

Nutritional Status among Chinese Preschoolers in Subang Jaya, Selangor

Norimah Abdul Karim¹ and Lau Kah Kheng¹

¹ *Department of Nutrition and Dietetics, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur, Malaysia.*

ABSTRACT

A nutritional status study was carried out among Chinese preschoolers (4— 6 years old) residing in Subang Jaya, Selangor. 91 preschoolers (48 boys and 43 girls) of Chinese descent participated in the study. Anthropometric measurements such as weight and height were taken and compared with the NCHS reference. Food habits and demographic background were also evaluated. The results indicated that the prevalence of underweight, wasting and stunting was 2% respectively, while the prevalence of overweight was 3%. Food habits data showed that most preschoolers consumed the daily main meals and snack once a day. Fruits were consumed between three to four times per week. Food items preferred by these preschoolers were milk, fish and fruits. In general, preschoolers in this study favoured foods, which were deep fried rather than steamed or roasted. Correlation analysis showed that there was no significant relationship between income, education of parents and anthropometric index (weight for age, height for age and weight for height). The nutritional status of these preschool children in Subang Jaya was satisfactory.

INTRODUCTION

Malaysia is now experiencing malnutrition of the double burden type, whereby both under-nutrition and over nutrition may prevail in the same community at the same time. Earlier studies have reported that under nutrition was more prevalent in the rural communities (Chong *et al.*, 1984; Zawiah, Norlida & Ismail, 1985). More recent studies show that under nutrition is now appearing more in the urban communities as well, specifically in the squatter areas (Yap & Teoh, 1989; Chee, 1992 Khor & Tee, 1997). In a community, the group which is most affected by under nutrition is children.

Numerous nutritional status studies have been carried out in Malaysia since the 1970s (Chen, 1974); in the 1980s (Roselina & Aminah, 1988; Wan Abdul Manan & Low, 1989); and in the 1990s (Ng, 1993; Soon & Khor, 1995; Zamaliah *et al.*, 1998). Most of these earlier nutritional status studies were carried out among Malay preschoolers, mostly children from rural or Felda communities. Recent reports have indicated that malnutrition manifested as underweight and stunting are still prevalent, and are becoming worse among children from poor rural communities and indigenous population groups (Khor, 2000; Wan Abdul Manan *et al.*, 1999).

This study aims to evaluate the nutritional status among Chinese preschoolers in an urban residential area in Kiang Valley. Other objectives are to determine the food habits of these preschoolers and to evaluate the relationship between nutritional status and level of education and family income.

METHOD

Study location and sampling

The study was carried out in several kindergartens in Subang Jaya, a residential area in Klang Valley, about 20 km from Kuala Lumpur. These kindergartens have a high admission of Chinese preschoolers. Subang Jaya was selected because of its convenient location; thus the sampling for this study was based on convenient sampling. A letter to explain the objectives and the protocol of the study was sent to several kindergartens in Subang Jaya for consent to carry out the study. A total of six kindergartens gave consent for their preschoolers to participate in the study.

Subjects

Subjects who participated in the study were preschoolers whose parents or guardians had given consent for their children's participation. To be included in the study, the preschoolers must satisfy the following criteria: they must be between 4.00 - 6.99 years old; of Chinese descent; healthy; and their parents or guardians had completed the demographic and food habits questionnaire reasonably well. Socioeconomic status and educational background of the subjects parents were not a criteria for inclusion. A total of 91 (48 boys, 43 girls) preschoolers met the inclusion criteria.

Anthropometric measurements

The weight and height of the preschoolers were measured according to the techniques suggested by WHO (1995). Subjects were weighed in minimum clothing, without shoes and requested to stand in the middle of the weighing scale (SECA model 713) with their weight well distributed on both feet. The weight was recorded to the nearest 0.5 kg. Height was taken using a measuring tape, which was fixed to the wall. Subjects stood erect, without shoes with heels, buttocks and shoulder blades in a vertical line. Height measurement was recorded to the nearest 0.1 cm

Malnutrition classification

Malnutrition manifested as underweight, stunting and wasting were identified and classified according to the suggestions of WHO (1995). The cut-off points used for each anthropometric index, namely weight for age, height for age and weight for height was below -25D of the National Centre for Health Statistics (NCHS) reference. Subjects were classified as overweight if their weight for age was above +25D of the NCHS reference.

Demographic and food habits questionnaire

Demographic and food habits questionnaires were distributed to the parents of the subjects together with the letter requesting for consent through the kindergarten. The questionnaires were available in two languages, English and Chinese and were self-administered by the parents or the guardians of the subjects. Demographic information such as date of birth and birth weight (obtained from birth certificate), income and education of parents and family size were also gathered. Food habits questions included frequency of consumption of the main meals (breakfast,

lunch and dinner), snacks and fast foods. The respondents were also asked questions on types of foods preferred and disliked. The questionnaires were collected through the kindergarten a week after they were initially distributed.

Statistical analysis

All results are presented as mean \pm SD. Statistical analysis was done using the SPSS Version 7.5. Pearson correlation coefficient was carried out to evaluate relationships between nutritional status and levels of education of parents as well as family income.

RESULTS AND DISCUSSION

Table 1 shows the distribution of subjects according to age and sex. There was a slightly higher percentage of boys (48%) than girls (43%) in the study population. Most (43%) preschoolers in this study were in the 5.0 to 5.9 year age group. This age group is the usual age preschoolers start kindergarten.

Table 1. Subject distribution according to age and sex

Age (years)	Male (n=48)	Female (n=43)	Total (n=91)
4.0 - 4.9	18 (38)	16 (37)	34 (37)
5.0 - 5.9	19 (40)	20 (47)	39 (43)
6.0 - 6.9	11 (22)	7 (16)	18 (20)
Total	48 (100)	43 (100)	91 (100)

Table 2. Age, birth weight and anthropometric measurement according to sex

Subject	Male (n=48)		Female (n=43)	
	Mean \pm sd	Range	Mean \pm sd	Range
Age (year)	5.27 \pm 0.81	4.02 - 6.95	5.20 \pm 0.72	4.05 - 6.81
Birth weight (kg)	3.03 \pm 0.53	1.32 - 4.25	3.20 \pm 0.40	2.00 - 4.46
Height (cm)	109.8 \pm 6.0	96.5 - 123.0	110.4 \pm 5.2	99.4 - 127.1
Weight (kg)	17.9 \pm 2.9	11.0 - 26.0	18.2 \pm 2.8	13.5 - 30.0

The age, birth weight and anthropometric measurements are presented in Table 2 and expressed as a mean of all the preschoolers. This is due to the small sample size in each gender and each four-year to six-year age group. The mean birth weight, body weight, height were higher among the girls than boys, although there was no significant difference for all these parameters. Anthropometric measurements such as weight and height provide a general picture on the nutritional status of preschoolers. Malnutrition is identified using three anthropometric indices namely weight for age, height for age and weight for height as suggested by WHO (1995). In this study, malnutrition is presented as z-scores. The advantage of using z-score is to facilitate comparisons between studies on preschoolers of similar age groups. The prevalence of malnutrition is shown in Table 3. The prevalence of underweight, stunting and wasting was 2.2% respectively. Overweight, which relates to overnutrition does coexist with undernutrition in these

subjects. The prevalence of overweight was 3.3%. It is difficult to pinpoint the actual reason for the coexistence of underweight and overweight among preschoolers in the same community. A possible explanation is that mal nutrition can be influenced by interrelating factors such as food intake, socio economic status as well as family dynamics. Khor (2000) in her study also demonstrated coexistence of undernutrition and overnutrition, even in the same household.

Table 3. Malnutrition among preschoolers based on z-score of NCHS standard

Subject	Male (n=48)	Female (43)	Total (n=91)
No. of subjects	48	43	91
Underweight ^a	2(4.2)	0(0)	2(2.2)
Stunting ^a	2(4.2)	0(0)	2(2.2)
Wasting ^a	2(4.2)	0(0)	2(2.2)
Overweight ^b	1(2.1)	2(4.7)	3(3.3)
Stunting and Wasting ^a	1(2.1)	0(0.0)	1(1.1)

^a cut-off point < -2 S.D NCHS median

^b cut-off point > +2 S.D NCHS median

Table 4 shows the prevalence of underweight, stunting and wasting in some studies, which were carried out mostly among Malay preschoolers in various locations in Peninsular Malaysia. For example, Zawiah *et al.* (1985) who studied preschoolers in Sungai Klah and Sungai Behrang Felda schemes showed a high prevalence of 29-60% underweight, 16-47% stunting and 16% wasting. Another study also in a Felda scheme (Trolak, Perak) indicated prevalence of under weight, stunting and wasting at 57%, 33% and 5% respectively (Dayang, 1982). In a more recent study in Sungai Koyan, Pahang, Soon and Khor (1995) reported prevalence of 14% underweight, 11% stunting and 3% underweight. Only one semi urban study in Kajang and Bangi reported a prevalence of 4% underweight, 4% stunting and 1% wasting (Ng, 1993). All these studies except for Ng (1993) were on Malay preschoolers. Although there have been several studies on malnutrition among preschoolers, it may not be appropriate to make direct comparisons among these studies here as the ethnic groups and the socioeconomic status of these children were different. These results show that malnutrition is usually higher in the rural areas in comparison with the more urban areas.

Table 4. Malnutrition among preschoolers in various studies

Study location	N	Age (year)	Percentage		
			Under-weight	Stunting	Wasting
Penang					
[Wan Abd. Manan & Low (1989)]	391	0-6	27.0	59.0	0.0
Kuala Kangsar	78	0-5	31.5	26.0	3.8
[Zamaliah et al., 1988]					
Labu & Dengkil	221	1-7	46.2	18.1	30.3
[Norhayati et al. 1997]					
Bangi & Kajang	563	3-6	4.3	4.3	1.1
[Ng (1993)]					
Sg. Koyan	105	4-6	14.3	10.5	2.9

[Soon & Khor (1995)] Port Dickson	84	4-6	17.0	9.0	3.0
[Roslina & Aminah (1988)] Felda Sg. Klah	56	4-6	29.0	16.0	16.0
[Zawiah et al. (1985)] Felda Sg. Behrang	55	4-9	60.0	47.0	16.0
[Zawiah et al. (1985)] Felda Trolak	139	4-6	57.0	33.0	5.0
[Dayang Aminah (1982)] Subang Jaya [this study]	91	4-6	2.2	2.2	2.2

Figures 1 and 2 show the education and family income of parents in this study. More than half (55%) of the fathers had tertiary education while only 4% of the fathers were educated up to primary level. The percentage of mothers with tertiary education was 45%. Slightly more than half (52%) of the mothers had secondary education while the remaining 3% only had primary education. Most households had an income of at least RM3000 per month. This higher income bracket was proportional to their higher education status.

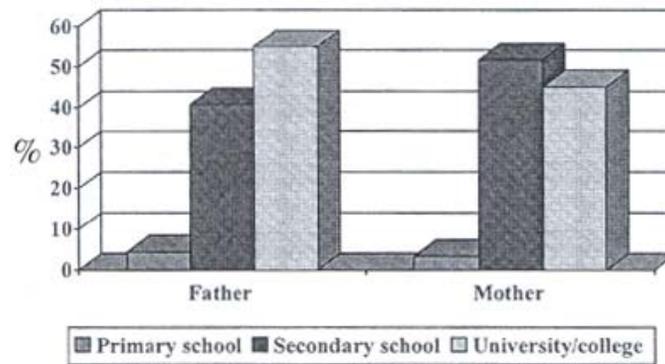


Figure 1. Level of education of parents in Subang Jaya

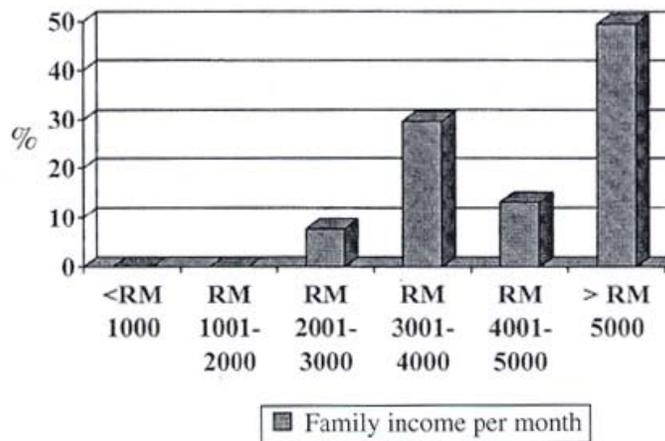


Figure 2. Family income in Subang Jaya

In this study, only a small percentage of the study population was affected by malnutrition, be it undernutrition or overnutrition. This could be due to the higher education level and a correspondingly higher income level. According to Hergreen *et al.* (1994), the level of education and family income is almost always interrelated with nutritional status. Education of mothers has been closely associated with the nutritional status of children as education could determine the lifestyle of the family. However, this study did not show such a trend. Our findings found no relationship between education and nutritional status and this was supported by Norhayati *et al.* (1997). However, Ying *et al.* (1994) and Soon and Khor (1995) showed that education of mothers was significantly correlated with nutritional status.

In this study, correlation analysis between anthropometric indices and socioeconomic status (family income and education of parents) did not indicate any significant relationship (Table 5). Soon and Khor (1995) also found no positive significant relationship between family income and nutritional status. Although this may imply that a higher family income does not necessarily guarantee a good nutritional status, there should be caution when interpreting the results. As for this study, the small sample size could be a reason for the non-existence of a significant relationship.

Table 5. Coefficient correlation between socio-economic status and anthropometric indices

Parameters	Variables	Subang Jaya
Family income	Weight-for-age	0.094
	Height-for-age	0.143
	Weigh-for-height	0.122
Father's education	Weight-for-age	0.004
	Height-for-age	0.077
	Weight-for-height	-0.058
Mother's education	Weight-for-age	0.018
	Height-for-height	0.188
	Weigh-for-height	-0.107

Food Habits

Table 6 shows the food habits of the preschoolers. Majority (84%) of the preschoolers consumed three to four main meals (breakfast, lunch, dinner and supper) and snack per day. More than two-thirds (70 %) of the preschoolers have breakfast everyday. The frequency of consumption of fruits, four to more than seven times per week was practised by 71% of the preschoolers. Almost half (41%) of the preschoolers consumed fast foods once to twice per week. The consumption of snacks was quite high with more than half of the preschoolers eating snacks three to seven times per week.

Figure 3 shows the food preferences of the preschoolers. Three favourite food items among the preschoolers were milk, fish and fruits. The majority of the preschoolers disliked vegetables. The type of food preparation preferred by the preschoolers is shown in Figure 4. Deep-fried and stir-fried foods were favoured compared to steamed or roasted foods.

The food habits of the preschoolers such as consuming the three main meals per day, taking breakfast and frequent consumption of fruits demonstrate good eating habits and this is reflected in our results which show a low percentage of undernutrition and overnutrition. On the other hand, as in other studies reported earlier, the preschoolers also enjoyed eating snacks. Aminah *et al.* (1994) reported that two-thirds of primary schoolers in their study enjoyed eating snacks. Earlier reports in the 1980s also indicated similar findings (Aminah and Norimah, 1988; Aminah *et al.*, 1987). The implication of frequent snacking is that the preschoolers might feel too full before the main meal, lose their appetite and thus not benefit from proper nutrition of the main meal. In this study, snacks were easily obtained from mini markets, hawkers and supermarkets.

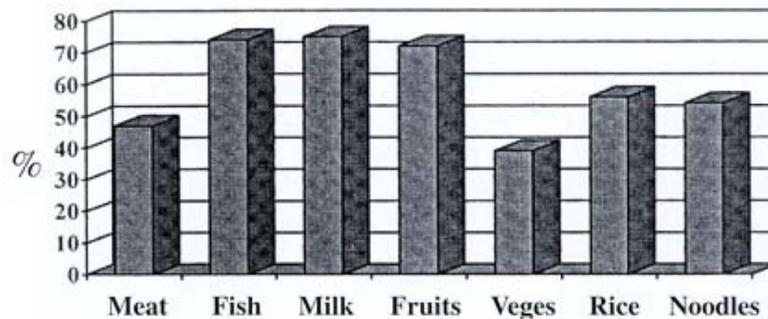


Figure 3. Food preferred by the pre-schoolers

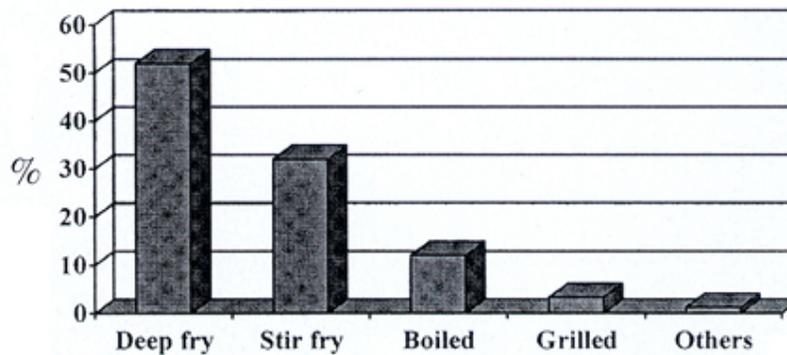


Figure 4. Types of food preparation preferred by the preschoolers

It is important that nutrition education is taught and instilled in these young children. Despite the preschoolers showing good food habits as discussed earlier, the nutrient content of the meal may not necessarily be nutritious. This study showed that these preschoolers preferred to eat fried foods, either deep-fried or stir-fried, rather than the healthier steamed or roasted foods. Even at this young age, they were inclined towards high fat foods and snacking. Although the relevant government agencies have carried out various nutrition and health campaigns to educate the public at large (Abu Bakar and Tee, 1998), the food habits of these preschoolers serve to indicate that while nutrition awareness might be present, the practice of good nutrition is lacking. Necessary steps need to be taken to improve this situation.

Table 6. Food habits of preschoolers

Food habits	Subang Jaya
Frequency of main meal and snack (per day)	
< 3 times	2 (2.2%)
3-4 times	76 (83.5%)
5 times	11 (12.1%)
>5times	2 (2.2%)
Frequency of breakfast (per week)	
Seldom	1 (1.1%)
1-2 times	8 (8.8%)
3-4 times	8 (8.8%)
5-6 times	10 (11.0%)
Everyday	61 (70.3%)
Frequency of fruit intake (a week)	
Seldom	1 (1.1%)
1-2 times	25 (27.5%)
3-4 times	36 (39.5%)
5-7 times	23 (25.3%)
> 7 times	6 (6.6%)
Frequency of fast food intake (per week)	
Seldom	46 (50.5%)
1-2 times	37 (40.7%)
3-4 times	6 (6.6%)
5-7 times	2 (2.2%)
> 7 times	0 (0%)
Frequency of snack intake (per week)	
Seldom	6 (6.6%)
1-2 times	25 (27.5%)
3-4 times	31 (34.0%)
5-7 times	25 (27.5%)
> 7 times	4 (4.4%)

CONCLUSION

Malnutrition, both under nutrition and over nutrition, was present among the preschoolers studied. However, the percentage is low. The food habits of the preschoolers appeared to be satisfactory. Nevertheless a closer assessment reveals an inclination (preference) for high fat foods and snacks. It is imperative that more emphasis be given to nutrition education, more so at this early age. This should go a long way towards inculcating proper eating habits in the future generation of Malaysia.

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