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UDUL: HOUSEHOLD FOOD PROCUREMENT AND NUTRITIONAL STATUS OF TEACHERS IN PITAS, NABAWAN AND KOTA KINABALU.

JAZAH: SARJANA MUDA SAINS MAKANAN DAN PEMAKANAN

SESI PENGAJIAN: 2005 / 09

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HOUSEHOLD FOOD PROCUREMENT AND NUTRITIONAL STATUS OF TEACHERS IN PITAS, NABAWAN & KOTA KINABALU

KUAN SHUPING

THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF FOOD SCIENCE AND NUTRITION

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UNIVERSITY MALAYSIA SABAH
2009

DECLARATION

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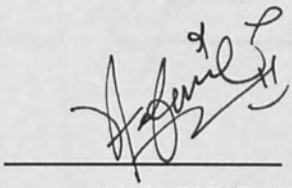

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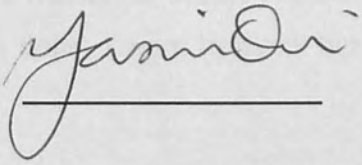

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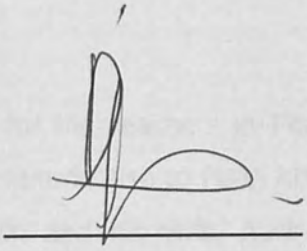

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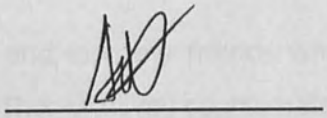

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ABSTRAK

PEROLEHAN MAKANAN DAN STATUS PEMAKANAN GURU-GURU DI KAWASAN PEDALAMAN DAN KAWASAN BANDAR

Kajian status pemakanan dan perolehan makanan di kalangan guru-guru di kawasan luar bandar dan kawasan bandar Malaysia sangat kurang. Kajian ini menilai paten perolehan makanan dan status pemakanan di kalangan rumahtangga guru-guru di bandar and di luar bandar. Faktor-faktor kepentingan kesihatan keluarga, kesegaran bahan-bahan mentah dan harga makanan dipilih sebagai paling penting dalam mempengaruhi perolehan makanan. Infomasi dari paten pemakanan membantu dalam menerangi obesiti dan penyakit-penyakit kronik punca diet orang dewasa. Hipotesis menguji min index jisim badan (IJM) dan purata pengambilan lemak adalah lebih tinggi dalam guru-guru kawasan luar bandar berbanding guru-guru kawasan bandar. Kaedah kajian yang digunakan ialah kajian deskriptif merentas dan kaedah persampelan ialah persampelan kuasi-rawak. Sampel saiz kajian 51 guru-guru yang dikaji, diambil dari tiga lokasi, Pitas, Nabawan, dan Kota Kinabalu. Terdapat tiada signifikasi perbezaan dalam min IJM di antara guru-guru di kawasan luar bandar dan kawasan bandar (p=0.342). Tiada signifikasi perbezaan dalam min pengambilan lemak di antara kedua-dua kawasnan ini (p= 0.462). Aktiviti fizikal juga tidak menunjukkan perbezaan signifikasi di antara kawasan pedalaman dan bandar. Terdapat korelasi di antara kumpulan makanan dengan pendapatan bersih sebulan dengan peratus pembelian makanan dalam tin, sayur-sayuran dan buah-buahan dan makanan ringan. Pembelian dalam satu bulan menunjukkan 33% pembelian untuk kumpulan makanan nasi, bijian, 30.8% untuk kumpulan daging dan kekacang dan 29.7% untuk kuih-muih tradisional dan kek.

ABSTRACT

There is a lack of data on the nutritional status and household food procurement of teachers in urban and rural areas in Malaysia. This study evaluates the pattern of food procurement and the nutritional status assessment in rural and urban school teacher's households. The factors of family health, freshness of raw ingredients and food price are rated as most important influencing the food procurement. The eating patterns information assists in efforts to address obesity and diet-related chronic diseases among adults. The hypotheses test that the BMI mean and the average fat intake are higher in rural than urban areas' teachers. The method used is a cross-sectional descriptive study with quasi-random sampling of the respondents. The sample size of the 51 teachers surveyed is taken from three different locations, *Pitas*, *Nabawan* and *Kota Kinabalu*. There is no significant difference in the mean body mass index (BMI) between the teachers in the rural and urban areas ($p=0.342$). There is no significant relationship and differences in the means of the average fat intake between the two areas ($p=0.462$). The physical activity of the respondents has no significant relationship between the urban and the rural areas. There are correlations between the net income in one month net income in one month with the percentage expenses of canned foods, vegetables and fruits, and the junk foods. The expenses in one month showed 33.0% on rice, grains, cereal and tubers group, and fish, poultry meat and legumes group 30.8%, and traditional *kuih-muih* and cakes at 29.7%.

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LIST OF SYMBOLS & SHORT FORMS

Asymp. Sig	Assumption Significant
BMI	Body Mass Index
X^2	Chi Square
C.I.	Confidence Interval
d.f.	Degree of Difference
JPNS	Jabatan Pelajaran Negeri Sabah
n	Sample size in study
N	Sample size in statistic
r^2	Pearson
%	Percentage
RNI	Recommended Nutrient Intake
RM	Ringgit Malaysia
Sig	Significant
r_s	Spearman Rho
SEM	Standard Error Mean

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In the Malaysian Adult Nutrition Survey MANS (2003) study, the daily median energy intake of Malaysian adults was 1540 kcal/day or 70% of the Recommended Nutrient Intake (RNI). The adults in Sabah achieved more than 70% of RNI for energy (1679 kcal/day). Rural adults had a slightly higher energy intake and RNI achievement (71%) than their urban counterparts (65%). The median income per month of secondary school teachers were RM2, 400 and the mean duration of working was 14.9 (±7.1) years (Hadi *et al.*, 2006). However, teachers on rural posting in Sabah received the basic salary of RM2000 with other allowances which summed up to estimated RM4, 100. Teachers who are teaching in Sabah, but came from outside Sabah like the Peninsula Malaysia and Sarawak will receive allowances beside their income. Thus, this study looked at the effect of income on purchasing pattern and factors influencing household food procurement.

There was only one study on nutrition and Malaysian teachers which looked at factors influencing the nutritional knowledge in Malaysia (Yong, 1985). With the current lack of study among the nutritional status of school teachers in rural areas, the present study will provide information on factors pertaining to the food procurement and the nutritional status of these teachers and their households. This study will collect one month's food inventory from rural and urban school teachers.

Lifestyles of population studies have showed to have reduced physical activity and consumption of foods high in calories (Narayan & Khan, 2007). It is important to understand the eating patterns of Malaysians as the information can assist in efforts to address obesity and diet-related chronic diseases among adults (Zalilah *et al.*, 2008). The risk of death from all causes, cardiovascular disease, cancer, or other diseases increases throughout the range of moderate and severe overweight for both

men and women in all age groups (Calle *et al.*, 1999). The escalation of obesity, once thought to be an urban phenomenon, has now spread to the rural population at an alarming rate (Ismail *et al.*, 2002). However, the study done by Kee and colleagues showed no differences in the prevalence of obesity in these two residential areas of rural and urban (Kee *et al.*, 2008). As explained by Kee and colleagues, the fact that sustained economic growth has resulted in increased household income and accessibility to food, which in turn has resulted in increased food consumption in rural areas (Kee *et al.*, 2008).

The pattern of the food obtained with the means and cost of food purchased are evaluated. The nutritional status of the teachers and households are analyzed using three-day food record, one month Grocery & Food Shopping Inventory, the International Physical Activity Questionnaire (IPAQ), socioeconomic and demographic questionnaires and the body mass index (BMI) of the teachers.

1.2 RATIONALE OF THE STUDY

Teachers are very important role models in our society. Role models such as school teachers should be available both at home and the school (Naing & Ahmad, 2001). Although it is not the objective of the study, participation in this study will be a form of informal nutrition education for the target school teachers. It will also help the Ministry of Education to create an awareness of health and nutrition among the rural school teachers.

The lack of nutrition research on rural school teachers has led to this study on household food procurement and their nutritional status. Rural area is less developed compared to urban area especially in Sabah. Distance from available fresh food and local supermarkets where the cost of food is comparable to the ones in city will also create an interest in this study.

This study is not focusing on the poverty level teachers in the rural areas, as teachers income is estimated to be RM4, 100 for those who are receiving other allowances besides the basic salary of RM2, 000. Teachers who are living in rural areas might find it difficult to obtain fresh foods and the distance travelled from available supermarket would also be a hindrance to their adequate nutritional intake and thus affecting their nutritional status.

1.3 STUDY OBJECTIVES

a) To evaluate the pattern of food procurement in rural and urban school teacher's households
b) To assess the nutritional status of the teachers in rural and urban areas
c) To understand the factors influencing food procurement of school teachers

1.4 HYPOTHESES:

a) The mean of the body mass index (BMI) is higher in rural teachers than urban areas
b) The mean of the average fat intake is higher in rural than in urban areas

1.5 SIGNIFICANCE OF THE STUDY

This study hopes to give a preliminary glimpse into the rural school teachers' diet and how they buy food for themselves and their households. This study also hopes to find a significant result whereby the types of food the teachers obtain in rural urban areas will somehow determine the nutritional status of the teachers.

1.6 ETHICAL CONSIDERATIONS

A letter and form seeking permission to conduct a study among the secondary school teachers was be sent to the Ministry of Education in *Putrajaya*. After permission was granted from the Ministry of Education, a letter was sent to the Sabah State Education Department followed by a permission letter to the headmistress of the SMK *Pitas*. After obtaining this approval, appointments were made through the telephone calls and the dates were set for the survey to be done. SMK *Nabawan*, SMK St. Francis and *Maktab Nasional* St. Simon were done through teacher's contact.

The teachers were invited to participate a study information sheet was distributed. Teachers were given briefing on the study information sheet, and they would have an opportunity to ask any questions pertaining to the study. A consent informed letter was obtained from teachers before the questionnaires were distributed to them during their break periods. All information given by teachers was treated in confidential and their identities was not be revealed in the study report or any subsequent publications. Respondents had a right to withdraw from the study at any time without giving any reasons. They were not forced to reveal information which might be discomforting to them throughout the study.

CHAPTER 2

LITERATURE REVIEW

2.1 FACTORS INFLUENCING FOOD PROCUREMENT

Purchasing decisions of consumer are influenced by demographic and socio-economic factors (Goktolga *et al.*, 2006). Food consumption decisions also related food procurement decisions. There are a number of factor that go into the daily decision making. The factors include not only individual and household level factors such as income, time resources, knowledge, skills, and preferences, but also factors outside of the household such as prices and the availability of stores and restaurants (NRC, 2005).

By looking at these factors, would suggest an overall understanding of food consumption decision and which will point out the food procurement decision. National Research Center in the United States (NRC, 2005) also emphasize that household members may also have a set of skills or informational resources available, for example, information on which foods are healthy and food preparation skills. Basing on these, the questionnaires were developed to acquire the information needed for the food procurement data.

The National Research Centre in the United States (NRC, 2005) claimed that the resources include monetary resources like income and asset levels, which are not always adequate for food consumption. Recognising this inadequacy, the consideration on the income level of the rural school teachers would be taken into account as it would be one of the confounding factor influencing teacher's household food procurement and their nutritional status.

Another alternative to assess dietary intake is using the environmental indicators of diet. The measure does not only assess individual food intake but rather the environment context in which food decisions are made, such as food availability in the home, geographic proximity to grocery stores or farmer's markets, and food

shopping habits measured by till receipts (Neuhouser *et al.*, 2007). In this study on food procurement, these indicators will be taken into account for and thus supporting the nutritional assessment.

Price and availability of foods are thought to be important mediating factors between socioeconomic position and food purchasing. Brisbane residents' survey found that a price difference is not associated with purchasing choices (Giskes *et al.*, 2007). It would be questionable to assume that school teachers in Malaysia also do not consider the price difference of food, which was looked in this study.

2.2 FOOD ACCESS IN RURAL AREA

The study of teachers in rural areas rings a concern on the food availability and nutritional value of food being purchased by the school teachers. Food access does determine the availability of nutritious food to those living far from markets or supermarkets. Some researchers found that living in a food desert did not, by itself, impose food access difficulties (Coveney & O'Dwyer, 2008).

Distance from shops has been shown to impact on the quality of foods eaten. For example, people who walk to food shops have been shown to have relatively poorer diets, which may be partly attributed to difficulties experiences in carrying shopping home (Coveney & O'Dwyer, 2008). People who live in food deserts often have no option but to rely on smaller stores where prices are higher and the quality and variety of fresh food is more limited.

In an evaluation to accessibility to food supermarkets, a methodology based on three measures of accessibility to supermarkets calculated using geographic information systems (GIS), and on exploratory multivariate statistical analysis (hierarchical cluster analysis), which we use to identify food deserts in Montréal. First, the use of three measures of accessibility to supermarkets is very helpful in identifying food deserts according to several dimensions: proximity (distance to the nearest supermarket), diversity (number of supermarkets within a distance of less than 1000 metres) and variety in terms of food and prices (average distance to the three closest different chain-name supermarkets) (Apparicio, Cloutier & Shearmur, 2007).

2.3 SOCIOECONOMIC AND DEMOGRAPHIC STATUS WITH DIET

There is now extensive research into relationship between socio-economic status (SES) and diet (Coveney & O'Dwyer, 2008). Caloric requirements of household members are based on their gender, height, weight, physiological status, and level of activity. Age is for the purposes of the caloric adequacy indicators, age in years completed is collected for all household members over one year of age (Swindale & Ohri-Vachaspati, 1999). It is widely acknowledged that a number of factors such as gender, age, and socioeconomic factors may be associated with the validity of dietary estimates (Marks *et al.,* 2006).

In the European food availability databank study which based on household budget surveys, the concurrent recording of demographic and socio-economic characteristics of the household members may allow exploratory analyses on the evaluation of their effects on dietary choices (Trichopoulou *et al.*, 2003). This study established that such characteristics would categorize the rural school teachers according to the pattern of food procurement and their nutritional status.

Although nutrition label use is significantly associated with a higher fruit and vegetable and a low-fat and low-saturated-fat diet, nutrition label use explains little variance in these dietary measures beyond that which is attributable to demographic, behavioural, and psychosocial factors (Satia *et al.*, 2005).

2.4 NUTRITIONAL KNOWLEDGE OF SCHOOL TEACHERS

Nutritional knowledge is an important factor to determine whether the studied subject will have the sufficient knowledge on healthy eating. This would also suggest that the nutritional status of the rural school teachers is not affected by insufficient knowledge on healthy eating. There is one study by Yong on a sample of Malaysian teachers using a self-administered questionnaire. He studied the relationships of ethnicity, father's occupation, sex and respondent's academic major with nutritional health knowledge. The results indicated that the level of nutritional health knowledge is low and dependent on sex but not on ethnicity, respondent's academic major and father's occupation. The need for males and physical education majors to improve their levels of nutritional health knowledge is indicated (Yong, 1985).

In a study of 323 teachers in Mississippi, to identify elementary teachers' acceptance and implementation of nutrition education as part of the School Wellness Policy (SWP) using Organizational Change Theory (OCT) constructs, 80.1% agreed that their school had a SWP with 86% in favor of the SWP. In providing nutrition education, teachers agreed (64.3%) they have the skills, however fewer (37.6%) agreed they have the adequate time or resources (22.2%) (Lambert *et al.*, 2008). Attention will be drawn to food procurement by the rural teacher's household and their nutritional status by studying the factors influencing them.

Lifestyle intervention programme brought about improved nutritional composition, dietary habits, exercise participation and increment in knowledge with concomitant improvement in health status (Noor-Aini *et al.*, 2006).

2.5 TEACHER'S INFLUENCE ON STUDENTS

Teachers are always role models for students to imitate and looked up to for advice. The role of teacher is central in dietary education and changing food choices while the nutritionist's role is to train teachers regarding nutrition concepts and application. It is true that teachers play an important role in encouraging student to eat and stay healthy and fit. A study shows that there was a significant increase in hours spent in physical activity per week in the teacher intervention group and a non-significant decrease for children in the nutritionist intervention group (Panunzio *et al.,* 2007).

In a study to measure the impact of teacher food related attitudes and behaviors on child food behaviors in the Head Start population, 187 Head Start teachers throughout the state of Virginia were recruited to participate in the study as part of an ongoing program titled Food Friend. The teachers were assigned food neophobia behavior and attitude scores. Teacher food attitudes and behaviors were found to improve in several key areas, including higher acceptance and consumption of novel foods, increased fruit and vegetable consumption and wider dietary variety. It is also found that teacher attitudes and behaviors may not impact children as much as particularly as they relate to child food behaviors (Stratton *et al.,* 2008).

In the Stradella Project to determine whether school teachers educated about Primary Prevention of Adult Cardiovascular Disease (PPCVD) could help their students improve their blood lipid profile, the study shows that well-trained school

teachers are able to manage PP-CVD education so that students can really improve their lipid profile as a consequence of autonomous changes in dietary habits (Aquilani *et al.,* 2007).

2.6 TEACHER'S DIET

Schoolteachers in Izmir, Turkey prefer meat, vegetables, cereals, and their combinations (overall 44.4%, female 51% and male 39.7%). Teachers eat raw vegetables and fruits, but prefer fried meat. Oil, sugar, and salt consumption of female and male teachers are between moderate ranges (Turgay *et al.*, 2005). Compared to other regions of Turkey, Izmir has more socioeconomic advantages and better opportunities for education and comparable to study on Malaysian school teachers. A survey among 41 teachers of special education, revealed deficiencies in carbohydrate, fibre, and micronutrient intake and excessive fat and protein intake suggesting that poor dietary habits may make the special education teachers more susceptible to emotional stress and physical illness (Bradfield & Fones, 1984).

School canteen meals usually have limited whole grain foods, and teachers reported that the cereals available at school are usually those with high sugar content because children prefer those (Burgess *et al.*, 2006). Thus, school teachers sometimes with limited lunch break would take inadequate amount of healthy food in school.

2.7 TEACHER'S PHYSICAL ACTIVITY

Physical activity is a good indicator on the energy expenditure of subjects studied when the validity of the nutrient intakes is questionable. A study among Finish female teachers revealed that teachers who teach Physical Education (PE) have higher life-long physical activity values than the Language (L) teachers. During the follow-up period in 1967 to 1971, the number of cancer cases totalled 108 for the PE and 513 for the L teachers (Pukkala *et al.,* 1993).

In Mexico, a pilot study was conducted to find out about the knowledge, attitudes and practices of teachers after a training workshop to increase vegetable and fruit consumption and routine physical activity as part of healthy lifestyle in elementary public schools (medium to low socioeconomic level). This study found that there is a significant difference in change of knowledge in the areas of

"educational strategy", "correct feeding", "self-care" and psychosocial aspects of feeding" after the workshop. However, no significant differences in the area of "physical activity" were found. This study concludes that special efforts to improve knowledge of the educational strategy, and awareness, attitudes and practices in the area of physical activity and correct feeding are needed in public Mexican schools (Perez *et al.*, 2007).

In an intervention among teachers at an elementary school, participants have found that wearing pedometer helped motivate more physical activity and increase total daily steps taken. Results showed that of the 31.21 percent that participated in the intervention, 93.55 percent have tried to increase their daily activity in the past. The 63.64 percent who did not participate, schedule conflicts and lack of time were the top two involvement barriers (Woolfolk *et al.,* 2006).

In the Izmir study of schoolteachers, it was determined that most teachers had regular physical activities and they were mostly walking from 49 percent of female group and 50.2 percent of the male group females (Turgay *et al.*, 2005).

2.8 INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (IPAQ)

The purpose of the International Physical Activity Questionnaires (IPAQ) is to provide a set of well-developed instruments that can be used internationally to obtain comparable estimates of physical activity. There are two versions of the questionnaire. The short version is suitable for use in national and regional surveillance systems and the long version provide more detailed information often required in research work or for evaluation purposes.

The public health burden of a sedentary lifestyle has been recognized globally, but until recently, the prevalence and impact of the problem has not been studied in a uniform and systematic fashion. The questionnaire is the most feasible instrument for measuring physical activity in large groups or populations. However, many of the existing instruments are not comparable in the type of activities surveyed (i.e., leisure-time activities only) and format for data collection. In response to the global demand for comparable and valid measures of physical activity within and between countries, IPAQ was developed for surveillance activities and to guide policy development related to health-enhancing physical activity across

various life domains (Booth, 2000). The long, self administered IPAQ questionnaire has acceptable validity when assessing levels and patterns of PA in healthy adults (Hagstromer *et al.,* 2005). IPAQ short form has been developed and tested for use in adults' age range of 15 to 69 years (IPAQ, 2005).

2.9 BODY MASS INDEX (BMI)

Body Mass Index (BMI) is the most widely used height-weight index which is also called Quetelet's Index (Kandiah *et al.,* 2007). Body weight and height can be used in combination as simple and reliable measurements for evaluating nutritional and overall health status, and in screening for overweight. BMI is independent of age and reference population, it can be used internationally (Narayan & Khan, 2007). Weight, height and body mass index (BMI) have been studied as risk factors for cancer (Tehard *et al.*, 2002). The importance of the BMI profile is that it is community-based in a rural population.

Rural population used to be considered at a lesser risk of overweight and obesity than urban populations, but the situation may have changed owing to influences of urban lifestyles in a study of two rural villages in northern Malaysian (Narayan & Khan, 2007). Narayan and Khan also noted that the prevalence of overweight was 21.3 percent while the prevalence of obesity was 4.5 percent. In a study done in 9 districts of Kelantan and the overweight were significantly younger than the lean subjects (Mohamad *et al.,* 1996). Mohamad and colleagues said that the high prevalence of overweight and obesity in Malaysia was associated with adverse lipid and glucose metabolism as well as poor blood pressure control.

In the study to describe knowledge, attitudes, risk factors and early detection relevant to cancer of schoolteachers, findings showed that the BMI of male teachers were higher than females (Turgay *et al.*, 2005).

2.10 FOOD CONSUMPTION PATTERN OF MALAYSIANS

Food consumption data provide estimation on the quantity of each prepared food consumed by individuals. Food consumption data vary considerably from country to country and even within a country due to variations in ethnicity, geographical areas, age and sex. Data collected from the food consumption pattern can be used for a variety of purposes such as examining the dietary pattern, assessing adequacy of

nutrient intake and exposure of various contaminants and additives through food as well as establishing policies in agriculture, food production, trade and health (Norimah *et al.,* 2008).

According to the Malaysian Adults Nutrition Survey (MANS), the food consumption pattern of adults aged 18 to 59 years from northern, central, southern and east coast of Peninsular Malaysia as well as Sabah and Sarawak, *nasi putih* (cooked rice) was consumed by 97 percent of the total 6,742 population studied. They consumed twice daily with an average of two and half plates per day. Other food items consumed daily were marine fish, one medium fish per day; green leafy vegetables as one cup per day; and sweetened condensed milk as three teaspoon per day.

The mean frequencies for daily intake of rice, leafy vegetables, marine fish, local *kuih*, anchovy (*ikan bilis*) and biscuits were significantly higher among the rural compared to the urban adults. Malaysian showed a satisfactory habit of drinking plain water, with 99 percent drinking at least six glasses of plain water daily. Other beverages consumed were tea, coffee and chocolate flavoured drinks and cordials (Norimah *et al.,* 2008). The finding was encouraging as it was in line with the recommendation of the Malaysian Dietary Guidelines (NCCFN, 1999).

2.11 TWENTY-FOUR HOUR DIET RECALL

The 24-hour recall method is widely used to collect dietary information. It is a simple method that imposes little burden on the respondents and is suitable for all levels of literacy. The household and standard measures, verbal descriptions are commonly used in this method. In Malaysia, food models and photographs the used of food models is expensive and inconvenient due to the nature of the survey, whereby interviewers have to make home visits. This reason plus the involvement of a lot of interviewers in a community survey becomes a deterrent factor in using the food models. The use of photographs to quantify amounts of food eaten had been used, however, little is known on the accuracy of photographs as an estimate of food intake and subsequently on nutrient intake. Consequently, as shown in some studies, there occurs an under-estimation and over-estimation of the food intake (Zamaliah, 1995).

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