available

to the nearest 0.1 kg using a Seca electronic balance (Seca, Germany). The height was measured to the nearest 0.1 cm. For children less than 2 years, the recumbent length was measured using a locally made length board. In older children, standing height was determined using a stadiometer with a head bar attached to electronic balance. The mid-upper arm circumference was measured to the nearest 2 mm over the left shoulder using a non-stretchable plastic tape.

Data entry and analysis were done using the Epi-Info Version 6 computer program (Dean *et al*, 1996). Statistical analyses were done using the two sample Student's *t*-test and comparisons of propor-

tions were tested with the z-test. However, a non-parametric test (Mann - Whitney U test) was done if the distribution was not normal. Probability less than 5% for null hypothesis was considered significant. Three anthropometric indices - the weight for age (WA), height for age (HA) and the weight for height (WH) were calculated with the Anthro software (Sullivan and Grostein, 1990) which uses the National Center of Health Statistics (NCHS) reference values. The indices were expressed as differences from the median in standard deviation units or z-scores. Children were classified as stunted, underweight or wasted if the z-scores of height-for-age, weight-for-age and weight-for-height, respectively,

Table 2  
Number of children 1-10 years participating in the study

Race	Orang Asli			Malay			Total
	M	F	Total	M	F	Total	
Preschool	121	140	261	27	41	68	239
School	104	86	190	60	41	101	291
Total	225	226	451	87	82	169	620

Table 3  
Mean anthropometric measurements of children according to race, sex and age-group in the Kuala Betis resettlement scheme.

Parameters	Preschool age (1-6 years)				School-age (7-10 years)			
	Male		Female		Male		Female	
	OA (n=121)	Malay (n=27)	OA (n=140)	Malay (n=41)	OA (n=104)	Malay (n=60)	OA (n=86)	Malay (n=41)
Weight	10.8	12.5	10.4	11.5	20.1	20.4	19.0	20.8*
(SD)	(2.6)	(4.4)	(2.9)	(3.7)	(4.5)	(3.7)	(3.6)	(4.1)
Height	84.6	89.3	84.0	88.7*	115.9	117.3	113.3	118.2*
(SD)	(10.3)	(16.6)	(11.5)	(15.1)	(9.8)	(7.2)	(7.8)	(7.0)
MUAC	14.5	15.9*	15.3	15.0*	16.7	17.7*	16.7	17.2
(SD)	(1.4)	(3.9)	(6.5)	(1.4)	(1.6)	(4.6)	(2.9)	(3.4)

OA = Orang Asli \*p<0.05

were less than 2 standard deviations (SD) below the NCHS median. Children were also classified as having under-nutrition if the mid-upper arm circumference (MUAC) is less than 13 cm.

## RESULTS

The mean weight, height and mid upper arm circumference (MUAC) of the children was determined according to the race, sex and age-group. There were 2 age-groups selected—preschool (1-6 years) and school age (7-10 years). The results are shown in Table 3. The mean weight, height and MUAC of the Malay children were generally higher than those of the Orang Asli children, except for the MUAC for female preschool children. However, the differences were significant in both the mean weight and height for female schoolchildren and in the difference in height for female preschool children only. There were no significant difference between the male children in both the preschool and the schoolchildren.

Table 4 shows the percentage of children classified as stunting (low height-for-age), wasting (low weight-for height), underweight (low weight-for-age)

and low MUAC (<13 cm) according to race, sex and age-group. The prevalence of malnutrition based on these measurements revealed that more Orang Asli children, both preschool and schoolchildren, were significantly more stunted and underweight than the Malay children. However, the prevalence of wasting was significantly more for the preschool Orang Asli children only.

The prevalence of children with a MUAC <13 cm was between 3.7-12.9%, all of which were found only in the preschool children. The prevalence of wasting, as measured by a MUAC <13 cm was much lower than that measured by the z-scores weight-for-height (WHZ). The correlation coefficient between MUAC and wasting (WHZ) was 0.22, which was not significant (p>0.05).

## DISCUSSION

A number of studies have indicated the poor health status of the Orang Asli community, and infections are still a common burden (Ariff *et al* 1997; Norhayati *et al*, 1998). Malnutrition strongly exacerbates the burden of infectious diseases and increases the mortality risk, especially among the

Table 4  
Prevalence of malnutrition in children 1-10 years according to race, sex and age-group in the Kuala Betis RPS resettlement villages.

Criteria (z-score<-2)	Preschool age (1-6 years)				School-age (7-10 years)			
	Male		Female		Male		Female	
	OA (n=121)	Malay (n=27)	OA (n=140)	Malay (n=41)	OA (n=104)	Malay (n=60)	OA (n=86)	Malay (n=41)
Underweight (WAZ)	65.3	14.8*	63.6	34.1*	44.0	25.0*	33.7	7.3*
Stunting (HAZ)	74.4	14.8*	60.7	26.8*	59.3	21.7*	55.3	9.8*
Wasting (WHZ)	29.7	7.4*	20.7	17.1	4.4	1.7	15.3	2.4
MUAC (<13.0 cm)	7.4	3.7	12.9	7.3	0.0	0.0	0.0	0.0

\* z-test,  $p < 0.05$

children. It has been estimated that 56% of child mortality worldwide were attributable to malnutrition potentiating effects and 83% of these were attributable to mild-to-moderate as opposed to severe malnutrition (Pelletier *et al*, 1995). Beside being associated with infections, malnutrition is also associated with under-achievements in schools or low score in tests of cognitive ability (Bundy, 1997; Sternberg, 1997).

In this study of malnutrition among the Orang Asli children, there was a high prevalence of underweight, from 33.7% to 65.3%, stunting, from 55.3% to 74.4% and wasting, from 4.4-29.7%. However, among the Malay children, the prevalence of malnutrition was lower-underweight-from 7.3% to 34.1%, stunting-from 9.8% to 34.1% and wasting-from 1.7% to 17.1%. This represent an excess of wasting, stunting and underweight among the Orang Asli children compared to the Malay children living in the same area. When sexes are compared, younger boys were found to be more stunted than younger girls (Svedberg, 1990; Stoltzfus *et al*, 1997a). This is similar to findings from other studies except for preschool Malay children where the prevalence of stunting, underweight and wasting was found to be higher among the female children.

An earlier study on the nutritional status of Orang Asli children 0-10 years old found the prevalence of underweight was between 32% to 65% and stunting from 50% to 81% (Sham *et al*, 1986). This is comparable to the prevalence found in the present study. This indicates that there is no significant improvement in the nutritional status of the Orang Asli children despite the efforts taken to resettle them and

providing them with a strong economic base and adequate health care. In fact, Khoo (1997) found the nutritional status of an Orang Asli community in a resettlement scheme to be worse after a year of being resettled.

Of the three main nutritional problems (stunting, wasting and underweight), stunting-or the slowing of skeletal growth of children is the most prevalent. It reflects the poor overall economics conditions, particularly chronic or repeated infections and inadequate food intake (Monteiro, 1991). There was a higher prevalence of stunted children found among the pre-schoolers compare to the schoolchildren. This is different from most other studies where stunting, being chronic in nature, was more prevalent among the older children (Beasley, 1995; Stoltzfus *et al*, 1997b). This may indicate a more recent cause for the excess stunting among the preschool children. An explanation may be the poorer economic conditions in these communities during this transformation period after being resettled. The diminishing food source from hunting and gathering due to logging activities in the resettled area will also contribute to this finding. Stunting may also result from impaired growth *in utero* when the fetus is deprived of essential substances during pregnancy (Martorelli *et al*, 1994). Resettled Orang Asli children have also been found to have a higher prevalence and intensity of infection compared to those living in traditional villages because the soil become adequately contaminated by the more permanent nature of the village (Kan, 1985). For schoolchildren, the supplementary feeding program in the school can promote 'catch up' growth (Golden, 1994; Tanner, 1981). There is

also evidence for 'catch up' growth by giving regular ante-helminthic medication, which is part of the school health care program (Stephenson, 1989; Thein Hlaing, 1991).

The prevalence of wasting among the Orang Asli was also high, especially among the preschoolers (20.7% to 29.7%). The term wasting is widely used to describe a recent and severe process that has led to significant weight loss, usually as a consequence of acute starvation and/or severe disease. In contrast to stunting, wasting is of relatively constant prevalence, usually less than 5%. The prevalence of wasting found was very high and it was more prevalent among the preschool Orang Asli children. This may be related to the impoverished state of the resettled Orang Asli communities. A wasted child needs immediate intervention because wasting is commonly related to high levels of morbidity and mortality.

Shakir (1975) reported that arm circumference increased by 1.5 cm in normal children between the ages of 1-6 years. The MUAC is suitable for assessing current acute malnutrition in a community, but because of the small linear measurement involved, changes are difficult to monitor and errors can be relatively large hence making it unsuitable for individual assessment (Zawiah *et al*, 1985). In poor situations, low MUAC, based on a fixed cut-off point such as 13.0 cm has been used as a proxy for wasting. However, this study found the correlation between the 2 indicators was low, which is similar to previous studies (Ng, 1984; Gayle *et al*, 1988). However, in community based studies, MUAC is said to be a superior predictor of childhood mortality compared with height and weight based anthropometric indicators, and is proposed as an additional screening tool in non-emergency situations (Chen *et al*, 1980; Trowbridge and Sommer, 1981).

The findings in this study can apply to other resettlement villages in the country because the resettlement program is handled by the same government agency. However, differences in the culture of Orang Asli groups and the state of development of nearby areas may limit this generalization. The health problems are still those which reflect underdevelopment despite being resettled near jungle fringes and provided of their traditional subsistence base and their resultant material deprivation (Fix, 1991). Although the aim of resettling these communities is to change the culture of shifting to a more permanent residence, the process is slow and adequate support must be provided to maintain a satisfactory level of health during this transition period. A comprehensive primary health care program, which will include

nutrition programs, has been suggested (Chee, 1995). Because of its early onset, programs for the prevention of malnutrition, especially stunting must be focussed on appropriate child care and nutrition during the preschool age. Osman and Zaleha (1995) found that the high prevalence of malnutrition in Orang Asli children was associated with feeding (especially late introduction of solid foods) and infections. Nutritional education programs are essential, as it can improve body weight and height in most infants and preschool children. It is however, reported to be more effective at curing than preventing malnutrition (Visitsunthon and Wongarn, 1995). Nutritional surveillance programs need to be more effectively organized and must provide a continuity of information about the nutritional status of the community, especially the preschoolers.

The comprehensive primary health care should also include family planning, regular ante-helminthic medication and vitamin A given regularly. Family planning will provide adequate spacing for the mother and improved child care and improved the family's economy with lesser number of children. The preschool children also misses out on the helminthiasis control program where regular ante-helminthic medication are given to schoolchildren. Extending the coverage to include preschoolers may help prevent malnutrition and improve their growth. Vitamin A supplementation has been demonstrated to reduce children mortality and morbidity.

## CONCLUSION

Malnutrition is still prevalent among the Orang Asli communities in Malaysia. Resettling these communities to special land schemes involve changing their traditional nomadic life of hunting and gathering into a permanent settlement of cash crop agriculture. During this transformation process, their economic base is eroded and will contribute towards declining nutritional status of their children. Adequate support, which should include a comprehensive primary health care program, should be provided to ensure satisfactory health status during this transition period. The preschool children is the highest risk group for malnutrition, and special focus should be directed towards them.

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