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Ph.D. degree in Human Nutrition

Jenny J. Bond
Major professor

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GROWTH STATUS DETERMINANTS OF SCHOOL AGE CHILDREN FROM PRIMARILY LOW INCOME HOUSEHOLDS IN THE URBAN AREA OF KUALA LUMPUR, MALAYSIA: A FOCUS ON INTRAHOUSEHOLD FACTORS

By

ZALILAH MOHD SHARIFF

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Food Science and Human Nutrition

1998

ABSTRACT

GROWTH STATUS DETERMINANTS OF SCHOOL AGE CHILDREN FROM PRIMARILY LOW INCOME HOUSEHOLDS IN THE URBAN AREA OF KUALA LUMPUR, MALAYSIA: A FOCUS ON INTRAHOUSEHOLD FACTORS

By

Zalilah Mohd Shariff

Growth status was examined in relation to intrahousehold factors in urban primary school children (6 – 10 years old) from low-income households in Malaysia. The investigation consisted of one study with 8,005 children and one with 309 households. Children's data were obtained from three school records: personal, health and academic performance. Household data were obtained using questionnaires and in-depth interviews with mothers. Approximately 50% (n=3,893) and 30% (n=2568) of the school children were stunted and wasted, respectively. Stunting or low height-for-age signifies slowing in skeletal growth and wasting or low weight-for-height indicates a deficit in tissue and fat mass. This study defined low height-for-age or weight-for-height as Z score below minus one of the NCHS/CDC reference median. Male children had lower mean Z scores for height-for-age ($p < 0.05$) and weight-for-height ($p < 0.01$) than female children. Older children had significantly lower mean Z score for height-for-age ($p < 0.001$) but higher mean Z score for weight-for-height ($p < 0.001$) than younger children. With increasing age, stunting is associated with improved weight-for-height. In the household study, mothers made and implemented household decisions related to food and child care, health and feeding more than fathers did ($p < 0.001$). Fathers had more participation in making and implementing household decisions related to income and expenditures than

mothers ($p < 0.001$). Compared to fathers, mothers participated equally in total decision making but significantly more in total decision implementation ($p < 0.01$). Mothers' employment and income-generating activities were significantly associated with their participation in total decision making and implementation in the household. Regardless of age, mothers' years of schooling was positively associated with nutrition knowledge scores ($p < 0.001$). Households with low income or low income per capita were more likely to exhibit household or individual food insecurity ($p < 0.001$) and child hunger ($p < 0.001$) relative to being food secure. Mothers reported allocating foods to all household members equally "Equality rule", (71%) rather than giving more to children "Needs rule", (27%) or to the adults and males "Contribution rule", (2%). Child health status as reported by mothers was positively associated with mother's years of schooling ($p < 0.05$), total household income ($p < 0.01$), income per capita ($p < 0.05$), mother's nutrition knowledge ($p < 0.05$) and household food security ($p < 0.001$). Finally, child growth status was predicted ($R^2 = 0.088$; $p < 0.001$) by child's age, gender and mother's decision implementation power. Mother's participation in implementing household decisions and child's age were positively related to child growth status. In comparison to being a female child, being a male child was negatively related to growth status. In conclusion, results demonstrate a high prevalence of stunting and wasting among low-income school children. It is recommended that efforts to improve child health and nutritional status in developing countries should consider familial and maternal factors within the child's ecology.

ACKNOWLEDGEMENTS

"In the name of Allah, The Most Gracious, The Most Merciful"

I thank Allah for his blessings and guidance in my life as a human, a daughter, a wife, a mother and for what I have achieved so far. I would also like to thank all the people who had directly and indirectly contributed to my doctoral degree.

To my academic and research advisor, Dr, Jenny Bond, words can never describe the personal and professional relationships that we have shared. She has been a prominent mentor, a distinguished teacher, a special friend who has always been there for me, both during the happy and hard times. I thank her for her insightful support, guidance and encouragement throughout my doctoral program. We have shared many special moments and she will always have a special place in my heart. I would also like to thank the other members of my guidance committee: Dr. Nan Johnson for her insightful advice and interest, particularly in the subject matter and data analysis. Her expertise and knowledge in regards to the research had benefited me tremendously; Dr. Won Song for her continuous support and encouragement throughout my program and Dr. Sharon Hoerr, who initially had me interested in this area of research, for her interest regarding the subject matter.

Many thanks are also extended to the other people at the department: Mrs. Stella Cash, who had been on my guidance committee during my Master's program, for her genuine interest and moral support in my academic and personal pursuits; Ms. Burness Wenberg for her encouragement throughout the times that I have known her; Mrs. Debbie Lecato for her kind support to me and my family; Marci Scott, a friend and a confidante,

for her encouragement in my personal and professional lives and my colleagues, Susan Davis, Jennifer Krenos and Maria Nnyepi, for their support in my research.

My special love and gratitude go to my family members: My late father, Mohd Shariff Tuing, who convinced me that I should pursue a degree in Nutrition and let me cross the continents to fulfill my dreams; My mother, Siti Zailon Ali and sisters, Zubaidah, Shahidah, Salinah and Mazmin, for their love, continuous support and their confidence in me that I can be whoever I want to be which meant very much to me; My sons, Syukri and Syazwan, who have helped me to comprehend the events in our lives better, to appreciate life and people and not to take things in life for granted. Finally, my love and appreciation to my wonderful husband, Shukor Md. Nor, who has always been an anchor in my life. We have been through hard and easy times together but he has never failed to amaze me with his support, encouragement and love for me and the children.

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CHAPTER I

INTRODUCTION

In many parts of the world, particularly in the less developed countries, growth assessment has become the single measurement that is convenient to undertake and best defines the health and nutritional status of children. This is because, as a consequence of any deviation in health and nutrition, regardless of the etiology, child growth will be affected. There are various factors that lead to health and nutrition problems among children. However, for those living in deprived or impoverished conditions, inadequate food intake or severe and repeated infections or a combination of these are the predominant causes of poor health and nutrition. For example, the frequent observation in less developed countries that children from poor households are prone to the dangerous combination of undernutrition and illness has prompted the establishment of health and nutrition programs (e.g., immunization, medical care and supplementary foods) that focus on the needs of these children. As growth assessment serves as a mean to evaluate the health and nutritional status of children, it also provides an indirect measurement of the general standard of living or the quality of life of the population (De Onis et al., 1993).

There have been numerous documentation of health and nutritional status of infants and young children in less developed countries but little attention has been given to the condition of the older children. These children have been studied less frequently in the evaluation of the health and nutritional status of a community as they are assumed to be less at risk of being malnourished or having poor health, although it is known that poor nutrition is associated with poor academic performance (Popkin and Lim-Ybanez,

1982; Moock and Leslie, 1986; Clarke et al., 1991) and that continued poor nutrition might diminish the already small likelihood of catch-up growth (Martorell et al., 1994). Poor academic performance may not be a direct outcome of growth failure, but it may reflect shared contributory factors – poverty and malnutrition. Malnutrition hinders intellectual development and is one of the contributing factors to generally poor academic performance among children from poor communities.

Similar to other less developed countries, health and nutrition of school age children in Malaysia have not received much attention as indicated by the relatively little published information on this topic. In addition, the health and nutritional status of those living in the urban sector has also been neglected as the focus has been primarily on the poor and the hard-core poor households in the rural areas of Malaysia. However, the increasing urbanization and its related problems (social, environmental, economic and health) can have important consequences on the health and nutrition of the urban populations, particularly women and children. Therefore, this present research is undertaken to provide current information on growth status of school children from primarily underprivileged households in the urban area of Kuala Lumpur, Malaysia and investigate the determinants of their growth status. It is hoped that this information will assist health and education officials (1) to prepare for the increasing number of children enrolled in the school system in Malaysia and the rising incidence of health and nutrition problems among this age group and (2) to focus on measures to eliminate the problems.

Statement of Problem

Although much is known about the determinants and correlates of child health and nutritional status in Malaysia, the focus has been restricted to demographic, socioeconomic and biological factors. These factors, however, do not account for household behaviors which may provide more information on how these factors, particularly demographic and socioeconomic factors affect the well being of the children. Therefore, it is proposed here that a study which takes into account intrahousehold factors should be undertaken. Besides the focus on demographic and socioeconomic aspects of the households and the biological characteristics of the children as determinants of a child's well-being, emphasis is also given to household behaviors, e.g., intrahousehold resource allocation and decision inputs. Household behaviors may not only be influenced by priorities, perceptions and knowledge of the household members but also by religious, cultural, economic and social factors of the community. At present, there is no published information on intrahousehold resource allocation, household decision making and the role of women in these processes as determinants of child health and growth status in Malaysia.

This study will 1)provide an understanding of the determinants of growth status of Malay children from low income households in an urban area of Malaysia; 2)contribute to the study of women's status in less developed countries; 3)understand women's roles in low income Malay households in relation to decision making and allocation of resources and how these roles contribute to the growth status of their

children and 4)provide a starting point or a basis for future intrahousehold resource allocation research in Malaysia.

This study will look at intrahousehold factors, predominantly those which relate to the mothers and children and attempt to model a theoretical explanation for child growth status in an urban area of Malaysia. Thus, the dependent variable of interest is the anthropometric outcomes (combined score of weight-for-height and height-for-age) of Malay primary school children from primarily low-income households in the capital city of Kuala Lumpur. The independent variables include household measures of demographic and economic status, household resource allocation (time, food and income), child care and feeding, household decision inputs of mothers and child-related variables.

Research Purpose, Objectives and Questions

The overall research aim is to identify various intrahousehold factors which may contribute to the well-being of a child in a deprived socioeconomic environment. In addition, the research will predict child's growth as an outcome of several household inputs and throughput that can act independently or interdependently. At all times the research will be guided by concerns to understand the child's microsystem as an effort to improve the child's total development. Thus, the research will be guided by the following purpose and their respective objectives and research questions.

I. Purpose: To assess the growth status of school children from primarily low income households in the urban area of Kuala Lumpur, Malaysia.

Objective 1 - To determine the prevalence of stunting and wasting in school children from primarily low income households in Kuala Lumpur according to gender, standard and age.

Objective a - To compare the mean *Z* scores of weight-for-height and height-for-age for primary school children according to gender, standard and age.

Question 1 : What are the prevalences of stunting (low height-for-age) and wasting (low weight-for-height) and the mean *Z* scores of height-for-age and weight-for-height for the primary school children according to gender, standard (1-3) and age (6.0-6.9, 7.0-7.9, 8.0-8.9 and 9.0-9.9)?

II. Purpose: To investigate the determinants of growth status among Malay school children from primarily low income households.

Objective 2 - To investigate mothers' participation in making and implementing household decisions as predictors of child growth status.

Objective a - To compare mothers' and fathers' participation in making and implementing household decisions.

Objective b - To compare mothers' participation in making and implementing household decisions.

Objective c - To determine if mothers' participation in making and implementing household decisions vary with mother's age, years of schooling, employment status, income earning level, total household income and income per capita.

Question 2a : How much participation do mothers have in making and implementing household decisions in comparison to fathers'?

Question 2b : Is there any difference between mothers' participation in making and implementing household decisions?

Question 2c : Do mothers' participation in making and implementing household decisions vary with age, years of schooling, employment status, income earning level, total household income and income per capita?

Objective 3 - To assess mothers' nutrition knowledge as a predictor of child growth status.

Objective a - To determine if mothers' nutrition knowledge varies with years of schooling.

Question 3a : What is the distribution of mothers' nutrition knowledge scores?

Question 3b : When mother's age is controlled, does nutrition knowledge vary with years of schooling?

Objective 4 – To identify household food security as a predictor of child growth status.

Objective a - To determine if total household income and income per capita vary with household level of food security.

Question 4a : What is the distribution of household food security?

Question 4b : How do total household income and income per capita vary with household level of food security?

Objective 5 - To identify mothers' food allocation rules as a predictor of child growth status.

Objective a - To determine if mother's years of schooling, income earning, nutrition knowledge, total household income, income per capita and household food security differ by mothers' food allocation rules?

Question 5a : What is the distribution of mothers' food allocation rules?

Question 5b : How do mothers' years of schooling, income earning, nutrition knowledge, total household income, income per capita and household food security differ by mothers' food allocation rules?

Objective 6 - To investigate mothers' perceptions of child health status as a predictor of child growth status.

Objective a - To determine if mothers' perceptions of child health status vary with household demographics and economics, child care and feeding and child-related variables.

Question 6 : Do mothers' perceptions of child health status vary with household demographic and economic variables (number of children, mother's and father's years of schooling, total household income and income per capita), child care and feeding variables (nutrition knowledge and household food security) and child-related variables (gender, age, birth order and number of younger siblings)?

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Objective 7 - To describe mothers' allocation of income in the households.

Objective a - To describe mothers' perceptions of household income adequacy.

Objective b - To identify the characteristics of mothers with income-earning activities in relation to income pooling, control and allocation.

Objective c - To identify the characteristics of mothers with no earned income in relation to income pooling, control and allocation.

Question 7a : How do mothers' perceive the adequacy of income in their households?

Question 7b : For mothers with earned incomes ..

i. Do they report pooling of incomes with their husbands?

ii. If they do, who has control of allocating and spending the pooled incomes?

iii. If they do not pool or partially pool their incomes, who has control of mothers' incomes?

iv. Do they receive additional allowances from husbands?

v. What are their priorities for money use?

Question 7c : For mothers with no earned income

i. Who has control of husbands' incomes?

ii. Do they have access to husband's incomes?

iii. Do they receive personal allowance from husbands?

iv. If they do, what are their priorities for money use?

Objective 8 - To describe the mothers' perceptions of children's food habits.

Question 8 : What are the food habits of these children (during the school week)

i.Eating breakfast before going to school?

ii.Eating meals (breakfast, lunch and dinner) at home?

iii.Taking food from home to school?

iv.Having pocket money to buy food at school?

Objective 9 - To determine whether household inputs and throughput can predict child growth status.

Question 9 : Is child growth status predicted by household inputs (household demographics and economics variables, household resource allocation variables, child care and feeding variables and child-related variables) and throughput (household decision inputs)?

Conceptual Framework

The conceptual framework for this study employs the family resource management model (Deacon and Firebaugh, 1988) and family determinants of child health model (Bennet, 1990). In the family resource management model, the theorists conceptualize family resource management as a system comprised of inputs, throughputs and outputs. Inputs consist of **demands** such as physiological need for air, food and water and **resources**, both human and non-human. Human resources include skills, abilities, knowledge, health, energy and time while non-human resources encompass natural and processed consumption goods, housing, household capital, physical energy, money and

investments. Throughput is the transformation of matter, energy and information into outputs. Output is matter, energy and information produced by a system in response to input and from throughput (transformation) processes.

For this research, input variables are represented by household measures of demographics and economics, household resource allocation, child-related variables and child care and feeding. Throughput variables are represented by mothers' participation in making and implementing decisions related to various household activities and resource allocation. One of the main concerns of this research relates to the extent to which mothers' decision making power in the households influences their children's well-being. It is essential to examine decision making in two separate mechanisms (making and implementing household decisions) as they involve different processes (Deacon and Firebaugh, 1988). Making or planning decisions is a process using cognitive skills to envision what is to be done while implementing decisions is putting plans into effect or actuating plans and controlling the actions. Frequently, mothers' decision making power or social status in the households have been found to be positively related to their children's nutritional status. Child's anthropometric status as indicated by a combined score of height-for-age and weight-for-height represents the output of the system under investigation.

Bennet (1990) proposed that there are four main factors within a family which determine the child's health and nutritional status. The first two determinants, child care time and income to purchase material goods are related to time allocation in that one occurs at the expense of the other. For example, a mother with an income-generating occupation may not be able to spend much time in domestic activities, which include

food preparation, child care, cleaning and laundry. Although the money will help to supplement the family income (e.g., purchase of more and better quality food), the substitute child care for the young child may have a negative effect on health and nutrition of the young child (e.g., the care giver is older sibling who may not be able to prepare appropriate weaning food). The third and fourth determinants, distribution patterns and knowledge will have an impact on how the first two determinants are used. For distribution patterns, a mother may have her own distribution rules or she may not have any decision making power (her husband may make all the decisions) when allocating the household resources. Finally, a mother's knowledge and skills are essential to transform household resources (food, time and income) efficiently into child welfare. Figure 1 is the conceptual framework for this study adapted from Deacon and Firebaugh (1988) and Bennet (1990).

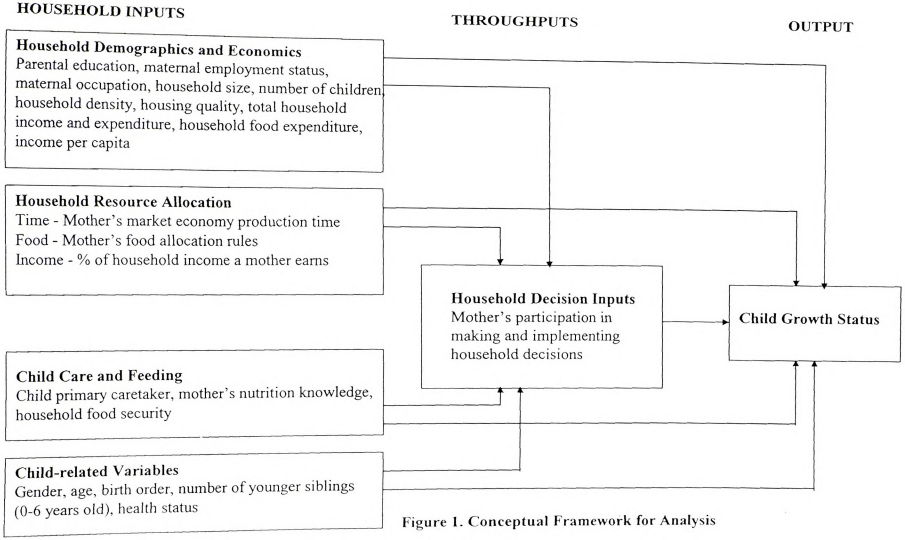

Figure 1. Conceptual Framework for Analysis

Working definitions of terms

The definitions of all the terms used in this study are stated below (Please see the nstrumentation section of Methodology in Chapter III for more elaborated conceptual nd operational definitions of the dependent and independent variables in the study):

. Child care and feeding - a category under household inputs which consists of three redictor variables – child's primary caretaker, mother's nutrition knowledge and ousehold food security.

. Child's growth status – a continuous variable (1 – 4) which is based on the Z scores for eight-for-height and height-for-age.

Child's age – the age of the child calculated from the date of birth to the date of sessment.

Child's birth order - the position of child under investigation in relation to the births of s/her older siblings in the household.

Child's gender – male or female.

6. Child's health status - a combination score based on child's current health, previous health and susceptibility and resistance to illness.

7. Child's primary caretaker - the person who takes care of the child when the mother is at work (e.g., if the mother is at home when the child is at school during the day, then the mother is the primary caretaker. If the mother is not at home due to working, then she is not the primary caretaker at least during the week days).

8. Child-related variables - a category under household inputs which consists of five predictor variables -- gender, age, birth order, number of younger siblings ages 0-6 years old and health status.

9. Food allocation rules – mother's food allocation rules defined as Needs rule, Contribution rule or Equality rule.

10. Household - unit of analysis in this study. It is defined as a group of people who reside together under one roof and share some forms of activities usually domestic ctivities (food production and consumption, sexual reproduction and child rearing), conomy production activities(income earned occupation) and leisure activities.

. Household decision inputs - mothers' participation in making and implementing usehold decisions compared to their husbands' or senior women's in the households.

12. Household demographics and economics - a category under household inputs which consists of twelve predictor variables – mother's and father's years of schooling, maternal employment status, maternal occupation, household size, number of children, household density, housing quality, total household income, total household expenditure, household food expenditure and income per capita.

13. Household density - number of persons/room in the household.

14. Household food expenditure – the amount of income spent on food monthly.

15. Household food security – mother's perception of food adequacy in her household which is assessed by ten statements and further categorized into – household food secure, household food insecure, individual food insecure and child hunger.

16. Household income adequacy - mother's perception of income adequacy in her household which is based on either one of these responses -- not enough, enough and more than enough.

17. Household inputs - indicated by four categories of predictor variables -- household demographics and economics, household resource allocation, child care and feeding and child-related variables.

18. Housing quality – a continuous variable based on a combination score of household possessions, constructions and ownership.

19. Household resource allocation - a category under household inputs which consists of three predictor variables -- mother's market economy production time, mother's food allocation rule and the percentage of total household income earned by the mother.

20. Household size - number of persons (regardless of relationship) residing in the household for more than 3 months.

21. Implementing household decisions - putting plans into effect (actuating plans).

22. Income per capita - total household income/household size.

3. Intrahousehold resource allocation - allocation of resources (food, time, income, ttention, education, etc.) within the household unit.

4. Making household decisions - a cognitive skill process to envision what is to be done lanning)

5. Maternal employment status – indicated by whether mother is not working for income working for income (working away from home or working at home).

26. Maternal occupation – categorized as unskilled, semi-skilled or skilled.

27. Mother's economy production time - number of hours a mother spent working away from home.

28. Mother's nutrition knowledge – mother's total score on 32 nutrition questions.

29. Number of children – number of unmarried children currently living in the household.

30. Number of younger siblings – number of children in the age group of 0 – 6 years old currently living in the household.

31. Parental education – mother's and father's years of schooling (formal education).

32. Percent of household income a mother earns – the amount of income a mother earns as a percentage of the total household income (e.g., 50% of total household income).

33. Primary school age children - children in the age group 6 - 12 years old (Standards 1-6). However, for Study 1 and Study 2, only school children in the age groups 6 - 9.9 (Standards 1-3) and 6 - 7.9 (Standard 1) years old respectively will be included.

34. Stunting - low height-for-age which will be presented by two categories -- mildly stunted ($-2 \leq x < -1$ SD of NCHS/CDC median for height-for-age) and significantly

stunted (< -2 SD of NCHS/CDC median for height-for-age). Stunting signifies slowing in skeletal growth and represents the accumulated consequences of retarded growth (long term indicator of growth status).

35. Throughput - indicated by household decision inputs (making and implementing household decisions).

36. Total household expenditure – the amount of income spent on food and other essentials monthly.

37. Total household income – the amount of money the household receives from income earning activities, gifts, rents, shares and others.

38. Output - indicated by child growth status.

39. Wasting - low weight-for-height which will be presented by two categories -- mildly wasted ($-2 \leq x < -1$ of NCHS/CDC median for weight-for-height) and significantly wasted (< -2 SD of NCHS/CDC median for weight-for-height). It indicates a deficit in tissue and fat mass which can develop very rapidly but under favorable conditions can be restored rapidly (short term indicator of growth status).

40. Z scores for height-for-age or weight-for-height -

(observed value) - (reference median value) / reference SD value.

The Z score for the reference population has a normal distribution with mean of zero (0) and SD of one (1)

Organization of the Study

This study is organized into five chapters: Chapter I, Introduction includes the statement of problem, research purpose, objectives and questions, conceptual framework for analysis and definitions of the variables under investigation. Chapter II, Review of Literature focuses on topics related to the study and includes studies conducted in Malaysia and other parts of the world, mainly the less developed countries. Three main topics are discussed in this chapter – intrahousehold resource allocation, child health and nutritional status and urban poverty, health and nutrition. Chapter III, Methodology consists of measurement instruments (conceptual and operational definitions of all the study variables), research questions and hypotheses, description of study area, research design (respondents, sampling and research procedures and data analysis. Chapter IV, Results presents sample characteristics, description of study variables and hypothesis testing. Chapter V, Discussion and Conclusion includes discussion on the results of the study variables, conclusions, strengths and significance, limitations and recommendations for future research.

CHAPTER II

REVIEW OF LITERATURE

This section will focus on three main topics pertinent to the present research -- intrahousehold resource allocation with an emphasis on food, time and income, child health and nutritional status in the less developed countries and urban poverty, health and nutrition. The review of the literature consists of studies conducted in Malaysia and other parts of the world, particularly the less developed nations.

Intrahousehold Resource Allocation

It has been suggested that the household should be the primary focus for nutrition research and intervention programs (Messer, 1983; Rogers, 1990). This is based on a set of assumptions which include the following: (1)the household is the primary unit for the production or acquisition of food; (2)food preparation and distribution occur mainly within the household; (3)the proportion of food consumed by individuals outside of this unit is relatively small in comparison with the amounts that are provided within the unit; (4)child care, especially feeding, is the responsibility of the household, even when children are outside of the household for periods of time during the day; (5)the management of illness in children, which has significant relationships to nutritional status, also falls mainly to the household, usually the mother. However, under the conditions of poverty and chronic resource scarcity, households as a whole may not

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perate to promote the common good of all their members. It is, therefore, necessary to dentify intrahousehold factors that influence health and nutrition behaviors.

One of the intrahousehold factors that has received much attention among many development planners and programmers is the allocation of resources to household members (Piwoz and Viteri, 1985). The resources in this context can be food, time, education, attention, health care, clothing, income or goods which are consumed by the households. The allocation of resources within the household can be affected by various factors such as biological requirements, physical environment, social environment and organization, technology and cultural system. An understanding of intrahousehold resource allocation which takes into account how households produce and manage their resources and on what basis the household members make their decisions will eventually help to address problems related to development, health or nutrition more effectively, and consequently to the design of appropriate development, health or nutrition programs. For example, increasing the disposable income of a household or providing food aid has not necessarily resulted in better-fed and healthier children (Kennedy, 1983). Agricultural development projects have not always improved children's nutritional status either (Dewey, 1981). Evidence has also suggested that improvements in the food supply of the household alone are not enough to ensure adequate nutrition for all its members (Rizvi, 1983). Some of the family members, particularly women and children, may fare worse than males and adults. Evidently, in all cultures, there are rules of exchange (allocation rules) which govern both the types and the amount of resources allocated to each household member and the basis for the allocation decisions will affect who receives more resources (Foa and Foa, 1980). Therefore, it is crucial to understand the allocation

rules from the household's perspective or to identify how households produce and manage resources and the basis on which household decision making occurs in these processes.

Several reports have indicated that parents in the developing nations may have different criteria for determining the allocation of resources from those of health professionals (Cassidy, 1987; Scheper-Hughes, 1987). Health professionals may expect that parents will direct the resources to the needy children who are malnourished or sick. Parents, however, may feel it is more appropriate to distribute the resources equally to all or to those who contribute most to the well-being of the family, rather than to the needy ones. These conflicting views have led to the identification by social psychologists of three allocation rules and the conditions under which each is applied (Leventhal, 1980). The first is the "contribution rule" which is based on "equal pay for equal work" or rewards and punishments to the recipients upon their inputs or contributions. Examples using the contribution rule include underfeeding of girls compared to boys, infanticide and underinvestment (health care, child care, education) in some children (high birth order, female), sex differences in nutritional and health status and more foods for adults or income-earners in the households than for children or non-workers. The perceived potential contribution to the households by each of the household members or the perceived value of some household members (children, female) may lead to the unequal allocation of resources to some of the household members. The second allocation rule is the "needs rule", which is the assumption underlying any targeted feeding program; for example, a food supplementary program for pregnant women or malnourished young children is designed to meet the demand for their increased nutritional needs. In order for

feeding programs to succeed, the target undernourished child and/or lactating or pregnant women should be the primary recipients for the foods and resources. Thus, the needs rule should be applied rather than the contribution rule. The third allocation rule, "equality" has been mentioned by Guatemalan women in a study by Engle and Nieves (1993). The rule implies that each person in the household should receive the same amount of resources regardless of their age, health condition, sex and income earning ability. The distribution rule used in a particular situation depends on many factors, including the types of resources (food, education, time, attention), the resource constraints (poverty, starvation) and the characteristics or values (educated, employed) of the resource distributor (Engle, 1990).

Three main topics of intrahousehold resource allocation which have been documented extensively in the developing countries are unequal allocation of household food to certain members of the households (e.g., women and children) and the effects of women's participation in labor force or income-earning activities on children's health and nutritional status (time and income). The following sections will provide an overview of various research findings on these topics and will discuss some of the related issues.

Food Allocation

An area of intrahousehold resource allocation which has received much attention among policy makers, development planners and nutritionists in developing countries concerned with food inequalities or causes of malnutrition among young children, female children and women is intrahousehold food allocation (Pelto, 1984; Haaga and Mason, 1987). Intrahousehold food allocation refers to the patterns of eating and feeding that take

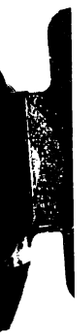
place in the home only, although, it may be influenced by feeding outside of the household. This definition does not take into account food obtained by household members outside the household. Food obtained and eaten outside the household can significantly increase an individual's consumption. Thus, the amount of food actually received by an individual may differ from the amount of food he is allocated within the household. Nevertheless, an inappropriate food allocation within the household may exacerbate the effect of inadequate household food supply on certain household members. Even if the households have sufficient food supply for all of its members, some individuals may still suffer from malnutrition because of the allocation patterns in the household. Thus, household food consumption is not only affected by factors that influence food availability (environment, food prices, income and access to fertile land and capital) and food management (storage, processing and preparation) but also by factors that influence intrahousehold food allocation including environment, economics, culture, perceived biological need, individual preferences and social organization) (Pelto, 1984; Piwoz and Viteri, 1985).

Documentation of unequal food allocation within the households has been extensive and has mainly focused on direct measurement of the food intake of individuals within the family in relation to dietary requirements. Although there have been attempts to explain observed sex differences in health outcomes (child growth, morbidity or mortality) as results of unequal allocation of food (Chen et al., 1981; Harbert and Mandizzo, 1982; Sen and Sengupta, 1983), caution must be exercised when assuming that the observed outcomes are the result of food discrimination. There are things other than food intake (e.g., physical activity of the individuals and differences in

environmental conditions) which may pose greater threats to health (Haaga and Mason, 1987). Furthermore, anthropometric measures frequently used as outcome variables in many of intrahousehold food allocation studies reflect the impact of both food and health factors. Therefore, poor growth performance detected by these measurements may not necessarily be caused by lack of food. These studies also generally ignore sociocultural factors influencing food allocation within the family, seldom obtain information on all food consumed (within and out of the households) and may focus on mothers and children rather than all family members.

An earlier study in an urban area of the Philippines (Florencio and Aligaen, 1980) indicated that sex and age discrimination did operate in food allocation among the survey households. In the analysis of nutrient distribution within the household (Nutrient Adequacy Ratio-NAR and Diet Rating-DR), on the basis of sex, household heads (fathers) and male children had a significantly better DR and NAR for protein and iron compared to housewives and female offspring. Generally, household heads and male offspring had more adequate diets (NAR and DR) than housewives and female offsprings. On the basis of age, household heads did best relative to their RDAs, adolescents worst and pre-school and school-aged children were in between. In rural areas of Philippines, while Senauer et al. (1988) found that higher birth order children and girls (ages 1-17) received significantly less calorie allocation than lower birth order children and boys respectively, Karangka and Onate (1980) reported no large difference in dietary adequacy (RDAs averaged across 9 nutrients) by birth order and sex of children.

In South Asian countries, there have been reports on sex differentials in mortality rates and in nutritional status after birth throughout the childbearing ages. More girls died in infancy and childhood and become malnourished than boys (D'Souza and Chen, 1980; Chen et al., 1981; Brown et al., 1982; Sen and Segupta, 1983). In Bangladesh, Chaudhury (1988) examined age discrimination (children vs. adults) and sex differences (sons vs. daughters) in intrahousehold food allocation (energy and protein intakes). He found that the data neither supported discrimination against children in food allocation when allowance is made for the differential needs of the two groups, nor son preference in energy and protein intakes when adjustment is made for the different nutrient needs for boys and girls. However, the author found that there is a strong son preference in time spent in child care and health care expenditure although it has been reported by other investigators (Chen et al., 1981) that sex differentials in infection rates are minimal or disease exposure is similar between sexes. While Chaudhury (1988) reported no son preference in food allocation, another study in Mathlab Thana, Bangladesh (Chen et al., 1981) found that male children (ages 0-4) had higher calorie intake than female children. In general, the calorie intake of males in all age groups exceeded that of females. They also reported that health service utilization at the Mathlab treatment facility for diarrhea treatment (treatment services were free) was higher for male than female children (ages 0-4). However, these data may also indicate that female children had lower episodes of diarrhea attack rates and therefore less visits to the treatment center. The data too may include those children who came to the treatment center more than once for diarrheal treatment. The different conclusions of sex bias in food allocation among the young children in these two studies may be due to the length of the study (the study in Mathlab



Thana did not take into account seasonal variation in food intake in Bangladesh because of the short study period) and different methods used in dietary intake measurements. Another study (Abdullah and Wheeler, 1985) which took into account the seasonal variations, reported that the proportional energy intakes (energy intakes expressed as a proportion of the male household head's energy intake) of women and older children (5-14 years old) were constant throughout the year and in line with the Food and Agriculture Organization (FAO) recommended intakes. However, for 1-4 year old children, average proportional energy intakes were below the expected range with the girl's proportional intakes lower than boys.

In India, bias against females in intrahousehold food allocation has been documented by many researchers. Levinson (1974) found that female children in rural India were breast-fed for a shorter period and given less supplementary milk and solid food than male children. In this study, food scarcity due to chronic poverty was shown to increase sex disparities in nutrition, especially among the lower caste. Gulati (1978) showed that woman's calorie intake was very much lower than man's when compared to the recommended allowances of the Indian Council Medical Research (20% vs. 11%). Batliwala (1983) in another Indian study reported that the average woman had a deficit of 100 calories and the average man a surplus of 800 calories per day. A study of a tribal population in Gujarat, India (Gopaldas et al., 1983) looked at the nutrient intakes (6 nutrients) of family members as percentages of the family head's intakes and percentages of the RDA. The results indicated that although the nutrient intakes of the family members as compared to the family head (used to reflect intrahousehold food allocation) were proportionately less, in terms of the percentages of the RDA, all age

groups seemed to receive more than 50% of RDA for all nutrients except for vitamin A and ascorbic acid. Another study (Basu et al., 1986) was undertaken to determine variation in sex bias (a) among several tribal groups and (b) among economic, occupational, religious and rural/urban subgroups of these groups. The authors found that male bias in intrahousehold food allocation did not operate among the tribal groups. Religion, occupation and rural/urban subroups within the tribes did not contribute to sex bias in food allocation. However, among one tribal group (a traditional Hindu caste), higher economic status seemed to favor males in caloric intake. A number of research (Levinson, 1974; Sen and Segupta, 1983; Basu et al., 1986) have found that it is more ethnic and sociocultural factors rather than just economic factors that contribute to sex bias (male dominance) in many parts of India.

A study of three communities in rural Nigeria (Okeke and Nnanyelugo, 1989) on intrahousehold food allocation showed that the proportional nutrient intakes (nutrient intakes expressed as proportion of the adult male's intake) for many of the nutrients in all age groups were lower than that of the adult males. However, when comparing the nutrient intakes of all age groups (including the adult males) to the FAO/WHO recommended intake, except for retinol and ascorbic acid (and in some cases, iron), other nutrients were found to be deficient. In this rural Nigerian society, socio-cultural factors were found to influence food distribution in homes in that adult males received priority in choice of food, sequence of meals served and prestige food. Steenbergen et al. (1984) in their study of intrahousehold food allocation in a rural population in Kenya reported that though there was no sex or age discrimination in type and quality of diet received by the household members, unequal food allocation may pertain to quantities of food

consumed. Comparison of energy adequacy between the diets of fathers and lactating mothers showed no significant difference. However, the comparison of energy adequacy between lactating mothers and children only showed significant difference with toddlers (1-3 years old). The diet inadequacy of these young children may be attributed to low energy density of the maize porridge and poor childcare (toddlers missed their evening meal which was served when they were already asleep).

Engle and Nieves (1993a) conducted research in Guatemala City with households receiving supplementary food from the health center. Each household had at least one young child with low weight-for-age. The objective was to investigate food allocation (percentage adequacy for energy and protein and proportion of family's energy and protein) in the households with respect to age, sex, earning status, family role and status of target child enrolled in the supplementary feeding program. Children in the youngest age group received significantly less adequate energy during mealtimes compared to other subjects; however, when snacks were included, the significant differences disappeared. Workers tend to receive a higher proportion of the family's energy. While male heads of households received a relatively higher proportion of the family's protein, female heads of households received a relatively higher proportion of the family's energy than other family members. When comparing the energy and protein adequacies and proportion of family's energy and protein between target child and other siblings (non-target), no significant differences between the two groups was observed. There is no evidence that the targeted children received anymore food than their siblings although these targeted child were significantly more wasted (weight for height) than the sibling group. In the same study (1993b), the authors found that mothers who expressed male

preference were significantly more likely to give a greater proportion of family protein and energy to males than those who did not state male preference. In comparing the proportion of family energy and protein of adults in families whose mothers expressed a preference for equality and those who did not (Equal preference vs. Non-equal preference), adults in families with equality preference ingested a significantly smaller proportion of family protein. In contrast, children under 18 and target children in families with equality preference received a higher proportion of family protein. This may be a function of the mother's tendency to give foods to all children rather than to adults or specifically to the target malnourished child. In fact, the authors reported that the mothers in the study rarely mentioned the nutritional needs of the target child as a basis for their patterns of food allocation.

Due to the complexity of factors related to intrahousehold food allocation, there are research questions pertinent to food allocation within the households that remained unanswered or are needed as guidance in the assessment of unequal food allocation (Carloni, 1981; Nutrition Economics Group, 1983; Van Esterik, 1984; Haaga and Mason, 1984: Pelto, 1984; Piwoz and Viteri, 1985). For examples, issues related to food supply or availability to the households (how does food supply impact the allocation of food within the households; does food allocation differ in times of food abundance, seasonal scarcity or chronic poverty; how does food allocation practice contribute to the incidence of malnutrition in times of low food availability); issues related to decisions on food allocation (how are the decisions on food allocation made; what are the sex and age differentials in decision making power related to food acquisition and allocation in the household; to what extent are decisions on household food allocation made in the absence

of adequate nutritional knowledge; how do women's role in decision making along the household food path contribute to intrahousehold food allocation; how do factors such as education and income generation and control of women enhance their ability in decision making on food allocation); issues related to culture (what are the prevailing beliefs or perceptions of social status of a particular gender or age group, ideal body size, health status and nutrient needs for different age groups that may affect food allocation; what is the impact of food beliefs, taboos and restrictions on food allocation; how do traditional meal patterns affect food intake); issues related to methodology and theory (the need to examine individual food intake in relation to total household intake; the need to examine total food intake which includes food consumed within and away from home; the need to assess intake in relation to requirement; the need to have new data from micro-studies which then can be developed into representative surveys (prevalent study) and consequently nutritional surveillance and intervention programs).

ncome and Time Allocation

Bennet (1990) has emphasized the importance of the relationship between omen's economic productive roles and children's nutritional and health status. As omen fill a dual role in most households as both the mother/caretaker and an economic ovider, these roles can create a conflict in maternal time use and allocation of sponsibilities. Maternal employment affects child nutrition in several ways. It can mean ditional income for the household to supplement household food expenditure and nsequently better food quality and quantity for her children. However, at the same time

it also means that the mother has less time available for breastfeeding, preparation of weaning food, child care and household food preparation.

The net effect of mother's employment status on child nutrition has been examined from two aspects – women's work and infant feeding practices and women's work and child nutritional status. As the focus of this present research is on nutritional status of children, only the latter aspect will be reviewed in detail. A review of 25 studies on women's work and infant feeding practices (Leslie,1988) have shown an inconsistent pattern of relationship. Most studies found similar patterns of infant feeding between employed and non-employed women. The type and location of women's work also contributed to the effect of women's employment on infant feeding practices. The most consistent negative effect of maternal employment is an earlier shift in exclusive breastfeeding to mixed (bottle and breast) feeding. Methodological weaknesses in the study design and/or the data analysis have been implicated for inconsistent findings. For examples, lack of random samples, small sample size, use of statistical analysis which did not control for confounding variables and inadequate categorization or measurements of women's employment and infant feeding methods.

Mother's employment status or income earning ability has been found to be a crucial factor in improving the dietary intakes (quality and quantity) and nutritional status of her children. Kumar (1977) found that among landless households in rural Kerala, India, income from mother's employment had a net positive effect on the nutritional status of both boys and girls. As the income increased for the wage-earning mother, so did the nutritional status of her children. However, for women who did not work for money, increases in household income were not associated with improved nutritional

status of children. In a study conducted in villages of northern Ghana, Tripp (1982) reported that trading activity of the mother was the most positive variable associate with child's weight-for-age. The women traders controlled their earnings which were then consequently used to purchase food for their children. A study in Panama (Tucker and Sanjur, 1988) which examined the effect of maternal employment status on child dietary intake and nutritional status, revealed that children of working mothers tended to have increased dietary intake (no significant difference in nutritional status between children of working and non-working mothers) and children of mothers who work for income at home had significantly better weight-for height and arm circumference measurements. Engle (1993) in her study of the relative effects of fathers' and mothers' income on children's nutritional status (aged 8-47 months) reported that the total income mothers' earned and the percentage of family income that mothers earned had a positive effect on children's nutritional status even after controlling for confounding variables (e.g., mother's education, age of child, gender). However, the amount and the percentage of their incomes contributed to food expenditures were not predictive of their children's nutritional status. The author concluded that the variability among mothers would be small if they tended to use their incomes for food and that the amount contributed to food would be less important in predicting children's nutritional status if all mothers contributed a similar amount. Finally, the results from a national representative household survey of food consumption, income and expenditure in the Dominican Republic (Johnson and Rogers, 1993), showed that among the low income households, the percentage of household earned income contributed by mothers was a significant predictor of their preschoolers' nutritional status even after SES variables (mother's

education and total income) and child characteristics (birth weight, birth order and age) were controlled. Also, at low income levels, children in female-headed households had significantly better nutritional status than those from male-headed households (although the researchers did not specify if the females in the female-headed households had partners or not). These findings suggest that in poor households, as women earn their own income, they are more likely to have influence in household consumption or financial decisions (allocation of resources) which can then be translated into their children's welfare.

The findings above on the positive relationship between maternal employment and children's nutritional status support the notion that women's earning power in the family will improve their children's welfare. Several explanations have been given as to why mother's income generation would benefit her children. First, when women control their own income, employment can increase their decision-making power in all household activities (Acharya and Bennet, 1981). Participation in economic contribution to the households have been theorized to increase the women's status and self-esteem through the perception that they are contributing partners. Second, Blumberg's gender stratification theory (Blumberg,1988) hypothesized that the relative male/female economic power is the most important of the major independent "power variables" affecting overall gender stratification. The greater the women's relative economic power, the greater their control over their own lives. Third, the attachment theory (Engle, 1990) suggests that mothers will be more attentive and responsive to their children's needs than men, whether due to cultural norms or to the process of attachment. While mothers' incomes are used for additional family food supply, household needs, feeding the family

and children's well-being, fathers' income are for his personal use, consumption of alcohol and cigarettes and purchase of prestige goods such as a radio (Blumberg, 1988).

On the other hand, a negative relationship between maternal employment and child nutritional status or infant feeding practices is proposed based on the belief that mother's labor force participation significantly reduces her child care time and breastfeeding. An earlier study by Popkin and Solon (1976) on the island of Cebu, Philippines showed that the working status of the mother adversely affected child nutritional status measured either by dietary intake, prevalence of xerophthalmia or feeding behavior. They found that the children of working mothers had lower vitamin A intake with a higher prevalence of xerophthalmia among children of working mothers whose family income was in the bottom two quartiles (but lower prevalence of xerophthalmia in the upper two quartiles for children of working mothers). The location of work is an important factor in determining the method of infant feeding chosen by the mothers; mothers who work close to their homes were likely to continue to breastfeed their infants. In another paper using 573 households in the province of Laguna, Philippines (Popkin,1980), it was reported that although mothers' employment reduced their childcare time, there was no significant effect on children's dietary intake of energy and protein. Mothers' employment had a negative effect on younger children's (1-35 months) weight-for-age and height-for-age but no effect on the older children. Also, when mothers' child care time is substituted by older siblings, the nutritional status of children deteriorated. This finding is supported by Engle (1991) who found that children taken care of by preteen siblings had significantly higher prevalence of wasting (low weight-for-height) than those of non-working mothers, even after controlling for SES

variables. In rural Haiti, Devin and Erickson (1996) reported that it is typical for women to engage in work activities from morning to evening, leaving their infants and children at homes in the care of substitute care givers who are primarily fathers and older brothers. These authors also reported that besides birth spacing between the index children and its next oldest sibling, having a male substitute caregiver contributed to poorer nutritional status of preschool children. Perhaps, lack of nutrition knowledge, attention to the younger children or experience in childcare tasks on the part of the substitute caregivers (older siblings, grandmothers, fathers) may be the explanation for the negative association between substitute caregivers and nutritional status of young children.

Two additional studies in India (Abbi et al., 1991) and Iran (Rabiee and Geissler, 1992) supported the negative impact of maternal workload on child nutrition. In rural Iran (Rabiee and Geissler,1992), mothers were involved in agricultural work throughout the year, especially during summer when weeding and harvesting activities were most intense. This resulted in early cessation of breastfeeding of infants and the care of young children by siblings between ages of 8 and 13 (older children worked in fields). The study data indicated that children of mothers with a heavy workload (despite greater family income) had lower energy intake and higher prevalence of diarrhea, were given sedative drugs at night to keep them quite and allow the mothers to rest and were wasted. Similarly, in rural India (Abbi et al., 1991), children (1-6 years old) of working mothers were more likely to become malnourished (especially under three years old), to develop anemia and vitamin A deficiency and to get measles, diarrhea and worm infestation. Even, after controlling for family income and child's age, maternal work status remained adversely affect both the nutrition and health status of the children. Both of these

studies demonstrated that maternal child-care time is essential in determining the well-being of children and the negative effect of maternal employment on children's health is further exacerbated by inadequate substitute childcare.

Other studies, however, found no relationship between maternal employment status and child nutritional status. A recent study by Engle (1991) indicated that when factors such as maternal education, income per capita, house quality, marital status and child's characteristics were controlled, no significant effects were found for maternal employment (work type and work amount) on any of the children's anthropometric measurements. Results from a study in Tanzania (Wandel and Holmboe-Ottesen, 1992), revealed that the time mothers spent working in the field and their preschool children's nutritional status gave no conclusive support that women's work has negative consequences on children's well-being. Although, the authors found that women spent less time cooking and children were fed less often in the seasons of hard field work, these negative effects of women's work were buffered by adequate childcare and the quality of diet fed to the young children. Frequently, women would bring their young children (those who are breastfed) to the field. Weaned children were left in the care of older siblings but the mothers would prepare food in advance for the children to eat before they left for work. Kaiser and Dewey (1991a, 1991b, 1991c) conducted a study on 178 households in three communities in Mexico on various effects of household economic strategies and food allocation patterns. They did not observe any relationship between mothers' income contribution to the households and nutritional status of preschoolers. Also, mothers' income contribution was not significantly related to percentage of food budget for various food groups analyzed, contradicting the finding that mother's income

will contribute to household food expenditures. However, these findings may be due to the small number of mothers who reported any personal income and the possibility of underestimating the mothers' incomes. Although there was no relationship between mothers' income contributions and children's nutritional status, it was found that intrahousehold food allocation patterns tended to favor these children – observations indicated that mothers often gave their children quality foods or voluntarily consumed less of certain foods at meal times to spare the youngest children. Nutrient adequacy data revealed that although both mothers and children had deficient intakes of nutrients, children consumed a greater percentage of their requirements for these nutrients than did the mothers. However, no dietary intake data of other household members were taken to allow the researchers to examine both mothers' and children's dietary intakes in relation to other household members.

All the evidence reported above did not give us a conclusive view of the relationship between maternal employment and children's nutritional status. However, a review of literature on this topic (Leslie, 1988) concluded that no negative relationship exists between mother's work and child nutrition. The studies that did find effects of maternal work on child nutrition generally considered mother's employment as a dichotomous variable (employed vs. unemployed), have not measured the hours mothers spent working, did not differentiate the types of work (work at home, work in the field, work in formal or informal sector) and did not control for confounding variables such as SES variables (mother's education, household income or wealth), the quality of substitute childcare (competence of alternate caretakers), birth weight of the child which may compromise the health and growth, the incidence of infection and accidents, the previous

birth interval, the level of hygiene in the child's environment, the age of children (infants may suffer nutritionally whereas older children may benefit nutritionally from having employed mothers or infants may be at greater health and nutritional risks when breastfeeding is terminated and bottle feeding or early weaning is introduced), the quality of health care and the extent to which health services are utilized.

Women's Decision Making Power

In developing countries, mothers have been viewed as an instrument to achieve child survival and health. These mothers bear the primary responsibility for maintaining their children in good health – mothers make choices on daily basis that affect their children's diets, determine the extent to which accident and disease prevention measures are implemented, and determine whether or not the children receive medical attention when needed. Because of the major responsibilities of mothers, there is a growing literature which looks at women's status in households and communities, their decision-making power in the households which eventually contributes to their roles in intrahousehold resource allocation and how these various roles of women have an impact on child health and survival. Evidently, it has been recognized that mothers' ability to obtain information and to use it as the basis for making decisions (autonomy) on their personal matters and those of their family members, particularly the welfare of their children, has an influence on the health and nutrition of their children (Dyson and Moore, 83).

Power bases, which refers to the relationship between family members, and the ative bargaining power, influence and respect each member has for each other

determines the access, control and use of household resources (Safilios-Rothschild, 1970). If the power bases within the household are ignored, it is similar to suggesting that all household members act as a unit to maximize their mutual good and they agree to certain management rules regarding the distribution of resources (income, food, time etc.) within the household. This is the assumption of the joint-utility function of the New Household Economics theory (Becker, 1981). However, this assumption of household decision-making may not hold true in many low income households. For examples, data have shown that household income is not always pooled between husband and wife (Dwyer, 1983; Bruce and Dwyer, 1988), a spouse is often ignorant of the amount the other earns (Engle, 1993) and men and women have separate obligations for their incomes in that women's incomes are often targeted for the provision of food and other necessaties for their children (Blumberg, 1988). Power bases which then determine patterns of household decision-making and resource allocation may be influenced by generational and gender issues. In many Asian cultures, the new bride is usually powerless compared to her mother-in-law who often has considerable domestic authority. For example, in Bangladesh, new brides were to do all the heavy and tedious house chores, while the mothers-in-law made decisions regarding health, the use of food and the provision of child care (Abdullah and Zeidenstein,1982). However, the new brides gain power with age and through the bearing of children (especially sons) to carry on the line. Gender inequality also seems to predominate in many Asian societies with respect to the extent of men's control over women in the households (e.g. women's economic dependence on their husband), the sexes relative control of material and social resources (e.g., sexual division of labor, control of household resources such as income) and to a

lesser extent the prestige of the sexes (e.g. material inequality) (Cain, 1982; Dyson and Moore, 1983).

Education and income generation and control (women's work) of women have been reported to be the key variables in a woman's control over household resources and decision making power (autonomy) and consequently in child health and survival (Piwoz and Viteri, 1985). Mohanty (1996) found that literate women (women with primary and middle grades education) were more likely than their illiterate counterparts to have a more active role in decision making related to health matters, their children's education and the families' savings and investments. Similarly, many studies have found a significant positive relationship between maternal education and child nutrition (see review on "The determinants of child health and nutritional status). However, other studies have reported that women's education or their income earning ability may not be as important as other indicators of women autonomy, for example, her position in the household and control of household resources. In a study of female autonomy (woman's structural position within the household in relation to her mother-in-law) and child nutritional status in Amman, Jordan (Miles-Doan and Bisharat, 1990), it was found that mother's high autonomy has a positive effect on the nutritional status of her child. This effect was found to be independent of age and educational level of the mothers and household income. Myntti (1993) in her study of rural Yemen mothers, reported that women with healthy children were the ones who had control of their husbands' incomes and good management of the existing resources (food, money, medication), had better social support and have active attitudes toward life (they were sensitive to the needs of their children and able to identify danger signs of illness and to respond appropriately).

These mothers did not differ in their age, education level, number of children and young children, residential pattern, husband's education and occupation and household income. The linkages of the mother's education and work to child nutrition are complex and not always positive. While many research support the role of mother's education in promoting the well-being of her children, research on women's work and child nutrition have yielded inconsistent findings (see review on "Income and time allocation"), although the evidence supports no negative effects of maternal employment on child health and nutrition.

Oppenheim-Mason (1985) in her review of the status of women and its relationship to fertility and mortality discussed the confusion related to defining the status of women. She attributed this to two reasons – first, the complexity of gender stratification and second, the demographers' confusions. The first reason includes multidimensionality of gender inequality and the multiple social situations in which inequality is exercised. Multidimensionality suggests that women can be "powerless" or "low in status" in one area but not in other areas. For example, they may have increased control or power of the household income but decreased prestige and authority in the domestic sphere. Also, the degree of gender inequality may not necessarily be the same in all locations. Women can be powerful or have prestige in their households but not in the kin network or community or women may be powerless when they enter their husbands' homes as new brides (the mothers-in-law are more powerful) but these women gain power when they actually become mothers-in-law.

The second reason includes the lack of recognition that gender inequality has its origin in both gender and caste/class stratification systems and confusion in access to vs.

control of resources by women. For the former, a woman may have a different role in household labor division which may determine her status in the household in comparison to her husband. For example, her low status or autonomy in the household may be due to her domestic activities while her husband retains a higher status as the household economic provider . At the same time, because she is from a lower-class household, she will be considered lower in status compared to the middle and upper classes households. Therefore, she can be low in status or poor because she is a woman or because she is a member of a lower caste or class or both. The latter implies that much gender inequality research has failed to differentiate between access to and control of resources as these terms have different meanings – access means to have passage to the resources and frequently results from dependency or the ability to use the resources upon permission of those who have the rights on the resources. Control, on the other hand, means the ability to dispose of resources and is typically power bearing. In summary, these sources of confusion in the meaning of women's status may also have implication on the proposition that women's educational level and labor force participation enhance their status. In reality, these two factors do not alone indicate women's status or autonomy as have been suggested by many researchers.

Research on intrahousehold resource allocation, which encompasses household decision making and the role of women in these processes which then may impact children's health and growth, has yet to be done in Malaysia. Although several anthropological studies in Malaysia have looked at women's roles in intrahousehold resource allocation (time, food and income) (Strange, 1991; Karim, 1992; Rudie, 1994),

their roles have not been studied as correlates or determinants of the health or nutritional status of children.

In conclusion, issues pertaining to intrahousehold resource allocation in developing countries have led to policy design and implementation in areas such as food production, consumption, health, nutrition and natural resource management. However, neglecting or misunderstanding the "black box" of the household which consists of complex interaction among household members that consequently influences the household decision making processes, have led many policies to fail (Nutrition Economics Group, 1983; Haddad et al., 1997). For example, many policies have been designed to alleviate household poverty in an effort to lower individual poverty. But, failure to understand intrahousehold behavior can increase the likelihood that policies will not reach their target goal which is to improve the individual well-being. Certainly, more well-designed research on intrahousehold resource allocation which addresses intrahousehold decision making is needed in order to assist policy development and consequently for the policy to reach or to be adopted by the targeted population.

Child Health and Nutritional Status in Less Developed Countries

The nutritional and health status of young children or preschoolers (under 6 years of age) in less developed countries, has always been a major concern of health professionals as this age group is considered to be most vulnerable to unsatisfactory food intakes or severe and repeated infections or a combination of the two. The nutritional and health status of this age group also reflect the standard of living and whether a population is able to meet its basic needs, such as, food, housing and health care (De Onis et al., 1993). The older children (above six years of age), however, may not experience severe nutritional and health problems and usually there is little mortality in this age group from malnutrition (Jelliffee,1983). By six years of age, they are able to consume adult foods and will develop to some extent, immunity to many infections and parasites. Consequently, health and nutritional needs of this age group in less developed countries have been relatively neglected (Leslie and Jamison, 1990), although many conditions such as helminthic infection, nutritional deficiencies, infections (ranging from malaria to dental caries), substance abuse, injury and poisoning may generate high levels of morbidity relative to their limited consequences for mortality. Poor health and nutrition contributed significantly to school failure and poor school attendance among the school children even after controlling for socioeconomic variables (Clarke et al., 1991). In fact, if poor health and nutrition persist throughout later childhood and adolescence, the chance for a child to experience catch-up growth is little or none at all and as a consequent can lead to short adult stature (Martorell et al., 1994).

The determinants of nutritional and health status among young children (0-6 years old) from low socioeconomic or poor and rural households in less developed countries have repeatedly shown the same patterns -- low parental education, limited household income, large household or family size, high birth order, high number of children in the household, high number of young children (0-6 years old) in the household, poor diet quality and quantity, alternative child care, low autonomy (decision making power) of mothers, lack of mother's control on household resources, gender inequality in access to household resources (male over female preference), low birth weight, short birth interval, poor nutrition knowledge of mothers, age of the child, mother's employment status, children of teenage mothers, female-headed household and feeding practices (Carloni, 1981; Chen et al., 1981; Sen and Segupta, 1983; Smith et al., 1983; Chaudhury, 1984; Becker et al., 1986; Abbi et al., 1988; Mazur and Sanders, 1988; Doan and Bisharat, 1990; Allen et al., 1991; Golden and Golden, 1991; Desai, 1992; Kennedy and Peters, 1992; Wandel and Holmboe-Ottese, 1992; Guldan et al., 1993; Harrison et al., 1993; Johnson and Rogers, 1993; Myntti, 1993). However, whether these determinants also apply to school-age children (above 6 years of age), needs further investigation as these factors may exert different effects on older children. While the young child is nurtured and depends entirely on his mother for food and care, the older child gradually becomes independent of her and learns to feed and look after himself. Also, the young child is more susceptible to infections or pathogens from the home environment that can cause specific infectious diseases of childhood compared to his older siblings who are less at risk of these infections.

The definition of school age corresponds approximately to the period from kindergarten through lower secondary school; it begins after the period of high mortality risk in the preschool years and continues through most of the adolescent growth spurt and sexual maturation to young adulthood. School age children form a substantial fraction of the world's population, numbering about 24% of the population of less developed world and about 15% of that of the industrialized world. Not only are school age children a much larger proportion of the total population in the less developed than industrialized countries (24% vs. 15%), but their numbers are growing at a substantial rate in the former (1.4% per year) and not at all in the latter. In consequence, by the year 2000 approximately 87% of the world's school age children will live in the less developed nations (Bulatao and Stephens, 1990). As their number is increasing, so does the number of health, nutrition, social and educational related problems among them which should warrant the attention of the government officials in these countries.

A growth assessment study of school children (4-10 years old with majority in the age group of 6-9 years old) attending two primary urban schools in Nigeria was conducted to compare the growth achievement of these indigenous children to the US reference population (Ukoli et al., 1993). It was found that the prevalence of short stature (height-for-age < 5^{th} percentile) was 14.2% for boys and 17.4% for girls. The prevalence of wasting (weight-for-height < 5^{th} percentile) was even higher with more girls (21.1%) than boys (19.5%) being wasted. Less than 1% of the children were considered overweight (weight-for-height > 95^{th} percentile). Stoltzfus et al. (1997), in their longitudinal study of rural school children in Zanzibar reported that at base-line data (cross-sectional), the prevalence of stunting increased as the age of school children

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increased (14% in 7-year olds and 83% in 13-year olds). The prevalence of wasting, however, was 10% or lower and showed no trend by age or sex. In girls, the prevalence of stunting peaked at age 12 and then began to decline, whereas in boys, the prevalence of stunting rose steadily up to age 13. The children's growth (weight and height) were again assessed after 6 and 12 months later and compared with the US reference data. Height and weight deficits throughout the one year study period were calculated for girls and boys as the difference between each child's height or weight and the median height or weight of the WHO growth reference population. Boys trailed an average 1.99 cm/year and 1.97 kg/year, while girls were behind an average 1.42 cm/year and 1.63 kg/years relative to the reference population. The authors concluded that based on this and other growth studies of African children, stunting occurs in older children as well as younger children and that boys are more vulnerable to stunting than girls.

Several studies have found that school-age children from low socioeconomic households are more likely to be stunted than children from high SES households and that children from large household size have higher prevalence of stunting and poorer diet quality compared to their counterparts from smaller household sizes (Ahmed et al., 1991, 1992; Baba et al., 1991; Pelto et al., 1991; Wright et al., 1992; Aurelius et al., 1996; Sichieri et al, 1996). Ahmed et al (1991) looked at the relationship between socio-demographic variables and growth of urban school children in Dhaka, Bangladesh. Two main findings from this study are 1) children from the low-income group were more likely to have significantly lower anthropometric measurements (wt/age, ht/age, mid-upper arm circumference and skinfold thickness) than children from high-income group and 2) family income was a significant contributor to the differences in anthropometric

indices between the children from the two income groups even after adjusting for other socio-demographic variables (age, sex, family size and father's occupation). The latter finding seems to be contradictory to the finding that nutritional status of urban Brazilian children from low income communities (slums and residential areas) as classified by their families' income level may not necessarily show significant differences (Gross and Monteiro, 1989). These authors (Gross and Monteiro, 1989) suggested that environmental factors (water supply, health services, sewerage facilities etc.) may take precedence over the economic conditions of the households in influencing the health and nutrition status of the children. However, the major difference in both studies is that school-age children were used as subjects in the Bangladesh study while only preschoolers were included in the Brazilian study.

A study was undertaken to investigate the prevalence of underweight, stunting and wasting and the impact of socioeconomic status on nutritional status among school children (6-9 years old) in West Beirut (Baba et al., 1991). The children were divided into two groups which represented different socioeconomic status – children from private schools who were considered to come from high SES families (HS) and children from public schools who represented the lower SES group (LS). Children in LS group were found to have a higher prevalence of stunting and underweight (significantly lower z-scores for height-for-age and weight-for-age) compared to the children from HS group. However, the prevalence of wasting (z-score for weight-height) among the two groups showed no significant difference. The authors concluded that the LS children may have experienced chronic malnutrition since preschool years as reflected in the high occurrence of stunting among them and that they probably managed to adapt their weight

to their "lower than reference" height. Aurelius and colleagues (1996), looked at weight, height and body mass index (BMI) of Vietnamese school children aged 7-11 years as stratified by their parents' occupation and education. There were very small variations (no significant difference) in the growth measurements (height, weight and BMI) of the children with respect to their parents' education and occupation. When all the age groups were pooled and the height, weight and BMI were compared between the occupation/education groups, only girls (but not boys) whose mothers in the lower occupational group (workers/farmers) were significantly shorter, lighter and had a lower BMI than girls whose mothers were government staff (teachers, medical doctors, nurses and administrators). Also, significantly more girls than boys were rated by the doctors as being in "bad general condition" for health. Significantly more girls whose mothers were in the lower occupational and education groups and fathers who were workers and farmers fared worse in health condition than girls from the upper occupational and educational groups for mothers and upper occupational group for fathers. However, for boys, there was no significant associations between health and fathers' and mothers' occupation and education. These findings may indicate that in certain cultures, girls are cared for less than boys, especially among the lower working classes. This can lead to girls' and not boys' health and nutritional conditions being affected by socioeconomic status.

Pelto et al. (1991), examined the relationships of food intake, anthropometric measures and household size among school-age children (7-9 years old) in highland Mexico. Their findings showed that children from larger families were more likely to be shorter and heavier for their height than children from smaller families. They also

consumed significantly less calories and protein from animal sources. These relationships remain statistically significant even after controlling for socioeconomic status (material possessions). It was concluded that the relationship between household size and child's growth status and food intake cannot be fully explained by the household socioeconomic status. Economic resources in the highland Mexico were inadequate to alleviate the stresses of maintaining large household size regardless of the SES of the households. As a consequence, children from large household size are more likely to experience growth faltering and consume poor quality diets. In a study on the effect of family size and income on the biochemical indices of urban school children in Bangladesh (Ahmed et al., 1992), it was found that family size and family income exerted significant effects on the children's biochemical data. Children from smaller families (up to 4 people in a family) had significantly higher levels of hemoglobin and serum vitamin A compared to children from large families (8 or more). Also, children from the high family income group showed significantly higher serum protein and hemoglobin compared to children from the low family income group. These differences in biochemical indices persisted after adjusting for the effects of age, sex, father's occupation and family size. The findings suggest that children from larger families or from the low family income group tended to have poorer nutritional status. This might reflect the families' financial constraints to purchase quantity and quality foods and perhaps the limited capacity to distribute adequate food among the children.

Low socioeconomic status is a risk factor for low birth weight among infants which may influence their survival and future health and growth status (Institute of Medicine, 1985). In areas where poverty and malnutrition are prevalent, maternal height

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is also associated with infant mortality and low birth weight (Martorell, 1989). This simply reflects the fact that the harsh conditions of poverty and malnutrition which give rise to markedly reduced stature (e.g., among mothers) have other undesirable consequences (e.g., low birth weight, infant mortality). It has been reported that a high percentage of low birth weight in a population, may result in overestimation of short stature and underestimation of overweight (Gayle et al., 1987). A study (Doong, 1993) on growth status of low income preschoolers enrolled in a Head Start Program found that low birth weight children (< 2.5 kg) had a higher prevalence of short stature than the optimal birth weight children (3.5 – 4.0 kg) (14.9% vs. 3.9%), but the optimal birth weight children had a significantly higher prevalence of overweight (12.6%) than low birth weight children (2.8%). Nevertheless, the study supported that low income children are at high risk for stunting and overweight. Brody et al. (1995) analyzed the growth data of children (aged 6 – 11 years old) in the National Health Examination Survey (NHES) and concluded that although there was a positive relationship between the children's birth weights and attained weights and heights, increases in birth weight were not likely to have a major effect on the prevalence of childhood obesity. Other studies have reported that children with low birth weight were shorter, thinner and had less weight gain than the optimal birth weight children (Garn, 1985; Binkin and Yip, 1988). For example, Garn (1985) found that high birth weight (> 97.5 th birth weight percentile) and full term children had higher weight gain than low birth weight children (< 2.5th birth weight percentile) at 7 years of age. Binkin and Yip (1988) reported that lower birth weight children had accelerated growth during the first 2 years of life, while the higher birth weight children had slower growth rate. However, the lower birth weight children

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remained shorter and lighter than the higher birth weight children throughout childhood. The effect of low birth weight on the prevalence of short stature may not only remained significant during the early childhood or in the first decade of life (Garn, 1985; Binkin and Yip, 1988; Fitzhardinge and Inwood, 1989; Hadders-Algra and Touwen, 1990) but it may also extended into adolescence and adulthood (Martorell, 1989; Paz et al., 1993).

In a sample of low income Brazilian school children from a rural community (Sichieri et al., 1996), it was found that they were at risk of stunting with high weight-for-height and anemia. Anemia was measured based on a hemoglobin value lower than 11.5 g/dl. The prevalence of anemia among boys and girls were 31.5% and 20.9% respectively. Fifty three percent (53%) of the children had values lower than the 10^{th} percentile compared to only 2.3% who had values below the 10^{th} percentile for weight-for-height distribution. The high weight-for-height suggests that the stunted children may be at risk of obesity as suggested by the strong correlation between weight-for-height and tricep skinfold (r=0.89). This finding is not surprising as Popkin et al. (1996) showed that there is a relationship between stunting and high weight-for-height (stunted children have a higher chance of being overweight) among children (3-9 years old) in Russia, China and South Africa. The underlying mechanisms for this relationship need further research, but in many low income countries, this relationship can have public health implications. For example, stunting may remain irreversible among older children which can increase their risk for chronic diseases in adulthood.

Others have also found that in the less developed countries, obesity is increasing among school children from all socioeconomic groups (Ivanovic et al., 1991; Matulessy et al., 1992; Mo-suwan et al., 1993;). A survey of Chilean school children (5-18 years

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old) of different socioeconomic status from Chile's Metropolitan Region showed that although there was an improvement in the nutritional status of Chilean school children, the prevalence of overweight and obesity was most significant nutritional problem in all SES groups. Overall, the prevalence of well nourished, overweight and obesity (expressed as % of weight-for-height) among the school children was 61.0%, 19.9% and 13.0%, respectively. When SES was taken into account, the numbers of well nourished were more prevalent among children from low SES group compared to children from high SES group (63.5% vs. 56.4%) but the reverse situation was observed for overweight (19.0% vs. 22.0%), obesity (11.8% vs. 14.7%) and wasting (5.7% vs. 6.9%). The prevalence of overweight and obesity were higher among females than males (overweight: 21.8% vs. 18.2%; obesity: 17.1% vs. 9.1%). However, this study did not look at the effect of age on children's nutritional status – whether or not the prevalence of overweight and obesity increase with age in both male and female children (Ivanovic, et al., 1991).

A study on 2531 primary school children (ages 6 – 13 years old) from three urban areas in Indonesia (Jakarta, Yogyakarta and Lampung) indicated that malnutrition as well as overnutrition are major problems among the school children. The prevalence of malnutrition (based on $< 3^{rd}$ percentile for weight-for-height) among the school children from these three areas were 5.0%, 4.9% and 2.9% respectively. Overnutrition ($> 97^{th}$ percentile for weight-for-height), however, was much higher in Jakarta than in either Yogyakarta or Lampung (10.9% vs. 1.6% and 2.4%). A follow-up study of obesity among 1,106 school children in a large city (Hat Yai) of Thailand (Mo-suwan et al., 993) showed that the prevalence of obesity (>120% of the Bangkok reference) rose from

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12.2% in 1991 to 13.5% in 1992 and 15.6% in 1993. Within two years, 74 non-obese children had become obese while only 28 children had the opposite trend. In less developed countries such as Indonesia and Thailand, with the economy and society in a transitional state, nutritional problems are of both extremes. While in rural areas and the slums of the big cities, nutritional deficiencies are still major health problems, overnutrition in the urban areas seems to predominate in all age and socioeconomic groups.

In general, stunting seems to be prevalent among school children compared to wasting in many less developed countries. Although, it is believed that stunting reflects a process that occurs mainly during early childhood, the question remains whether the stunted children can experience catch-up growth in their later childhood. Martorell et al (1994) reported that catch-up growth can occur with improvements in living conditions (food supplementation and adoption into a better environment) more effectively in very young children than older children. However, if the children remain in similar impoverished conditions, there is a little or no chance that catch-up grow will occur. Similarly, stunting in school children and adolescents may be less reversible and consequently can lead to short adult stature.

Another concern with stunting among school children is whether this linear growth retardation affects their social and cognitive development and consequently their educational achievement. For example, in Chile, educational achievement of elementary and high school students has been found to be closely related to anthropometric indicators of past nutrition (Ivanovic et al., 1989; Ivanovic and Marambio, 1989). The Cebu Longitudinal Health and Nutrition Survey (Glewwe et al., 1996) also reported that

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height-for-age reflects the effects of early childhood nutrition on school readiness. The authors found that better nourished children (based on height-for-age) performed significantly better in school and were less likely to repeat first grade. In studying the determinants of school performance among primary school children in the less developed countries, several studies have found that after controlling for socioeconomic variables, height-for-age is a better predictor of educational achievement than weight-for-height or weight-for-age (Moock and Leslie, 1986; Agarwal et al., 1987; Clarke et al., 1991), while one study reported the association between weight-for-height and educational achievement (Popkin and Lim-Ybanez, 1982). Other determinants such as missing breakfast or feeling hungry and anemia have also been found to affect school performance (Popkin and Lim-Ybanez, 1982; Clarke et al., 1991; Pollitt, 1995; Pollitt, 1997). Whether weight-for-height or height-for-age is closely related to educational achievement, all of the findings above indicate that poor school performance among primary school children (attendance, failure to learn or unequal school participation by gender, drop-out) is in part the consequences of poor child health and nutrition. Inevitably, malnutrition in early childhood does affect the development of intellectual or cognitive abilities, necessary to the learning process and consequently educational achievement.

Measures of Nutritional Status

Anthropometry (body measurements of weight and height and sometimes with arm or head circumference and skinfolds) has been used extensively to assess children's developmental patterns because it is a practical and immediately applicable technique

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compared to other clinical and biochemical methods, especially in the less developed countries. An evaluation of children's developmental patterns during the early years of life, especially when growth is most rapid, provides much information on their nutritional and health history, both immediate and cumulative. This evaluation, in turn, provides useful insights into the nutrition and health situation not only of the children but also of entire population groups. Anthropometric indicators are most effectively used to describe the nutritional status of populations in terms of the magnitude and distribution of undernutrition but they are less accurate than the clinical and biochemical techniques when used to assess individual nutritional status (Gorstein and Akre, 1988). Similarly, anthropometric information per se is non-specific and inadequate for identifying the cause of growth failure or undernutrition. However, its usefulness reflects its close correlation with nutritional outcome (dietary inadequacy and infection) and its socioeconomic determinants (ACC/SCN, 1989).

Three basic anthropometric measurements should be considered when assessing the nutritional status of children - age, weight and height. These measurements are then translated into three indices – weight-for-age, height-for-age and weight-for-height. However, in the assessment of nutritional status in cross-sectional studies, the primary emphasis is on weight-for-height as an indicator of the current nutrition and on height-for-age as an indicator of past nutrition (Waterlow et al., 1977). The deficits in weight-for-height and height-for-age are commonly known as wasting and stunting respectively. Both wasting and stunting reflect different biological processes. First, a child can fail to gain height but cannot lose it but the child can fail to gain weight or he can lose weight. Second, linear growth is a slower process compared to growth in body mass. Finally,

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Weight-for-height reflects current nutritional status of the individuals. A deficit in weight-for-height is an indicator of wasting or thinness. Wasting indicates a deficit in tissue and fat mass and may result from failure to gain weight or from weight loss. It usually occurs when household food supply is limited and the child's food intake is inadequate. The child's health and nutritional status will deteriorate further with the occurrence of infections or diarrhea. However, wasting may be established but restored quite rapidly under favorable conditions (adequate food supply, clean environment). Height-for-age is used to assess linear growth and low height-for-age is frequently associated with poor overall economic conditions and/or repeated exposure to adverse conditions. Low height-for-age or stunting signifies slowing in skeletal growth. This process takes time to develop and thus may not be evident for some years. While wasting indicates current nutritional status, stunting reflects accumulated consequences of retarded growth or past nutrition. The prevalence of wasting may be a reasonable indicator of the incidence of the process that is causing weight deficit but this is not applicable for stunting. For example, the prevalence of stunting is greater among older children than the younger ones simply because the process of retardation had been going for a longer period of time for the older children (WHO, 1986). Stunting is also generally far commoner than wasting and in some Asian populations, over 50 percent of the children could be classified as stunted (WHO, 1987). Weight-for-age, or growth measured by weight changes over time, is by far the commonest measure used in the evaluation of nutritional status. It is particularly useful in children under 1 year old if

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The growth reference curves developed by the National Center for Health Statistics (NCHS) and Centers for Disease Control (CDC) have been recommended by the World Health Organization as a growth reference for international use (WHO, 1978). The three anthropometric indices (weight-for-age, height-for-age and weight-for-height) can then be expressed in terms of Z-scores, percentiles and percent of median relative to the international growth reference population.

In relatively well-nourished populations or developed countries, the anthropometric indices are usually expressed as a percentile of a reference population (Shann, 1993). Percentiles or centiles range from zero to 100, with the 50^{th} percentile representing the median of the reference population. The cut-off points to indicate low anthropometric levels for the three indices are generally $< 5^{th}$ percentile or $< 3^{rd}$ percentile and in the reference population, 5% and 3% of the population fall below the 5^{th} and 3^{rd} percentiles, respectively. However, in many less developed countries where a large number of children are severely malnourished or their weights and heights fall far outside the extreme ranges (5^{th} and 3^{rd} percentiles) of the reference population, centiles may not be accurate in classifying their nutritional status. Percentiles are easy to interpret and they are comparable between age groups and among anthropometric indices (as they rely on fitted distribution around the median of reference population) but they are not normally distributed for the reference or the study population. Thus, percentiles should not be described in terms of means and standard deviations (Gorstein et al., 1994).

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Percentage of the reference median has been commonly used to classify children in undernourished populations, especially those of less developed countries, as many are below the extreme 5th or 3rd percentile (WHO, 1986). However, percent of median does not take into account the distribution of the reference population around the median (Gorstein et al., 1994). As a consequence, the interpretations of this measure are not consistent across age and height groups and among anthropometric indices. For example, 60% weight-for-age suggests severe malnutrition in infants but only moderate malnutrition in school children or 60% weight-for-age suggests severe malnutrition whereas 60% weight-for-height is incompatible with life (Shann, 1993).

Because of the disadvantages with percent of median and percentiles, Z-score or standard deviation (SD) scores have been widely used in populations where many children lie outside the extreme centiles of the reference population. Z-scores in the reference population have a normal distribution with a mean of zero and standard deviation of one and this allows meaningful calculations of mean and standard deviation for a population. WHO recommends using Z-scores for monitoring groups of children for public health or research purposes (WHO, 1986). In this case, the Z-score cut-off point recommended to classify low anthropometric levels is 2 SD units below the reference median for the three anthropometric indices. In the reference population, 2.3% of the population fall below a Z-score of 2. The cut-off for very low anthropemetric levels is usually more than 3 SD units below the median. The Z-scores for the three anthropometric indices can be calculated as below:

Z-score = (observed value – reference median value) / reference SD value

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Child Health in Malaysia

Malnutrition continues to be prevalent in Malaysian children and it is widespread in both rural and urban areas of the country (Ariffin,1994). Anthropometric assessment studies in Malaysia since the 1930's have concentrated on the rural population as their lower socioeconomic status has been associated with health and nutritional problems. However, more focus has been given to urban children since the 1970's, especially in light of the fast pace of urbanization that has occurred in Malaysia (Khor, 1992). Studies in the 1970's documented the prevalence of mild-to-severe malnutrition among primary-school children in the urban areas of Kuala Lumpur and Petaling Jaya (Chen, 1977; Rampal, 1977). Underweight among primary-school children (7 and 12 years old) was also one of the main findings of the School Health Service Unit of the Health Department of the City Hall of Kuala Lumpur (Anonymous, 1990). In 1989, 12.5% and 16.2% of 7 and 12 years old children respectively, were underweight. This survey also identified overweight to be 3.6% and 7.1% among 7 and 12 years old respectively in Kuala Lumpur. Chee (1992) found that in a sample of low income children between two to ten years of age, underweight and stunting again appeared to be a major problem among all age groups with 5-10 years old showing the highest prevalence of underweight and stunting. To date, studies on growth status of primary school children in the urban areas of Malaysia have only examined the relationship between economic and demographic factors such as household income, education levels and occupations of parents, ethnicity, number of sibling, family size and gender differentials and child's growth attainment (Chen, 1976; Chen, 1977; Rampal, 1977; Ching, 1989; Chee, 1992).

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Information on child rearing among the Malays has been very limited. Women have the primary responsibility for taking care of the children but child rearing is considered undemanding and is not allowed to interfere a great deal with women's other economic and domestic activities (Weekes-Vagliani and Grossat, 1980). Karim (1992) reported that the supervision of a child's personal health and hygiene, particularly among the rural poor, is also not taken very seriously and this applies to both preschoolers and school age children. Children are left to play by themselves in the compounds of the neighborhood within the village without any adult supervision. Often, mothers who are nursing or who have very young children do not have time to supervise the older children's personal needs including food requirements. These children will eat whatever is in the house (left-overs) or will have to wait for the meals to be prepared because their mothers are busy attending to the needs of infants and toddlers. Sometimes, to compensate for this and also to avoid any demand for foods from the older children, mothers will give the children money to buy foods. The purchased foods are mostly sweets, chocolates, artificially flavored prawn or fish crackers, ice cream and sweet or sour preserved fruits (Strange, 1991; Karim, 1992). Although this phenomenon is common among the Malays in the rural areas, whether it can be generalized to the Malays in the urban areas or it can contribute to poor health and nutritional status of Malay children, is still unknown.

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Urban Poverty, Health and Nutrition

Extreme poverty, which is given the code Z59.5 in the International Classification of Diseases, is the major cause of deaths, diseases and sufferings among the world population today, particularly in the less developed (or developing) countries (WHO, 1996). Hunger and poverty issues have been addressed extensively worldwide through development, health and nutrition programs. However, the recipients of these programs have been primarily the rural and agricultural subsistence households. Similarly, the study of intrahousehold resource allocation has mainly focused on these households because of their lower socioeconomic status, susceptibility to food shortages which may affect household food allocation or contribute to gender inequalities in infant or child mortality rates and household resource allocation (i.e. preference for males and higher prevalence of malnutrition among females). While much attention has been given to rural poverty and hunger issues, there has been a relative neglect of urban problems. Certainly, there is no need to abandon the attention to these rural issues but there is an urgency to change the balance to reflect the growing relative importance of urban health and nutrition especially in the light that such unprecedented growth of urban population has consequences for hunger and malnutrition (Solomon and Gross, 1987).

Urbanization in less-developed countries is a post-World War II phenomenon and for past decades, there has been a marked demographic shift from rural to urban residences. However, today, urban growth is less dependent on rural-urban migration. This is because two thirds of urban growth is due to the natural increase in urban population (excess of births over deaths in both the pre-existing residents and rural

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migrants). The natural increase in city dwellers and rural migrants often contributes to the growth of an urban area in equal segments (Rossi-Espagnet, 1987). Consequently, the average annual growth of urban population due to in-migration and natural increase is faster than the total population growth. For example, in the Western pacific region of the world, it is estimated that from the year 1990 to 2000, the rate of growth of urban population will continue to be high, from 4 – 5% compared to total population growth rate of about 2% (Mercado, 1992). According to UN statistics (United Nation, 1985), the world's population will grow from 4.4 billion to 6.2 billion in the year 2000 and approximately 50% will be living in urban areas. In comparing the growth rate or urban populations in less-developed to developed countries, a United Nations report (United Nations, 1980) indicated that the growth rate of urban populations in less-developed countries is approximately 4.0% while that of urban areas in developed countries is 1.8% a year. While over 2 billion people in less developed countries will be urban by the year 2000, slightly over one billion inhabitants of the developed nations will be urban.

Urbanization is an inevitable consequence of socioeconomic development and industrialization. In the less developed countries, the urbanization process is accelerating in an uncontrollable manner that it is outpacing the growth of services, infrastructures and employment. Consequently, slums and shanty towns begin to appear in city centers or their peripheries and the inhabitants are forced to live in a state of economic deprivation and to experience hunger and malnutrition in the cities (Hussain and Lunven, 1987). It has also been estimated that by the year 2000, more than 50% of the urban population in less developed countries will live in extreme deprivation and poverty. In other words, over one billion people will live in distressed conditions of the least desirable areas of

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the cities and this population group is called a "Fourth World". Often, the new arrivals or the migrants are the inhabitants of these marginal areas of the urban or metropolitan zones (Solomon and Gross, 1995; Gross, 1997). This term is frequently used to describe the urban poor whose housing, sanitation, clothing and food are inadequate. Evidently, with the many implications of urbanization phenomenon, urban poverty, health and nutrition are receiving increasing attention as development issues. In fact, urban poverty has been highlighted by the World Bank as the major challenge in the next decade for governments in the less developed countries (World Bank, 1991).

The health problems in the urban centers of developing countries reflect both those observed in developing and developed countries. Three categories of health problems afflicting the urban poor have been identified. First are the diseases related to poverty which include infectious diseases and malnutrition, both prevalent among urban populations in slum areas and squatters. The second includes cardiovascular, neoplastic, hypertensive and mental diseases and accidents which are mainly related to the man-made urban environment. The diet-related noncommunicable diseases (cardiovascular disease, hypertension, malignant neoplasm and diabetes mellitus) are also the consequences of the transitional changes in dietary intake and food behaviors, food availability socioeconomic status, lower physical activity and stress among the urban population. All of the diseases in this category will affect the urban poor more so than the general urban population because of the former is very limited capability to cope with such problems (e.g., poor access to health and social services due to cost or inequitably distribution of these services). The third group consists of disorders associated with social

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instability and insecurity such as alcoholism, drug addiction, venereal diseases, child labor and street children (Mercado, 1992).

Poverty related health problems such as infectious diseases and malnutrition among the urban poor are of special importance as both aggravate and are aggravated by each other. Both can also be co-factors of mortality especially among children. It has also been suggested that the severity and frequency of malnutrition in the less developed countries are increasing more rapidly in urban than in rural areas. In South-east Asia and Latin America, rural laborers depend of their landlords for food. Many of the rural families own small pieces of land on which they can grow part of their food or produce harvest surpluses. However, for the poor urban this is not possible due to the overcrowded cities. Therefore, urban dwellers have to purchase all or most of their food. Also, in cities, although the salaries are higher, so are the costs of food and other essentials and this often results in the urban poor having a small proportion of their incomes for food. In other words, there is a lack of purchasing power for food among the urban poor due to higher cost of living in the urban areas (expenses for transportation to and from work, housing and utilities). Finally, more women have to work to supplement their family incomes or as the only family income provider. In this situation, women have less time for food preparation and will depend more on vendor foods which may be more expensive but less hygienic and less nutritious than home-cooked food. For mothers with young children, they will resort to cessation of breast-feeding, early weaning and leaving their infants under the care of young siblings who are unable to prepare weaning food properly (Rossi-Espagnet, 1987; Hussain and Lunven, 1987).

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Frequently, crude statistical data will indicate that the rate of malnutrition in rural areas is higher than in urban settlements in less developed countries. However, this comparison may more often confuse than clarify because of the greater variations in incomes, degree of adaptation to the environment and food and health practices among the urban compared to rural populations. Often, malnutrition information is provided in the form of aggregated averages for large urban areas or for a whole city. The averages can mask the low nutritional status of certain poorer communities or do not reflect the absolute amount and severity of malnutrition because of the assumption that cities are homogenous entities when in fact there are intra-urban differences by geographical areas and socioeconomic groups. In general, it is inappropriate to have statistical comparisons on malnutrition distribution of the rural and urban communities. First, there are differences in subsistence activities between these communities although both have comparable economic status. For example, rural households may work as laborers but they are able to produce their own crops for consumption and market. This is impossible for the urban poor. Second, cases of malnutrition in rural areas are distributed across villages rather than concentrated in one or two since, most villages include a range of income levels. However, in the urban areas, the settlement pattern is frequently characterized by income and the differences in environmental health among these settlements are also marked. Therefore, the malnutrition cases actually reflect the settlement patterns and thus these cases can be more easily found and targeted in the urban areas (Atkinson, 1992, 1993).

Hussain and Lunven (1987) discussed the extent of hunger and malnutrition as consequences of poverty in urban areas of less developed countries and measures to

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combat these issues in the cities. Poverty is concentrated in overcrowded shanty towns and slums in the cities and as a result, nutritional deprivation occurs prevalently among the vulnerable groups such as mothers, young children and unemployed immigrants. However, the seriousness of these health and nutritional problems often is overlooked or unnoticed by the policy makers. For example, in Lima, Peru, the prevalence rate of underweight among preschoolers was 19% but the number increased to 28% in a shanty town of the city (Pryer and Crook, 1988). In Manila, Philippines, there were higher cases of low birth weight, severe and moderate malnutrition, anemia and infant mortality in slum areas than in the prosperous sections of the city (Basta, 1977). In Sao Paulo, Brazil, it was reported that children in the slum areas and shanty towns are shorter than those from families of the same income group in the residential areas. Also, an increase in family income does not necessarily improve growth retardation among children from both communities. The findings suggest that besides family income, environmental factors (water supply, sewerage system, health services) or even cultural background may be operating to have an effect on physical growth of children (Gross and Monteiro, 1989). Squatters or slum dwellers are often excluded from the city statistics because they may not register as residents and if they are included, their actual health and nutritional status may be overshadowed by the enormous differences that exist between their socioeconomic status and that of the middle and upper socioeconomic groups. With the realization that there are many aspects of hunger and malnutrition and the causes may vary from city to city depending on the sequence and consequences of urbanization, basic data on socioeconomic status, physical environment, food behavior, marketing and distribution systems is needed to facilitate in identifying the type and severity of hunger

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and malnutrition, basic causes, groups at risk and areas where hunger and malnutrition cases are prevalent. With this information, strategies for interventions can be formulated which may include measures to reduce the rate of urbanization, to improve food and agricultural production, marketing, distribution, handling and food control and to improve health care and environmental sanitation, nutrition intervention programs (supplementary feeding programs for young children and pregnant and lactating women, school feeding programs and nutrition education) and urban agriculture.

It has been claimed that the health and welfare programs are biased in favor of the urban populations in that there are greater concentrations of health facilities and relative proximity of hospitals and medical facilities in the cities than in rural areas (Lipton, 1988; Chambers, 1983. However, the urban poor may have little access to these services because of priorities of development policy and government's resource allocation (Harpham et al., 1988). Changes in the focus of primary health care to the needs of the urban poor (health education, promotion of food supply and proper nutrition, maternal and child care health, immunization against infectious diseases, treatment of common diseases and injuries, basic sanitation and supply of safe water and prevention and control of locally endemic diseases) and government policies to incorporate primary health care in their national strategy for urban health (provide increased investment for urban poor and upgrade slums and shanty areas) are essential to overcome the health gaps between the rich and poor in the cities. However, it is also to be expected that the urban poor may not practice healthy behaviors or comply with medical advice when their basic needs such as shelter, food availability, clothings, employment and education are not satisfied (Rossi-Espagnet, 1987).

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In most less developed countries, industrialization is regarded as necessary to achieve development and modernization. In Malaysia, the government has developed aggressive policy promoting industrialization ever since it attained its independence in 1957. As a result of the government's policy of encouraging industrialization, more urban centers are emerging all over the country. The urbanization process has always been associated with three facets, namely demographic, economic and social and these consequences of urbanization are best illustrated by looking at Kuala Lumpur and Selangor since these areas are the most urbanized areas within the Klang Valley of Malaysia. With the urbanization rate growing faster than that of economic growth, the city officials are faced with a host of problems related to housing, health, public transportation, traffic congestion, sanitation, environmental pollution and conservation (Arokiasamy, 1990; Badri, 1992; Talib and Agus, 1992). The increase in urban population density, the expensive housing and the scarcity of land in the Klang Valley, have led to the growth of squatter areas whose residents consist of a large number of rural-urban migrants. However, relocation of these squatters from the squatter settlements, first to Rumah panjang (Long Houses) and later to low-cost public housing has reduced the number of the squatter areas and the overcrowding of these settlements in Klang Valley. With the recognition that the squatters and the low-income urbanites are at risk of poor health status, the government is continuously maintaining its effort to upgrade the lives of the squatters and low-income urbanites. For example, in many of the squatter settlements, the government has supplied piped water, electricity, sewage system, garbage disposal and social amenities such as community halls and mother and child health clinics (Agus, 1984). The City Hall of Kuala Lumpur has also introduced the

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NADI program (City Hall's Squatter Upgrading Program) with the objective to improve the quality of life by improving family health, welfare services and environmental conditions and developing community and family life. Under NADI, the Sang Kancil program was established which provides preschool education for children and health services for mothers and children. Activities of the Sang Kancil Clinic include immunization for children, prenatal care, health and nutrition education for mothers and family planning services (Khairuddin et al., 1982).

In conclusion, the urbanization process which is occurring in less developed countries today has both positive and negative implications for the health and nutritional status of the urban poor. While the positive effects may include greater food diversity, greater mobility, better employment and education opportunities, the negative effects such as lack of food purchasing power, greater intakes of processed food, over-crowding, poor sanitation, less extended-family interaction and a higher probability of social maladjustment may pose greater disadvantages to this group (Katona-Apte, 1987). In reaching the goal of "Health-For-All By The Year 2000" (WHO, 1991), the diversity of health and nutritional problems afflicting the urban poor should not be overlooked or neglected. The possible solutions to overcome the problems should be specific to the nature and causes of the problems. In other words, as long as there is a lack of understanding of the interaction between nutrition and health and urbanization, we will not be able to overcome and prevent the health and nutritional problems of the urban poor and urban populations, in general (Gross, 1997).

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CHAPTER III

METHODOLOGY

The present research attempts to investigate the relationship between intrahousehold factors and child growth status in the urban area of Kuala Lumpur, Malaysia. This chapter will discuss the measurement instruments, the research questions and related hypotheses, the description of the study area, research design (respondents, sampling and procedures), data analysis, strengths and significance, assumptions and limitations of the study. The research purposes and objectives were achieved through a descriptive, non-experimental survey design and cross-sectional in nature.

Measurement Instruments

This section contains both the conceptual and operational definitions of the variables investigated in this present research. The independent variables for Study 1 (growth status assessment of primary school children from low-income households) are age, standard (1-3) and gender, while the dependent variables are the mean Z-scores for weight-for-height and height-for-age. The dependent variable for Study 2 (determinants of growth status among primarily low income Malay children) is a combined Z scores of weight-for-height and height-for-age. The dependent variables are categorized into five groups of variables – Household demographics and economics, Household resource allocation, Child care and feeding, Child-related variables and Household decision inputs. Table 1 illustrates the summary of the independent and dependent variables in Study 1 and 2.

Table 1. Independent And Dependent Variables In Study 1 And Study 2

STUDY	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	SUBJECT
			Primary-school

Table 1. Independent And Dependent Variables In Study 1 And Study 2

STUDY	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	SUBJECT
Study 1	Child growth status 1)Weight-for-height 2)Height-for-age --Prevalence rate --Mean Z scores	Gender Standard Age	Primary-school children in Standards 1 - 3
Study 2	Child growth status --A combination score (1-4) based on Z-scores of weight-for-height and height-for-age	Household demographics and economics Household resource allocation Child care and feeding Child-related variables Household decision inputs	Primary-school children in Standard 1 (Malay children) and their mothers

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For assessing both the dependent and independent variables in this research, specific instruments were adapted and/or revised from previous works. The instruments covered all aspects of the variables in this research. They were developed after an intensive review of the literature (Eisen et al., 1980; Malaysian Family Life Survey 2, 1988; Radimer et al., 1992; Engle and Nieves, 1993(b); Martin and Hoover, 1993; Indonesian Demographic and Health Survey, 1994). Table 2 provides the summary of the various instruments included in this research.

Child growth status

Growth status in children is closely related to nutritional outcome (dietary adequacy and infection) and its socioeconomic determinants (ACC/SCN, 1989). Growth status will eventually provide useful information on both current and cumulative nutrition and health conditions of the children. In this study, child growth status was measured by obtaining data on weight and height and the information was then translated into the indices of weight-for-height and height-for-age. These indices which represent growth in body mass and linear growth respectively, were compared to the growth reference curves developed in 1975 by the National Center for Health Statistics (NCHS) and Centers for Disease Control (CDC). The NCHS/CDC reference curves have been recommended by the World Health Organization as a growth reference for international use (WHO, 1978).

For Study 1 (growth status assessment of low income children ages 6.0 – 9.9 years old), as the weight and height data were already available in the school database (classroom registers or children's files), no additional measurements were taken by the

Table 2. Summary Of The Adapted Instruments Used In The Present Research On Growth Status Determinants Of School-age Children From Primarily Low-income Households In Kuala Lumpur, Malaysia

INSTRUMENT	POPULATION	MEASUREMENT	VALIDITY/RELIABILITY	REFERENCES
1. General Health Perceptions	Children (0-13 years old)	Current health Prior health Resistance/Susceptibility to illness	Validity - Yes Reliability - Yes	Ersen et al., 1980

Table 2. Summary Of The Adapted Instruments Used In The Present Research On Growth Status Determinants Of School-age Children From Primarily Low-income Households In Kuala Lumpur, Malaysia.

INSTRUMENT	POPULATION	MEASUREMENT	VALIDITY/RELIABILITY	REFERENCES
1. General Health Perceptions	Children (0-13 years old)	Current health Prior health Resistance/Susceptibility to illness	Validity = Yes Reliability = Yes	Eisen et al., 1980
2. An Assessment of Nutrition Education & Training Needs in Texas	Parents or guardians Children Educators Food Service Personnel	Nutrition knowledge Nutrition attitude Nutrition practice Reported food intake	Validity = Yes Reliability = Yes	Martin and Hoover, 1993
3. Radimer/Cornell Hunger and Food Insecurity Items	Women	Household food insecurity Adult/Women food insecurity Child hunger	Validity = Yes Reliability = Yes	Radimer et al., 1992
4. Mothers' Allocation Rules	Women with young children who participated in a supplementary feeding program in Guatemala	Eleven statements to assess mothers' food allocation rules	Validity = Yes Reliability = Unknown	Engle and Nieves, 1993

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researcher. These growth measurements are done on yearly basis (during the school year) by Maternal and Child Health (MCH) nurses from Ministry of Health or the school teachers. This service is rendered as part of the School Health Service (SHS) which is a component of the School Health Program (SHP). The activities of the SHS include health appraisal and treatment of minor ailments, recording of weight and height, screening for hearing and visual defects, referral of children with special problems, immunization, emergency care and first aid, health education, guidance and counseling, deworming and dental treatment (Jantan, 1993). SHP was initiated in 1967 as a joint effort between the Ministry of Health and Ministry of Education to promote, protect and maintain optimum health of school children. However, a shortage of MCH nurses has led to a cooperation with the school teachers to perform some of the SHS activities such as measurements of height and weight, observation of children for signs of deviation from health and conduction of screening test for hearing and vision. An evaluation of the performance of teachers and MCH nurses in relation to the doctors' health examination of a sample of school children, revealed that both teachers and nurses performed extremely well with 93% and 95.8% agreement respectively with the doctors' detection of health abnormalities in children (Ayyamani, 1986). Also a pilot study was conducted in seven selected primary schools by the researcher to assess the validity of the teachers' assessments of children's weight and height measurements (see Appendix C). Based on these evaluations, the researcher strongly believes that the MCH nurses' or teachers' weight and height measurements of the school children are valid for use in the study. For Study 2, the researcher measured each child for his/her weight and height. This was

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High = > -

considered necessary because the weight and height measurements from the time they were made by the MCH nurses or teachers in the beginning of the year may have changed by the end of the year when this study were undertaken.

In Study 1, growth status was indicated by Z scores for weight-for-height and height-for-age in order to identify the prevalence of wasting and stunting among the sample of school children from low income households. The mean Z-scores for the two indices were also stratified according to gender, standard (1 – 3) and age of the children. The software package Epi Info, version 6.04 (Dean et al., 1996) was used to calculate the Z-scores. The following categories of weight-for-height and height-for-age were utilized to determine the children's growth status:

Weight-for-height

Significantly wasted = < -2 SD of NCHS/CDC reference median

Mildly wasted = -2 SD $\leq$ x < -1 SD of NCHS/CDC reference median

Normal = -1 SD $\leq$ x $\leq$ +2 SD of NCHS/CDC reference median

High = > +2 SD of NCHS/CDC reference median

Height-for-age

Significantly stunted = < -2 SD of NCHS/CDC reference median

Mildly stunted = -2 SD $\leq$ x < -1 SD of NCHS/CDC reference median

Normal = -1 SD $\leq$ x $\leq$ +2 SD of NCHS/CDC reference median

High = > +2 SD of NCHS/CDC reference median

In Study 2, the Z scores f

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In Study 2, the Z scores for weight-for-height and height-for-age were combined into four categories of growth outcomes - "Wasted and stunted", "Wasted and Not Stunted" "Not wasted and Stunted" and "Not wasted and not stunted". Both mild and significantly wasted or stunted were collapsed into wasted and/or stunted categories, while both normal and high growth outcomes were combined into not wasted and/or not stunted categories. Each category was given a score based on the severity of malnutrition.

Weight-for-height	Height-for-age	Score
Wasted	Stunted	1
Wasted	Not stunted	2
Not wasted	Stunted	3
Not wasted	Not stunted	4

This proposed classification identifies wasting and stunting simultaneously. The classification by Waterlow (1972, 1973) is similar to the proposed classification in that it uses percent of reference median instead of Z scores to identify children in the four categories:

Waterlow classification

Normal: above 90% height/age
above 80% weight/height

Wasted: above 90% height/age
below 80% weight/height

Stunted:

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Stunted: below 90% height/age

above 80% weight/height

Wasted and Stunted:

below 90% height/age

below 80& weight/height

The World Health Organization Working Group (1986) has strongly advocated that the measurements of a study population should be related to the reference population by Z scores rather than as a percentage of the median of the reference for statistical reasons. Therefore, the present study utilized the Z scores in its proposed classification. However, the validity of the proposed classification may be questionable as it has not been used before.

The height and weight of the primary school children were measured by the researcher using the outlined procedures in Gibson (1990):

Height – "The child (without shoes and socks) will stand straight with the shoulder blades, buttocks and heels in contact with the vertical surface of the measuring device. Arms should be hanging loosely at the sides with palms facing the thighs. The feet must be flat on the floor and slightly apart. Shoulders should be relaxed and legs and back straight. The moveable headboard is gently lowered until it touches the crown of the head. The height measurement is taken with the examiners eyes level with the reading to avoid optical errors. Height is recorded to the nearest millimeter (0.1 cm)."

Weight – "The child

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Weight – "The child should stand unassisted in the center of the scale and be asked to look straight ahead in a relaxed standing position. Minimal clothings (only school uniform) and no shoes or socks should be worn by the child during the weighing. Preferably, the weighing should be done after the bladder is emptied and before a meal. The weight measurement should be recorded to the nearest 100 gram (0.1 kg). After weighing, the scale weight should return to zero position."

Height was measured using a wooden portable adult and infant measuring unit (Perspective Enterprise, Kalamazoo, MI). Weight was measured using a battery powered digital scale (Seca, Colombia, MD). The researcher took three successive measurements each of weight and height and the averages of these three measurements were used for final analysis. The three successive measurements should agree within 5 millimeters (0.5 cm) for height and 100 gram (0.1 kg) for weight.

Household Demographics and Economics

This refers to information on parents' educational level, mother's age, mother's employment status, mother's occupation, household size, number of children, household density, housing quality, household income, income per capita and household food and total expenditure. The various questions used in this present study to obtain such information were adapted from two survey instruments - Malaysian Family Life Survey (MFLS) 2 (1988) and Demographic and Health Survey (DHS) (1994). As Demographic and Health Survey is not available for Malaysia, Indonesia Demographic and Health Survey was utilized for this study. As Indonesia is a neighbouring country with a similar

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culture as Malaysia, the questions in the Indonesia Demographic and Health Survey would be appropriate to the Malaysian population.

The MFLS 2 was a collaborative project between the Rand Corporation and the National Population and Family Development Board of Malaysia, with support from the United States National Institute of Child Health and Human Development and the National Institute of Aging. This survey was a follow-up to the 1976-1977 MFLS 1 and was designed to provide data for the study of household behavior over a period of rapid demographic and socioeconomic changes in Malaysia. The MFLS 2, administered more than a decade after the first, permits study of persistence and change in Malaysian household economics, behaviors and decisions. The MFLS 2 was composed of four samples - New Sample (females aged 18-49), Senior Sample (1357 males and females aged 50 or older), Panel Sample (889 female primary respondents to MFLS 1 in 1976) and Children Sample (1096 respondents aged 18 or older who were still living with the Panel Sample respondents). Overall, nine instruments were used to collect MFLS 2 information - Tracking, MF20 (Roster update and list of eligibile children), MF21 (1988 Household roster), MF22 (Female life history questionnaire), MF23 (Male life history questionnaire), MF24 (Senior life history questionnaire), MF25 (Household economy questionnaire) and MF26/MF27 (Community questionnaire). In general, the quality of MFLS 2 data were found to be high; the data were generally representative of the Peninsular Malaysian population as the data were consistent with the trends and patterns reported from other data sources.

The 1994 Indonesia Demographic and Health Survey (IDHS) is a nationally representative survey which was conducted under the Demographic and Health Survey

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Project of Macro International with the support from the Indonesian Central Bureau of Statistics, State Ministry for Population and National Family Planning Coordinating Board, Ministry of Health, U.S. Agency of International Development and World Bank. The 1994 IDHS was the third survey in Indonesia with the first two conducted in 1987 and 1991. The main purpose of this survey was to provide policymakers and program managers in population and health with detailed information on fertility, infant and child mortality, family planning and maternal and child health. The IDHS also collected information on maternal mortality, knowledge of AIDS and the availability of family planning and health services. A total of 33,738 households and 28,168 ever-married women (age 15-49) representing the national, regional and provincial level and by urban and rural residence were interviewed. The findings of the 1994 IDHS will be a tool to monitor and evaluate the achievement of health development in Indonesia. The following household demographic and economic variables used in the present study were adapted from both MFLS 2 and IDHS.

Parents' education level

Mothers were asked to indicate the highest grade of school both they and their husbands had completed. The data for mothers and fathers were collapsed into categories of years of schooling: a)0-6 years b)7-11 years c)more than11 years

Mother's age

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Mother's age

Mothers were asked to state their birth dates and their ages at their last birthdays. During the data analysis, mothers' ages at their last birthdays were categorized as:

a)20 – 29 years b)30-39 years c)more than 39 years

Mother's employment status

Mothers were asked to indicate whether they were employed or not. If employed they were asked to indicate the location of the workplace (at home or away from home). The data were collapsed into two types of categories:

Type 1: a)Did not work b)Work

Type 2: a)Work at home b)Work away from home c)No work

Mother's occupation

For mothers who were employed, they were asked to state the type of work in which they were engaged. The type of work was then categorized into unskilled, semi-skilled and skilled. However, during data analysis, these data were collapsed into categories of: a)Unskilled b)Semi-skilled and skilled

Household size

Mothers were asked to state the number of their children (children related by blood, marriage and/or adoption) currently living in the households and the presence of

their husbands. exten

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Number of children

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their husbands, extended family members and non-relatives who have been staying in the households for more than three months. The data were collapsed into categories of:

a)1-4 people b)5-7 people c)more than 7 people

Number of children

Mothers were asked to state the number of their unmarried children currently living in the households. Children who were married and lived outside or within the households were recorded but excluded in the final analysis. During data analysis, these data were collapsed into categories of:

a)1-3 children b)4-5 children c)more than 5 children

Household density

Mothers were asked to indicate the number of rooms in the households. Rooms include the kitchen, eating/dining room, family/visitors lounge and bedrooms. Household density was calculated as number of persons per room.

Housing quality

Mothers were asked to indicate the availability of household possessions and utilities (electric, water pipes, television etc.), household constructions (wall, floor and roof) and household ownership (land and house). Household quality was calculated as the combined total scores of household possessions/utilities, constructions and ownership. Minimum and maximum possible scores for housing quality are 0 and 28 respectively.

Household possessions -

a)Stove. television. r

b)Piped water. electr

c)Motorcycle

d)Car

Household construct

a)Wall - wood

- brick

b)Floor - wood

- cement

- tiles

c)Roof - zinc asbes

- concrete

Household ownersh

a)House - governm

- rent

- own

b)Land - governm

- rent

- own

Total household in

Mothers we

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a)Stove, television, refrigerator, radio	(1 point/each)
b)Piped water, electricity	(2 points/each)
c)Motorcycle	(3 point)
d)Car	(4 point)
Household construction -	
a)Wall - wood	(1 point)
- brick	(2 point)
b)Floor - wood	(1 point)
- cement	(2 points)
- tiles	(3 points)
c)Roof - zinc/asbestos	(1 point)
- concrete	(2 points)
Household ownership -	
a)House - government	(1 point)
- rent	(2 points)
- own	(3 points)
b)Land - government	(1 point)
- rent	(2 points)
- own	(3 points)

Total household income (Ringgit Malaysia)

Mothers were asked to state the total household income received every month from various sources. Household income includes money income in the form of salary,

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gifts, dividends, pensions, profits, investments and inheritances. During data analysis, these income data were collapsed into categories of: a)RM1 - 2162 b)> RM2162 (USD 1 is equivalent to RM 4)

Income per capita (Ringgit Malaysia)

Income per capita was calculated as total household income per person (total household income/household size). The data were then categorized into:

a)RM1 - 150 b)RM151-300 c)> RM300

(USD 1 is equivalent to RM 4)

Total household expenditure

Mothers were asked to estimate the monthly total household expenditure from four categories of expenditure (less than RM300, RM300-599, RM600-999 and more than RM1000). During analysis, these four categories were collapsed into:

a)RM1 – 1000 b)> RM1000

Household food expenditure

Mothers were asked to estimate the monthly food expenditure from four categories of expenditure (less than RM300, RM300-599, RM600-999 and more than RM1000). During analysis, these four categories were collapsed into :

a)RM1-300 b)> RM300

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Household Resource Allocation

This refers to the mother's allocation of three basic resources – her market economy production time, household food and her income.

Mother's market economy production time

For mothers who were employed outside of their homes, they were asked to indicate the hours they worked by day and/or week. The total hours worked in a week were used in the data analysis.

Mother's food allocation rules

This is the distribution of food among family members by mothers. Food allocation was measured by asking mothers how food was allocated to household members. Two types of questions were asked:

1)A hypothetical food allocation situation

2)Ten statements about how they would allocate food

These questions were adapted from an instrument used with a sample of Guatemalan mothers who participated in a supplementary feeding program (Engle and Nieves, 1993b). The authors reported four allocation rules -- preference for adults or workers, preference for children, preference for males and equality. Males preference and equality allocations were found to be significantly associated with actual food allocation within the families; mothers who stated a male preference were likely to give more food to males than those who did not. Mothers who stated a preference for equality gave a relatively higher proportion of food to children. These findings provided some validation of the method used to assess mothers' food allocation rules in this study. In this present

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research, five different food allocation rules were derived from mothers' responses on the hypothetical food allocation situation and ten statements:

Adult preference – mother gives the food to husband/adults and agrees with statement (c) or (d)

Male preference – mother agrees with statement (g) or (h)

Child preference – mother gives the food to children and agrees with statement (a) or (b)

Equal preference – mother gives food equally to all household members and agrees with statement (e) or (f)

Demand preference – mother gives the food to anyone who wants and agrees with statement (i) or (j)

Finally, the mother will be categorized as having:

a)Contribution rule – if she reports adult or male preference

b)Needs rule – if she reports child or demand preference

c)Equality rule – if she reports equal preference

However, as the number of mothers with contribution rule was small, only mothers with needs and equality rules were considered in the analysis.

Percent of household income a mother earns

Mothers were asked to state the total amount of income that they earned (income earning), both from a primary and secondary sources. The amount was then divided by the total household income to yield the percentage that a mother earns. The data on mothers' incomes were also categorized as:

a)No income b)Income

Child care and Fee

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Child care and Feeding

This refers to the overall quality of child's living environment related to nutrition (mother's knowledge of nutrition for their children and household food security) and caregiving. Three variables were investigated:

Mother's nutrition knowledge.

The basis for the development of the items in nutrition knowledge assessment is that these items will address current health and nutrition issues among Malaysian school children, e.g. high prevalence of anemia and inadequate growth outcomes, poor academic achievements due to poor health and food habits. Although the development of these nutrition items is still preliminary, it is important because to the researcher's knowledge there is no valid and reliable nutrition knowledge assessment for mothers and parents of school children in Malaysia. Therefore, there is a potential for a long term commitment in future research on the development of nutrition knowledge assessment for parents or mothers with school children, especially with the increasing number of school children in Malaysia and their existing health and nutrition problems.

The nutrition knowledge items for this research were adapted from the "Texas Nutrition Education and Training Needs Assessment Project" (Martin and Hoover, 1993). This project used four separate instruments for target populations -- children (Grades 3, 5, 8 and 11), parents, educators and food service personnel. In general, there are four components in each instrument to assess nutrition knowledge, attitudes, practices and reported food intake. For this present research, the parent's instrument was adapted and revised to suit the study population (see Appendix A). Several methods were utilized by

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(see Appendix C).

Martin and Hoover (1993) to test for the validity of the parents' instrument. First, the Delphi technique was selected to validate the goals and goal indicators (criteria) of the instrument. In the Delphi technique, respondents who were selected for their professional involvement and commitment to nutrition education, were directed to evaluate the importance of each goal and its indicators, to make suggestions for clarity of the goals and indicators and to list any new goals and/or goal indicators. This technique provided criterion-related validity for the development of assessment instrument on nutrition knowledge, attitudes and practices. In other words, the goals and goal indicators validated in the Delphi technique formed the table of specifications for the assessments. For example, for parent's nutrition knowledge component, eight criteria provided the guidelines for the development of test items (10 test items were developed for each criteria). Second, the multiple choice test items were reviewed for content validity (the representativeness of the sample of test items for each criterion) by a content specialist, an evaluation specialist and members of the project team. The reliability estimates (internal reliability) for the parents' instrument (all four components) were reported to be high (0.71 - 0.84). Several procedures were utilized to assess the readability levels of the instruments for the target populations -- faculty in the College of Education, Texas Tech University and experienced public school teachers reviewed the instruments for readability. Fry's readability graph and a computer program (unspecified) were used to assess the readability of each instrument (Martin and Hoover, 1993).

A pilot study with a sample of Malaysian mothers was conducted to assess the test-retest reliability of the adapted nutrition knowledge questions prior to data collection (see Appendix C). There were a total of thirty two questions in the instrument which

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represented five areas pertinent to child nutrition – Healthy food choices, Nutrition and scholastic achievement, Nutrition and growth, Nutrition and health and Nutritional needs. Each correct and incorrect (or don't know) answer was scored 1 and 0 respectively. During data analysis, nutrition knowledge scores were then categorized into:

a)0-12 b)13-18 c)more than 18

Household food security

Food security has been defined as "access by all people at all times to enough food for an active, healthy life and includes at a minimum: the ready availability of nutritionally adequate and safe foods, and the assured ability to acquire acceptable foods in socially acceptable ways. In 1989, the Expert Panel of American Institute for Nutrition defines food insecurity as "whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain". The AIN Expert Panel also defined hunger as "the uneasy or painful sensation caused by a lack of food" and noted that "hunger, in this definition, and malnutrition, are potential, although not necessary, consequences of food insecurity."(Life Sciences Research Organization, 1990).

In this present study, the Radimer/Cornell hunger and food insecurity instrument with ten items was used with the study population. The instrument was developed from the perspective of women who had experienced hunger (n=32) through in-depth interviews with these women (Radimer et al., 1992). Their responses were analyzed and yielded two conceptions of hunger – individual and household. Based on this conceptualization of hunger, Radimer and colleagues administered 189 low income

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women a questionnaire that included 30 potential items. As these items were directly from the words of 32 women interviewed in the in-depth qualitative study, therefore the items were considered to have face validity. Their content validity was based on the thorough understanding of the phenomena of hunger and food insecurity by these women. Construct validity of the items was determined by examining the relationship of items to each other through factor analysis. Items that consistently grouped together were considered valid.

In determining the minimum number of items needed to measure hunger in a valid and reliable manner, item reliability (reliability of the scales) and construct validity of the scales were assessed. The reliability of the scales was assessed using Cronbach's alpha while the construct validity was assessed by examining the relationship between scale scores and generally accepted risk factors for hunger such as low-income or limited food expenditures and the consequences of hunger using Pearson's R and Kendall's Tau-B correlation coefficients. Based on the results of the item reliability analysis, three scales (with each scale containing 4 items) emerged – household hunger, children's hunger and women's hunger (alpha coefficients of 0.91, 0.89 and 0.92 respectively). The results of the construct validity analysis of the three scales indicated significant correlations ($p<0.005$). The Pearson's r values for the relationships of each scale to the validating items were: 0.20 to 0.75 for the household scale; 0.32 to 0.73 for the children's scale; and 0.36 to 0.76 for the women's scale.

In the questionnaire for the mothers in this present study (see Appendix A), mothers were asked to respond to 10 items with three response categories – not true,

sometimes true and

(Kendall et al., 199

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b)Household

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sometimes true and often true. The severity of food insecurity was based on the following (Kendall et al., 1996):

a)Food secure – negative answers (not true) to all items

b)Household insecure – positive answers (sometimes true or often true) to one or more household level items (no.1-4), but not others.

c)Individual insecure – positive answers to one or more adult level items (no.5-7) or the item on quality of children's diets (no.8) but not to items on quantity of children's intakes (no.9-10).

d)Child hunger – positive answers to items on quantity of children's intakes (no.9-10).

During data analysis, food insecurity was categorized into:

Type 1: a)Food secure b)Household/Individual insecure c)Child hunger

Type 2: a)Food secure b)Food insecure (household/individual insecure and child hunger)

Child care

Two types of questions on child care were included in the survey instrument. Mothers who were employed (at home or away from home) were asked to indicate the primary care-givers for their children while they were at work. Mothers who were not employed were asked to state whether they were the primary care-givers of the children. During data analysis, this information was combined into categories of:

a)Mother b)Others

Child-related Vari

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Child-related Variables

This refers to biological and physical characteristics of the child such as gender, age, standard, birth order, number of young siblings (0-6 years old) and child's health status.

Gender

The sex of the child under investigation in the study – male or female.

Age

Mothers were asked to state the birth dates of the children included in the study. To cross-validate their responses, the children's birth dates were also recorded from the children's files and/or classroom registers. Age of the children is calculated by subtracting the date of birth from the date of assessment. Four categories of age were used in the analysis:

a)6.0 – 6.9 yrs b)7.0 – 7.9 yrs c)8.0 – 8.9 yrs d)9.0 – 9.9 yrs

Standard

The standard in which the children were in when the weight and height measurements were made. The categories are:

a)Standard 1 b)Standard 2 c)Standard 3

Birth order

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Birth order

Mothers were asked to state the number of elder and younger sisters or brothers of the child. The data on the number of older children were then categorized into:

a)1-2 b)3-4 c)more than 4

Number of young siblings (ages 0-6 years old)

Mothers were asked to write the birth dates of all of their children and marked those children who were six years of age or below. During data analysis, the information was grouped into three categories of: a)none b)1 c)more than 1

Child's health status

Child's health status was assessed by the General Health Perceptions instrument used in The Rand Health Insurance Study (HIS) (Eisen et al., 1980). These measures of general health perceptions ask parents as proxies for an assessment or rating of their children's health in general. In the HIS, general health perceptions for children have been defined with respect to time (perceptions of prior and current health) and with respect to the child's ability to withstand illness or diseases (resistance or susceptibility to illness). Also, a general evaluation of the child's health (in terms of excellent, good, fair or poor) was included.

Reliability was estimated by using the internal-consistency method for HIS measures of children's health (General Health Perceptions). Reliability estimate for this instrument was reported to be satisfactory for HIS purposes (correlation coefficients

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2)Prior health – th

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ranged from 0.53 to 0.77), although the actual number was not reported. Similarly the face, content and construct validity of the HIS health measures for children were also judged satisfactory. The face validity was based on a review of the content of each measure by physician consultants and professional staff in relation to the health component and the dimension within each component that it was intended to measure. The content validity was determined by assessing the measures' representativeness in terms of the universe content defined by physical, mental, social, health and general health ratings identified in the literature. Finally, three types of construct validity studies were performed on HIS health status measures for children:

1)studies of associations within measures of health components

2)studies of associations among measures of physical, mental and social health and general health perceptions

3)studies of associations among health status measures and other health and health-related variables (Eisen et al., 1980).

A pilot study was conducted prior to this present research to assess the test-retest reliability of the instrument with the study population (see Appendix C). In the final study, mothers were asked to rate their children's overall health status which included (see Appendix A):

1)Current health – there were three items (1, 2a, 2d) to assess a child's current health. The highest possible score (best health) was 14 and the lowest (worst health) was 3.

2)Prior health – there were two items (2b, 2e) to assess a child's prior health. The highest possible score (best health) was 10 and the lowest (worst health) was 2.

3)Susceptibility an

child's susceptibili

health) and lowest

4)Overall health sta

and resistance to ill

(worst health) was

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For item 1.

items 2a. 2c and 2e

items 2b. 2d and 2f

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2 .....

3 .....

4 .....

5 .....

Household Decisio

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focus groups with

3)Susceptibility and resistance to illness - there were two items (2c, 2f) to assess a child's susceptibility and resistance to illness. Similar to prior health, the highest (best health) and lowest (worst health) possible scores were 10 and 2 respectively.

4)Overall health status – a cumulative value for current and prior health and susceptibility and resistance to illness. The highest possible score (best health) was 34 and the lowest (worst health) was 7. The overall health status was used for analysis in the study. The higher the score for overall health status, the better the health of the child.

For item 1, the minimum and maximum scores were 1 and 4, respectively. For items 2a, 2c and 2e, they were scored according to the mothers' actual responses. For items 2b, 2d and 2f, mothers' actual responses were scored as the following:

1 ..... reverse to 5

2 ..... reverse to 4

3 ..... remains as 3

4 ..... reverse to 2

5 ..... reverse to 1

Household Decision Inputs

There are two parts of the instrument for measuring mothers' participation in household decision making -- making or planning household decisions and actually implementing the decisions (see Appendix A). There are altogether 24 items which fall under three main categories - household income and purchases, food and child care, health and feeding. These items were developed after the researcher conducted three focus groups with a sample of married Malaysian women at Michigan State University

(Appendix D). One

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Mothers we

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(Appendix D). One of the findings of the focus groups was that making and implementing household decisions among this sample are not synonymous -- it is common for these women to participate in making household decisions but it is usually the husbands who have the final words in actuating the decisions or plans. Based on this finding, the researcher feels that it is appropriate to address these two distinct processes in decision making.

Mothers were asked to respond to a total of forty eight statements on making and implementing household decisions in comparison to that of their husbands' and mothers' or mother in laws'. For each question, the response was scored as follows:

Wife	Husband	Mother/Mother in law
0	3	3
1	3	3
2	2	2
3	1	0

However, because the number of mother/mother-in-law in the households (n = 19) were too small for statistical analysis, no comparison in making and implementing household decisions was made between wife and mother/mother-in-law.

To answer t

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Research Questio

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Height-for-age

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Ho-2: Th
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Ho-3: Th
sc

Weight-for-heigh

Ho-4: T
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Ho-5: T
p

Ho-6: T
p

Research Questions and Hypotheses

To answer the research questions in this present study, several hypotheses were formulated. These hypotheses are organized to reflect the purpose, objectives and conceptual framework presented in Chapter 1.

Research Question 1:

What are the prevalences of stunting (low height-for-age) and wasting (low weight-for-height) and the mean Z scores of height-for-age and weight-for-height for the primary school children according to gender, standard (1, 2 and 3) and age (6-6.9, 7-7.9 and 8-8.9 and 9-9.9)?

Height-for-age

Ho-1: There is no difference in mean Z scores of height-for-age among primary school children by gender.

Ho-2: There is no difference in mean Z scores of height-for-age among primary school children by age.

Ho-3: There is no difference in mean Z scores of height-for-age among primary school children by standard.

Weight-for-height

Ho-4: There is no difference in mean Z scores of weight-for-height among primary school children by gender.

Ho-5: There is no difference in mean Z scores of weight-for-height among primary school children by age.

Ho-6: There is no difference in mean Z scores of weight-for-height among primary school children by standard.

Research Question

a)How much parti
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Ho-3: The
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Ho-4: Th
par

Ho-5: Th
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Ho-6: T
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Ho-7: T
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a

Ho-8: T
p

b)Is there any
implementing

Ho-9:

Ho-10:

Ho-11

Research Question 2:

a)How much participation do mothers have in making and implementing household decisions in comparison to fathers'?

Ho-1: There is no significant difference between mothers' and fathers' participation in decision making related to household incomes and expenditures.

Ho-2: There is no significant difference between mothers' and fathers' participation in decision making related to food.

Ho-3: There is no significant difference between mothers' and fathers' participation in decision making related to child care, health and feeding.

Ho-4: There is no significant difference between mothers' and fathers' participation in total decision making .

Ho-5: There is no significant difference between mothers' and fathers' participation in decision implementation related to household incomes and expenditures.

Ho-6: There is no significant difference between mothers' and fathers' participation in decision implementation related to food.

Ho-7: There is no significant difference between mothers' and fathers' participation in decision implementation related to child care, health and feeding.

Ho-8: There is no significant difference between mothers' and fathers' participation in total decision implementation.

b)Is there any difference between mothers' participation in making and implementing household decisions?

Ho-9: There is no significant difference between mothers' participation in decision making and implementation related to household income and expenditures.

Ho-10: There is no significant difference between mothers' participation in decision making and implementation related to food.

Ho-11: There is no significant difference between mothers' participation in decision making and implementation related to child care, health and feeding.

Ho-12: Ther
deci

c)Do mothers' par
with age, years of
household income

Ho-13: The
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Ho-14: The
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Ho-15: Th
dec

Ho-16: Th
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Ho-17: Th
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Ho-18: T
d

Ho-19: T
d

Ho-20: T
c

Ho-21:

Ho-22:

Ho-23:

Ho-24

Ho-12: There is no significant difference between mothers' participation in total decision making and implementation.

c)Do mothers' participation in making and implementing household decisions vary with age, years of schooling, employment status, income earning level, total household income and income per capita?

Ho-13: There is no significant difference in mothers' participation in total decision making by age.

Ho-14: There is no significant differences in mothers' participation in total decision making by years of schooling.

Ho-15: There is no significant difference in mothers' participation in total decision making by employment status.

Ho-16: There is no significant difference in mothers' participation in total decision making by income earning level.

Ho-17: There is no significant difference in mothers' participation in total decision making by total household income.

Ho-18: There is no significant difference in mothers' participation in total decision making by income per capita.

Ho-19: There is no significant difference in mothers' participation in total decision implementation by age.

Ho-20: There is no significant differences in mothers' participation in total decision implementation by years of schooling.

Ho-21: There is no significant difference in mothers' participation in total decision implementation by employment status.

Ho-22: There is no significant difference in mothers' participation in total decision implementation by income earning level.

Ho-23: There is no significant difference in mothers' participation in total decision implementation by total household income.

Ho-24: There is no significant difference in mothers' participation in total decision implementation by income per capita.

Research Question

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of schooling?

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b)How do housel
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Ho-1: Ho
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Ho-2: Ho
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Research Ques

a)What is the

b)How do mot
total household
mothers' food

Ho-1:

Ho-2:

Ho-3:

Ho-4:

Research Question 3

a)What is the distribution of mothers' nutrition knowledge scores?

b)When mother's age is controlled, does nutrition knowledge score vary with years of schooling?

Ho-1: When mother's age is controlled, there is no significant difference in nutrition knowledge scores by years of schooling.

Research Question 4

a)What is the distribution of household food security?

b)How do household economic characteristics (total household income and income per capita) vary with household food security?

Ho-1: Households with different levels of food security do not differ in total household income.

Ho-2: Household with different levels of food security do not differ in household income per capita.

Research Question 5

a)What is the distribution of mothers' food allocation rules?

b)How do mothers' years of schooling, income earning and nutrition knowledge, total household income, income per capita and household food security differ by mothers' food allocation rules?

Ho-1: Mothers with needs and equality rules do not differ in years of schooling.

Ho-2: Mothers with needs and equality rules do not differ in income earning.

Ho-3: Mothers with needs and equality rules do not differ in nutrition knowledge.

Ho-4: Mothers with needs and equality rules do not differ in total household income.

Ho-5: Mothers w
income per

Ho-6: Mothers w
food secur

Research Question 6:

Does mother's percepti
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father's, total household
variables (nutrition kn
variables (gender, age,

Ho-1: There is
children.

Ho-2: There is
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Ho-3: There is
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Ho-4: There is
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Ho-5: There is
capita.

Ho-6: There i
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Ho-7: There i
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Ho-8: There

Ho-9: There

Ho-10: There
order.

Ho-5: Mothers with needs and equality rules do not differ in household income per capita.

Ho-6: Mothers with needs and equality rules do not differ in household food security.

Research Question 6:

Does mother's perception of child's health status vary with household demographic and economic variables (number of children, years of schooling for mother's and father's, total household income and income per capita), child care and feeding variables (nutrition knowledge and household food security) and child-related variables (gender, age, birth order and number of younger siblings)?

Ho-1: There is no significant difference in child's health status by number of children.

Ho-2: There is no significant difference in child's health status by mother's years of schooling.

Ho-3: There is no significant difference in child's health status by father's years of schooling.

Ho-4: There is no significant difference in child's health status by total household income.

Ho-5: There is no significant difference in child's health status by income per capita.

Ho-6: There is no significant difference in child's health status by mother's nutrition knowledge.

Ho-7: There is no significant difference in child's health status by household food security.

Ho-8: There is no significant difference in child's health status by child's gender.

Ho-9: There is no significant difference in child's health status by child's age.

Ho-10: There is no significant difference in child's health status by child's birth order.

Ho-11: There is n
younger s

Research Question 7:
This research question is
tested.

a) How do mothers per

b) For mothers with ea

i. Do they repo
ii. If they do, w
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mothers' inc
iv. Do they rec
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c) For motners with n

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iv. If they do,

Research Question 8
This research question
tested.

What are the food ha

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ii. Eating mea
iii. Bringing f
iv. Having po

Research Question

Does child growth s
and socioeconomic
child-related variab

Ho-11: There is no significance difference in child's health status by number of younger siblings.

Research Question 7:

This research question is exploratory in nature, therefore, no null hypothesis is being tested.

a) How do mothers perceive the adequacy of income in their households?

b) For mothers with earned incomes

- **i. Do they report pooling of incomes with their husbands?**
- **ii. If they do, who has control of allocating and spending the pooled incomes?**
- **iii. If they do not pool or partially pool their incomes, who has control of mothers' incomes?**
- **iv. Do they receive additional allowances from husbands?**
- **v. What are their priorities for money use?**

c) For mothers with no earned income

- **i. Who has control of husbands' incomes?**
- **ii. Do they have access to husband's incomes?**
- **iii. Do they receive personal allowances from husbands?**
- **iv. If they do, what are their priorities for money use?**

Research Question 8:

This research question is exploratory in nature, therefore, no null hypothesis is being tested.

What are the food habits of these children (during the school week)

- **i. Eating breakfast before going to school?**
- **ii. Eating meals (breakfast, lunch and dinner) at home?**
- **iii. Bringing food from home to school?**
- **iv. Having pocket money to buy food at school?**

Research Question 9:

Does child growth status predicted by household inputs (household demographics and socioeconomic status, household resource allocation, child care and feeding, child-related variables) and throughput (household decision inputs)?

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Ho-2: There is no
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Ho-3: There is n
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Ho-4: There is n
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Ho-5: There is n
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2.5% (Malaysian Dep

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Malaysia is

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Ho-1: There is no relationship between child growth status and household demographic and socioeconomic variables.

Ho-2: There is no relationship between child growth status and household resource allocation variables.

Ho-3: There is no relationship between child growth status and child care and feeding variables.

Ho-4: There is no relationship between child growth status and child related variables.

Ho-5: There is no relationship between child growth status and household decision inputs.

Description of Study Area

Malaysia is located in Southeast Asia and shares a common border with Thailand in the north, Singapore in the south and Indonesia in the east. The country consists of thirteen states and two Federal Territories of Kuala Lumpur and Labuan. Currently, the estimated population of Malaysia is 22 million with an annual population growth rate of 2.5% (Malaysian Dept. Statistics, 1997a). Being the capital city of Malaysia, Kuala Lumpur has been the national administrative and political center since Malaysia attained independence in 1957. With the country's economy growing fast towards industrialization, Kuala Lumpur has expanded rapidly into a thriving commercial, financial and industrial metropolis.

Malaysia is a multi-ethnic nation with Malays, Chinese and Indians as the major ethnic groups. Today, these groups constitute approximately 51%, 27% and 8% of the total population respectively. The majority of the Malays reside in the rural areas while the Chinese predominate the urban areas. The residential distribution of the three ethnic

groups is also reflected i

49%, followed by Malay

the Malay population in

in Kuala Lumpur in 195

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groups is also reflected in the ethnic composition of Kuala Lumpur where Chinese are 49%, followed by Malays (36%) and Indians and others (15%) (Khor, 1992). However, the Malay population in Kuala Lumpur has been increasing from 15% of total population in Kuala Lumpur in 1957, to 25.1% in 1970 and 28% in 1980 (Anonymous, 1984). The urban pull factor for the Malays has been largely attributed to increased economic and educational opportunities for them in the urban areas, in line with the New Economic Policy (NEP) implemented during 1970-1990. The principle objective of NEP was to achieve national unity through poverty eradication and elimination of the identification of economic activities among the ethnic groups.

At present, the total population of Kuala Lumpur or Wilayah Persekutuan is estimated at 1.4 million, with a population density of 5762 persons per km^2. The overall population of Kuala Lumpur has been expanding at a high annual rate, registering at 4.1% during 1980-1990. This is much higher than the natural population growth rate of 2.5% for Malaysia. The high population growth rate of Kuala Lumpur is attributed almost equally to natural increase and net migration (Anonymous, 1984). The marked increase in economic achievement and total population in Kuala Lumpur has contributed to squatter settlements in the city. Although, the total squatter population has declined as many of them have been moved into public housing (low-cost flats and long houses) by the Kuala Lumpur City Hall, the squatter population in 1987 constituted approximately 12% of the total population in Kuala Lumpur (Anonymous, 1991). In 1987, the squatter population was 179,270 and was 30.3% Malays, 55% Chinese and 14.7% Indians. In 1990, there were about 234,693 squatters residing in approximately 202 squatter settlements around Kuala Lumpur (Agus, 1991). The increase in the number of squatters in Kuala Lumpur

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The poverty

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may be due to the increase in number of rural migrants and international immigrants from Indonesia, Bangladesh, India and Myanmar. In comparison to the other cities in Malaysia, squatter problems are more acute in Kuala Lumpur as it is the center of administration and commercial activities which definitely has attracted a large number of people from rural areas and other countries.

As in many other cities in the world, a wide income gap exists between the upper-income and lower-income groups in Kuala Lumpur. The average monthly household income in Kuala Lumpur was estimated at RM2158 in 1990; this amount is much higher than the mean income (RM300 – 700) earned by the urban squatters (Khairuddin et al., 1988; Khor and George, 1988). As data for comparison on household income, total and food expenditures between the low-income and upper income in Kuala Lumpur is unavailable, the following discussion will focus on the comparisons between the urban and rural populations. According to the 1995 Household Income Survey (Malaysian Dept. of Statistics, 1997b), the average monthly household income for Malaysian citizen in urban areas was RM2593 while that of the rural population was RM1319. The average spent for household expenditures presents a similar picture with RM1406 for the urbanites and RM854 for the ruralites. However, as income level increases, the proportion of household income spent on food decreases. While 30% of the household income is spent on food for the rural population, the urban dwellers only spend approximately 20% of their household income on food (Malaysian Dept. Statistics, 1995).

The poverty line income (PLI) is used to assess the number of households living in poverty in Malaysia, defines as poor households and hard core poor households. The

PLI is based on a minim
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Malaysian Plan (NEP 19
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half of the PLI is used (
household size of five).
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core poor in Malaysia
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PLI is based on a minimum expenditure for food and other essentials and is updated annually to be relative to the current standard of living in the country. Under the 7th Malaysian Plan (NEP 1996 – 2000), the national PLI (for the poor households) is RM425 for a household size of five, while that for Kuala Lumpur (Wilayah Persekutuan) is RM750 for a household size of five persons (Kassim, pers.comm). For hardcore poor, half of the PLI is used (national is RM213 and Wilayah Persekutuan is RM375 for a household size of five).The incidence of poverty in Malaysia in 1990 was estimated at 16.5% (574, 500 households) to 8.9% (370,200) households in 1995. For urban and rural areas, the incidence of poverty registered at 7.1% and 21.1% respectively in 1990. In 1995, the percentages decreased to 3.7% in urban and 15.3% in rural areas. For the hard core poor in Malaysia, the incidence also decreased from 3.9% in 1990 (137,100 households) to approximately 2.1% in 1995 (88,400 households) (Ministry of Finance, 1997).

Under the New Economic Policy (NEP) of the 6th and 7th Malaysian Plan (6th Malaysian Plan, 1995), the government's efforts to improve the standard of living of the low-income groups in the urban areas include the provision of low-cost housing units and opportunities for the poor to participate in small-scale businesses. For example, the Kuala Lumpur City Hall has implemented the City Hall's Squatter Upgrading Program (NADI program) in squatter areas and low-cost flats, where health standards were low and basic amenities were inadequate. Under this program, the poor in the squatter areas benefited from the provision of electricity, water stand-pipes and health care, while those in low-income flats were provided with income-generating projects (for housewives) and day

care centers. The govern

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care centers. The government and the private sectors were expected to cooperate in providing the urban poors with more employment opportunities.

In terms of employment opportunities in Kuala Lumpur, the government is the largest employer followed by retail trade and small industries (Anonymous, 1984). A survey of 180 households from 12 squatter settlements (Khairuddin et al., 1988), found that approximately 90% of the male heads of households were employed full-time, while the rest held two jobs, one full-time and the other part-time. The majority of these squatters were factory production workers and equipment operators, laborers, drivers, security guards, construction workers, hawkers and sales persons. Given the high cost of living and competitive situation in the city today, it is often necessary for women to work full or part-time to supplement the household income. An early study on women's employment in Kuala Lumpur (Hashim, 1979), indicated that the majority of women living in low-cost flats and squatter settlements worked full-time outside the home because their families need additional incomes. They were more likely to be involved in low-skill or unskilled positions with low incomes as factory production workers, in sales and personal service sector (e.g. laundry, cleaning, hair and beauty salons). Low income earning levels or job positions among the women has been attributed to their low level of educational attainment. A high percentage of these women had only primary schooling or not more than six years of formal education, compared to a significant percentage of the male heads of households with lower secondary education (approximately nine years of formal education).

The twenty one primary schools selected in this present study were located in either squatter settlements or low income public housings. Thus, the children who

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Participants

A list of 35

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attended these schools were mostly from low-income households. The majority of the households visited by the researcher had access to basic amenities such as piped water supply in the house and adequate sewage and waste removal systems (septic tank or flush toilets). Others had to resort to public stand pipes and less adequate waste removal systems (pour flush into the drain and pit latrines). Garbage disposal in the public (low-cost flats) and squatter settlements in the households studied was inadequate. In the low-cost flats, unpleasant odors from the garbage chute was a main problem for the tenants. In the squatter settlements, many of the households dumped their garbage in the nearby rivers, drains or open space. However, other public amenities including roads, electricity, public telephones, street lighting, playgrounds and community halls are available in public housings and in many of the squatter settlements in Kuala Lumpur.

Research Design

The research design includes participants, sampling and the procedures involved in the data collection. These are discussed in detail below:

Participants

A list of 35 schools which are categorized as "schools with low income parents or guardians" in Kuala Lumpur, Federal Territory (Wilayah Persekutuan) was obtained from the Malaysian Ministry of Education. There were two types of school on the list:

a) SRK schools - refers to any governmental primary school which has a mix of children from the three ethnic groups (Malay, Chinese and Indian) in Malaysia. There were a total of 14 SRK schools.

b) SK schools - refers to

Malay children. All of t

Study 1 – This study w

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Kuala Lumpur. School

Study 2 – This study w

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2)This age group is

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b) SK schools - refers to any governmental primary school which has predominantly Malay children. All of the 21 SK schools on the list were used in this research as follows:

Study 1 – This study was designed to assess the growth status of primary school children in Standards 1-3 (6 - 9.9 years of age) from low income households in the urban area of Kuala Lumpur. School children from the 21 SK schools were included in this study.

Study 2 – This study was designed to determine factors that contribute to the growth status of children from Malay ethnic group. Only children in Standard 1 from 7 SK schools (out of the 21 SK schools) were included in the study. This age group was selected because --

1)It is assumed that this age group is greatly affected by intrahousehold resource allocation, particularly food, income and attention/child care time, compared to the older age groups (Standards 2-3). For example, the effect of the mother's employment status in low income households is greater among the younger children who are still dependent on adults for food and child care. They will either benefit from the extra income that the mothers bring into the households for quality and quantity of foods or their food intakes will be negatively affected because they are taken care by older siblings or grandparents.

2)This age group is considered "very new" to school life and therefore will be very much under the watch and care of their parents. In preliminary research with focus groups (Appendix D), a majority of Malaysian mothers indicated that the older the children get, the more freedom, they are given by the parents i.e., they can buy or prepare their own meals, they do not require child care after school hours if their parents are at work, they do not need adult supervision or companionship when they walk or take the public

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transportation to schools, they 'graduate' from bringing foods from home to school and they receive spending money from parents.

Another criterion for child selection in Study 2 was that the child had both biological parents in the household. This criterion was essential as the researcher wanted to assess mothers' household decision inputs in relation to their spouses and to address questions pertinent to allocation of household resources. The information on parents' marital status or the presence of both parents in the households was obtained from the classroom teachers (class registers or children files) and the questionnaire. Mothers of the Malay children in Standard 1 were also the respondents in this research as they were required to complete the questionnaires. The two criteria for mothers to be included in the research were that they were currently married and were the biological mothers of the children.

Sampling

For the general growth assessment of low income children (Study 1), the weight and height data of children in Standards 1-3 from the 21 SK schools were obtained. For Study 2, (determinants of growth status of low income Malay children) only school children from Standard 1 (6-7.9 years old) were included. The 7 SK schools selected for Study 2 were SK Petaling 1, SK Petaling 2, SK Kampong Pandan, SK Kampung Baru and SK Bangsar, SK Datuk Keramat 1, SK Datuk Keramat 2 (see Appendix B for the location of the schools involved in this research).

To determine the number of mother-child pairs needed for Study 2, the method to determine sample size in health studies proposed by the World Health Organization was

used (Lemeshow et al.. 1

(Anonymous. 1990). the

Harvard reference) amo

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significance test as the

12.5%) with 90% powe

error) of the true value

1)Consider Pa is great

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used (Lemeshow et al., 1990). From a previous school health survey in Kuala Lumpur (Anonymous, 1990), the prevalence of underweight (less than 80% weight-for-height of Harvard reference) among Standard 1 school children (N=23,199) was 12.5%. To determine the number of subjects for the study at 0.05 significance level (two-tailed significance test as the prevalence of underweight in the low income sample may not be 12.5%) with 90% power of detecting a difference of 10 percentage points (acceptable error) of the true value (Po), the equations used:

1)Consider Pa is greater than Po by 10% (percentage point)

$Pa = 0.225;\ Po = 0.125;\ z_{1-\alpha/2} = z0.975 = 1.960;\ z_{1-\beta/2} = z0.90 = 1.282$

$$n=\frac{\{z_{1-\alpha/2}\ P_o(1-P_o) + z_{1-\beta/2}\ P_a(1-P_a)\}^2}{(P_a - P_o)^2}$$

$$n=\frac{\{(1.960 \times 0.125 \times 0.875) + (1.282 \times 0.225 \times 0.775)\}^2}{(0.1)^2}$$

$n=(1.183549614)^2/0.01$

$n=140.07$

2)Consider Pa is less than Po by 10% (percentage point)

$Pa = 0.025;\ Po = 0.125;\ z_{1-\alpha/2} = z0.975 = 1.960;\ z_{1-\beta/2} = z0.90 = 1.282$

$$n=\frac{\{z_{1-\alpha/2}\ P_o(1-P_o) + z_{1-\beta/2}\ P_a(1-P_a)\}^2}{(P_a - P_o)^2}$$

$$n=\frac{\{(1.960 \times 0.125 \times 0.875) + (1.282 \times 0.025 \times 0.775)\}^2}{(0.1)^2}$$

$n=(0.848361256)^2/0.01 = 71.79$

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Procedures

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Hence, taking the larger of the two sample size determinants, I would require at least 140 mother-child pairs for Study 2.

Procedures

For Study 1, anthropometric measurements and other related variables (e.g. household income, parental occupation, ethnicity) were collected on 8798 primary school children (Standards 1-3) from 21 SK schools. Three sources of information on each child were required to obtain the data as to ensure data consistency. The sources were: Child's confidential record, academic report and health book. The data for Study 1 were collected by the researcher and three research assistants between October 1997 and March 1998.

For Study 2, seven hundred and fifteen (715) Malay children (Standard 1) from the selected 7 SK schools were measured for their weights and heights by the researcher and a research assistant. Due to school absenteeisms and transfers, only six hundred and thirteen children were given envelopes containing four items: information sheet on the research for parents, a consent letter for the child and parents to participate in the study, a consent letter to allow the researcher to visit the mother and a questionnaire for the mother. The mothers were given approximately two weeks to respond to the questionnaire. Upon the receipt of the questionnaires, the researcher began the home visits and in some cases telephone interviews to verify the accuracy of the mothers' responses. The home visits and phone interviews were conducted between December 1997 and March 1998. For each home visit, the researcher brought some foods for the households (e.g., fruits, sweet cakes, rice or noodle dish). The home visits varied from

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two to five hours, depending on mothers' initial responses to the questionnaires and their available time to interact with the researcher.

Prior to the data collection in Malaysia, three focus groups, a pre-test and a pilot study were conducted by the researcher. The focus groups and the pre-test were completed with married Malaysian mothers at Michigan State University and the pilot study was done with a sample of low income Malay mothers in Kuala Lumpur, Malaysia.

After the approval from the MSU University Committee on Research involving Human Subjects (UCRIHS) (Appendix E), three focus groups were completed with seventeen married Malaysian women at Michigan State University in August, 1996. The intent of the focus group was to elicit information pertinent to household resource allocation, child care and feeding, nutrition knowledge, decision making inputs and child health perceptions which are common among mothers in Malay households. This information was used for the development of the mother's questionnaire for the research (see Appendix D for the focus group report)

Another request was approved by the UCRIHS (Appendix E) to conduct a pre-test of the mother's questionnaire. The pre-test was done with a sample of Malaysian married women at Michigan State University in early May, 1997. This sample consisted of women who participated in the previous focus groups and those who recently arrived at MSU in September and December, 1996. The purpose of the pre-test was to check for 1)Wording, translation and flow of the questions, 2)Cultural appropriateness of the questions and 3)Length of the questions. The questionnaire was translated into Malay language by the researcher before they were pre-tested and were further revised after the pre-test. Upon the revision of the questionnaire, a pilot study was conducted with a

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sample of Malay mothers (n=35) from low income households in Malaysia. The purpose of the pilot study was to check the reliability of the various instruments used in the research. Another pilot study to asses the validity of the teachers' measurements of the school children's weight and height data (n=120) was also conducted in the 5 SK schools involved in Study 2. The teachers were instructed to measure the children's weight and height using the school weighing scales and height measuring units, while the researcher used her equipment (Seca beam balance and portable adult/infant measuring unit) to measure the children (see Appendix C for the report on the pilot studies).

The University Committee on Research Involving Human Subjects (UCRIHS) provided approval prior to the inception of the data collection in Malaysia (Appendix E). In Malaysia, the authority to conduct the pilot studies and the research was granted by various departments. At the federal and state levels, permissions were obtained from the Ministry of Education of Malaysia and the Wilayah Persekutuan Department of Education respectively. At the school level, a letter to request permission to conduct the research at the selected schools and to access the various sources of child's information was sent to each school principal. Upon these approvals, only then the pilot studies and research were conducted in the school system (see Appendix F for approval letters from the Ministry of Education and Wilayah Persekutuan Department of Education)

Data Analysis

The study was designed to determine the relationship between the major dependent variable, child's growth status, and independent variables of household demographics and economics, household resource allocation, child care and feeding,

child-related variables

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child-related variables and household decision inputs of mothers. However, there was no attempt to interpret causality. The study variables were treated as either discrete or continuous data.

First, basic descriptive statistics were generated -- frequency distributions for discrete variables and medians, means, range and standard deviations for continuous variables. Then, the relationship among the independent variables and dependent variables was assessed with a correlational technique, Pearson Product Moment correlation coefficient. The technique is used to determine the strength of association that exists between two variables. The range of interpretation of values utilized to analyze these results was that suggested by Dr. Stephen Raudenbush in CEP 905 (Advanced Statistics), MSU, Winter, 1990is:

.80 to .99 - very strong positive correlation

.60 to .79 - strong positive correlation

.40 to .59 - moderately strong positive correlation

.20 to .39 - weak positive correlation

.01 to .19 - very weak positive correlation

*the ranges also apply to negative correlation

To determine the extent of multicollinearity among the independent variables, if the correlation coefficient exceeded 0.4, then care was taken to ensure that the correlated variables did not both appear in the same regression analysis equation.

The paired T-test procedure was used to analyze the mean differences in participation in making and implementing household decisions between mothers and fathers and the mean differences between mothers' participation in making and

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implementing household decisions. One-way ANOVA (analysis of variance) and T-test were used to identify the mean differences of child's health status scores and mothers' participation in making and implementing household decisions according to various household demographics and economics, child care and feeding and child-related variables. To determine the relationship between mothers' food allocation rules and other variables, ANOVA and Chi-square test were used. ANCOVA was utilized to analyze the mean differences of nutrition knowledge scores among mothers with various education levels when age of mothers were controlled. In assessing the risk factors for household food insecurity, multinomial logistic regression was utilized. Finally, multiple regression analysis was used to identify the predictors of child growth status. For testing the null hypotheses, probability level at or less than 0.05 was used to determine statistical significance. All data analyses were done with SPSS 7.5 (Norusis, 1997).

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Assumptions

1. All the primary school children were from low income households as evidenced by the list of "low income" schools provided by the Ministry of Education.

2. The mothers' responses to the questions in the study were assumed to reflect their actual initiatives (they were telling the truth).

3. The weight and height measurements of the school children taken by the MCH nurses or teachers were valid to be used in this study.

4. Based on evidence that Malay mothers were responsible as food purchasers and preparers, they were then assumed to play a significant role in intrahousehold food allocation.

5. All of the instruments used in this study (e.g. Food Security, Nutrition Knowledge, Child Health Perception, Decision Making and Decision Implementation and Food Allocation) were valid for this study sample.

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2)Study 2 – survey

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CHAPTER IV

RESULTS

The data for Study 1 (growth status assessment of primary school children from low income households) and Study 2 (determinants of growth status among primarily low income Malay children) presented in this chapter were gathered from these sources – 1)Study 1 – child's record, health book and academic report.

2)Study 2 – survey questionnaire and in-depth interview (home visit and phone interview). In Study 1, data on 8798 children were obtained from twenty one participating schools in Kuala Lumpur. However, only the data for 8005 children were analyzed due to missing weight, height or birth date information. In Study 2, 715 Malay children (Standard 1) from seven SK schools were measured but only 613 questionnaires were distributed to their mothers. The other 102 children were either absent from the schools on the days the questionnaires were being distributed or they were transferred to other schools. A total of 554 questionnaires were returned to the researcher. However, only 497 mothers consented to participate in the study. From this number, only 309 mothers were eligible for the study after accounting for their marital status, relationship of the parents with the children and citizenship. Home visits and phone interviews were completed with 193 and 88 mothers respectively. Attempts were made to contact the other 28 mothers but failed due to incomplete address, inaccurate phone number and no given address or phone number. However, for these mothers (n=28), their survey questionnaires were all completed.

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In general, the seven schools included in Study 2 represented 5 different low income areas in Kuala Lumpur (see Appendix B). In terms of mother's response rate according to each school, the range is between 33% to 72% (Table 3). The number of questionnaires distributed (n=613) did not represent the actual total number of Malay school children in the seven schools. The number of children measured for their weight and height by the researcher was 715 but the actual number of the school children in each school was difficult to determine due to several reasons –

1)Many of the schools had completed final examinations. Therefore, many of the children were temporarily absent from schools.

2)There were children who had transferred to other schools but the class-attendance books were not updated. Similarly, some children had transferred to the study schools.

3)The children were absent on the days the researcher distributed the questionnaires.

Table 3

Mother's Response R

School	
SK Petaling 1	
SK Petaling 2	
SK Datuk Keramat	
SK Datuk Keramat	
SK Bangsar	
SK Kg. Baru	
SK Kg. Pandan	
Total	

Table 3

Mother's Response Rate According To The Seven Participating Schools in Study 2.

School	Num. Of Questionnaires Distributed	Num. Of Questionnaires Returned	%
SK Petaling 1	85	61	71.8
SK Petaling 2	100	43	43.0
SK Datuk Keramat 1	87	46	52.9
SK Datuk Keramat 2	92	34	37.0
SK Bangsar	100	59	59.0
SK Kg. Baru	63	21	33.3
SK Kg. Pandan	86	45	52.3
Total	613	309	

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households in Study 1

Households Demogra

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Sample Characteristic

The demographic and economic characteristics of the school children and households in Study 1 (n=8005) and Study 2 (n=309) are elaborated in this section.

Households Demographics

Table 4 shows the distribution of gender, age and standard of all the school children in Study 1. There were 3793 female (47.4%) and 4212 male (52.6%) children from Standards 1 to 3. Other demographic and economic information of the children and households in Study 1 will not be discussed as some of the information was not updated or unavailable.

In Study 2, the children in the sample were comprised of 161 males (52.1%) and 148 females (47.9%). All of the children were in Standard 1 with an average age of 85.7 months (Table 5). All of the households were from the Malay ethnic group and were Moslems. The mothers who responded to the questionnaires ranged in age from 24 to 50 years with an average of 35.4 years. In terms of marital status of the parents, fifteen mothers had previous marriages. For fathers, twenty three of them had other marriages besides their current marriages to the mothers. However, fifteen of the fathers had ended the other marriages. All of the parents of the children in Study 2 were the children's biological parents. The number of children in the households ranged from one to 12 children with an average of four children per household. The average household size in this sample was 6 people and the range was three to 14 people. The average household size reported for this sample is higher than the average household size of 4.3 reported for

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households in urban areas of Malaysia (Malaysian Dept. of Statistics, 1995). In relation to the number of young children aged 0-6 years, the range was zero to 4 with an average of 1 child. Of the households, 25.9% (n=80) did not have any young children aged 0-6 years. Nineteen of the households had either the wife's mother (n=8) or mother-in-law (n=11) living in the same household. The majority of these mother-in-laws and mothers (n=15) visited by the researcher were old and several (n=10) were ill. In other words, they were physically, socially and financially dependent on these households.

The education level, employment status and occupation of the mothers and fathers in Study 2 are shown in Table 6. A majority of the mothers (69%) and fathers (72%) had at least some secondary education. Based on the education level, years of schooling (not listed in Table 5) for both mothers and fathers were calculated. The average years of schooling for mothers and fathers were 8.8 and 9.1 years respectively. In terms of employment status, 168 mothers (54.4%) were housewives, while 141 mothers (45.6%) worked for incomes either at home (n=34) or away from home (n=107). For fathers, the majority (n=300) were working while nine were either ill, pensioners or did not work at all. The occupation of the mothers and fathers were categorized as unskilled (general factory workers, hawkers, cleaners, construction workers), semi-skilled (factory supervisors, laboratory assistants, beauticians) and skilled (teachers, nurses, government officers, lectures) , depending on their education levels (years of schooling), types of occupation and/or seniority of the positions. Of the working mothers (n=141), 69.5% were unskilled, 19.2% semi-skilled and 11.3% skilled workers. For working fathers (n=300), 75% were unskilled, 21% semi-skilled and 4% skilled workers.

Table 4

Demographic Characte

Variable	Level
Gender of Children	
	Male
	Femal
Age of Children (mo	
	6.0 –
	7.0 –
	8.0 –
	9.0 –
Standard * Age of C	
	Std.
	Std.
	Std.

a = The number ar

M = mean; SD

Table 4

Demographic Characteristics of the Children in Study 1 (n=8005)

Variable	Level	n	(%)	M	SD	med.
Gender of Children		8005	(100.0)			
	Male	4212	(52.6)			
	Female	3793	(47.4)			
Age of Children (months)		8005	(100.0)	96.39	11.76	97.45
	6.0 – 6.9	1598	(20.0)			
	7.0 – 7.9	2058	(25.7)			
	8.0 – 8.9	2840	(35.5)			
	9.0 – 9.9	1509	(18.9)			
Standard * Age of Children[a]		8005	(100.0)			
	Std. 1	2598	(32.5)	82.70	4.97	82.53
	Std. 2	2839	(35.5)	97.43	5.06	97.58
	Std. 3	2568	(32.1)	109.09	5.04	109.01

a = The number and average age (months) of children in each standard

M = mean; SD = standard deviation; Med = median;

Table 5

Demographic Charac

Variable	Level
Gender of Children	
	Male
	Fema
Age of Children (m	
	6.0 -
	7.0 -
Age of Mothers (ye	
	20 -
	30 -
	> 3
Mother's first mar	
	Ye
	No
Father with more	
	Ye
	No
Father with more	
	Y
	N

Table 5

Demographic Characteristics of the Children and Households in Study 2 (n=309)

Variable	Level	n	(%)	M	SD	med.
Gender of Children		309	(100.0)			
	Male	161	(52.1)			
	Female	148	(47.9)			
Age of Children (months)		309	(100.0)	85.70	4.68	85.91
	6.0 – 6.9	115	(37.2)			
	7.0 – 7.9	194	(62.8)			
Age of Mothers (years)		309	(100.0)	35.36	5.74	35.00
	20 – 29	48	(15.5)			
	30 – 39	183	(59.2)			
	> 39	78	(25.3)			
Mother's first marriage						
	Yes	294	(95.1)			
	No	15	(4.9)			
Father with more than 1 marriage (previous and existing)						
	Yes	23	(7.4)			
	No	286	(92.6)			
Father with more than 1 existing marriage						
	Yes	8	(34.8)			
	No	15	(65.2)			

Table 5 (cont'd).

Variable	Level
Household Size	
	2 – 4 people
	5 – 7 people
	> 7 people
Number of Children	
	1 – 3
	4 – 5
	> 5
Number of Young C (0-6 years old)	
	None
	1
	> 1
Mother Mother-in-	
	Wife's Mo
	Wife's Mo

M = mean; SD

Table 5 (cont'd).

Variable	Level	n	(%)	M	SD	med.
Household Size		309	(100.0)	6.34	1.92	6.00
	2 – 4 people	47	(15.2)			
	5 – 7 people	187	(60.5)			
	> 7 people	75	(24.3)			
Number of Children		309	(100.0)	4.20	1.87	4.00
	1 – 3	127	(41.1)			
	4 – 5	114	(36.9)			
	> 5	68	(22.0)			
Number of Young Children (0-6 years old)		309	(100.0)	1.21	0.95	1.00
	None	80	(25.9)			
	1	112	(36.2)			
	> 1	117	(37.9)			
Mother/Mother-in-law		19	(100.0)			
	Wife's Mother	8	(42.1)			
	Wife's Mother-in law	11	(57.9)			

M = mean; SD = standard deviation; Med = median;

Table 6

Education Level. Em

Variable	Level
Education Level	
	No Schoolin
	Primary
	Secondary
	Post-second
Employment Stat	
	Did not Wo
	Work
Occupation	
	Unskilled
	Semi-skille
	Skilled

Table 6

Education Level, Employment Status and Occupation of Parents (n=309)

Variable	Level	Father n (%)	Mother n (%)
Education Level			
	No Schooling	5 (1.6)	9 (2.9)
	Primary	81 (26.2)	86 (27.8)
	Secondary	201 (65.1)	185 (64.7)
	Post-secondary	22 (7.1)	29 (4.6)
Employment Status			
	Did not Work	9 (2.9)	168 (54.4)
	Work	300 (97.1)	141 (45.6)
Occupation			
	Unskilled	225 (75.0)	98 (69.5)
	Semi-skilled	63 (21.0)	27 (19.2)
	Skilled	12 (4.0)	16 (11.3)

Household Economic

Table 7 provi

include household to

and total expenditure

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The average

were working (n=13

(n=309) was RM10

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Household Economics

Table 7 provides the data on economic characteristics of the households which include household total income, mother's and father's incomes, income per capita, food and total expenditures, housing quality (household possession, construction and ownership) and types of housing.

The average income of mothers (n=309) was RM338. The income of those who were working (n=139) was much higher (RM751). For fathers, the average income (n=309) was RM1069. The income of fathers who were working (n=300) increased to RM1093. As the majority of the households (n=300) had fathers as the main income providers, father's average income exceeded that of the mother. In this present study, the household income also included money from sources other than the main incomes of fathers and mothers (e.g. money from working children and other family members). The average household income (RM1491) for these households was relatively low compared to average monthly household income for the urban Malay (RM2162) or the urban citizens in general (RM2593) (Malaysia Dept of Statistics, 1997b). Other surveys have also reported lower average monthly household income for a majority of urban squatters and urban poor as between RM300-700 (Khairuddin et al., 1988; Khor and George, 1988). As indicated in Table 7, the majority of the households had household incomes below RM2162 (n=267). Using RM150 as the poverty level income per capita, 113 households (36.6%) can be considered as living in poverty.

The higher cost of living associated with living in a city can lead to higher consumption expenditure among the urban households. For example, the Household Expenditure Survey 1993/94 showed that the urban households spend on average

RM1406.09 for house

RM854.31 for the ru

households. however

RM280.85) compare

RM260.83). In the p

household total exp

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RM1406.09 for household expenditures (food and other essentials) compared to RM854.31 for the rural households (Malaysia Dept. Of Statistics, 1995). The urban households, however, would spend less on food (20% of household expenditures or RM280.85) compared to the rural households (30.5% of household expenditures or RM260.83). In the present study, the majority of the households (n=210) reported household total expenditure of less than RM1000 monthly, while 92% (n=285) spent less than RM600 monthly for food. As the majority of the households (n=267) in the sample had household incomes below RM2162, the household total and food expenditures reported in Table 7 constitute a significant portion of these households' monthly incomes.

Most of the households had access to piped water and electricity in their homes, although many of them (n=134) lived in squatter areas. In Kuala Lumpur, those who are living in the squatter areas will gradually be provided with accommodations in low-cost flats and long houses (Anonymous, 1991). These buildings are built by the Kuala Lumpur City Hall for rental at subsidized rates. All of the houses built in the squatter areas visited by the researcher shared similar household constructions – the wooden wall, cement or wooden floor and a zinc roof. The households with no access to electricity and piped water in their homes were squatters. The water supply came from main pipes or public stand pipes provided by the Department of Waterworks. All of the squatter households in the sample, either owned or rented their houses but the land remains the government's property. Those living in bungalows (n=27) either owned the land and house or both were rented from other individuals.

Table 7

Economic Characte

Variable	Lev
Father's Income (	
Mother's Income	
Total Income (RM	
1 – 2162	
> 2162	
Income per capit	
1 – 150	
151 – 30	
> 300	
Food Expenditu	
<300	
300-599	
600-999	
>1000	
Total Expendit	
<300	
300-59	
600-99	
>1000	

Table 7

Economic Characteristics of the Households (n=309)

Variable	Level	n	(%)	M	SD	med.
Father's Income (RM)		309	(100.0)	1069	760	900
Mother's Income (RM)		309	(100.0)	338	520	300
Total Income (RM)		309	(100.0)	1491	1171	1200
	1 – 2162	267	(86.4)			
	> 2162	42	(13.6)			
Income per capita (RM)		309	(100.0)	260	237	210
	1 – 150	113	(36.6)			
	151 – 300	117	(37.9)			
	> 300	79	(25.6)			
Food Expenditure (RM)		309	(100.0)			
	<300	117	(37.9)			
	300-599	168	(54.4)			
	600-999	21	(6.8)			
	>1000	3	(1.0)			
Total Expenditure (RM)		309	(100.0)			
	<300	5	(1.6)			
	300-599	91	(29.4)			
	600-999	114	(36.9)			
	>1000	99	(32.0)			

Table 7 (cont'd).

Variable	Leve
Household Possess	
Stove	
Radio	
Refrigerato	
Television	
Piped Wat	
Electricity	
Motorcycl	
Car	
Household Const	
Wall -	
Floor -	
Roof -	

Table 7 (cont'd).

Variable	Level				
Household Possession		Yes		No	
		n	(%)	n	(%)
	Stove	309	(100)		
	Radio	294	(95.1)	15	(4.9)
	Refrigerator	287	(92.9)	22	(7.1)
	Television	309	(99.4)	2	(0.6)
	Piped Water	294	(95.1)	15	(4.9)
	Electricity	304	(98.4)	5	(1.6)
	Motorcycle	200	(64.7)	109	(35.3)
	Car	141	(45.6)	168	(54.4)
Household Constructions				n	(%)
	Wall -	Wood		149	(48.2)
		Bricks		159	(51.5)
		Others		1	(0.3)
	Floor -	Wood		35	(11.3)
		Cement		237	(76.7)
		Tiles		37	(12.0)
	Roof -	Zinc		205	(66.3)
		Concrete		100	(32.4)
		Asbestos		4	(1.3)

Table 7 (cont'd).

Variable	Level
Household Ownership	
House	-
Land	-
Type of Housing	
Squatter	
Government	
Low Cost F	
Terrace	
Bungalow (	

USD1.00 = RM4.0

M = mean; SD

Table 7 (cont'd).

Variable	Level		
Household Ownership		n	(%)
House -	Government	34	(11.0)
	Rent	104	(33.7)
	Self	171	(55.3)
Land -	Government	205	(66.3)
	Rent	51	(16.5)
	Self	53	(17.2)
Type of Housing			
Squatter		134	(43.4)
Government Long House		42	(13.6)
Low Cost Flat		98	(31.7)
Terrace		8	(2.6)
Bungalow (Brick or Timber)		27	(8.7)

USD1.00 = RM4.00

M = mean; SD = standard deviation;

This section

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Research Findings

This section discusses the findings of the research questions for Study 1 and Study 2. It includes both the descriptive parts and hypotheses testing of the questions.

Research Question 1

What are the prevalences of stunting (low height-for-age) and wasting (low weight-for-height) and the mean Z-scores of height-for-age and weight-for-height for the primary school children according to gender, standard (1-3) and age (6-6.9, 7-7.9, 8-8.9 and 9-9.9)?

The percentages of the primary school children who were stunted and wasted according to their gender are shown in Table 8. Height-for-age is used as an indicator of stunting, an index of chronic malnutrition, while weight-for-height is used as an indicator of wasting, an acute condition of current malnutrition. Approximately 50% (n=3893) of the school children were mildly-severely stunted and 30% (n=2568) were mildly-severely wasted. The percentage of children who were both wasted and stunted is approximately 15% (n=1208) with the majority (n=644) of children being mildly wasted and mildly stunted (MW and MS). The findings also indicate that a greater percentage of male children were stunted and wasted compared to female children.

When comparing the percentages of children who were 1 SD (mildly) and 2 SD (significantly) below the NCHS reference median for height-for-age and weight-for-height in this sample to the 'normal' (or expected) proportion of children in the NCHS reference population (below median –1 SD = 15.9%; below median –2 SD = 2.3%), the

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percentage of children in this sample who were mildly or significantly malnourished based on these two indicators exceeded the 'expected' proportions in the NCHS reference population (mildly stunted = 32.0%, significantly stunted = 16.7%; mildly wasted = 22.9%, significantly wasted = 9.2%).

Table 9 presents the findings for the independent t-test and One-way ANOVA on height-for-age and weight-for-height Z-scores by gender, age and standard. The findings indicate that there are significant differences in the mean Z-scores for both indicators according to these variables. The null hypotheses pertinent to the findings are:

Height-for-age

Ho-1: There is no significant difference in mean Z-scores for height-for-age among primary school children by gender.

The result of independent t-test on mean Z-scores for height-for-age reveals a significant difference in the mean Z-scores between male and female children ($t = -2.545$; $p < 0.05$). Female children had a better (higher) mean Z-score for height-for-age than male children. Thus, this null hypothesis is rejected.

Ho-2: There is no significant difference in mean Z-scores for height-for-age among primary school children by age.

Significant differences are evident in the One-way ANOVA test for the mean Z-scores for height-for-age according to this variable ($F(3, 8001) = 117.054$; $p < 0.001$). The older the child is, the lower his/her mean Z-score for height-for-age. In other words, as age increases, the child is likely to be mildly stunted. This null hypothesis is rejected.

Ho-3: There is no significant difference in mean Z-scores for height-for-age among primary school children by standard.

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The findings from One-way ANOVA emphasize that there are significant differences in the mean Z-scores for height-for-age by the standard a child is in ($F(2, 8002) = 89.692$; $p < 0.001$). Children in higher standards had significantly lower mean Z-scores for height-for age. This finding also implies that as the age of the child increases according to his/her standard, he/she will have a lower mean Z-score for height-for-age. Therefore, this null hypothesis is rejected.

Weight-for-height

Ho-4: There is no significant difference in mean Z-scores for weight-for-height among primary school children by gender.

An independent t-test was utilized to compare the mean Z-scores for weight-for-height of male and female children. There is a significant difference in the mean Z-scores between these two groups ($t = -2.661$; $p < 0.01$) with a higher mean Z-score for weight-for-height for female children than male children. Thus, this null hypothesis is rejected.

Ho-5: There is no significant difference in mean Z-scores for weight-for-height among primary school children by age.

The findings from One-way ANOVA indicate that there are significant differences in mean Z-scores for weight-for-height according to children's age ($F(3, 8001) = 41.055$; $p < 0.001$). Although the mean Z-scores for each of the four age categories indicate normal growth ($-1\ SD \leq x \leq 2\ SD$ of NCHS/CDC reference median), as the child gets older, the higher his/her mean Z-score for weight-for-height. This null hypothesis is rejected.

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Ho-6: There is no significant difference in mean Z-scores for weight-for-height among primary school children by standard.

It is evident from the One-way ANOVA that there are significant differences in the mean Z-scores for weight-for-height by standard ($F(2, 8002) = 71.467$; $p < 0.001$). Unlike the mean Z-scores for height-for-age which are significantly lower as children are in higher standards, the mean Z-scores for weight-for-height are significantly higher as children are in higher standards. Therefore, this null hypothesis is rejected.

Table 8

Growth Status Dis
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Variable	Le
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High[c]	
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Normal[c]	
High[c]	
Weight-for-heigh	
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b = -2 SD ≤ x <
c = -1 SD ≤ x ≤
d = > 2 SD of th
e = categories of
for-age Z scores

Table 8

Growth Status Distribution (Height-for-Age and Weight-for-Height) Among Primary School Children (n=8005)

Variable	Level	Male		Female		Total	
		n	(%)	n	(%)	n	(%)
Height-for-age		4212	(52.6)	3793	(47.4)	8005	(100.0)
	Significantly[a] Stunted (SS)	761	(18.1)	572	(15.1)	1333	(16.7)
	Mildly[b] Stunted (MS)	1351	(32.1)	1209	(31.9)	2560	(32.0)
	Normal[c]	2051	(48.7)	1989	(52.4)	4040	(50.5)
	High[d]	49	(1.2)	23	(0.6)	72	(0.9)
Weight-for-height		4212	(52.6)	3793	(47.4)	8005	(100.0)
	Significantly[a] Wasted (SW)	419	(9.9)	318	(8.4)	737	(9.2)
	Mildly[b] Wasted (MW)	1031	(24.5)	800	(21.1)	1831	(22.9)
	Normal[c]	2510	(59.6)	2464	(65.0)	4974	(62.1)
	High[d]	252	(6.0)	211	(5.6)	463	(5.8)
Weight-for-height * Height-for-age[e]		697	(8.7)	511	(6.4)	1208	(15.1)
	SW and SS	49	(7.0)	31	(6.1)	80	(6.6)
	SW and MS	121	(17.4)	83	(16.2)	204	(16.9)
	MW and SS	178	(25.5)	102	(20.0)	280	(23.2)
	MW and MS	349	(50.1)	295	(57.7)	644	(53.3)

a = < -2 SD of the NCHS/CDC median
b = -2 SD $\leq$ x < -1 SD of the NCHS/CDC median
c = -1 SD $\leq$ x $\leq$ 2 SD of the NCHS/CDC median
d = > 2 SD of the NCHS median
e = categories of growth status based on a combination of weight-for-height and height-for-age Z scores

Table 9

Mean Z-scores of H
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Table 9

Mean Z-scores of Height-for-Age and Weight-for-Height by Gender, Age and Standard of Primary School Children (n=8005)

Variable	Level	n	M	SD	p-value
Height-for-Age					
Gender					
	Male	4212	-0.96	1.19	0.011 *
	Female	3793	-0.89	1.06	
Age (years)					
	6.0 – 6.9	1598	-0.60	1.12	0.000 *** [a]
	7.0 – 7.9	2058	-0.79	1.18	
	8.0 – 8.9	2840	-1.03	1.07	
	9.0 – 9.9	1509	-1.28	1.03	
Standard					
	Std. 1	2598	-0.70	1.12	0.000 *** [b]
	Std. 2	2839	-0.99	1.15	
	Std. 3	2568	-1.09	1.07	

Table 9 (cont'd).

Variable	Lev
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b = Std. 1 & St

c = 6.0 – 6.9 &
7.0 – 7.9 &
8.0 – 8.9 &

Table 9 (cont'd).

Variable	Level	n	M	SD	p-value
Weight-for-Height					
Gender					
	Male	4212	-0.35	1.42	0.008 **
	Female	3793	-0.27	1.34	
Age (years)					
	6.0 – 6.9	1598	-0.54	1.44	0.000 *** [c]
	7.0 – 7.9	2058	-0.44	1.39	
	8.0 – 8.9	2840	-0.20	1.35	
	9.0 – 9.9	1509	-0.08	1.33	
Standard					
	Std. 1	2598	-0.55	1.41	0.000 *** [b]
	Std. 2	2839	-0.29	1.37	
	Std. 3	2568	-0.09	1.34	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

M = mean; SD = standard deviation;

Bonferroni post-hoc test indicates that these groups differ from each other significantly:
a = 6.0 – 6.9 & 7.0 – 7.9; 6.0 – 6.9 & 8.0 – 8.9; 6.0 – 6.9 & 9.0 – 9.9;
7.0 – 7.9 & 8.0 – 8.9; 7.0 – 7.9 & 9.0 – 9.9;
8.0 – 8.9 & 9.0 – 9.9;

b = Std. 1 & Std. 2; Std. 1 & Std. 3; Std. 2 & Std. 3

c = 6.0 – 6.9 & 8.0 – 8.9; 6.0 – 6.9 & 9.0 – 9.9;
7.0 – 7.9 & 8.0 – 8.9; 7.0 – 7.9 & 9.0 – 9.9;
8.0 – 8.9 & 9.0 – 9.9;

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Research Question 2

a)How much participation do mothers have in making and implementing household decisions in comparison to fathers?

Decision making and implementation of decisions of mothers were investigated by asking the mothers to respond to two sets of 24 statements – one set on the level of their participation in making household decisions and the other of the level of their participation in implementing the household decisions in comparison to their husbands. These twenty four statements were categorized into three groups – Household income and expenditure, Household food and Child care, health and feeding). Table 10 indicates the mean scores for mothers and fathers in each category of making and implementing household decisions. The hypotheses that are pertinent to this research question are:

Decision Making

Ho-1: There is no significant difference between mothers' and fathers' participation in decision making related to household income and expenditure.

Paired sample t-test performed on the mean scores for decision making of mothers fathers in relation to household income and expenditure reveals that there is a significant difference between the means for this variable. Fathers had significantly more influence on household decisions related to income and expenditure compared to mothers ($t = -8.821$; $p < 0.001$). This null hypothesis is rejected.

Ho-2: There is no significant difference between mothers' and fathers' participation in decision making related to food.

Paired sample t-test indicates that there is a significant difference between mothers' and fathers' participation in household decision making related to food. The

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finding indicates that mothers had significantly more participation in decision making than fathers ($t = 6.825$; $p < 0.001$). Therefore, this null hypothesis is rejected.

Ho-3: There is no significant difference between mothers' and fathers' participation in decision making related to child care, health and feeding.

The finding based on paired sample t-test indicates that mothers had significantly more participation in making household decisions related to child care, health and feeding than fathers ($t = 4.889$; $p < 0.001$). Similar to household decisions related to food, decisions pertinent to child care, health and feeding seemed to be in the domain of mothers. This null hypothesis is rejected.

Ho-4: There is no significant difference between mothers' and fathers' participation in total decision making.

The result of paired sample t-test on mean scores for total decision making reveals no significant difference between mothers' and fathers' mean scores ($t = 0.980$; $p = 0.328$). The finding implies that mothers and fathers had similar contribution to the overall household decision making. Thus, this null hypothesis is not rejected.

Decision Implementation

Ho-5: There is no significant difference between mothers' and fathers' participation in decision implementation related to household income and expenditure.

Paired sample t-test performed on the mean scores for decision implementation between mothers and fathers in relation to household income and expenditure indicates that there is a significant difference between the means for this variable ($t = -7.099$; $p < 0.001$). Similar to decision making related to household income and expenditure, fathers had significantly more participation in decision implementation related to income

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and expenditure than mothers. This null hypothesis is rejected.

Ho-6: There is no significant difference between mothers' and fathers' participation in decision implementation related to food.

The finding indicates that there is a significant difference between mothers' and fathers' participation in implementing household decision related to food ($t = 9.061$; $p < 0.001$). Mothers had significantly more participation in decision implementation in this area of household decision than fathers. Therefore, this null hypothesis is rejected.

Ho-7: There is no significant difference between mothers' and fathers' participation in decision implementation related to child care, health and feeding.

The finding based on paired sample t-test indicates that mothers had significantly more participation in implementing household decisions related to child care, health and feeding than fathers ($t = 7.302$; $p < 0.001$). This null hypothesis is rejected.

Ho-8: There is no significant difference between mothers' and fathers' participation in total decision implementation.

The result of paired sample t-test on mean scores for total decision implementation reveals that there is a significant difference between mothers and fathers mean scores ($t = 3.018$; $p < 0.01$). Although fathers did dominate in the implementation of decisions related to income and expenditure, mothers had significantly more participation in implementing the overall household decisions. Also, unlike total decision making in which mothers and fathers had similar participation, mothers had significantly more power than fathers in the implementation of total household decisions. Thus, this null hypothesis is rejected.

Table 10

Mean Scores for
(n=309)

Variable	Le
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Table 10

Mean Scores for Mothers and Fathers in Decision Making and Decision Implementation (n=309)

Variable	Level	M	SD	med.	p-value
Decision Making					
Income and Expenditure					
	Mother	13.49	4.42	14.0	0.000 ***
	Father	17.20	3.43	17.0	
Food					
	Mother	17.18	4.28	17.0	0.000 ***
	Father	14.24	3.58	15.0	
Child care, health and feeding					
	Mother	16.74	3.64	16.0	0.000 ***
	Father	14.92	3.24	15.0	
Total Decision Making					
	Mother	47.41	10.13	48.0	0.328
	Father	46.42	8.45	47.0	

Table 10 (cont'd).

Variable	Lev
Decision Implem	
Income and Expe	
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Total Decision	

** $p < 0.01$

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Table 10 (cont'd).

Variable	Level	M	SD	med.	p-value
Decision Implementation					
Income and Expenditure					
	Mother	13.88	4.60	14.0	0.000 ***
	Father	17.11	3.69	17.0	
Food					
	Mother	17.75	4.06	17.0	0.000 ***
	Father	13.92	3.55	14.0	
Child care, health and feeding					
	Mother	17.14	3.19	17.0	0.000 ***
	Father	14.67	2.91	15.0	
Total Decision Implementation					
	Mother	48.78	9.74	48.0	0.003 **
	Father	45.77	8.28	46.0	

** $p < 0.01$ *** $p < 0.001$

M = mean; SD = standard deviation; Med =median

Possible score range for Decision Making and Decision Implementation related to income and expenditures, food and child care, health and feeding:
Lowest = 0 Highest = 24

Possible score range for Total Decision Making and Total Decision Implementation:
Lowest = 0 Highest = 72

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b)Is there any difference between mothers' participation in making and implementing household decisions?

As discussed in the previous Chapter 2, many studies have often neglected the distinct processes of making and implementing household decisions. While making or planning decisions is a process using cognitive skills to envision what is to be done, implementing decisions is putting plans into effect or actuating plans and controlling the actions. This question tries to answer whether these two processes are indeed different among a sample of Malay mothers. Table 11 indicates the mean scores of mothers on making and implementing household decisions. In all areas of household decisions, mothers had more participation in implementing than making household decisions. The hypotheses that are pertinent to this research question are:

Ho-9: There is no significant difference between mothers' participation in decision making and implementation related to household income and expenditure.

A significant difference is evident in the paired sample t-test between mothers' participation in decision making and implementation related to income and expenditure ($t = -2.142$, $p < 0.05$). Mothers had more power in implementing the household decisions related to income and expenditure than making the decisions. Therefore, this null hypothesis is rejected.

Ho-10: There is no significant difference between mothers' participation in decision making and implementation related to food.

The finding based on the paired sample t-test reveals that mothers' mean score of decision implementation related to food is significantly higher than that of decision making ($t = -2.966$; $p < 0.01$). This null hypothesis is rejected.

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Ho-11: There is no significant difference between mothers' participation in decision making and implementation related to child care, health and feeding.

The paired sample t-test performed on mean scores for decision making and implementation related to child care, health and feeding indicates that mothers had more participation in decision implementation than in decision making ($t = -2.310$; $p < 0.05$). This null hypothesis is rejected.

Ho-12: There is no significant difference between mothers' participation in total decision making and implementation.

The finding shows that there is a significant differences in mean scores between mothers' participation in total decision making and implementation ($t = -3.110$, $p < 0.01$). Mothers seemed to have significantly more influence in putting the decisions into action than in the planning of the decisions. Thus, this null hypothesis is rejected.

Table 11

Mean Scores for
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Table 11

Mean Scores for Mothers' Participation in Decision Making and Decision Implementation (n=309)

Variable	Level	M	SD	med.	p-value
Income and Expenditure					
	Decision Making	13.49	4.42	14.0	0.033 *
	Decision Implementation	13.88	4.60	14.0	
Food					
	Decision Making	17.18	4.28	17.0	0.003 **
	Decision Implementation	17.75	4.06	17.0	
Child care, health and feeding					
	Decision Making	16.74	3.64	16.0	0.022 *
	Decision Implementation	17.14	3.19	17.0	
Total Household Decisions					
	Decision Making	47.41	10.13	48.0	0.002 **
	Decision Implementation	48.78	9.74	48.0	

* $p < 0.05$ ** $p < 0.01$

M = mean; SD = standard deviation; Med = median;

Possible score range for Decision Making and Decision Implementation related to income and expenditures, food and child care, health and feeding:
Lowest = 0 Highest = 24

Possible score range for Decision Making and Decision Implementation of total household decisions:
Lowest = 0 Highest = 72

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c)Do mothers' participation in making and implementing household decisions vary with age, years of schooling, employment status, income earning level, total household income and income per capita?

For the following discussion, only Total Decision Making and Total Decision Implementation are considered. As there is a significant difference between mother's participation in making and implementing total household decisions (Table 11), two separate analyses of these two processes as a function of the various household variables were conducted. The results of one-way ANOVA followed by Bonferroni test (to determine which mean difference is significant at 0.05 level) or independent sample t-test are presented in Table 12. The hypotheses related to the findings are:

Total Decision Making

Ho-13: There is no significant difference in mothers' participation in total decision making by age.

One-way ANOVA indicates that there is no significant difference in mean scores of mothers' participation in decision making by mothers' age groups. This implies that older mothers and younger mothers did not differ in their participation in total decision making. Therefore, this null hypothesis is retained.

Ho-14: There is no significant difference in mothers' participation in total decision making by years of schooling.

The finding from One-way ANOVA reveals that there is no significant mean difference among the three levels of education in terms of mothers' participation in total decision making. Years of schooling does not seem to influence mothers' participation in total decision making. This null hypothesis is retained.

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Ho-15: There is no significant difference in mothers' participation in total decision making by employment status.

A significant difference is evident from the One-way ANOVA for mothers' participation in decision making by employment status ($F(2, 306) = 7.456$; $p < 0.001$). Regardless of the location of work place (home or away from home), mothers who were working had significantly higher mean scores in total decision making than housewives. Therefore, this null hypothesis is rejected.

Ho-16: There is no significant difference in mothers' participation in total decision making by income earning level.

A significant difference is found in the independent t-test results for mothers' participation in decision making by their income earning levels ($t = -4.010$; $p < 0.001$). Mothers who had no income at all had significantly lower participation in total decision making than mothers who had incomes. This null hypothesis is rejected.

Ho-17: There is no significant difference in mothers' participation in total decision making by total household income.

No significant difference is evident from the independent t-test for mothers' participation in decision making by total household income. The result indicates that mothers in households with incomes more than RM2162 did not have significantly higher participation in total decision making compared to mothers in households with RM2162 or less. This hypothesis is not rejected.

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Ho-18: There is no significant difference in mothers' participation in total decision making by income per capita.

The One-way ANOVA test shows that there is no significant difference in mothers' participation in total decision making according to household income per capita. Mothers of poor households (RM1 – 150) did not significantly differ in their participation in total decision making than mothers in higher brackets of income per capita. Thus, this null hypothesis is retained.

Total Decision Implementation

Ho-19: There is no significant difference in mothers' participation in total decision implementation by age.

There is no significant difference in mean scores of mothers' participation in decision implementation by mothers' age groups in the One-way ANOVA test. Regardless of age, mothers had similar participation the implementation of household decisions. Therefore, this null hypothesis is not rejected.

Ho-20: There is no significant difference in mothers' participation in total decision implementation by years of schooling.

The finding from One-way ANOVA reveals that there is no significant mean difference among the three levels of education in terms of mothers' participation in total decision implementation. Mothers with primary, secondary and more than secondary education did not significantly differ in the mean scores for total decision implementation. This null hypothesis is retained.

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Ho-21: There is no significant difference in mothers' participation in total decision implementation by employment status.

A significant difference is evident from the findings for mothers' participation in decision implementation by their employment status ($F(2, 306) = 7.456$; $p < 0.001$). The Bonferroni test indicates that only the mean total decision implementation score of mothers who were working away from home is significantly different from that of housewives. Therefore, this null hypothesis is rejected.

Ho-22: There is no significant difference in mothers' participation in total decision implementation by income earning level.

A significant difference is found in the independent t-test results for mothers' participation in decision making by their income earning levels ($t = -3.930$; $p < 0.001$). Mothers who had no income at all had significantly lower participation in total decision implementation than mothers who had incomes. This null hypothesis is rejected.

Ho-23: There is no significant difference in mothers' participation in total decision implementation by total household income.

The independent t-test indicates that there is no significant difference in mothers' mean scores for total decision implementation by total household income. Mothers in both categories of total household income did not significantly differ in their participation in total decision making. This hypothesis is not rejected.

Ho-24: There is no significant difference in mothers' participation in total decision implementation by income per capita.

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The finding reveals that there is no significant difference in mothers' participation in total decision implementation according to household income per capita. Mothers in households with income per capita of RM1-150 (below poverty level income), did not significantly differ in their participation in total decision implementation than mothers in households with income per capita above the poverty level income. Thus, this null hypothesis is retained.

Table 12

Mean Scores for
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Table 12

Mean Scores for Total Decision Making and Total Decision Implementation of Mothers by Maternal and Household Characteristics (n=309)

Variable	Level	n	M	SD	p-value
Total Decision Making					
Mother's Age (years)					
	20-29	48	46.40	7.67	
	30-39	183	47.13	11.16	
	> 39	78	49.69	8.82	
Years of Schooling (years)					
	0-6	95	48.21	9.62	
	7-11	185	46.63	10.66	
	> 11	29	49.76	7.75	
Employment Status					
	Work (H)	34	50.59	7.43	0.001 ** [a]
	Work (A)	107	49.50	10.22	
	No work	168	45.43	10.16	
Income Earning					
	No income	170	45.37	10.27	0.000 ***
	Income	139	49.91	9.41	

Table 12 (cont'd

Variable	L
Household Inco	
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Total Decisio	
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Table 12 (cont'd).

Variable	Level	n	M	SD	p-value
Household Income (RM)					
	1-2162	267	47.16	10.32	
	>2162	42	49.00	8.80	
Income per capita (RM)					
	1-150	113	47.17	10.48	
	151-300	117	47.01	10.79	
	>300	79	48.35	8.55	
Total Decision Implementation					
Mother's Age (years)					
	20-29	48	48.52	8.92	
	30-39	183	48.57	9.69	
	≥ 40	78	49.42	10.39	
Years of Schooling (years)					
	0-6	95	49.24	10.30	
	7-11	185	48.37	9.67	
	≥ 12	29	49.83	8.34	
Employment Status					
	Work (H)	34	50.32	8.35	0.001 ** [b]
	Work (A)	107	51.29	9.52	
	No work	168	46.86	10.06	

Table 12 (cont'd

Variable	L
Income Earning	
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*p < 0.05

M = mean:

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Table 12 (cont'd).

Variable	Level	n	M	SD	p-value
Income Earning					
	No income	170	46.85	10.06	0.000 ***
	Income	139	51.13	8.81	
Household Income (RM)					
	1-2162	267	48.63	10.08	
	>2162	42	49.69	7.17	
Income per capita (RM)					
	1-150	113	48.09	11.44	
	151-300	117	48.89	9.13	
	>300	79	49.59	7.81	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

M = mean; SD = standard deviation;

Employment Status: Work (At Home)
Work (Away from Home)
No Work

Bonferroni post-hoc test indicates that these groups differ from each other significantly:
a = Work (H) & No Work; Work (A) & No Work;

b = Work (A) & No Work

Possible score range for Total Decision Making and Total Decision Implementation::
Lowest = 0 Highest = 72

Research Quest

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Research Question 3

a)What is the distribution of mothers' nutrition knowledge scores?

Table 13 shows the summary of mothers' nutrition knowledge scores. The mean score is 14.71. Although the highest possible score is 32, all of the mothers had scores between a minimum of 0 and a maximum of 25. Taking the percentile scores as cutting points, four categories of mothers' scores are observed.

b)When mother's age is controlled, does the nutrition knowledge score vary with years of schooling?

Bivariate correlations were first computed to examine the relationship between nutrition knowledge scores and individual characteristics (mother's age and years of schooling) and between the individual characteristics. Table 13 reveals that there is a significant positive relationship between years of education and nutrition knowledge scores ($r = .31$), while a significant negative relationship exists between years of schooling and mother's age ($r = -.34$). These findings imply that as mothers' education level increased, their nutrition knowledge scores increased and that older mothers had lower years of formal schooling. Partial correlation was also computed to examine the relationship between nutrition knowledge scores and years of schooling while controlling for mother's age. The result indicates that the significant positive relationship between nutrition knowledge and years of schooling is retained ($r = .33$). In other words, regardless of mother's age, as years of schooling increased, mothers knowledge in nutrition tends to increase.

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A General Linear Model Analysis (GLM) was conducted to determine the interaction effect between mother's age and years of schooling in relation to nutrition knowledge scores. The findings in Table 14 indicate that there is no interaction effect between mother's age and years of schooling ($F = 1.38$, $p = 0.25$). This means that as the homogeneity of regressions assumption (the regression of total nutrition knowledge score on mother's age is the same for all three levels of mother's years of schooling) is not rejected, analysis of covariance can be conducted. The null hypothesis pertinent to this research question is:

Ho-1: When mother's age is controlled, there is no significant difference in nutrition knowledge scores by years of schooling.

Analysis of covariance (ANCOVA) was performed to determine if the difference in the mean scores of nutrition knowledge by years of schooling is confounded by mother's age. When mother's age is controlled in the analysis, the mean scores of mothers with secondary education (7-11 years of schooling) and more than secondary education (more than 11 years of schooling) are significantly higher than the mean score for mothers with primary education (0-6 years of schooling). Also, the mean score of mothers with secondary education is significantly lower than that of mothers with more than secondary education. Based on the finding, this null hypothesis is rejected.

Table 13

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** $p < 0.01$

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Table 13

Mean Score for Mothers' Nutrition Knowledge and the Correlation Between Mother's Characteristics and Nutrition Knowledge Scores (n=309)

Variable	Level	n	(%)	M	SD	min.	max.	med.
Possible Score Range						0	32	
Total Score (Mothers)		309	(100)	14.71	4.26	0	25	15.0
Percentile Score (Mothers)								
	0 - 12	79	(25.6)					
	13 - 15	90	(29.1)					
	16 - 18	92	(29.8)					
	19 - 25	48	(15.5)					
Bivariate Correlation (r)		309	(100)					
				Nutrition Knowledge Score			Years of Schooling	
	Years of Schooling			.31 **				
	Mother's age			-.01			-.34 **	
Partial Correlation [a] (r)		309	(100)					
				Nutrition Knowledge Score				
	Years of Schooling			.33 **				

** $p < 0.01$

a = Partial correlation between nutrition knowledge score and years of schooling while controlling for mother's age

M = mean; SD = standard deviation; Min = minimum; Max = maximum; Med =median;

Table 14

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Table 14

Interaction Effect Between Mother's Age and Years of Schooling and Mean for Nutrition Knowledge Scores by Years of Schooling after Controlling for Mother's Age (n=309).

Variable	Level	n	M	SD	p-value
General Linear Model (GLM)					
Nutrition Knowledge Score					
Main Effects					
	Years of Schooling				0.107
	Mother's Age				0.395
Interaction Effect					
	Years of Schooling * Mother's Age				0.254
Analysis of Covariance (ANCOVA)					
Nutrition Knowledge Score					
Main Effect					
	Years of Schooling (years)				0.000 *** [a]
	0 - 6	95	13.26	4.28	
	7 - 11	185	14.89	4.16	
	> 11	29	18.30	4.08	
Covariate					
	Mother's Age				0.204

*** $p < 0.001$

Bonferroni post-hoc test indicates that these groups differ from each other significantly:
a = 0 – 6 & 7 – 11; 0 – 6 & > 11; 7 – 11 & > 11;

M = mean; SD = standard deviation;

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Research Question 4

a)What is the distribution of household food security?

The summary findings on mothers' responses to statements on household food security are reported in Table 15. The majority of the mothers (n=206) reported some kind of household food insecurity – 30.1% household food insecure, 27.8% child hunger and 8.7% individual food insecure. For further discussion, household food security is divided into three categories according to its severity – household food secure, household/individual food insecure and child hunger.

b)How do household economic characteristics (total household income and income per capita) vary with household food security?

Table 15 indicates the relative odds (OR) of household income and income per capita by household food security. In the analysis, relative odd (OR) of 1 means that the independent variable (e.g., household income or income per capita) does not differ in its risk for food insecurity than for the reference group (household food secure). An OR more than 1 indicates that the independent variable is a risk factor while an OR less than 1 has a protective measure against food insecurity. The analyses also serve as a cross-validation of other household factors related to food insecurity. The null hypotheses pertinent to the findings are:

Total Household Income

Ho-1: Households with different levels of food security do not differ significantly in total household income.

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Based on the multinomial logistic regression, the relative odds show that the higher the total household income, the lower the odds that the households will experience household/individual food insecure (OR = 0.998; $p < 0.001$) or child hunger (OR = 0.997; $p < 0.001$) relative to being food secure. In other words, low household income is a risk factor for food insecurity among the households in this study. Therefore, this null hypothesis is rejected.

Income per capita

Ho-2: Households with different levels of food security do not differ significantly in household income per capita.

The finding from multinomial logistic regression also indicates that low income per capita is a risk factor for household food insecurity. Similar to household income, the higher the income per capita, the odds that a household will be household/individual food insecure is much less to being food secure (OR = 0.992; $p < 0.001$). Also, the odds that the household has a hungry child will be much less relative to the household being food secure (OR = 0.987; $p < 0.001$). Therefore, this null hypotheses is rejected.

Table 15

Relative Odds f

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*** p < 0.0

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reference
c = 0.998
d = 0.995

Table 15

Relative Odds for Risk Factors for Household Food Insecurity (n=309)

Variable	Level	n	Odds ratio	p-value
Household Food Security				
	Hh. Food Secure	103		
	Hh Food Insecure	93		
	Individual Food Insecure	27		
	Child Hunger	86		
Household Economic Characteristics				
Household Total Income (RM)				
	Hh. Food Secure (reference) [a]	103	1.000	
	Hh/Ind. Food Insecure [b]	120	0.998	0.00 ***
	Child Hunger	86	0.997	0.00 *** [c]
Income per capita (RM)				
	Hh. Food Secure (reference)	103	1.000	
	Hh/Ind. Food Insecure	120	0.992	0.00 ***
	Child Hunger	86	0.987	0.00 *** [d]

*** $p < 0.001$

a = Household Food Secure
b = Household/Individual Food Insecure

Relative odds for Child Hunger with Household/Individual Food Insecure as the reference group:
c = 0.998 ($p < 0.01$)
d = 0.995 ($p < 0.01$)

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Research Question 5

a)What is the distribution of mothers' food allocation rules?

The various types of mothers' food allocation rules in this sample is presented in Table 16. Three types of food allocation rules were identified – Contribution Rule, Needs Rule and Equality. Mothers using a contribution rule were either those who reported with adult/worker or male preference in food allocation. In this sample, mothers who reported having demand preference frequently mentioned that it is their children (not adults in the households) who ask for more food and that they will give more food to these children. Thus, as this type of preference tends to favor children, it is appropriate to categorize it as Needs Rule. Equality has been identified as another food allocation rule frequently mentioned by a sample of Guatemalan mothers (Engle and Nieves, 1993b). This rule implies that each person should be given an equal proportion of food or other resources regardless of age, health condition, sex and income earning ability. Although equality is similar to the needs rule in that the younger and smaller children would receive relatively more food than older and larger household members, each rule differs in its process. While the needs rule assumes that mothers give priority to their children in food allocation , mothers using the equality rule give food on an equal basis (no priority to the children).

A majority of the mothers in this sample (71.2%) were categorized as using an equality rule. This is followed by mothers with needs rule (26.5%) and contribution rule (2.3%). As the number of mothers using the contribution rule is too small for statistical analysis, only needs and equality rules were considered in the analysis.

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b)How do mothers' years of schooling, income earning and nutrition knowledge, total household income, income per capita and household food security differ by mothers' food allocation rules?

Independent sample t-test and Chi-square analyses were utilized to compare the mean differences and frequency distribution of household and individual variables by needs and equality rules. Table 16 summarizes the findings which indicate that mothers using the needs rule and equality rule did not differ in any of the mentioned individual or household characteristics. Years of formal education, amount of earned incomes and nutrition knowledge of mothers did not differ significantly between these two groups of mothers. Further analysis (data is not shown) of mothers with Equality and Needs rules who were working and with earned incomes (n=135) also did not reveal any significant difference in mean earned incomes ($t = 0.214$; $p = 0.838$). The mother's food allocation rule did not differ by income and food adequacy in her household. Thus, all the null hypotheses related to the findings are retained:

Ho-1: Mothers with needs and equality rules do not differ significantly in years of schooling.

Ho-2: Mothers with needs and equality rules do not differ significantly in income earning.

Ho-3: Mothers with needs and equality rules do not differ significantly in nutrition knowledge scores.

Ho-4: Mothers with needs and equality rules do not differ significantly in total household income.

Ho-5: Mothers with needs and equality rules do not differ significantly in household income per capita.

Ho-6: Mothers with needs and equality rules do not differ significantly in household food security.

Table 16

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Table 16

Maternal and Household Characteristics by Mothers' Food Allocation Rules (n=302)

Variable	Level	n	(%)	M		p-value
				Needs Rule (n=82)	Equality (n=220)	
Food Allocation Rules		309	(100)			
Contribution Rule		7	(2.3)			
	Adult/Worker Pref.	7	(2.3)			
	Male Preference	0	(0.0)			
Needs Rule		82	(26.5)			
	Child Preference	74	(23.9)			
	Demand Preference	8	(2.6)			
Equality		220	(71.2)			
Maternal and Household Characteristics						
Years of Schooling		302		9.01	8.71	0.469
Mother's Income Earning (RM)		302		343.01	329.27	0.838
Nutrition Knowledge Score		302		14.56	14.71	0.789
Household Total Income (RM)		302		1524.16	1449.93	0.606
Income per capita (RM)		302		260.74	253.40	0.805
Household Food Security		302		Chi-square = 1.66		0.680
	Hh. Food Secure					
	Hh/Ind. Food Insecure					
	Child Hunger					

M = mean;

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Research Question 6

Do mothers' perceptions of child health status vary with household demographic and economic variables (number of children, years of schooling for mothers and fathers, total household income and income per capita), child care and feeding variables (nutrition knowledge and household food security) and child-related variables (gender, age, birth order and number of younger siblings)?

Table 17 indicates the summary scores of child health status – previous health, recent health, susceptibility and resistance to illness and total health. Previous health indicates the child's health throughout his life until now, while recent health provides his current health condition. Susceptibility and resistance to illness represents the child's immunity against diseases. For the following discussion, only total health will be considered as it reflects the overall health of the child. The score for total health ranged from 16 to 34 with an average of 24.67.

One-way ANOVA was utilized to examine whether the mean differences in the total health score vary by the various levels of household variables. The null hypotheses related to the findings are:

Number of Children

Ho-1: There is no significant difference in child's health status by number of children in the household.

The finding from One-way ANOVA indicates that the number of children in the household does not significantly affect the child's health status ($F\ (2,\ 306) = 0.561$; $p = 0.571$). It also implies that the distribution of resources does not differ by the number of children in the households and that the resources may be distributed equally among all

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children. This finding will further be confirmed by findings on child's health status according to his/her birth order and the number of young children (0-6 years old) in the households. This hypothesis is not rejected.

Years of Schooling

Ho-2: There is no significant difference in child's health status by mother's years of schooling.

A significant difference is evident from the One-way ANOVA for the mean scores of child's health status according to mother's years of schooling ($F(2, 306) = 3.251$; $p < 0.05$). However, the difference is only significant between mother's with more than secondary education (more than 11 years of schooling) and mothers with only primary education (0-6 years of schooling). Thus, this hypothesis is rejected.

Ho-3: There is no significant difference in child's health status by father's years of schooling

Unlike mother's years of schooling, father's years of schooling does not produce any significant effect on child's health status based on One-way ANOVA test ($F(2, 306) = 2.937$; $p = 0.065$). This finding may imply that mother's education plays a more significant role than that of father's in determining the health of their children. This null hypothesis is retained.

Total Household Income

Ho-4: There is no significant difference in child's health status by total household income.

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The independent t-test performed on the mean scores for child health status reveals that there is a significant difference between the two groups of household income ($t = -2.787$; $p < 0.01$). Children from households with incomes more than RM2162 had a significantly higher mean score for health status than children from households with incomes of RM2162 or less. Therefore, the null hypothesis is rejected.

Income per capita

Ho-5: There is no significant difference in child's health status by income per capita

The finding from One-way ANOVA indicates that the mean scores of child health status differ significantly according to this variable ($F (2, 306) = 3.923$; $p < 0.05$). Children from households with income per capita more than RM300 had significantly higher mean scores for health status than children in the other two groups (RM1-150 and RM151-300). This null hypothesis is rejected.

Nutrition Knowledge

Ho-6: There is no significant difference in child's health status by mother's nutrition knowledge scores

The finding from One-way ANOVA reveals that mothers with higher scores in nutrition knowledge had children with better total health scores ($F (2, 306) = 4.388$; $p < 0.013$). Post-hoc test indicates that mothers with the highest score (> 18) had better total health scores for their children than mothers in the other two groups. This null hypothesis is rejected.

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Ho-7: There is no significant difference in child's health status by household food security.

The finding based on one-way ANOVA indicates that there is a significant difference in the mean scores of child health status by the severity of household food insecurity ($F(2, 306) = 13.212$; $p < 0.001$). Households with food security had children with better health status than households with some form of food insecurity (hh/ind. food insecurity and child hunger). Therefore, this null hypothesis is rejected.

Child's Gender

Ho-8: There is no significant difference in child's health status by child's gender

Based on independent t-test, no significant difference is observed in mean total health scores of children according to their gender ($t = 0.338$; $p = 0.735$). Mothers of male and female children reported a similar health condition for their children. This null hypothesis is retained.

Child's age

Ho-9: There is no significant difference in child's health status by child's age.

Child's health status did not differ significantly by age as indicated by the t-test result ($t = 0.49$; $p = 0.622$). This null hypothesis is not rejected.

Child's Birth O

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Child's Birth Order

Ho-10: There is no significant difference in child's health status by child's birth order

The finding from One-way ANOVA reveals that child's birth order does not significantly influence child health status ($F(2, 306) = 1.811$; $p = 0.165$). Children of lower and higher birth order did not differ significantly in mean total health scores. Thus, the null hypothesis is retained.

Number of Younger Siblings

Ho-11: There is no significant difference in child's health status by number of younger siblings (0-6 years old)

Again, One-way ANOVA shows no significant difference in the mean scores of child health status according to the number of younger siblings in the household ($F(2, 306) = 0.063$; $p=0.939$). This hypothesis is not rejected.

Table 17

Mean Score fo
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Variable
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Table 17

Mean Score for Child's Total Health by Household Variables (Demographic and Economics, Child Care and Feeding and Child-related Variables) (n=309)

Variable	Level	n	M	SD		p-value
Possible Score Range					min.	max.
Previous health					2.00	10.00
Recent health					3.00	14.00
Susceptibility/Resistance to illness					2.00	10.00
Total health					7.00	34.00
Child's Health					med.	
Previous health			7.72	1.48	8.00	
Recent health			10.54	1.53	11.00	
Susceptibility/Resistance to illness			6.42	1.52	7.00	
Total health			24.67	3.23	25.00	
Household Variables						
Number of Children						
	1-3 children	127	24.80	2.75		0.571
	4-5 children	114	24.75	3.42		
	> 5 children	68	24.31	3.73		
Mother's Years of Schooling						
	0-6 years	95	24.35	3.28		0.040 * [a]
	7-11 years	185	24.62	3.16		
	> 11 years	29	26.07	3.33		
Father's Years of Schooling						
	0-6 years	86	24.00	3.16		0.055
	7-11 years	185	24.85	3.14		
	> 11 years	38	25.32	3.70		

Table 17 (cont'

Variable	L
Total Household	
1 – 216	
> 2162	
Income per ca	
1 – 15	
151 –	
> 300	
Nutrition Kn	
0-12	
13-1	
> 18	
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Table 17 (cont'd).

Variable	Level	n	M	SD	p-value
Total Household Income (RM)					
	1 – 2162	267	24.47	3.16	0.006 **
	> 2162	42	25.95	3.47	
Income per capita (RM)					
	1 – 150	113	24.39	3.07	0.021 * [b]
	151 – 300	117	24.36	3.39	
	> 300	79	24.67	3.23	
Nutrition Knowledge Score					
	0-12	79	24.19	3.05	0.013 * [c]
	13-18	182	24.57	3.10	
	> 18	48	25.87	3.76	
Household Food Security					
	Hh Food Secure	103	25.71	3.17	0.000 *** [d]
	Hh/Ind. Food Insecure	120	24.72	2.97	
	Child Hunger	86	23.37	3.24	
Child's Gender					
	Male	161	24.73	3.26	
	Female	148	24.61	3.22	

Table 17 (cont

Variable	L
Child's Age	
6.0-6.9	
7.0-7.9	
Child's Birth	
1-2	
3-4	
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* $p < 0.05$

M = mean
Max = ma

Bonferron
a = 0 – 6

b = 1 – 1

c = 0 – 1

d = Hh.

Table 17 (cont'd).

Variable	Level	n	M	SD	p-value
Child's Age					
	6.0-6.9	115	24.79	3.22	
	7.0-7.9	194	24.60	3.25	
Child's Birth Order					
	1-2	154	25.01	3.05	
	3-4	95	24.43	3.48	
	>4	60	24.18	3.24	
Number of Younger Siblings (0-6 years old)					
	None	80	24.56	3.19	
	1	112	24.70	2.99	
	> 1	117	24.72	3.51	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

M = mean; SD = standard deviation; Med = median; Min = minimum; Max = maximum;

Bonferroni post-hoc test indicates that these groups differ from each other significantly:
a = 0 – 6 & >11;

b = 1 – 150 & > 300; 151 – 300 & > 300;

c = 0 – 12 & > 18; 13 – 18 & > 18;

d = Hh. Food Secure & Child Hunger; Hh/Ind. Food Insecure & Child Hunger;

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Research Question 7

a)How do mothers perceive the adequacy of income in their households?

The majority of the mothers (60.2%) reported having adequate household income for various expenditures (Table 18). However, more mothers with no earned income reported household income inadequacy (44.1%) compared to mothers with earned incomes (33.1%). The economic characteristics of households with income-earning mothers and their counterparts are also summarized in Table 18. In this sample, there were 141 mothers who either worked at home or away from home and 168 mothers who were housewives. However, two of the working mothers (worked at home) did not earn any income as they were working with their husbands and were not paid independently. Thus, the sample comprises of 139 mothers with earned incomes and 170 mothers with no earned income.

b)For mothers with earned incomes ...

i. Do they report pooling of incomes with their husbands?
ii. If they do, who has control of allocating and spending the pooled incomes?
iii.If they do not pool or partially pool their incomes, who has control of mothers' incomes?
iv.Do they receive additional allowances from husbands?
v. What are their priorities for money use?

Table 19 summarizes the findings on mothers with earned and no-earned incomes. For mothers with earned incomes (n=139), only fifty three (38.1%) of them reported of pooling all their incomes with their husbands' incomes. For these mothers who pooled their incomes (n=53), the majority of them reported of sharing the responsibility of allocating (81.1%) and spending (84.9%) the pooled incomes with their spouses. Also, all of them reported that since they pooled their incomes, both their husbands and

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themselves know each other's amount of earned incomes. For mothers who partially pooled their incomes (n=40) or did not pool at all (n=46), many of them reported (66.3%) having control of their own incomes. A majority of these mothers also reported that they knew the amount of their husbands' incomes (80.2%) and of their husbands' knowledge of their own incomes (86.0%).

For these mothers with earned incomes, most of them reported that their husbands gave them money for household expenditures (87.1%) and personal uses (62.6%). A similar pattern is true when the mothers are divided into those who pooled their incomes and those who partially pooled or did not pool their incomes at all. If the money given for household expenditures is not enough, mothers with earned incomes would either use their own incomes (44.6%) or ask their husbands for more money (54.0%). However, for mothers who pooled their incomes, almost all of them (96.2%) stated that they would ask their husbands for more money while for mothers who partially or did not pool their incomes, the majority of them would use their own incomes (72.1%). In terms of priority of money use, mothers with earned incomes frequently reported that their personal allowances or their own incomes are used for their children's needs (school books, allowances, clothes), supplementing household food expenditures, payment of bills and savings.

c)For mothers with no earned income

i. Who has control of husbands' incomes?
ii. Do they have access to husbands' incomes?
iii.Do they receive personal allowance from husbands?
iv.If they do, what are their priorities for money use?

For mothers with no-earned income (n=170), the majority (83.5%) reported that

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they knew the amount of their husbands' incomes. Although many of the mothers stated that their husbands have control of the incomes, approximately 86% of the mothers reported that it was easy for them to use their husbands' incomes. Easy access to their husbands' incomes means that their husbands would give the mothers money for households expenditures, personal allowances or upon requests for other things. More than 90% of the mothers received money from their husbands for household expenditures and many indicated that they were responsible for the allocation and spending of this portion of their husbands' incomes. For mothers (with and without earned incomes) whose husbands did not give money for households expenditures, their husbands were in charge of allocating and spending the money for households expenses (e.g. grocery, bills, rents). Among mothers with no income, 74% reported they receive personal allowances from their husbands. Similar to mothers with earned incomes, mothers with no-earned income would spent their personal allowances for their children, household needs and savings.

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Table 18

Household Economic Characteristics and Household Income Adequacy of Mothers With Earned and No Earned Income (n=309)

Variable	Level	n	(%)	M	SD	med.
Household Income Adequacy						
All Mothers		309				
	Not Enough	121	(39.2)			
	Enough	186	(60.2)			
	More than Enough	2	(0.6)			
Mothers with Earned Income		139				
	Not Enough	46	(33.1)			
	Enough	91	(65.5)			
	More than Enough	2	(1.4)			
Mothers with No-Earned Income		170				
	Not Enough	75	(44.1)			
	Enough	95	(55.9)			
	More than Enough	0	(0.0)			
Household Economics						
Mothers with Earned Incomes		139				
	Mother's Income			751.18	538.61	600
	Father's Income			1152.55	1006.44	900
	Total Hh. Income			2005.82	1512.52	1580
	d. Income per Capita			360.94	306.88	285.20
Mothers with No-Earned Income		170				
	Father's Income			1001.33	463.05	900
	Total Hh. Income			1069.44	486.02	980
	Income per Capita			177.29	99.86	147.14

M = mean; SD = standard deviation; Med = median;

Table 19

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Table 19

Allocation and Spending of Household Incomes (Husbands' and Wives') (n=309)

Variable	Mothers w/Income Pool Income (n=53)		Mothers w/Income Did not/Partially Pool (n=86)		Mothers w/No Income (n=170)	
	n	(%)	n	(%)	n	(%)
Wife knows husband's income						
Yes	53	(100.0)	69	(80.2)	142	(83.5)
No	0	(0.0)	17	(19.8)	28	(16.5)
Husband knows wife's income						
Yes	53	(100.0)	74	(86.0)		
No	0	(0.0)	12	(14.0)		
Who allocates pooled incomes?						
Husband	4	(7.5)				
Wife	6	(11.3)				
Both	43	(81.1)				
Who spends pooled incomes?						
Husband	3	(5.7)				
Wife	5	(9.4)				
Both	45	(84.9)				
Who controls mother's partially or non-pooled income?						
Husband			1	(1.2)		
Wife			57	(66.3)		
Both			28	(32.6)		
Who control's husband's income (no-earned income mothers)?						
Husband					106	(62.4)
Wife					13	(7.6)
Both					51	(30.0)

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Table 19 (cont'd).

Allocation and Spending of Household Incomes (Husbands' and Wives') (n=309)

Variable	Mothers w/Income				Mothers w/No Income	
	Pool Income (n=53)		Did not/Partially Pool (n=86)		(n=170)	
	n	(%)	n	(%)	n	(%)
Is it easy to have access to husband's income (no-earned income mothers)?						
Yes					146	(85.9)
No					24	(14.1)
Husband gives money for household expenditures?						
Yes	48	(90.6)	73	(84.9)	161	(94.7)
No	5	(9.4)	13	(15.1)	9	(5.3)
Husband gives personal allowance to wife?						
Yes	40	(75.5)	47	(54.7)	126	(74.1)
No	13	(24.5)	39	(45.3)	44	(25.9)
If money for household expenditures is not enough?						
Use own income	0	(0.0)	62	(72.1)	9	(5.3)
Ask from husband	51	(96.2)	24	(27.9)	156	(91.8)
Others	2	(3.8)	0	(0.0)	5	(2.9)
Priority for money(partially/non-pooled incomes and personal allowance) use?						
	Children's needs Household needs Payment of bills Savings				Children's needs Household needs Savings	

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Research Question 8

What are the food habits of these children (during the school week)?

i.Eating breakfast before going to school?
ii.Eating meal (breakfast, lunch and dinner) at home?
iii.Bringing food from home?
iv.Having pocket money to buy food at school?

This research question is exploratory in nature in that it investigates the common food habits of these primary school children in relation to their daily meals and the practice of bringing food and pocket money to schools. Table 20 summarizes the findings on the children's food habits during the school week. A majority of the mothers reported that their children ate breakfast at home in the morning (n=207). In this sample, 227 children were in the morning school session while 82 children were in the afternoon school session. Children in the morning session who did not eat breakfast prior to school (n=78) would have their breakfast during school recess hour (10 a.m.). These children would either bring food from home or buy food at the school canteens. The two frequent reasons given by mothers of the children who did not eat breakfast at home were that their children were not hungry in the early morning or they had no time to prepare breakfast for their children as they had to leave for work. Other reasons given were that breakfast makes their children sick (e.g. stomach ache, vomiting) and their children prefer to buy the canteen food. Children in the afternoon session had their breakfasts either at home or at their caregivers' homes. Similar to breakfast, most of the mothers reported that their children ate their lunches at home (n=281), either after school (for those in the morning session) or before going to school in the afternoon. All children who did not eat their lunches at home (n=28), ate their lunches either at school canteens (they would bring own food or buy the canteen food), their parents' food stalls or their

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caregivers' homes. Dinner is a family meal for these households and this is indicated by the fact that all mothers reported that their children had their dinner at home with other family members.

Many of the children did not bring food from home to school (n=232). Those who brought food to school were both in the morning and afternoon sessions. The food was eaten either during the school recess hour in the morning (10 a.m.) or afternoon (3.30 p.m.) or before school started for the afternoon session. Common foods brought by the children to school were rice, noodles, sandwiches, sweet cakes and spicy dishes (e.g. curry puff, spicy sweet rice). In terms of pocket money, almost all of the children received some money for spending at school (n=301). The average amount of money given to a child for food only RM 1.23; the amount ranged from RM 0.50 to RM 4.00. This money, however, did not include the child's daily bus fare as the parents paid the bus operators monthly. RM1.00 will allow a child to buy a decent meal consisting of a plate of nasi lemak (rice cooked in coconut milk and served with hot gravy with anchovies, slices of cucumber and boiled egg), a cup of syrup drink and a sweet cake or a piece of fruit.

Table 20

Food Habits o

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[a]MS: Mor
[b]AS: Afte

Table 20

Food Habits of the Primary School Children (n=309)

Variable	n	(%)	MS[a] (n=227)	AS[b] (n=82)
Eating Breakfast				
Home	207	(67.0)	149	58
Not at home	102	(37.0)	78	24
Eating Lunch				
Home	281	(90.9)	214	67
Not at home	28	(9.1)	13	15
Eating Dinner				
Home	309	(100.0)	227	82
Not at home	0	(0.0)	0	0
Bring home-prepared food to school				
Yes	77	(24.9)	23	54
No	232	(75.1)	204	28
Bring pocket money (for food) to school				
Yes	308	(99.7)	226	82
No	1	(0.3)	1	0

[a]MS: Morning Session School (7.30 a.m. – 12.45 p.m.)
[b]AS: Afternoon Session School (1 p.m. – 6.15 p.m.)

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Research Question 9

Is child's growth status predicted by household inputs (household demographics and economics variables, household resource allocation variables, child care and feeding variables, child-related variables) and throughput (household decision inputs)?

Table 21 shows the distribution of growth status for the 309 children in Study 2 based on height-for-age, weight-for-height and a combination of these two indicators. Approximately 50% (n=159) of the children were significantly and mildly stunted. For weight-for-height, 31% (n=97) of the children were significantly and mildly wasted. In this sample, only 33% of the children did not show any sign of malnutrition as indicated by children (n=104) in "Not wasted and Not stunted" category.

The relationships between the intrahousehold variables and child growth status were assessed first with correlational procedure i.e. Pearson Product Moment Correlation. This test is designed to determine the relationship that exists between the two variables. Simple regression analyses were then conducted to assess the relationship between the intrahousehold variables and child growth status. Given that there were relationships, multiple regression analysis then provided the mechanism to determine the combination of intrahousehold variables that can predict the variation in child growth status. Tables 22 to 24 present the values for Pearson Product Moment tests, linear regression and multiple regression analysis.

As reported in Table 22, all the correlations between child growth status and the selected intrahousehold variables were very weak and not significant except for mother's decision making ($r = 0.14$, $p < 0.05$), mother's decision implementation ($r = 0.19$, $p < 0.01$) and child's age ($r = -0.18$, $p < 0.01$). However, the correlations between these factors and child growth status were also very weak. As mother's decision making and

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implementation in the household increased, child growth status tended to improve. The significantly negative correlation between child's age and growth status implies that in this sample of Standard 1 children with similar age (age range from 74.7 - 94.0 months), the older the child, the poorer his/her growth status tends to be.

Two separate correlation analyses were run for male and female children to assess the correlation coefficients between child growth status and the various continuous independent variables (data not shown). The significant correlates for growth status among female children were age of the child ($r = -0.243$; $p < 0.01$) and mother's decision implementation ($r = 0.178$; $p < 0.05$). This finding indicates that as the age of female children increased, the growth status scores decreased. Also, the higher mothers' decision implementation power in the households, the better the female children's growth status. For male children, the significant correlates were the percentage of household income that mother earns ($r = 0.162$; $p < 0.05$), child's age ($r = -0.165$; $p < 0.05$) mother's decision making ($r = 0.223$; $p < 0.01$) and mother's decision implementation ($r = 0.215$; $p < 0.01$). The higher mothers' earned incomes (as a percentage of total household income), decision making and decision implementation in the households, the better the growth status scores for male children. However, no significant association was observed between the categorical variables (e.g., mother's employment status, occupation and food allocation rule, household total and food expenditures, household food security and child's primary caretaker) and male or female child's growth status.

Table 23 presents the simple linear regression between individual household variable and child growth status. Based on the analyses, four variables (mother's decision making and decision implementation, child's age and gender) were found to be

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significant predictors for child growth status. Table 24 shows the final multiple regression model for the four significant predictors of child growth status. The model combines mother's decision implementation, child's age and gender and it accounts for approximately 9.0% of the variance in child's growth status ($R^2 = 0.088$; F (3, 305) = 9.846, $p < 0.001$). Although mother's decision making is a significant correlate and predictor of child growth status in the simple regression analysis, it is excluded from the final prediction model. In other words, in combination with other factors, mother's decision making was not a significant predictor of child growth status.

As the prediction model indicates, an increase in decision implementation by mothers increases child's growth status score by 0.021. Similarly, a shift in child's gender from male to female results in an increase in growth status score by 0.282. However, when the child's age increased, his/her growth status score decreases by 0.044. Although the amount of variance explained in the prediction model is very small ($R^2 = 0.088$), it is evident that in this homogenous sample of primarily low income school children, mother's decision implementation, child's age and gender are important contributors to child growth status. Based on these findings, the null hypotheses related to child-related variables and household decision inputs are rejected while those related to household demographics and economics, household resource allocation and child care and feeding were retained.

Simple linear regression analyses were conducted for male and female children separately (data not shown) to assess the relationship between growth status and the various independent variables (continuous and categorical). For male children, the

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significant predictors were mother's decision implementation ($R^2 = 5.0\%$; $p < 0.01$), mother's decision making ($R^2 = 4.6\%$; $p < 0.01$), mother's earned income ($R^2 = 2.6$; $p < 0.05$) and child's age ($R^2 = 1.8\%$; $p < 0.05$). For female children, the significant predictors were child's age ($R^2 = 5.9\%$; $p < 0.01$) and mother's decision implementation ($R^2 = 2.9\%$; $p < 0.05$). Stepwise regression were then conducted for these significant predictors to assess the combination of factors that best predict child growth status in male and female children. Among the male children, mother's decision making and child's age were the significant predictors ($R^2 = 8.0\%$; $p < 0.001$) while among the female children, only child's age was significant in predicting child growth status ($R^2 = 5.9\%$; $p < 0.01$). Although mother's decision implementation is both correlated and related significantly with male and female children's growth status, it was not included in the final prediction model. This finding differs with the prediction model for male and female children combined where decision making was excluded. However, decision making was a significant correlate (Table 22) and predictor in the simple linear regression model (Table 23).

Household Demographic and Economic Variables

Ho-1: There is no significant relationship between child growth status and household demographic and economic variables

Household Resource Allocation Variables

Ho-2: There is no significant relationship between child growth status and household resource allocation variables

Child care and Feeding Variables

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Ho-3: There is no significant relationship between child growth status and child care, health and feeding.

Child-related Variables

Ho-4: There is no significant relationship between child growth status and child-related variables.

Household Decision Inputs

Ho-5: There is no significant relationship between child growth status and household decision inputs

The results of multiple regression analysis reveal that child growth status is significantly related to child-related variables (child's age and gender) and household decision inputs (mother's decision implementation). While several studies have documented poor nutritional status among female children compared to male children (Ukoli et al., 1993; Aurelius et al., 1996), this was not found in this present study. This may also imply that unequal distribution of resources (child care, food, health care, attention) which favors sons over daughters does not occur in this sample of low income households. There is also evidence for household decision power in which decision implementation of mothers accounted for the highest contribution ($R^2 = 0.036$) to child growth status followed by child's age ($R^2 = 0.030$) and gender ($R^2 = 0.018$). Participation in decision making is less powerful than implementing household decisions in having an impact on child growth status.

Table 21

Growth Status Dist
School Children (n

Variable	Lev
Height-for-age	
Significant	
Mildly[b] St	
Normal[c]	
High[d]	
Weight-for-heigh	
Significan	
Mildly[b] W	
Normal[c]	
High[d]	
Weight-for-heigh	
Wasted a	
Wasted a	
Not Was	
Not Was	

a = < -2 SD of t
b = -2 SD ≤ x
c = -1 SD ≤ x
d = > 2 SD of th
e = Growth stat

Table 21

Growth Status Distribution (Height-for-Age and Weight-for-Height) Among Primary School Children (n=309)

Variable	Level	Male		Female		Total	
		n	(%)	n	(%)	n	(%)
Height-for-age		161	(52.1)	148	(47.9)	309	(100.0)
	Significantly[a] Stunted	33	(20.5)	17	(11.5)	50	(16.2)
	Mildly[b] Stunted	53	(32.9)	56	(37.8)	109	(35.3)
	Normal[c]	74	(46.0)	75	(50.7)	149	(47.9)
	High[d]	1	(0.6)			1	(0.6)
Weight-for-height		161	(52.1)	148	(47.9)	309	(100.0)
	Significantly[a] Wasted	11	(6.8)	11	(7.4)	22	(7.1)
	Mildly[b] Wasted	49	(30.4)	26	(17.6)	75	(24.3)
	Normal[c]	88	(54.7)	103	(69.6)	191	(61.8)
	High[d]	13	(8.1)	8	(5.4)	21	(6.8)
Weight-for-height * Height-for-age[e]		161	(52.1)	148	(47.9)	309	(100.0)
	Wasted and Stunted	35	(21.7)	16	(10.8)	51	(16.5)
	Wasted and Not Stunted	25	(15.5)	21	(14.2)	46	(14.9)
	Not Wasted and Stunted	51	(31.7)	57	(38.5)	108	(35.0)
	Not Wasted and Not Stunted	50	(31.1)	54	(36.5)	104	(33.6)

a = < -2 SD of the NCHS/CDC median
b = -2 SD $\leq$ x < -1 SD of the NCHS/CDC median
c = -1 SD $\leq$ x $\leq$ 2 SD of the NCHS/CDC median
d = > 2 SD of the NCHS/CDC median
e = Growth status score of children: Wasted and Stunted = 1 (lowest)
Wasted and Not Stunted = 2
Not Wasted and Stunted = 3
Not Wasted and Not Stunted = 4 (highest)

Table 22

Pearson Product M
Growth Status (n=

Variables	
Household Demo	
Husband's	
Mother's y	
Household	
Number of	
Household	
Housing q	
Household	
Income pe	
Household Resou	
Mother's	
Mother's	
Child Care and	
Mother's	
Child-related V	
Birth ord	
Number	
Age	
Health s	
Gender	
Household De	
Mother	
Mother	

*p < 0.05

a = Correlatio

Table 22

Pearson Product Moment Correlation Between Intrahousehold Variables and Child Growth Status (n=309)

Variables	Correlation (r)
Household Demographics and Economic	
Husband's years of schooling	.02
Mother's years of schooling	.06
Household size	.03
Number of children	.00
Household density	-.07
Housing quality	-.07
Household total income	.07
Income per capita	.06
Household Resource Allocation	
Mother's market economy production time	.06
Mother's income (% of household total income)	.09
Child Care and Feeding	
Mother's nutrition knowledge	-.02
Child-related Variables	
Birth order	.03
Number of younger siblings	-.02
Age	-.18 **
Health status	.05
Gender	.11 * [a]
Household Decision Inputs	
Mother's decision making participation	.14 *
Mother's decision making implementation	.19 **

* $p < 0.05$ ** $p < 0.01$

a = Correlation coefficient based on Kendall's tau-b

Table 23

Simple Linear Regr
(n=309)

Variables
Household Demo
Husband's
Mother's y
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Mother
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Table 23

Simple Linear Regression Between Intrahousehold Variables and Child Growth Status (n=309)

Variables	R^2	B	p-value
Household Demographics and Economic			
Husband's years of schooling	0.000	0.005	0.778
Mother's years of schooling	0.004	0.019	0.295
Mother's employment status	0.003	0.118	0.330
Mother's occupational status	0.008	0.273	0.118
Household size	0.001	0.016	0.620
Number of children	0.000	0.001	0.984
Household density	0.005	-0.148	0.234
Housing quality	0.004	0.019	0.248
Household total income	0.005	0.072	0.206
Income per capita	0.003	0.057	0.320
Household food expenditure	0.011	0.225	0.071
Household total expenditure	0.008	0.210	0.106
Household Resource Allocation			
Mother's market economy prod. time	0.003	0.002	0.320
Mother's income (% of household income)	0.009	0.095	0.096
Mother's food allocation rules	0.000	-0.047	0.729
Child Care and Feeding			
Mother's nutrition knowledge	0.000	-0.003	0.795
Child primary caretaker	0.003	-0.118	0.330
Household food security	0.002	-0.112	0.385

Table 23 (cont'd).

Variables	
Child-related Va	
Gender	
Birth order	
Number of	
Age	
Health stat	
Household Decis	
Mother's	
Mother's	

$^{*}p < 0.05$ **

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Household food s
Child's gender

Table 23 (cont'd).

Variables	R^2	B	t
Child-related Variables			
Gender	0.018	0.286	0.018 *
Birth order	0.001	0.032	0.570
Number of younger siblings	0.000	-0.029	0.745
Age	0.030	-0.040	0.002 **
Health status	0.003	0.017	0.366
Household Decision Inputs			
Mother's decision making participation	0.021	0.015	0.012 *
Mother's decision making implementation	0.036	0.026	0.001 **

* $p < 0.05$ ** $p < 0.01$

Mother's employment status:	0 = Not Working	1 = Working
Mother's occupational status:	0 = Unskilled	1 = Semi Skilled/Skilled
Household food expenditure	0 = RM1-300	1 = > RM300
Household total expenditure	0 = RM1-1000	1 = > RM1000
Mother's food allocation rule	0 = Needs Rule	1 = Equality
Child's primary caretaker	0 = Mother	1 = Others
Household food security	0 = Food Secure	1 = Food Insecure
Child's gender	0 = Male	1 = Female

Table 24

Stepwise Regressi
Status (n=309)

Variable	
Mother's decision implementation	
Child's age	
Child's Gender	
Mother's decisio making	
Multiple	
R squared	
Adjusted	
(F (3, 30	

* $p < 0.05$ *

[a] Stepwise regre
mother's decisi

Table 24

Stepwise Regression Analysis[a] for Intrahousehold Variables Predicting Child Growth Status (n=309)

Variable	B	SE B	Beta	p-value
Mother's decision implementation	.021	.006	.195	0.000 ***
Child's age	-.044	.012	-.192	0.001 **
Child's Gender	.282	.116	.133	0.016 *
Mother's decision making	.004	.008	.042	0.584

Multiple R = .297
R squared = .088
Adjusted R = .079

(F (3, 305) = 9.85; p = 0.001***)

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.00$

[a] Stepwise regression analysis includes four variables – mother's decision making , mother's decision implementation, child's age and child's gender,

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Summary of Hypothesis Testing

This section summarizes the findings on hypothesis testing pertinent to the research questions in this study (see Table 25 for a summary of the results reported). The focus of the hypotheses in research question one was to determine the possible differences in child growth status (height-for-age and weight-for-height) according to the age, standard (1-3) and gender. The results of one-way ANOVA indicate that height-for-age and weight-for-height mean Z-scores were significantly different by these variables. Male children had significantly lower mean Z-scores for height-for-age and weight-for-height than female children. Although height-for-age mean Z scores decreased according to age and standard (older children and children in higher standards were likely to experience stunting), weight-for-height mean Z-scores increased as the children were older and in higher standards. All of the null hypotheses related to this question were rejected.

In research question two, the differences in mother's and father's decision making and implementation were investigated using paired t-test. The results show that in all areas of household decisions (except decisions related to household income and expenditures), mothers tended to dominate decision making and implementation. One-way ANOVA was also utilized to determine if mother's decision making and implementation varied according to various intrahousehold variables. Of all the hypotheses tested, only those related to mother's employment status and income earning level were found to be significant (null hypotheses were rejected).

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The hypothesis in research question three addresses whether the relationship between mother's nutrition knowledge score and her years of education is confounded by her age. When mother's age was controlled in the analysis, the mean scores of mothers with none/primary, secondary and more than secondary education differ significantly from each other. Household food security was the main focus in hypotheses testing for research question four. The two hypotheses tested indicated that households with some form of food insecurity were those of poor households (household total income is below the average monthly income of urban Malay households or income per capita is similar to poverty level income). All of the null hypotheses in research question three and four were rejected.

Mother's food allocation rule was investigated in research question five. Several hypotheses were tested to determine differences in intrahousehold variables by the two food allocation rules (Equality and Needs rules). However, all of the null hypotheses were retained. These findings imply that mothers with Equality and Needs rules did not differ significantly in household and individual characteristics. One-way ANOVA was utilized in research question six to determine whether child's health status differed by intrahousehold variables (household demographics and economics, child care and feeding and child-related factors). Only the hypotheses related to mother's years of schooling, total household income, income per capita, nutrition knowledge and household food security were found to be significant. Thus, these related null hypotheses were rejected.

The results of stepwise regression analysis in research question nine, indicate that there were significant relationships between child growth status and child-related variables (child's age and gender) and household decision inputs (mother's decision

implementation).

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implementation). These three variables were the only ones which contributed significantly to the prediction model for child growth status.

Table 25

Summary of Hyp

Hypothesis
Research Quest
1. There is no s for height-for-ag
2. There is no s for height-for-ag
3. There is no s for height-for-ag by standard.
4. There is no for weight-for-h by gender.
5. There is no for weight-for-h
6. There is no for weight-for-h by standard.
Research Que
1. There is no and fathers' pa household inco
2. There is no and fathers' pa food.
3. There is no and fathers' pa child care, hea

Table 25

Summary of Hypothesis Testing Results

Hypothesis	Test	Reject	Retain
Research Question 1			
1. There is no significant difference in mean Z-scores for height-for-age among primary school children by gender.	T-test	X	
2. There is no significant difference in mean Z-scores for height-for-age among primary school children by age.	ANOVA	X	
3. There is no significant difference in mean Z-scores for height-for-age among primary school children by standard.	ANOVA	X	
4. There is no significant difference in mean Z-scores for weight-for-height among primary school children by gender.	T-test	X	
5. There is no significant difference in mean Z-scores for weight-for-height among primary school children by age.	ANOVA	X	
6. There is no significant difference in mean Z-scores for weight-for-height among primary school children by standard.	ANOVA	X	
Research Question 2			
1. There is no significant difference between mothers' and fathers' participation in decision making related to household income and expenditure.	T-test	X	
2. There is no significant difference between mothers' and fathers' participation in decision making related to food.	T-test	X	
3. There is no significant difference between mothers' and fathers' participation in decision making related to child care, health and feeding.	T-test	X	

Table 24 (cont'd)

Hypothesis
4. There is no si and fathers' parti
5. There is no si and fathers' parti related to househ
6. There is no si and fathers' parti related to food.
7. There is no s and fathers' part related to child c
8. There is no s and fathers' part
9. There is no s participation in related to housel
10. There is no participation in related to food.
11. There is no participation in related to child
12. There is no participation in
13. There is no participation in

Table 24 (cont'd).

Hypothesis	Test	Reject	Retain
4. There is no significant difference between mothers' and fathers' participation in total decision making.	T-test		X
5. There is no significant difference between mothers' and fathers' participation in decision implementation related to household income and expenditure.	T-test	X	
6. There is no significant difference between mothers' and fathers' participation in decision implementation related to food.	T-test	X	
7. There is no significant difference between mothers' and fathers' participation in decision implementation related to child care, health and feeding.	T-test	X	
8. There is no significant difference between mothers' and fathers' participation in total decision implementation.	T-test	X	
9. There is no significant difference between mothers' participation in decision making and implementation related to household income and expenditure.	T-test	X	
10. There is no significant difference between mothers' participation in decision making and implementation related to food.	T-test	X	
11. There is no significant difference between mothers' participation in decision making and implementation related to child care, health and feeding.	T-test	X	
12. There is no significant difference between mothers' participation in total decision making and implementation.	T-test	X	
13. There is no significant difference in mothers' participation in total decision making by age.	ANOVA		X

Table 25 (cont'd

Hypothesis
14. There is no si participation in to of schooling.
15. There is no s participation in t status.
16. There is no s participation in t earning level.
17. There is no s participation in household incor
18. There is no participation in per capita.
19. There is no total decision i
20. There is no total decision i
21. There is no total decision i
22. There is no total decision i
23. There is no total decision
24. There is no total decision

Table 25 (cont'd).

Hypothesis	Test	Reject	Retain
14. There is no significant difference in mothers' participation in total decision making by years of schooling.	ANOVA		X
15. There is no significant difference in mothers' participation in total decision making by employment status.	ANOVA	X	
16. There is no significant difference in mothers' participation in total decision making by income earning level.	T-test	X	
17. There is no significant difference in mothers' participation in total decision making by total household income.	T-test		X
18. There is no significant difference in mothers' participation in total decision making by income per capita.	ANOVA		X
19. There is no significant difference in mothers' total decision implementation by age.	ANOVA		X
20. There is no significant difference in mothers' total decision implementation by years of schooling.	ANOVA		X
21. There is no significant difference in mothers' total decision implementation by employment status.	ANOVA	X	
22. There is no significant difference in mothers' total decision implementation by income earning level.	T-test	X	
23. There is no significant difference in mothers' total decision implementation by total household income.	T-test		X
24. There is no significant difference in mothers' total decision implementation by income per capita.	ANOVA		X

Table 25 (cont'd)

Hypothesis
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1. When mother significant differe years of schoolin
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Table 25 (cont'd).

Hypothesis	Test	Reject	Retain
Research Question 3			
1. When mother's age is controlled, there is no significant difference in nutrition knowledge score by years of schooling.	ANCOVA	X	
Research Question 4			
1. Households with different levels of food security do not differ significantly in total household income.	ANOVA	X	
2. Households with different levels of food security do not differ significantly in household income per capita.	ANOVA	X	
Research Question 5			
1. Mothers with needs and equality rules do not differ significantly in years of schooling.	T-test		X
2. Mothers with needs and equality rules do not differ significantly in income earning.	T-test		X
3. Mothers with needs and equality rules do not differ significantly in nutrition knowledge scores.	T-test		X
4. Mothers with needs and equality rules do not differ significantly in total household income.	T-test		X
5. Mothers with needs and equality rules do not differ significantly in income per capita.	T-test		X
6. Mothers with needs and equality rules do not differ significantly in household food security.	Chi-square		X

Table 25 (cont'd)

Hypothesis
Research Questi
1. There is no si status by number
2. There is no si status by mother'
3. There is no si status by father's
4. There is no s status by total ho
5. There is no s status by income
6. There is no s status by mother
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8. There is no s status by child's
9. There is no status by child'
10. There is no status by child'
11. There is no status by numb

Table 25 (cont'd).

Hypothesis	Test	Reject	Retain
Research Question 6			
1. There is no significant difference in child's health status by number of children in the household.	ANOVA		X
2. There is no significant difference in child's health status by mother's years of schooling.	ANOVA	X	
3. There is no significant difference in child's health status by father's years of schooling.	ANOVA		X
4. There is no significant difference in child's health status by total household income.	T-test	X	
5. There is no significant difference in child's health status by income per capita.	ANOVA	X	
6. There is no significant difference in child's health status by mother's nutrition knowledge score.	ANOVA	X	
7. There is no significant difference in child's health status by household food security.	ANOVA	X	
8. There is no significant difference in child's health status by child's gender.	T-test		X
9. There is no significant difference in child's health status by child's age.	T-test		X
10. There is no significant difference in child's health status by child's birth order.	ANOVA		X
11. There is no significant difference in child's health status by number of younger siblings (0-6 years old).	ANOVA		X

Table 25 (cont'd)

Hypothesis	
Research Questi	
1. There is no si growth status and variables.	
2. There is no s growth status an	
3. There is no s growth status an	
4. There is no s growth status a	
5. There is no growth status a	

Table 25 (cont'd).

Hypothesis	Test	Reject	Retain
Research Question 9			
1. There is no significant relationship between child growth status and household demographic and economic variables.	Regression		X
2. There is no significant relationship between child growth status and household resource allocation variables.	Regression		X
3. There is no significant relationship between child growth status and child care, health and feeding.	Regression		X
4. There is no significant relationship between child growth status and child related variables.	Regression	X	
5. There is no significant relationship between child growth status and household decision inputs.	Regression	X	

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CHAPTER V

DISCUSSION AND CONCLUSIONS

This study on growth assessment of primary school children from primarily low income households in an urban area of Malaysia and the determinants of their growth status was designed to investigate the relationship between intrahousehold factors (household demographics and economics, household resource allocation, child care and feeding, child related variables and household decision inputs) and child growth status as reported by the mothers. This chapter discusses the findings and conclusions of the study, research implications and the recommendations for future research.

In Study 1 (growth status assessment of primary school children from low income households), the growth data were obtained for 8005 children from Standard 1 to 3 in 21 SK schools (low income schools with predominantly Malay children) in Kuala Lumpur. There were 3793 female (47.4%) and 4212 male (52.6%) children in this sample. In Study 2 (determinants of growth status among primarily low income Malay children), the children in the sample were 161 males (52.1%) and 148 females (47.9%). In this study, only children from 7 SK schools were included and a total of 613 questionnaires were distributed to the mothers of these children. From this number, only 309 mothers were eligible for the study. Data on both studies were gathered from October 1997 to March 1998 using several sources such as child's record, health book, academic record, survey questionnaire and in-depth interview (home visit and/or phone interview).

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Discussion of Results for the Study Variables

The discussion of the results in this section is presented in terms of the summary findings of the nine objectives of the study specified in Chapter I (Introduction).

Objective 1 – To determine the prevalence of stunting and wasting in school children from primarily low income households in Kuala Lumpur according to gender, standard and age.

In this study, approximately 50% (n=3893) and 30% (n=2568) of the children were found to be stunted and wasted, respectively. However, the majority of the children were either mildly stunted (32%) or mildly wasted (23%). As stunting reflects past nutrition, the finding indicates that these children may have had experiences with poor diets and infection during their early childhood and perhaps were continuously living with similar conditions as a consequence of poverty. Linear growth retardation occurs primarily in the first 2-3 years of life (growth retardation is intensified between 3 and 12 or 18 months) and is a reflection of the interactive effects of poor energy and nutrient intakes and infection (Martorell and Habicht, 1986). This finding also agrees with other findings on the prevalence of stunting among school children from low income households in less developed countries which indicate that shortness-for-age is a common nutritional insult among these school children compared to wasting (Ahmed et al., 1991; Baba et al., 1991; Pelto et al., 1991; Sichieri et al., 1996; Stoltzfus et al., 1997).

In comparing the growth status of children in this sample with other growth assessment studies in Malaysia, the findings were quite similar. In a much earlier study by Chen (1976), the prevalence of stunting and wasting among primary school children

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(6-9.9 years old) from schools in Kuala Lumpur and Selangor were reported to be 25% and 9% respectively (stunting is < 90% of height-for-age and wasting is < 80% of weight-for-height). Chee (1992) in her study of growth status among children ages 5 – 10 years old (n=107) from a squatter settlement in Selangor, found that 19.8% were significantly stunted and 33.6% were mildly stunted. The prevalence of significantly and mildly wasted was 9.3% and 32.7%, respectively. Another study on dietary intake and growth assessment of school children from three primary schools in Selangor (1988) reported that the overall prevalence of stunting and wasting was 19.8% and 11.3%, respectively (stunting and wasting were defined as below minus 2 of the NCHS median). Although this present study did not look at growth status in relation to ethnicity, two earlier studies found that underweight and wasting were most prevalent among Indian children compared to children from Malay and Chinese ethnic groups. For example, Chen (1976) reported that 41% and 16% of the Indian children were underweight and wasted respectively, while the percentages were lower among the Malay and Chinese children (Malay – 35% underweight and 7% wasted; Chinese – 14% underweight and 8% wasted). However, the prevalence of stunting was higher among the Malay children (38%) than the other two groups (Indian – 30% and Chinese – 13%). Cheng et al. (1988) found that Indian children had the highest prevalence of stunting (33%) and wasting (19%) ccmpared to children from the Malay (15% stunted and 3% wasted) and Chinese (11% stunted and 12% wasted) ethnic groups. In general, based on the findings of this present study and other studies on the growth status of Malaysian school children, stunting is more common among these children compared to wasting. Both of these forms of malnutrition, especially wasting, are more prevalent among the Indian than the Malay or

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Chinese children. The differences in growth status according to ethnicity may be explained by the poor socioeconomic status and inadequate dietary intakes among the Indian children compared to children from other ethnic groups (Chen, 1976; Cheng, 1988; Mustapha et al., 1992).

Nutritionists have argued that children in less developed countries can attain their optimum weight and height if the environment is conducive to their health and nutritional status (e.g., better socioeconomic and environmental conditions) Thus, it was suggested that growth standards developed in industrialized countries (e.g., NCHS/CDC growth reference) are appropriate for measuring child growth in less developed countries (Graitcer and Gentry, 1981). However, Eveleth and Tanner (1990) described it as a misconception to assume that the growth of healthy populations is the same (at least up to the age of 5 years old) and concluded that they should not be represented by a universal standard. Chen (1976) found that although the growth achievement of Malaysian school children from the three ethnic groups (Malay, Chinese and Indian) differed as a whole, the growth achievement of higher income group children among the three ethnic groups did not differ significantly. However, when the weights and heights of Malaysian children (all ethnic groups from lower and income groups) were compared to the Boston standard (Nelson, 1966), even the higher income Malaysian school children were lighter and shorter than the Boston children. These findings indicate that the differences in growth achievement of these children from the three ethnic groups are probably due to environmental differences, rather than genetic differences. However, environmental and perhaps genetic factors may contribute to the differences in weight and height attainment between Malaysian school children and Boston children. Osman and colleagues (1993)

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conducted a study to compare the anthropometric measurement patterns of Malay children from wealthy families to the NCHS reference population. Eight hundred and seventy one children (3 – 12 years old) were measured for their heights, weights and skin fold thickness. The children had similar increment pattern of weight-for-age and height-for-age to the NCHS reference population, except that they had lower median weight-for-age and height-for-age which may be influenced by their birth weights and genetic factors. Body mass index (BMI) and skin fold thickness (tricep and bicep) measurements of these children were also similar to that of the NCHS and HHANES population. It was concluded that Malay children from higher income groups have growth rates comparable to the children in the industrialized nations and that the NCHS percentile charts are suitable as a reference for comparing the nutritional status of Malay children in Malaysia. In the present study, the high prevalence of stunting and wasting among the school children may be explained by their low socioeconomic status which may influence their birth weights, dietary intakes and health status. Perhaps, if these children were given an environment which is conducive to better health and nutritional status, their growth potential may be similar to the growth of children from upper socioeconomic background or children from the developed nations.

In comparing the growth status of school children from urban and rural areas, a study by Rampal (1977) indicated that underweight and stunting were more prevalent among urban than rural school children. For example, the prevalence of underweight and stunting among urban Malay children (7-12 years old) were 47.2% and 2.5%, respectively. However, the prevalence increased to 67% (underweight) and 10.9% (stunting) among rural Malay children. Cheng et al. (1989), in their study of rural Malay

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school children (7-12 years old), found that the prevalence of significantly (< - 2 SD of NCHS median) stunted and wasted were 15.3% and 2.8%, respectively. In the present study, the prevalence of significantly stunted was 16.7% and the prevalence of significantly wasted was 9.2%. Based on other growth assessment studies of school children in Malaysia and the present study, it is difficult to conclude that school children from rural areas have poorer growth status than urban school children. This is because some of the studies used different methods (percentile, percent of median or Z scores) to categorize malnutrition, included children from all ethnic and income groups and children of ages 10 to 13 years old and utilized different definitions of urban or rural areas. However, there is an indication that growth status of urban school children is not much better than that of their rural counterparts.

There were 3793 female (47.4%) and 4212 male (52.6%) children in Study 1 from Standard 1 to 3. T-test analysis indicated that male children had lower mean Z-scores for weight-for-height and height-for-age (Table 8). These findings were supported by the fact that more male children in this sample were wasted and stunted than female children (Table 7). The prevalence of stunting and wasting were 50% and 34% respectively in male children and 47% and 29% respectively in female children. Gender differential in the study of child nutritional status in the less developed countries has frequently reported that male children were favored in that they were breast-fed longer, received better quality diet, child care time, health treatment and had better nutritional status (Levinson, 1974; D'Souza and Chen, 1980; Florencio and Aligaen, 1980; Chen et al., 1981; Brown et al., 1982 and Sen and Segupta, 1983). However, many of these studies focused on preschoolers rather than school-aged children. The present findings that more boys were

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at risk of stunting and wasting than girls, were similar to the findings among school children in Zanzibar (Stoltzfus et al., 1997) but differ from the other findings that among school children, more female children had poorer health or were wasted and stunted than the male children (Ukoli et al., 1993; Aurelius et al., 1996).

There are several hypotheses to explain why more male than female children in this present study were stunted and wasted. According to Martorell et al (1994), prolongation of the growth period can make up for some of the earlier growth retardation. In other words, if the maturation process is grossly delayed and the growth period is extended, then the potential for catch-up in growth will be marked. However, the effects of the maturation delay may differ in male and female children. In a longitudinal study (Satyanaryana et al., 1980, 1981) of growth patterns for boys and girls in India (height data was analyzed at 5 and 18 years of age), the children were divided according to the degree of stunting at 5 years of age – I (above –2 SD), II (-2 to –3 SD), III (-3 to –4 SD) and IV (below –4 SD). Among the girls, in all four group, the differences in relation to the growth reference mean were less at 18 years than at 5 years, particularly in groups III and IV. The authors suggested that the apparent catch-up growth may be attributed to the delayed menarche or pubertal growth spurt, although no information on age at menarche was given. For the boys, despite the maturation delay (timing for peak height velocity), the differences with respect to the growth reference data increased from 5 to 18 years. The researchers concluded that growth retardation in early childhood was slightly increased by adulthood in males but decreased in females. Second, Martorell and colleagues (1994) also indicated that older children may not achieve the potential for catch-up growth if they continue to live in the same environment which gave rise to

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stunting in early childhood. Perhaps, in this present study, the male children were less fortunate than the female children in terms of their socioeconomic status which does not allow them to experience catch-up growth and consequently leads to the higher prevalence of malnutrition among the male children. However, as these are cross-sectional data, information on the duration of time that the children have been living in socioeconomic deprived situations is not available. Nevertheless, the comparison of household SES between male and female children in this sample indicated that households with male children had significantly lower household income ($t = -2.15$; $p \leq 0.05$)and income per capita ($t = -2.94$; $p \leq 0.01$) than households with female children. Also, mothers of female children had significantly higher earned incomes ($t = -2.14$; $p \leq 0.05$) than mothers of male children (data is not shown). Third, the difference in the growth status among male and female children may be attributed to other factors such as birth weight, physical activity, food intake and infections. As the majority of the children were from low income households, their food intakes may be inadequate in terms of quality and quantity. If the male children were more physically active than the female children and in the presence of inadequate food intakes (assuming that both male and female children had similar inadequate food intakes), this may compromise their nutritional status or exacerbate their already poor growth status. In addition to the consumption of inadequate diets, if the male children were more susceptible to infections or they had lower birth weights than the female children, then they will be more at risk of poor nutritional status. However, this hypothesis cannot be confirmed in this present study as data on children's food intake, physical activity and medical history was not obtained.

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Analysis of variance test results revealed that there are significant differences in the mean Z-scores for height-for-age and weight-for-height due to age and standard ($p < 0.001$). There was a progressive degree of stunting as age and standard increase. For example, the mean Z-scores for 6 and 7 year-olds showed normal growth, while that for 8 and 9 year-olds indicate that they were mildly stunted. A possible explanation for these results is that the older children may be stunted because they were more malnourished than the younger ones during their early childhood and they have been experiencing the process of growth retardation for a longer time and not because they are growing poorly as school children. For wasting, however, a different picture emerges – as age and standard increase, the mean Z-scores for weight-for-height improve. The increased Z-scores for weight-for-height and the decreased Z-scores for height-for-age according to age and standard among these children may reflect that their weights have been adapted to their low stature and that there is a possibility of an association between stunting and high weight-for-height (Sichieri et al., 1996; Popkin et al., 1996). However, it is not in the realm of this present study to determine such a relationship between stunting and overweight.

Objective 2 – To investigate mothers' participation in making and implementing household decisions as predictors of child growth status.

Paired sample t-test was utilized to examine the differences in mothers' and fathers' participation in making and implementing household decisions related to income and expenditures, food and child care, health and feeding (Table 10). In all three areas of household decisions, mothers seemed to significantly dominate in making and

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implementing household decisions in regards to food and child care, health and feeding. Fathers, on the other hand, had significantly more influence in making and implementing household decisions in relation to income and expenditures. In terms of total decision making and implementation, there was no significant difference between mothers' and fathers' participation in decision making but mothers had significantly more power in the implementation of the overall household decisions ($p < 0.01$). In general, the Malay fathers and mothers in this sample contributed almost equally to making or planning household decisions but mothers seemed to have significantly more influence than fathers in actuating or implementing the overall household decisions.

According to the gender stratification theory (Blumberg, 1988), women's relative economic power is conceptualized according to the degrees of control of key economic resources; that is income and property. In others words, a woman does not gain economic power if she only works in economic activities or owns economic resources and does not control them. The greater women's relative economic power, the greater their control over their lives (including marriage, divorce, reproduction) and various types of household decisions which could benefit both themselves and their children. In the present study, while women dominated in household decision making and implementation in relation to food and child care, health and feeding, men were significantly in control of financial related household decisions. Even though the Malay women in this sample had significantly more decision making and implementation power in the two areas of household decisions (food and child care, health and feeding), they may not have the economic power as they had significantly lower participation in making and implementing household decisions related to income and expenditures.

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In Malaysia, the male-headed household is defined by the government as the norm. In the Malay society, men have long been the primary economic producers while women are the supplementers of household income when needed (Strange, 1994). However, this does not imply that women have less participation in the household financial matters. For example, Karim (1992) in his extensive anthropological study on women and culture in Malaysia, indicated that rural women have an important role in maintaining the household economy and resources within the household. These women, who majority were housewives, spent considerable time in farming and food-processing for household consumption, managed the household expenses and had significant power in owning, controlling and managing land, labor and capital. In another study of rural women (Strange, 1991), it was observed that although controlling household finances can give the women decision-making power in the household, during economically difficult times and commonly among rural Malay families, women's control of household finances burdens them with having to take up the slack between income and needs, and allows men to ignore the problem. However, whether these findings on the rural women's economic power relative to their husbands hold true for the urban Malay households may need more investigation, although the present study seemed to support that men remain as the financial planners and implementers in their households. In the Malay society, household tasks related to food and child care, health and feeding, are considered to be in the women's domestic spheres of activity and are controlled by them (Ariffin, 1986; Karim, 1992; Rudie, 1994). In this society, women's main roles are as mothers and wives. They are expected to perform their duties as wives to their husbands

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According to Rogers (1990), there are limitations to the measurement of decision making power within the households. First, genuine differences of opinion are likely to exist among household members as to who makes what decisions. In this present study, only mothers (and not fathers) were asked to indicate their participation in making and implementing household decisions. Perhaps, different results would have been obtained if fathers were also asked about their participation in household decision making and implementation. In other words, the findings may be biased as only mothers' responses were considered in the study. Second, people may not admit the true allocation of influence. For example, food and child care, health and feeding are looked upon as women's tasks in the Malay and other cultures. Therefore, it may not be appropriate for the mothers to report that they actually have less influence than their husbands in these household tasks. Finally, decision making power appears to be influenced by the sexual dichotomies in household activities (division of labor by sex) – the men may have more influence in financial-related matters while women in domestic activities. In the present study, the only category of household decisions considered to be in the men's domain is decisions related to income and expenditures (compared to the two categories of household decisions related to food and child care, health and feeding which are defined as women's tasks). This may lead to the findings that mothers had more participation in the overall decision making and implementation of household decisions.

Paired t-test analyses also indicated that mothers differ significantly in making and implementing household decisions related to income and expenditures, food and

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child care, health and feeding. Mothers had significantly more participation in decision implementation in all areas of household decisions (Table 11). Oppenheim Mason (1985) stressed the importance of differentiating the two different processes of access to and control of resources in the studies of women status. While **access** means that the women can use the resources with the permission of her husbands who have the rights to dispose of the resources, **control** of resources implies that the women have the power to dispose of the resources. Making and implementing household decisions are similar to these two processes (access to and control of resources) in that making household decisions may not be power bearing compared to actually implementing the decisions. A woman can contribute to household decision making but that does not necessarily mean she has greater influence in household decisions unless she is the one who implements the decisions. The findings in the present study support the importance of treating these two processes, participation in the making and the implementing of household decisions as two distinct mechanisms (Deacon and Firebaugh, 1988).

One-way ANOVA analyses were conducted to determine if mothers' total decision making and implementation vary with household demographic and economic variables (Table 12). For both total decision making and implementation, the mean scores significantly differ according to mothers' employment status and income earning ability. In total decision making, as long as the mothers worked (at home or away from home), they had significantly higher mean scores than mothers who did not work. However, only mothers who worked away from home had a significantly higher mean score for total decision implementation than mothers who did not work. In terms of

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Participation in income-generating activities has been found to improve a woman's control over household resource allocation and to increase her decision making power in the households. However, these outcomes depend on the type of employment (agricultural, non-agricultural), its location (inside or outside the home), the salary and the control of the income earned (Piwoz and Viteri (1985). In a study of women in Nepal, Acharya and Bennet (1983) reported that women who worked in subsistence farming had little control of household resource allocation. However, women who worked outside the household (in the market), had an increased decision making power (or control in household resource allocation) in all household activities. It was theorized that economic participation enhanced the perception that they are contributing partners in the household financial matters. A study in Mexico City (Roldan, 1982) found that as long as a woman has access to her earned income, this will improve her decision making power in the households and her self esteem. This was true in households where both the husbands and wives pooled their earned incomes and in those which did not. Similarly, low income mothers in Guatemala City with greater earned incomes were more likely to have or share the responsibility in making decisions than mothers with less earned incomes (Engle, 1993). In the present study, mothers who worked inside and outside the home had significantly more participation in total decision making compared to the non-working mothers which could be related to their income earning abilities. However, only mothers who worked outside the home (and not inside the home) seemed to have significantly more participation in decision implementation than the non-working mothers. Perhaps,

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for these mothers, working outside the home increased their self confidence and made them more assertive and independent (than mothers who worked inside the home) so that they were able to alter the balance of bargaining power between their husbands and themselves or control and manage the household resources.

Objective 3 – To assess mothers' nutrition knowledge as a predictor of child growth status.

Maternal education has frequently been found to have a positive impact on infant survival and child health and nutrition. This is because with education, mothers are more knowledgeable and aware of resources which enable them to make the right choice among alternatives, especially where resources are limited, adequate health services are not always available and access to the existing health care facilities is difficult (Cochrane et al., 1982). A mother's educational status also influences her child-care practices – she has better knowledge on child health and nutrition and is more attentive to her child's feeding needs, able to detect illness or any deviation in health among her children, more likely to manage household resources in favor of her children and less tradition-bound in terms of her child care practices (e.g. utilization of health services for illness in her children) (Caliendo and Sanjur, 1978; Ware, 1984; Guldan et al., 1993).

As mother becomes the primary care-giver for her children, the type of care she provides depends very much on her knowledge and understanding of some aspects of basic nutrition and health care. Her knowledge of child health and nutrition and child care practices is essential for her children's diets and nutritional status. This positive relationship between mother's nutrition knowledge and child health and nutritional status

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may either be independent (Smith et al, 1983; Christian et al., 1988) or confounded by other factors (Chen, 1986; Abbi et al., 1988). For example, it has been proposed that children of educated mothers with better nutrition knowledge have lower mortality risk because educated mothers tend to marry at a later age than uneducated women. Older mothers may be more knowledgeable than the younger ones in terms of better child care practices. Therefore, age and educational status of the mothers may confound the relationship between nutrition knowledge and child survival (Chen, 1986). Abbi and colleagues (1988) concluded that unless a mother's economic status is improved simultaneously with her nutrition knowledge, she may not able to put into practice all that she knows. In this study, household socioeconomic status (income per capita, land holding, occupation and family housing) confounded the relationship between the various components of mother's nutrition knowledge and child nutritional status (weight-age, height-age and weight-height).

In the present study, mothers' years of schooling was positively correlated with their nutrition knowledge scores ($p \leq 0.01$) while mothers' age did not show any significant association with nutrition knowledge (Table 13). However, mothers' age was negatively correlated with their educational status ($p \leq 0.01$) indicating that older mothers had shorter years of schooling. Results based on partial correlation and ANCOVA supported that the significant relationship between mothers' years of schooling and nutrition knowledge was not confounded by age (Table 14).

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Objective 4 – To identify household food security as a predictor of child growth status.

Approximately 67% of the households in this sample experienced some kind of food insecurity with the majority in the categories of household food insecure and child hunger (Table 15). Households which experienced child hunger were also household food insecure and individual food insecure. Similarly, households with individual food insecurity would also reported household food insecurity. Although 33% of the households reported food security, there is a strong reason to believe that the percentage is actually less because mothers may not report the truth about their household food situation.

Risk factors for food insecurity include any factors that affect or limit the household resources (e.g., money, time, information and health) or the proportion of those resources available for food acquisition. The potential consequences of food insecurity include hunger, malnutrition and negative effects on health and quality of life (Campbell, 1991). Household income has frequently been found to influence household food security – households with lower incomes are at risk for food insecurity. Kendall et al. (1995), in their validity study of the Radimer/Cornell measures of hunger and food insecurity found that household income was inversely associated with food insecurity status. As household income decreased, food insecurity status worsened. Similarly, as food insecurity worsened, women had lower education (less than high school education) and both men and women in the households were likely to be unemployed or not employed full-time. The researchers also reported that there was a significant and

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Other researchers have argued that it is not income per se that has an impact of household food security. For example, large household size has also been implicated as a risk factor for food insecurity (Baer and Madrigal, 1993). Their study of a Mexican sample indicated that large households had lower food consumption of all food types which was due to a lower available income to purchase food. Even when household income was controlled, larger households had significantly lower per capita food consumption than the smaller households. The data also suggested that nutritional problems of large households (children who were stunted or wasted) may be due to lower per capita income. This present study (data are not shown) also found that the larger the household size, the greater the risk for the households to experience hh/ind. food insecure (OR = 1.237; $p < 0.01$) or child hunger (OR = 1.262; $p < 0.01$) relative to being food secure. Others have reported that although household income is a major determinant of household food security, it is also true that the level of income controlled by women has a positive impact on household caloric intake which then can be translated into better child dietary intake and nutritional status (Kennedy and Peters, 1992; Johnson and Rogers, 1993).

The International Food Policy Research Institute (IFPRI) in its food policy statement (Quisumbing et al., 1996), indicated that women play an essential role in household food security through three possible mechanisms. First, the recognition that the majority of women in the less developed countries are involved in household food production. Therefore, there is a need to improve their access to resources, technology

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and information. Second, is the women's economic access to available food. Poverty is a major threat to household food security and the combination of lack of household income and gender inequality (women access and control of income) may further worsen food security. Policy makers must increase women's ability to generate income to maximize the benefits of women's incomes for household food security and nutrition. Finally, ensuring nutrition security (adequate nutrients) for all household members is in the domain of women. For example, the care that women provide to their children can affect nutrition security in two ways – feeding practices (breastfeeding and preparation of nutritious foods) and health and hygiene practices (bathing of children or washing hands before food preparation). It is also recognized that in order to achieve nutrition security, especially for the children, policy makers must protect women's health and nutrition to allow women to fulfill their productive and reproductive roles.

In the present study, households with lower incomes and income per capita were more likely to experience some form of food insecurity. As total household income or income per capita increases, the odds that a household will experience hh/ind. food insecure or child hunger will be much less relative to the household being food secure. Besides household income and income per capita, other variables such as household size, mother's earned income and years of schooling were also found to be risk factors for food insecurity in this study (data not shown). The larger the household size, the less money that the mother earns or the less years of schooling she had completed, the more likely that the households will experience food insecurity. It can be concluded that the combination of low level of available income and large household size may contribute to food insecurity among the households in this sample. With smaller incomes and a high

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cost of living (higher expenses for food and other essentials) in Kuala Lumpur, many of these households may have difficulty in obtaining adequate food supplies (quality and quantity) for their family members.

Objective 5 - To identify mothers' food allocation rules as a predictor of child growth status.

Table 16 shows that a majority of the mothers in this sample reported using the equality rule (71%) followed by needs rule (27%) and contribution rule (2%). Although the equality and needs rules seem to favor children (proportionately more food for them), each differs in its process. While the needs rule assumes that a mother's food priority is for her children, mother's using the equality rule give the food equally to all of the household members with no priority to the children.

Findings related to this objective were obtained from an independent t-test performed on the mean scores for mother's years of schooling, amount of income earned and nutrition knowledge and household total income and per capita income. A Chi-square test was performed on the frequency of household food insecurity (Table 16). In all of the analyses, none of the variables differs significantly between mothers' with needs and equality rules indicating that these groups of mothers did not differ in these various household characteristics. Statistical analyses (t-test and chi-square) were also performed for other variables such as household size, number of children, child's gender, food and total expenditures and mother's working hours in relation to the different types of mothers' food allocation rules (needs and equality rules). Again, no significant difference was detected for these variables between these two groups of mothers (data are

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Objective 6 – To investigate mothers' perceptions of child health status as a predictor of child growth status.

Three different measures of health were used to assess child health status – previous health, recent health and susceptibility and resistance to illness. These measures were then combined into a composite score of total health. Findings related to this objective were obtained from one-way ANOVA and independent t-test performed on the mean scores of total health (Table 17). Three categories of household variables (household demographics and economics, child care and feeding and child-related variables) were examined to determine if child health status vary with the various levels of these variables.

Based on research from other less developed countries, it is evident that maternal education has a consistent, positive effect on child health and survival (Bairagi, 1980; Cochrane, 1980; Ware, 1984; Piwoz and Viteri, 1985; Bhuiya et al., 1986; Caldwell, 1986) . The pathways through which maternal education manifests itself in improved child health and nutrition include efficiency of household resource allocation (time, money, food), greater confidence to take decision making into own hands, better child care and feeding practices, compatibility of the work with child care and the availability and quality of substitute child care, available household assets such as piped water and

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modern cooking equipment which may decrease time for household activities and job opportunity. In the present study, there was a significant difference in child health status according to mother's years of schooling – mothers with post secondary education had children with significantly better health status than children of mothers with only primary education. Two possible explanations for this finding are – first, better educated mothers may provide more positive responses in regards to their children's health compared to less educated mothers and second, in this sample, maternal education is positively associated with child health through the various pathways discussed in the literature. However, no significant difference was observed between mothers with secondary and post secondary education. Perhaps, the sample size of mothers with post secondary education was too small to detect any significant difference ($p=0.07$).

Total household income and income per capita were the other two household demographic and economic variables which were significantly associated with child health status in this sample. Children from households with an average total household income which exceeded the average for urban Malays (RM2162) had significantly better total health scores than children from households with total household income below RM2162. Similarly, while there is no significant difference in total health scores between children from households below the poverty level income (RM1-150) and households with income per capita RM151-300, significant differences in child health status were observed between households with RM1-150 and RM>300 ($p \leq 0.05$) and households with RM151-300 and RM>300 ($p \leq 0.05$). Ahmed and colleagues (1991; 1992) reported that household size and family income contributed significantly to growth and biochemical indices of urban school children in Bangladesh. In these studies, children

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from large families were more likely to be in the low income group. When factors such as child's age and gender, father's occupation and household size were controlled, the differences in growth and biochemical indices by family income remained significant. Another study of risk factors for malnutrition among school children in Mexico (Pelto et al., 1991) found that children from larger households were significantly shorter and had significantly poor diet quality. These relationships remained statistically significant even after controlling household economic status (material possessions, education of parents, house value and animal ownership) in regression analyses. In the present study, child health status did not differ significantly according to household size nor is there evidence that large household size is associated with low income (data not shown). Perhaps, in this sample of children, total household income (and in combination with household size) plays an important role in child health through better access to food, safe environment (sanitation and hygiene) and health care services.

The mean scores for child health status were also examined in relation to mother's nutrition knowledge and household food security (child care and feeding category). For nutrition knowledge, children of mothers in the highest score group (>18) had significantly better health status than children in the other two groups (0-12 and 13-18). However, no significant difference was observed in the mean scores of total health between mothers with nutrition knowledge scores of 0-12 and 13-18. In research question three, it was shown that in this sample of mothers, better educated mothers had better nutrition knowledge scores. Also, it was mentioned above that child health vary significantly with mother's education level. Therefore, it may be that the effect of mother's nutrition knowledge on child health status is confounded by maternal education.

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An analysis of covariance (ANCOVA) was carried out to determine the effect of mother's nutrition knowledge on child health status when mother's years of schooling is controlled (data not shown). When mother's years of schooling is controlled, the effect of mother's nutrition knowledge on child health status remained significant ($F = 3.024$; $p \leq 0.05$). Thus, the finding implies that the effect of mother's nutrition knowledge on child health status is independent of maternal education. This finding is similar to the finding by Christian et al. (1988) which indicated that the effects of mother's nutrition knowledge scores on anthropometric measures of children (weight-age, height-age and weight-height) remained significant even after controlling for mother's literacy status.

The ANOVA results on child health status by household food security were significant. Households experiencing child hunger were significantly more likely to have children with poor health status compared to households with food security and households with food insecurity (household/individual food insecurity). Although little is known about the consequences of food insecurity, it has been conceptualized that food insecurity is a risk factor for poor diet which may potentially result in poor nutritional state (hunger and malnutrition), health status (physical, social and mental well-being) and poor quality of life (Campbell, 1991). The findings in the present study indicate that as household food insecurity worsened (child hunger), children's health was negatively affected. Lack of available income to purchase quality food in these households may be a significant contributor to poor child health status and this effect may further be aggravated by the poor environment in which these children are living.

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Objective 7 - To describe mothers' allocation of income in the households.

The results in Table 19 suggested that among these Malay mothers who had earned incomes, income pooling may not be a common household economic strategy as only 38% of these mothers pooled their incomes with their spouses (n=53). The majority of these mothers (> 80%), however, shared the responsibilities of allocating and spending the pooled incomes. The similarity between mothers who pooled and partially pooled/did not pool their incomes with their spouses is that the majority knew the amount of their spouses' incomes and vice versa. The difference, however, between these two groups of mothers is that mothers who partially pooled/did not pool their incomes had control of their own incomes. Blumberg (1988) reported that when women have their own independent incomes and have control on their incomes, their self-esteem grows (which may influence their participation in both household domestic and economics decision making) and they are more likely to spend their incomes primarily on items for daily household consumption or children's support. Two studies of Guatemalan women (Blumberg, 1985; Engle, 1993c) supported that income pooling is not a common phenomenon among low income mothers. Women who had their own incomes did not pool their incomes with their spouses – many purchases were seen as either mothers' or fathers' responsibility.

Although the majority of mothers who had no income knew the amount of their husbands' incomes, sixty two percents of the husbands controlled the household incomes. The frequent responses by these mothers included – the husbands have the rights on the incomes because they are the ones who earn them, the husbands are the leaders of the

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household and they should make the financial decisions and the husbands are the ones who are working and spend most of their time outside the house; therefore, it is much easier for them to go to places (markets, shops) to buy what the household need. However, a majority of these mothers (86%) reported that they can easily have access to their husbands' incomes in that the husbands would give the mothers money for household expenditures (especially food), personal allowances or other things (clothes, furniture etc.). In a study of the relationship between women's autonomy and child health in Yemen (Myntti, 1993), it was found that women with healthy children had the opportunity to control and manage at least a portion of their husbands' incomes (they buy foods, supervise their husbands' spending, buy medicines, etc) compared to mothers with less healthy children. However, for the Malay mothers with no earned income, control of a portion of their husbands' incomes may not be adequate to improve their decision making power in the households as confirmed by the finding that mothers who were employed and had their own incomes had significantly higher participation in decision making and implementation than mothers who did not work and did not have own income.

The finding that husbands gave their wives money for household expenditures and personal allowance also apply to mothers with earned incomes (those who pooled and partially pooled/did not pool their incomes). In the Islamic religion and all of the study participants are Moslems, it is the responsibility of the husband to provide for his wife (food, home, clothes etc) in return for the wife's duty to her husband and family. Therefore it is the wife's religious right to receive 'nafkah' or payment from her husband for herself and her children, regardless of whether she has her own income or not. The

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wife also has the right to her husband's income, however, this is not true for the husband – if the wife forbids him to take her money, then the husband has to comply to the rule (Al-Khusti, 1997).

Objective 8 – To describe the mothers' perceptions of children's food habits.

Breakfast is an important meal as it provides children with energy for their activities in school. For children in particular, breakfast adds substantively to their total energy, protein and carbohydrate and micronutrient intake and increases the likelihood of meeting nutrient requirements. Children who are nutritionally at risk may significantly benefit from breakfast in that it may make it possible for a child to be well nourished over the long tern and may prevent or reverse nutrient deficiencies that affect cognition (Pollitt, 1995). In this sample of children, a majority (67%) ate breakfast at home and before going to schools (Table 20). There were, however, children in the morning school session (n=78) who did not eat their breakfast before going to school with the reasons given that these children are not hungry in the morning, the mothers have no time to prepare breakfast as they have to leave for work, the children get sick when they eat breakfast and the children prefer to buy the canteen foods. Perhaps for these parents, there should be a greater commitment to reinforce the importance of eating breakfast to their children. All of the children who went to schools in the afternoon session, had their breakfasts either at home or at their care-givers' homes although it could have been as early as when their mothers left for work or later in the morning. For other meals (lunch and dinner), a majority of the children would eat their lunches at home (91%) and all of the children would have their dinners with the rest of the family members.

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In the past, bringing food to school was a common practice among school children in Malaysia. However, today, it is not. A majority of the children (n=232) in this sample did not bring food to school. Parents may not have the time to prepare food for their children or children do not like to bring food to school due to embarrassment. If they bring food to school, they will either not eat the food or give the food to their friends (Rahman, 1994). However, almost all of the children were given pocket money to buy food at the school canteens. Although, the Ministry of Education has set guidelines for school canteen operators to provide a wide selection of nutritious foods and reduce the sale of less nutritious food such as commercially extruded snack foods or CES (foods which contain additives e.g. monosodium glutamate, sodium chloride, sugar and artificial sweeteners). The children can still obtain these foods from hawkers or retail shop outside the school compound. For example, a study reported that the average intake of CES by primary school children in a small town in Malaysia is one packet/day which is equivalent to 20 gram. A 20 gram serving of CES contains approximately 1.0 gram protein and 100 kcal, compared to 3.5 gram protein and 190 kcal from a 110 gram serving of "nasi lemak" (rice cooked in coconut milk and served with hot gravy with anchovies, slices of cucumber and boiled egg) at the same price (Abdullah et al., 1987).

A survey of canteen foods and foods served under the Supplementary School Feeding Program (RMT) in selected primary schools in Malaysia, revealed that in general, the canteen foods were lower in calories and macronutrients (carbohydrate, protein and fat) than the RMT foods. The RMT foods, however, were lower in calories and protein than the guidelines outlined by the Ministry of Education. For example, the RMT foods were supposed to provide 25-33% (or 290 – 390 kcal) of the RDA for energy

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and 10 – 15% (10 gram) of the energy should come from protein. In this survey, the RMT foods only provided 6 – 11% of the RDA for energy and 2 – 10% of protein (Wan Daud and Abdullah, 1996).

Based on the researcher's observations, it was common to see children stopped at the hawker stalls or small shops outside the school compound to buy CES after the morning school session or before the afternoon school session. Also, if the children do not eat breakfast at home in the morning but depend on the canteen foods which may be low in macronutrients, they may be at risk of not meeting their nutrient requirements (Pollitt, 1995). Parents may not have much control in the kinds of food that their children consume outside the homes especially when the children are at schools. Cooperation among the Ministry of Education, parents, teachers, canteen operators and nutritionists/dietitians is essential in educating every child on healthy eating habits. For example, it is meaningless for the Ministry of Education to discourage the sales of CES in school canteens when the children can easily buy the snacks elsewhere. It is also inadequate to have a school curriculum on physical education and health but little emphasis on nutrition or less commitment on the part of the teachers to teach it.

Objective 9 – To determine whether household inputs and throughput can predict child growth status.

In this sample of 309 Malay primary school children, the prevalence of stunting and wasting (both mild and significant) were 51.5% and 31.4% respectively (Table 21). In general, more male children were stunted and wasted than the female children. Similarly, when both weight-for-height and height-for-age indices were combined, 69%

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of male children experienced some kind of malnutrition compared to 64% of female children. Altogether, only 34% (n=104) of these Malay children (both gender combined) were not wasted and not stunted.

Past research in less developed countries has indicated that various factors contribute to growth status of primary school children (e.g. socioeconomic status, health condition). Given a different context in Malaysia, these factors may vary. In this study, the sample was children from primarily low income households and all of them were of Malay ethnic group and Moslems. The homogeneity of the sample in this present study in terms of socioeconomic status (income, education levels and occupational status of parents), ethnicity (e.g. child care practices) and religion (status of women) and the exclusion of other important growth determinants such as physical activity, dietary intake and exposure to infections or disease state may explain the differences between the current findings and findings from previous research. In addition, issues related to ethnicity and religion are not explored directly in this study.

Regression analysis indicates that child growth status as measured by a combination score of weight-for-height and height-for-age is explained by mother's decision implementation, child's age and gender (Table 24). The major predictor of child growth status in this study is mother's decision implementation which is an indicator of female autonomy in the household. This finding confirms the results of previous research (Doan and Bisharat, 1990; Kennedy and Peters, 1992; Engle, 1993c; Johnson and Rogers, 1993; Myntti, 1993) which found that as female autonomy increases in the household (she has the ability to generate and control or manage the resources in the households), child nutritional status improved. However, all of these studies focused on the effect of

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women decision making power on the health of young children (< 5 years old), whereas in this present study the focus is on the well-being of primary school children. Although, mother's decision implementation did not explain much of the variance in child growth status ($R^2 = 3.6\%$) in this sample, it suggests that the significant effect of female autonomy may extend beyond the age (0-5 years old) when children are totally dependent on their mothers for survival.

In this present study, age of the children was found to be negatively related to child growth status. That is, the older the children were, the poorer their growth status. This finding supports the findings by Chee (1992) and Stoltzfus et al.(1997). Chee (1992) in her study of children (aged 2 –10 years old) from a squatter settlement in Kuala Lumpur, reported that the prevalence of underweight and stunting increased with age. Children below 5 years of age were significantly better in their growth achievement compared to the older children. Stoltzfus and colleagues (1997), also found that the prevalence of stunting rose dramatically with age especially in male children. However, the prevalence of wasting did not show any trend by age or sex. Although not much can be concluded on the gender differences in growth status using cross-sectional data, it is possible that the older children may be stunted because they were more malnourished during their early childhood or had experienced longer retardation process than the younger ones and not because they are growing poorly as school children. Also, as the child becomes older, less attention may be given to him by his parents, especially the mother. For example, Karim (1992) in his detailed analysis of child rearing and socialization among the Malay households in Malaysia, stated that the physical and emotional comforts given to young children by their mothers may gradually wear off

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when the mothers conceive again or have other younger children. Mothers with young children do not have the time to supervise the older children's health and hygiene, personal needs and food requirements. Consequently these children are left to play on their own e.g. in mud, dirt, water and they frequently do not practice good hygiene e.g., they do not wear slippers while playing and do not change their clothes or wash their hands after playing. In terms of food intakes, as the mothers are busy attending to the younger children, the older children are left to eat the left-over food or wait for the food to be prepared. Frequently, because of the irregularity of meals in the households, the older children are given money by the mothers to buy snack foods.

With regards to gender differences in growth status in this study, the regression analysis indicates that there is a significant relationship between child's gender and growth status. Finding from this study reveal that being a male child is related to poor growth status. As discussed earlier, there are several possible explanations of why more male than female children are stunted and wasted – growth retardation may be more severe in male than female children due to the different effects of maturation delay in both sexes, possible continuation of living in the same deprived environment for the male children which may impede their potential for catch-up growth and differences in growth status due to factors such as physical activity, food intake and infections. However, none of these possible explanations was investigated in this study.

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Conclusions

The differences in culture, religion and/or geographic location may have contributed to the findings in the present study. Therefore, these findings are only generalizable to the sample of low income urban households in this study. All of the variables (mother's decision implementation, child's age and gender) that are significantly related to child growth status in this sample have also been found to be significant predictors in other studies in a variety of settings. This is also true for variables that significantly influence mother's decision making and implementation, mother's nutrition knowledge, household food security and child health status.

Among this sample of primary school children (6 – 10 years old), stunting as a form of malnutrition is more prevalent than wasting. Two major implications of linear growth retardation among primary school children are – first, the process of stunting may be associated with concurrent risks to the health and development of school age children and second, stunting in school age children may result in shorter adult height, which decreases work capacity and increases reproductive risks for women (WHO Expert Committee, 1995). The findings also indicate that both stunting and wasting vary significantly according to the children's age and gender. As the children get older, they are at greater risk of being stunted but not wasted. Also, male children compared to their female counterparts have a higher prevalence of stunting and wasting.

Evidently, there are differences in decision making and implementation of various household tasks between mothers and fathers. In the Malay culture where the male is the breadwinner and the head of the household and the female is the caretaker of the family

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members, it is no surprise that the fathers dominate in financial-related decisions and mothers in domestic chores (food preparation and child care). In this sample, mothers and fathers contributed almost equally to total decision making but mothers had significantly higher participation in total decision implementation. Although the mothers had significantly higher participation in decision making and implementation related to food and child care, health and feeding and total decision implementation, it may not necessarily imply that they also have higher economic power relative to their husbands' in the households as fathers had significantly higher participation in making and implementing household decisions related to income and expenditures. However, actuating the household decisions (decision implementation) may give the mothers more power than just planning the decisions in that the mothers are able to control and manage the resources, especially those that relate to food and child care. This ability then may transform into better health and nutrition for their children. The findings also support previous research that found mother's employment status and her income earning ability contribute significantly to female autonomy – access to and control of her own income will improve her self-esteem and decision making power. In other words, when she has her own income, she is more confident in taking matters in her own hands independent of her husband.

Mother's knowledge of child health and nutrition is important for their children's diet, health and nutritional status. However, mother's age and education may confound the relationship between nutrition knowledge and child nutritional status in that older and /or more educated mothers have better nutrition knowledge than younger and/or less educated mothers (Chen, 1986). In this study, older mothers had shorter years of

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schooling compared to younger mothers but no significant correlation was observed between mother's age and nutrition knowledge. The finding also supports that better educated mothers (regardless of age) had a higher mean score for nutrition knowledge compared to the less educated mothers. In terms of household food security, approximately 67% of the households in this sample experienced some kind of food insecurity (household food insecure, individual food insecure and/or child hunger). Inadequate household income and large household size have frequently been found to be risk factors for food insecurity (Campbell, 1991; Baer and Madrigal, 1993; Kendall et al, 1995). Household income is inversely associated with household food security and the effect of large household size on food insecurity may further aggravate the association between lower available income and food insecurity. The findings in this study reveal that the higher the total household income, the lower the risk for the household to experience food insecurity. Similarly, households with higher income per capita were also at lower risk for experiencing any form of food insecurity (hh/ind. food insecure and child hunger). These risk factors (household income and income per capita) for household food insecurity among this sample were similar to that found in other studies (Kennedy and Peters, 1992; Johnson and Rogers, 1993; Baer and Madrigal, 1993; Kendall et al., 1995).

The findings on the association between child health status and various household variables (demographic and economic, child care and feeding and child-related variables) suggest that mother's education level and her nutrition knowledge are essential for her children's well-being. In fact, the positive effect of mother's nutrition knowledge on child health status was independent of her education level. Other factors that have been

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found to influence child health status in this sample included household income, income per capita and food security. The lack of available income and its combination with large household size may put constraints on the household to purchase adequate food for all of its members and limit the household's access to a safe environment (sanitation and hygiene through better cooking facilities, water supply etc.) and health care services.

The prediction model based on regression analysis indicates that only mother's decision implementation, child's age and gender are significant predictors of child growth status (combination score based on weight-for-height and height-for-age). However, the model accounts for only 9% of the variance in child growth status with mother's decision implementation being the highest contributor ($R^2 = 3.6\%$) to the model followed by child's age ($R^2 = 3.0\%$) and gender ($R^2 = 1.8\%$). The small amount of variance in child growth status explained by this model may be due to the homogeneity of the sample (socioeconomic status, religion, ethnicity) and exclusion of other important variables such as children's birth weights, physical activity, dietary intake and medical background (e.g., occurrence of infections or diseases). Also, all of the variables proposed as determinants of child growth status in Figure 1 have been found to be significant predictors of child health and nutrition for primarily young children (0-5 years of age) in less developed countries. Whether these findings apply to the school-age children are questionable as at this age, the children are less susceptible to the threats of poor socio-economic and health environment. Perhaps, there are other factors which have not been investigated in this study that may have greater effects on these children's growth achievement.

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The number of primary school children in Malaysia (7 – 12 years old) has increased to approximately 2.9 million (Malaysian Dept. Statistics, 1997). With the increasing number of children enrolled in the school system, we should also expect a rise in the number of children with health problems such as malnutrition, overweight, skin diseases, dental caries, poor vision and helminthic infection. The findings in this study on the prevalence of malnutrition among Malaysian school children should warrant concern from the government (Ministry of Education and Ministry of Health) about the health condition of our school children. The improvements of their nutritional status may benefit the country in terms of better educational achievement (lower drop-out rates in schools and increased learning ability), improved work capacity among the people and in general, a healthy population. Certainly, there have been join efforts by the Malaysian Ministry of Education and Ministry of Health to promote and maintain the health and nutrition of school children through programs such as School Health Service (SHS), Supplementary School Feeding Program (RMT) and School Milk Program (PSS). However, there is a need to examine the effectiveness of these various programs in targeting children who are at risk of health and nutritional problems and in their program management and implementation.

Although the growth predictors of these children in this study are limited t0 mother's decision implementation, child's age and gender, it is important to recognize that among these primarily low income households, female autonomy may play a significant role in the lives of children. Intervention programs such as the NADI Program by City Hall of Kuala Lumpur with the main objective to improve the quality of life of the lower income population in Kuala Lumpur, should also increase their efforts in

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improving the lives of these low income women. Under the NADI program, projects for family and community development such as income generating activities for women, vocational training and family counseling have also been implemented. For other significant predictors (child's age and gender) of child growth status in this study, more research is recommended to investigate the reasons for age and gender differentials in children's growth attainment.

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Research Implications

This study supports the finding that stunting and wasting are still prevalent among low income urban school children. The finding emphasizes the need for the government, particularly the Ministry of Health and Ministry of Education to address health and nutrition issues in this age group. Health and nutrition monitoring is essential so that effective interventions can be implemented to eliminate the health and nutrition problems among the school children. Currently, there are various health and nutrition programs for school children which include the School Health Program (SHP), School Health Education Program, School Supplementary Feeding Program and School Milk Program.

One of the components of School Health Program is School Health Services (SHS) which offers emergency health care, treatment of minor ailments, appraisal of health status, dental services, screening for visual defects, immunization, deworming, referral of children with special problems and health education (Jantan, 1993). SHS is mainly rendered by Maternal and Child Health (MCH) nurses with very few children being examined by doctors. The coverage is at present confined to only primary school entrants (Standard 1) and school leavers (Standard 6) due to shortage of manpower. There is a need, however, to have follow-ups to see if the health problems experienced by Standard 1 children will continue into later years. In other words, to assess children's health and nutritional status, it is necessary to screen children several times and not just at Standard 1 and 6. Besides limited coverage, in some schools, SHS is not always completed for children in Standard 1 and 6 due to shortage of manpower (nurses and doctors). By increasing the number of MCH nurses and training these nurses to provide

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the services rendered by the doctors, it is a necessary step to overcome the shortage of doctors both in the program and in Malaysia.

Weight and height measurements of school children are taken at least once a year by the classroom teachers. They are easy and inexpensive to perform and can be used as indicators for poor health and nutrition. In many of the schools visited, the equipment used to measure the height and weight of these children were inadequate e.g., there is only one bathroom scale to measure all children in the school or the scale and the anthropometer were already worn out. Also, the measurements are available in the school records but they are not being utilized by school or health officials for monitoring or intervention purpose (e.g., use weight and height measurements as criteria for School Food Supplementary Feeding Program and School Milk Program). It is recommended that each school should have adequate equipment to measure the children and that the available growth data be used as a health and nutrition monitoring tool of these school children.

The School Supplementary Feeding Program offers a nutritious meal to school children from low income households as a temporary measure to improve their health status. The meal provides about 1/4 to 1/3 of a child's daily nutritional requirement. A longitudinal study on the effectiveness of this program reported that children who received the supplementary food had improved nutritional status, better academic performance and school attendance (Kandiah, 1990). Since the program does benefit the low income school children, some measures should be taken to improve the implementation and management of this program. For examples, the use of standardized ingredients to prepare the meal by school canteen operators and frequent monitoring of

food preparation by school officials. These measures will reduce the variability in quantity and quality of foods served to the children.

Household income and income per capita have been the criteria used to select children for the School Supplementary Feeding Program. The use of household income as a criterion for the program can be misleading as parents may provide incorrect information on their incomes in order for their children to qualify for the program. Another frequent complaint from school officials on the use of household income and income per capita is that the criteria is too strict. For example, in Kuala Lumpur, it is difficult to find a family with an income of less than RM450 or income per capita less than RM35 (criteria used for the program). Also, in many cases, if a family qualifies for the program and it has more than one child in the school, only one sibling is allowed to receive the meal. Especially in schools where majority of the children are from low income households and they are at risk of many health and nutrition problems, weight and height measurements and other health indicators (e.g. anemia) are recommended as other main criteria for the program selection.

The study also supports that mother's bargaining power (e.g., decision implementation) in the household improved child growth status and that income earning activities increased mother's decision power in the household. In the urban area of Kuala Lumpur, efforts to improve the life of low income households have been carried out through several programs. For example, the NADI program by City Hall of Kuala Lumpur with its main objective to improve the quality of life of the low income population in Kuala Lumpur. The program components include health and education (e.g., maternal and child health, family planning, control of contagious diseases, and food

hygiene), environmental (water supply and electricity) and family and community projects (vocational training, family counseling and income-generating activities). Efforts to improve the lives of low income women should be incorporated into activities such as vocational training and income-generating activities. Another program is the Sang Kancil program (a cooperative effort by City Hall of Kuala Lumpur, National Institute of Public Administration and University of Malaya) which offers maternal and child health care, preschool education and income-generating activities for women. However, due to operational and technical difficulties, the few income-generating projects for women have been terminated (Khor, 1992). Perhaps, it is time for the City Hall of Kuala Lumpur to review the issues related to the projects and reconsider the implementation of the income-generating projects for low income women.

Mother's nutrition knowledge is essential for their children's diet, health and nutritional status. The finding from this study indicates that better educated mothers had better nutrition knowledge compared to less educated mothers. Nutrition education should be offered to mothers, especially those from low income households through programs such as Maternal and Child Health Services, NADI program, Sang Kancil program, Health and Nutrition Education House and Community Health program. In some of these programs, nutrition education has already been incorporated, however, vigorous efforts should be taken to ensure that the health and nutrition materials are variety and acceptable to the mothers. Another recommendation is to offer health and nutrition education to primary school children through the School Health Education Program. At present, health and nutrition is not being taught as a subject but it is being integrated into various subjects such as Physical Education and Health, Man and His

Environment, Moral Education and Religious Education. We need to have experts in health and nutrition to design a curriculum which includes various topics appropriate for this age group. Also, at the school level, teachers and nurses should be trained to teach this subject to school children. Indeed, good health and nutrition habits should start at a young age.

Strengths and Significance of the Study

In 1976-1977 and 1988-1989, Malaysian Family Life Survey (MFLS) 1 and 2 were conducted in Malaysia. Both surveys were collaborative projects between the National Population and Family Development Board of Malaysia government and RAND Corporation, USA and were supported by the United States National Institute of Child Health and Human Development and the National Institute on Aging. The surveys produced household level retrospective and current data for women and their husbands, covering topics of demographic and household economic research (fertility, nuptiality, migration, mortality, employment and household composition), as well as social, economic and community-level factors affecting the household behavior. They were also designed to provide data for the study of household behaviors i.e. breast-feeding and family planning over a period of rapid demographic and socioeconomic changes in Peninsular Malaysia. As these surveys did not provide data on nutritional status of the subjects and their children, they did not measure the nutritional consequences of the changes in demographic and economic factors as well as the changes in household behaviors. This present study attempts to demonstrate the utility of conceptualizing intrahousehold factors, which not only account for demographic and economic factors (household measures of SES) but also behaviors (as influenced by knowledge and perceptions), as determinants of child's growth status. From a family resource management perspective, it is useful to assume that child growth status is an output of several household inputs that can act independently or interactively.

Urban nutrition issues including nutrition as related to migration, changes in family structure, food contamination, changing in food habits and lifestyles, poverty in cities, towns and metropolises have only recently received recognition due to the overwhelming increase in the urban population in developing countries. A workshop on "Urbanization and Nutrition" (Gross, 1992) which focused on current state of knowledge of nutritional problems in urban areas has advocated research on intrahousehold food allocation and disadvantaged household members as one of its proposals for action. The basis for the selection of the disadvantaged household members is threefold:

1)Physiological - pregnant and lactating women and children, particularly under-five children who are in active growth period and have greater nutritional requirements.

2)Cultural - groups where individuals are vulnerable due to social pressures such as power relationships between adults and gender bias in the upbringing of children

3)Urban environment - higher standard of living, monetary income and food prices which will influence food choices and demand on women's time to participate in the work force as to meet household's financial needs negatively affect child care and feeding.

To date, there is no published information on the study of intrahousehold food allocation in Malaysia. Although this study did not look at dietary intakes of all members in the households, it did focus on mothers' food allocation rules as an initial step to understand how food is being distributed in the households.

Women play a major role in the health and nutritional status of their family, especially children; yet in many cultures, women have relatively low decision making power and little control over household resources compared to men. Decision making processes and control over resource use or allocation, including time, food and money,

are determined by power bases in the household (Safilios-Rothschild, 1970). The term "power bases" refers to the relations between family members, and the relative bargaining/decision making power, influence and respect each member has in determining the use of household resources (Piwoz and Viteri, 1985). The common characteristics shared by women from most low income households are low education level and lack of income generation and control. Little is currently known about how these characteristics may negatively impact a woman's decision making power and intrahousehold resource allocation and consequently a child's health outcomes. This study will not only look at these characteristics but also try to understand the roles and interactions of culture, poverty and the status of women in influencing the growth and health status of children.

In Malaysia, the number of primary school children (6-12 years old) in 1997 has increased to approximately 2.9 million (Malaysian Dept. Statistics, 1997). As the number is increasing, there is a need for health professionals to focus on nutrition and health of this age group. It has been reported that underweight, stunting, overweight, upper respiratory infections, hair lice, worms infestation, poor vision and skin diseases are the major nutritional and health problems among the primary-school children (Ayyamani, 1986; Anonymous, 1990). This present research will contribute to the body of current information on the determinants of growth and health status of low income school children so that with this information, efforts to improve the total development of children will consider all levels of a child's ecosystem from the microsystem to macrosystem. For example, although there are food supplementary programs (School Supplementary Feeding Program and School Milk Program) to improve the health and

nutritional status of primary school children from low income households (Jantan, 1993), health and nutrition education for school children has not received much attention. The primary reasons are (1)Health and nutrition education is a non-examination subject in the primary school education system. Therefore, teachers, parents and pupils, tend to put very little emphasis on health and nutrition education in comparison with other subjects. (2) The number of teachers trained in health and nutrition education is by far insufficient due to inadequate school budget. (3)There is inadequate professional and administrative support and follow-up for health and nutrition education from the Ministry of Education and State Department of Education due to lack of trained personnel.

The food security instrument in this study was adapted from the Radimer/Cornell hunger and food insecurity instrument (Radimer et al., 1992). The instrument was developed after in-depth interviews with a sample of low-income women from Upstate New York, America. This present study is the only one so far to the researcher's knowledge, has attempted to use the instrument with an international population. The study found that the instrument can be used with cross-population as it was validated with the findings that among these sample of low-income Malaysian households, low household income and income per capita, large household size and less years of schooling and earned incomes of mothers were significant risk factors for household food insecurity. Some of these risk factors were similar to that reported by Kendall and colleagues (1995) in their validation of the Radimer/Cornell measures of hunger and food insecurity.

Finally, the investigator shared the same cultural and religious background as the children and the mothers in the study. These similarities facilitated the investigator's

interaction with the respondents. For example, during the weight and height measurements of the children, the investigator did not measure the male and female children at the same time as it was perceived as culturally inappropriate. In some of the households, the investigator had to ask the fathers for permission to interview the mothers as according to the Islamic religion, a woman has to obtain her husband's permission before she lets someone else (relatives, friends or strangers) enter her household. Also, the mothers were receptive to the investigator in that they wanted to share information that was personal and confidential; for example, their marital problems, difficulties and unattained ambitions. The investigator's knowledge of the culture and the religion of the respondents contributed to obtaining complete information for the study.

Limitations

1. Due to restrictions of time, money and staff, the subjects in Study 1 (growth status of primary school children) were limited to low income primary school children in 21 SK schools (approximately 9000 children) in the urban area of Kuala Lumpur. For the study on the determinants of child growth status, only low income Malay primary school children from seven selected SK schools (approximately 600 children) and their mothers were included in the study.

2. The results of this study on the determinants of growth status of Malay school children from low income households could only be generalized to primarily low income Malay children in urban areas of Kuala Lumpur. The determinants may not be similar to those of rural children or other ethnic groups because of different cultural or religious beliefs

and environment. Consequently child care, food intakes, types of employment and family structure may differ among the various ethnic groups and between rural and urban populations and may have different effects on children's growth status. Also, because this study focused on 6-7.9 year-old children, the findings were not generalizable to older age groups who may be affected more by the school environment (e.g. food intake) than by household environment (e.g. child care, maternal employment).

3. Only mothers were interviewed in this study which may result in bias responses on the questionnaire items. Also, this study only looked at maternal inputs (resource allocation, decision making, nutrition knowledge, child care and feeding and child health perceptions) in the households. This may not provide a holistic view of intrahousehold behaviors as predictors of child nutritional status.

4. The research was limited to cross-sectional data which was collected at one point of time. For instance, reliance on recall (child's health status) and self-report (decision making and food allocation) to obtain information were less reliable than recall with direct observation or medical report.

5. As Malaysia has no country-specific growth standard, NCHS growth reference was used as a standard for growth comparisons in this study. The relative contribution of environment and heredity to the growth status of Malaysian children which may influence the comparisons with the NCHS reference population, is yet to be investigated.

6. This study focused on mother's perceptions of child health, food security and household resource allocation and decision inputs. Thus, the validity of the instruments used to assess child' s health status, food security or adequacy, mother's food allocation rules and decision making and implementation may be questionable because there were no health examinations performed by physicians, assessments of children's and household members' dietary intakes or observations of mothers actually allocating the foods and participating in making and implementing household decisions.

7. In Study 1 (growth status of primary school children), the growth status of the children was not stratified according to household income due to the possibility of the income information being confidential, inaccurate or missing. Also, even though the schools in this study were categorized as "low-income schools", there may be some children who were not from low-income households. These factors may bias the study findings in that the growth outcomes of children from low-income households may differ from that of children from middle or high-income household. There was also the possibility that the study would exclude the poorer children who never go to school or who drop out from school.

8. In Study 2, mothers were asked to report the amount of income the households received every month from various sources. This may result in underreporting of household income especially if the mother did not know the amount of his husband's income or if the husband is in charge of household income and expenditures.

9. In Study 2, seven hundred and fifteen children were measured but only 613 were given questionnaires for their mothers. Also, although 554 questionnaires were returned, only 497 consented to participate and 309 were eligible for the study. The high number of non-respondents in this study may reflect either those who did not participate in the study had children with poorer health and growth status or those who participated were motivated by the study's concern with the children's well-being.

Despite the limitations, there are strengths associated with some of the limitations. First, the inclusion of only primary school children from low income households in Kuala Lumpur is based on the many research findings that these children are more susceptible to poor health and nutritional status. The present study did not compare growth outcomes of children from low income households to that of children from high income households. It did, however, investigate the factors within the low income community which may contribute to better growth outcomes of children. Second, only primary school children in Standard 1 were included in Study 2. It is essential to detect the factors that contribute to the deviations from normal health and nutritional status at an early age before the conditions further deteriorate. The identified factors may also assist in policy making or program planning related to the well-being of primary school children (e.g. inclusion of household size as a criterion for a child's eligibility to participate in current government food supplementary feeding program in schools). Third, the research focused only on mothers' inputs (and not fathers') as predictors of children's growth status because of the consistent research findings that mothers' inputs have more impact on their children's health and nutritional status (e.g. maternal income contribution, nutrition

knowledge, education level and child care). Fourth, although the validity of the instrument on mothers' perceptions of child health status, food security, household food allocation and participation in making and implementing decisions may be questionable, perceptions may actually determine actions or actual behaviors. This research is intended to be the beginning of much future research related to maternal and child health in Malaysia. Then mothers' perceptions can be validated by the various methods of medical assessment, household dietary intakes and observations. Nevertheless, in this study, food security was found to be related to household income and income per capita in that households with lower incomes were more likely to experience household/individual food insecure or child hunger. Also, child health is significantly related to household income, income per capita, mother's years of schooling and nutrition knowledge. All of these relationships have been documented in the literature as important determinants of child health and nutritional status. These findings provide a validation of the food security and child health instrument used in the study. Fifth, household incomes may be underreported by the mothers especially if they did not know the amount of their husbands' incomes or if their husbands handle all the financial matters. However, based on the interactions between the investigator and these mothers, there were indications that underreporting of household income may not be a severe limitation to this study. First, when cross-validating mothers' reported household incomes in the questionnaires with household incomes reported in the children's records, the amount reported in the children's record was always lower than that in the questionnaires. Perhaps, the many options given in the questionnaire (e.g. various sources of household income) facilitated the mothers to report their monthly total household incomes. Second, mothers' reported

household incomes may actually have face validity in that they were found to be related to child health status and household food security. For examples, households with lower income had children with poorer health status and were more likely to exhibit food insecurity. Finally, although there was a concern with non-respondents in this study, the findings indicated that the non-respondents may not have biased the study. In Study 1 (growth assessment of 8005 primary school children), the percentages of children who were stunted and wasted were 48.7% and 32.1%, respectively. In Study 2 (determinants of growth status), the prevalences of stunting (51.5%) and wasting (31.4%) among the 309 children were similar to those reported in Study 1. These findings gave an indication that this study may not have missed those households with children who were significantly malnourished and chose not to participate in the study.

Recommendations for Future Research

Since this study was conducted on a sample that is culturally different from those used for previous research, the norms that are used in comparison to the findings may be misleading. For example, the various instruments used in this study (food allocation, nutrition knowledge, child health, food security) were developed for populations in the United States and Guatemala. This may explain in part the discrepancies in the findings which result from cultural differences of the sample being studied. If the items are culturally or religiously inappropriate for the population, they may need to be revised or replaced. For example, in the food security instrument, there may be questions which are considered culturally sensitive so that the mothers may feel embarrassed to answer. On the basis of the researcher's observations (home-visits), the severity of food insecurity in

many of the households was underreported by the mothers in the food security instrument.

Methodologically, using only the mothers to elicit responses on various household measures may bias the findings. For example, the exclusion of fathers in asking their participation in making and implementing household decisions or subtracting the fathers' scores from the mothers may not be the best way to measure female autonomy in the household. In addition, as domestic activities are considered to be in women's domain, it may be inappropriate for the mothers to report otherwise. Ideally, the instrument should include the responses from both fathers and mothers. For future research on female autonomy, it is recommended that fathers be included as respondents in order to allow the researcher to directly measure the differences in bargaining power between fathers and mothers in the households.

Measurements of female autonomy, child health, food allocation and food security may not necessarily have covered all the various aspects of their domains that may be pertinent to the sample being studied. There may be other areas of household decisions such as children's education and socialization of the children or other decisions related to income and expenditures, food and child care, health and feeding that have been excluded which may have a significant bearing of the bargaining power in the households. Similarly, assessment of child health based on mother's perception may not give the actual picture of the child's health status. Instead, medical examination or information on the child's health history (based on health records) is more accurate in child health assessment. For food allocation and food security, observations on how foods

are being distributed among the household members and investigation into household food supply or intakes may produce more accurate and conclusive results.

The use of NCHS/WHO growth reference as a yardstick to measure the Malay children's growth attainment in this study may possibly produce inaccurate results, although the growth reference has been internationally accepted for growth comparisons among children. At present, Malaysia does not have any national growth reference for its population. However, other neighbouring countries such as Thailand, India and Japan have their own growth standards which may be more applicable to the sample of Malaysian children being studied. Perhaps, for future research, considerations should be given to growth comparisons of the Malaysian children to the NCHS/WHO reference and also to other population-specific growth standards.

Finally, there are other variables that need to be investigated when studying the growth determinants of school-age children. Examples would be their birth weights, dietary intakes, physical activity and health state (infections or diseases), the length of time they have been living in the deprived environment, child care practices of the mothers (child feeding and quality of child care, e.g., priority for health care, time and attention), parents' weight and height measurements and life stresses in the household or child's life (e.g., father lost a job, death of someone close to the child). Also, it is important to note that the predictors of child growth status for children living in impoverished environment in urban areas may differ than those for children living in the same environment in rural areas. Future research may include these variables in order to better understand the effect of the child's ecosystem (from micro to macro system) on child growth status. This information may facilitate the allocation of resources by the

Malaysian government, health professionals and other organizations accordingly as a means to improve the well-being of our school children and the future generation.

APPENDIX A

RESEARCH FORMS AND QUESTIONNAIRE

RESEARCH PROJECT

Growth Status Determinants Of School-Age Children In The Urban Area Of Kuala Lumpur: A Focus On Intrahousehold Factors.

Dear Parents,

YOU and **YOUR CHILD** are invited to take part in a very important research project. The purpose of this project is to get information from both the mother and child on factors that may affect your school-age child's health and growth. Knowing about these factors may help us understand the kind of things that we can do to help our school children to have good health and growth. Good health and growth will help school children do better in their school works. The factors that may affect your child's health and growth include the food he/she eats at home and school and the home he/she lives in (e.g. clean water, house and surrounding, love and care from both parents and parents' knowledge of health and nutrition).

Therefore, before we can help our school children, we need your help and your child's help to give us the information that we need. The kind of information that we would like from both the mother and child are:

1)**Your child** : we will measure your child's weight and height and this activity will be carried out during school hours in your child's school.

2)**Mother** : we will ask the mother questions about your husband's and your education, income and occupation, how you distribute food in the house, how you take care and feed your children, how much you are involved in making and implementing decisions at home, your knowledge in nutrition, household food security and your child's health. This activity will be done through a questionnaire and a home visit.

We have given your child **four** kinds of forms to bring back home to give to you. The forms are:

1)This letter with a title "Research Project". The letter tells you about what we are going to do and the information that we would like to have from both the mother and child.

2)A form with a title "Consent Form". This form allows us to ask questions to the mother and to measure the child for the research project. The mother needs to sign the form if she agrees to have both herself and her child take part in the research project.

3)A form with a title "Permission to Conduct Home Visit". The form seeks the mother's permission to allow the researcher to visit her home.

4)A questionnaire with a title "Mother's Interview Guide". The questionnaire contains ten parts which the mother needs to fill in:

A)Demographic information on mother and father

B)Household questionnaire

C)Household income allocation

D)Food allocation

E)Mother's participation in decision making and implementation

F)Child information

G)Child care and feeding

H)Child health perception

I)Nutrition knowledge questions

J)Household food security

Each form will tell you more about what you need to do. If you have any question or you need any assistance to fill in the forms, please don't hesitate to let us know. You can either give the question (s) or request to your child to bring to school or you can call the researcher (Zalilah Mohd Shariff) at the number below. Please feel free to make collect call (s) to the number. After you have read and filled the forms, please return the following forms (consent form, permission to conduct home visit form and mother's interview guide) to your child's classroom teacher or the researcher.

Your and your child's cooperation are very much needed and appreciated for this project. The responses of all mothers and children in this project will help guide us to more effective ways to improve our school children's health and growth.

THANK YOU for being a part of this special project!

Yours Sincerely,

Zalilah Mohd Shariff (Research investigator)
1408/1 Batu 6 Jalan Puchong Petaling
Kuala Lumpur 58200
Phone: 03-7929388

CONSENT FORM

The purpose of this research project is to get information on factors that may affect your school age child's health and growth. To do this, the researcher will measure his/her weight and height. This activity will be done in school during the school hours. For you (mother), the researcher will ask questions about your and your husband's education, income and occupation, how you distribute food in the house, how you and your husband share and spend the incomes, how you take care and feed your children, how much you are involved in making and implementing decisions at home, your knowledge in nutrition, household food security and your child's health. A questionnaire containing these questions will be given to you through your child. If you have any question regarding the research and the questionnaire, please forward your questions to the researcher through your child or you can contact the researcher at 03-7929388. A follow-up interview will be carried out in your home (upon your permission) after the receipt of your questionnaire and you can choose to have your husband with you when the researcher asks the questions. However, there may be some questions such as how much you are involved in making and carrying out decisions or how you and your husband share and spend the incomes which may make you feel uncomfortable if your husband is with you when you answer the questions.

The researcher will make a visit to your home to ask you (mother) some questions sometimes between December 1997 through March 1998. It will take about 10 to 20 minutes to measure your child's weight and height and about 60 to 90 minutes to ask you questions. I (Zalilah Mohd Shariff) will be grateful to you (mother) and your child if both can participate in the research project. The information from all mothers and children will be reported together and the names will never be associated with any of the responses. Both your and your child's participation are voluntary and both are free to withdraw consent and participation at any time. I will also ask your child (in words) if he/she agrees to be measured before I actually measure him/her.

1) Please complete the following information:

**** I have read the above statement and

1)I have agreed to participate and to let my child participate in the research project. However, if the child chose not to participate, then I will have to agree with the child.

2)I understand that my child's and my participation are voluntary and that we can withdraw at any time.

3)I understand that my child and I will not have to respond to any of the questions during the interview.

_____ ___/____/1997_____

(Mother's Signature) (Date)

Name :_____

Address:_____

(Number) (Street)

_____ (03) _____

(City) (Zip Code) (Telephone)

Thank you for your and your child's participation.

Zalilah Mohd Shariff

Research Investigator

1408/1 Batu 6 Jalan Puchong Petaling

Kuala Lumpur 58200

Tel: 03-7929388

PERMISSION TO CONDUCT HOME VISIT

Dear Mother,

Please take time to read and fill in the information below before you answer the questionnaire.

MOTHER' NAME: _____

CHILD'S NAME: _____

DATE: _____

ADDRESS: _____

_____

TELEPHONE: _____ (home)

_____ (office)

PLEASE INDICATE WHETHER YOU WOULD ALLOW THE RESEARCHER TO MAKE HOME VISIT AFTER THE RECEIPT OF YOUR QUESTIONNAIRE.

I, _____ will allow / will not allow the researcher to come to my house for a home visit. The purpose of the home visit is to give an opportunity for the mother to ask questions about the research and the questionnaire and to allow the researcher to verify mother's responses in the questionnaire or to obtain the information on the questions that mother fails to answer. Below are the day (s) and time (s) that are appropriate for the researcher to make the home visit.

Day				Time	
Monday	____	Friday	____	Morning	___
Tuesday	____	Saturday	____	Afternoon	___
Wednesday	____	Sunday	____	Evening	___
Thursday	____			Night	___

(Please fill in more than one day and time)

_____ _____

(Mother's Signature) (Date)

MOTHER'S INTERVIEW GUIDE

Mother, please read all of the questions carefully before you answer them. If you have any question, please forward the question (s) through your child so that he/she can give the question (s) to his/her class teacher or you can contact the researcher (Zalilah Mohd Shariff) at this number : 03-7929388. You can also make reverse charge call (s) to the number. We are here to help you with your question (s) or assist you to answer the questions as best as you can. Before you start, please fill in the information below:

MOTHER'S NAME: _____

CHILD'S NAME: _____

DATE: _____

(The information below will be completed by the researcher)

MOTHER'S CODE: _____ CHILD'S CODE: _____

A)DEMOGRAPHIC INFORMATION OF HUSBAND AND WIFE

Please fill in the information below on you and your husband.

1. In what day, month and year were you born? ____/____/_____

2. How old were you at your last birthday? (Age in completed years) _____

3. Are you currently married Yes ____ No ____

4. If you answered "Yes" in question 3, is this your first marriage?
Yes ____ No ____

5. If you answered "Yes" in question 4, how old were you when you entered this marriage?
_____ years

6. If you answered "No" in question 4, how old were you when you entered your first marriage ? _____ years

7. What is the highest level of school you attended?

a) None ___
b) Primary school: Standard 1__ 2__ 3__ 4__ 5__ 6__
c) Lower secondary: Form 1__ 2__ 3__
d) Upper secondary: Form 4__ 5__ 6__
e) Teacher's college ___
f) Diploma/certificate ___
g) Degree ___
h) Other, please specify _____

8. Can you read? Yes ____ No _____

9. Can you write? Yes ____ No _____

10. As you know, many women work aside from doing their own housework. Some work in a shop, in a factory, in government offices or private companies and some work as a baby sitter, house-helper or house-cleaner. Some are paid in cash or in kind for their work; others are not paid.

In the past 12 months have you done any of these things or any other work?
Yes ____ No _____

11. Are you currently working/employed? Yes ____ No _____

12. Are you working/employed at home or away from home At home _____
Away from home _____

13. What is your occupation? (Describe as complete as possible and do not circle)

_____

a)Teacher/nurse
b)Personal service (laundry, cleaning, hair and beauty salons, waitress, tailoring)
c)Clerical (clerk, secretary)
d)Sales person
e)Technical (lab assistant, technician)
f)Agriculture worker
g)Industrial/ Factory worker
h)Own business, please specify _____
i)Construction worker (house, building, road)
j)Other, please specify _____

14. How long are you away from home working? Please think from the time you leave the house to the time you arrive at home on the days you are working

Monday	____ hours	Friday	____ hours
Tuesday	____ hours	Saturday	____ hours
Wednesday	____ hours	Sunday	____ hours
Thursday	____ hours	Total hours/week	_____ hours

15. Has your husband been married before or after he is married to you?
Yes ____ No _____

16. If he has, does the marriage still exist? Yes ____ No _____

(If you answered "Yes" in question 16, please answer questions 17 and 18)

17. If the marriage still exist, how many wives does your husband have? _____

18. You are wife number .....? Number ____

19. What is the highest level of school your husband attended?

a) None ___
b) Primary school: Standard 1__ 2__ 3__ 4__ 5__ 6__
c) Lower secondary: Form 1__ 2__ 3__
d) Upper secondary: Form 4__ 5__ 6__
e) Teacher's college ___
f) Diploma ___
g) Degree ___
h) Other, please specify _____

20. Can he read? Yes ____ No _____

21. Can he write? Yes ____ No _____

22. Is he currently working/employed? Yes ____ No _____

23.What is his occupation? (Describe as complete as possible and do not circle)

_____

a)Teacher
b)Personal service (tailor, waiter, barber etc.)
c)Clerical (office boy, clerk, secretary)
d)Sales person
e)Service (police, navy, security, army)
f)Technical (lab assistant, technician)
g)Agriculture worker

h)Industrial/ Factory worker
i)Construction worker (house, building, road)
j)Own business, please specify _____
k)Other, please specify _____

B) HOUSEHOLD QUESTIONNAIRE

Now I would like some information about the people who live in your household and your house
characteristics.

1. Please list the age and birth date of all your children from oldest to youngest (please ask for birth certificate from the mother for verification)

Num	Date of birth (day/mo/year)	Is child male or female?	Age less than 6 years old (please indicate with X)
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			

Number of children ____
Number of children under 6 years of age ____

2. Among all of the children in your household, please indicate the ones who are your biological children? Number

_____

3. Among all the children in your household, please indicate the ones who are your husband's biological children Number

_____

4. Is the child in this research your biological child? Yes _____ No _____

6. Is the child in this research your husband's biological child?
Yes _____ No _____

6. How many people usually live in your household, besides yourself, your husband and children? (Please write the number of people in the space provided)

Yourself	____
Your husband	____
Your children	____
Your mother	____
Your mother-in-law	____
Extended family (specify)	_____
	_____
	_____
	_____
Others (specify)	_____
	_____
	_____
Household size (total)	____

(Please include any person, guest or visitor who have stayed with you for the past three months or more)

7. How many rooms are there in your household?
(Please record observation)

Kitchen	____
Dining/Eating room	____
Living	____
Bedroom	____
Total rooms	____

8. How many room (s) in the household is used for sleeping? _____
rooms

9. Does your household have (Please indicate with "X" if you have the items)

Stove (oil)	____
Stove (gas/elec.)	____
Television	____
Refrigerator	____
Radio	____
Pipe water	____
Electricity	____
Motorcycle	____
Car	____

10. What is the main material for your outside wall? (Record observation)

Zinc	____
Wood	____
Brick	____
Other	_____

11. What is the main material for the floor? (Record observation)

Wood ____
Cement ____
Tiles ____
Other _____

12. What is the main material for the roof (Record observation)

Zinc ____
Asbestos ____
Concrete ____
Other _____

13. Who owns this house?

Government ____
Rent ____
Own ____

14. Who owns this land?

Government ____
Rent ____
Own ____

15. Type of housing (Please record observation)

Squatter ____
Long house ____
Low cost flat/house ____
Terrace ____
Bungalow ____
Other _____

C) INCOME ALLOCATION

Now, I would like to ask you about your household income and expenditure.

1. Do you have your own income? Yes ____ No _____

(If you (mother) have your own income, please answer questions 2 – 12)

2. Do you know how much your husband earns? Yes ____ No _____

3. Does your husband know how much you earn? Yes ____ No _____

4. Do you pool your income with your husband's income? Entirely _____
Partially _____
None at all _____

Why?_____

5. If incomes are pooled entirely, who allocates the pooled income?

Husband _____
Wife _____
Both _____

If only husband or wife,
why?_____
_____

6. Who spends the pooled income?

Husband _____
Wife _____
Both _____

If husband or wife,
why?_____
_____

7. If incomes are not pooled, or if pooled only partially, who is in charge of your personal money?

Husband _____
Wife _____
Both _____

If husband is
incharge,why?_____
_____

8. If self, what are your first 3 priorities for money use?

a._____ b._____ c._____

9. Does your husband give you household allowance (for household expenditures) every month? Yes _____ No _____

10. Does your husband give you allowance (besides for household expenditure) for your own personal use every month? Yes _____ No _____

11. If the household allowance is insufficient, what do you usually do?

Use own money _____
Ask from husband _____
Other _____

12. If you ask money from your husband, what is his frequent response?

Willing to give more _____
Unwilling to give more _____
Angry at request but give more _____
Other _____

(If you (mother) has no income of your own, please answer questions 13 – 20)

13. Do you know how much your husband earns? Yes _____ No _____

14. If you are not working and don't have your own income, who takes care of your husband's income?

Husband _____
Wife _____
Both _____

If husband or wife takes care, why?_____

_____

15. How easy/difficult for you to have access to your husband's income?

Difficult _____ Easy _____

16. Does your husband give you household allowance (for household expenditures) every month? Yes _____ No _____

17. Does your husband give you a personal allowance (besides for household expenditure) for your own use every month? Yes _____ No _____

18. If your husband gives you personal allowance, what are your first 3 priorities for money use?

a. _____ b. _____ c._____

19. If the household allowance is insufficient, what do you usually do?

Use own money _____
Ask from husband _____
Other _____

20. If you ask money from your husband, what is his frequent response?

Willing to give more _____
Unwilling to give more _____
Angry at request but give more _____
Other _____

21. How much is the total income in your household in a month?

Primary occupation	Husband	RM_____
	Wife	RM_____
Secondary occupation	Husband	RM_____
	Wife	RM_____
Contribution from children/other family members		RM_____
Rent (from houses, land, building etc.)		RM_____
Stocks/Shares		RM_____
Others (please specify _____)		RM_____
TOTAL HOUSEHOLD INCOME		RM_____
INCOME PER CAPITA		RM_____

(If on questions 15-18 in "Demographic Information of Husband and Wife", your husband has been married more than once or has other existing marriage(s), please answer questions 22 -23)

22. Does all of your husband's total income go into your household?

Yes _____ No _____

23.If no, how much of your husband' total income go into your household only?

RM _____

24. Please estimate how much money is spent on the following categories of expenditure per month.

CATEGORY	COST IN RM
a.Family food	_____
b.Rent	_____
c.Utilities (water, electricity, phone)	_____
d.Transportation	_____
e.Family clothing	_____
f.Family health (medical care)	_____
g.Children education (fees, books, uniform, pocket money)	_____
h.Househelp/child care	_____
i.Financial responsibilty for relatives or older parents	_____
j.Other, please explain	_____
	_____
Total household expenditure per month	RM_____

(If you find it difficult to estimate for each category, please answer the following questions)

Can you estimate how much your household food expenditure and total expenditure in month?

a.Family food expenditure per month

Less than M$300 _____
M$300 - M$599 _____
M$600 - M$999 _____
More than M$1000 _____

b.Total household expenditure per month

Less than M$300 _____
M$300 - M$599 _____
M$600 - M$999 _____
More than M$1000 _____

25. How would you describe your family financial condition now?

Not enough _____
Enough _____
More than enough _____

D) FOOD ALLOCATION

Now, we would like to get information on how you distribute food in your household and your perception of food adequacy.

1. If you were given a plate of rice or sweet dish, how would you distribute them among the members in your family? (Please describe as complete as possible)

_____

_____

_____

2. Please indicate whether you agree or disagree to the following statements:

Statement	Agree	Disagree
a.Children need more food than adults		
b.When there is not enough food, adults can handle being hungry better than children		
c.It is more important for the adults, who sustain the family, to eat well than for the children		
d.Those who work more need more food than those who work less		
e.I want to give an equal amount of food to all members of the family		
f.When someone gives me an extra food, I will give an equal portion to each member of my family		
g.Boys need to eat better than girls of the same age		
h.If I have a rice of plate and two children who are hungry, a boy and a girl, I prefer to give it to the boy		
i.I will give more food to those who ask for more		
j.If I have something for another member of the family and a child cries, I prefer to give it to that child rather than to the other, who remains hungry		

3. How would you describe food adequacy in your household?

Not enough _____
Enough _____
More than enough _____

E) PARTICIPATION IN HOUSEHOLD DECISION MAKING AND IMPLEMENTATION

Now, we would like to know your participation in decision making and implementation related to
household income, expenditure, food, child care, health and feeding. For the following questions, making and implementing household decisions may or may not be the same in your household. Making decision means that you have a say in the decision but implementing the decision means that you actually carry out the decision.

Example: Both you and your husband have made a decision to buy a house, but only your husband is involved in implementing the decision (take a loan from the bank, decide on the housing area and type etc.)

(If your mother or your mother-inlaw is staying in your household, please answer both question1a and 1b. If not, please answer 1a only)

1a. How much do you participate in **making** these decisions compared to your husband?

Decision	Participation			
HOUSEHOLD INCOME AND PURCHASES	None	Little	Same	A lot
a.Purchasing family clothings				
b.Paying the electricity/water/phone				
c.Purchasing woman's personal needs				
d. Purchasing medicines or medical care				
e.Paying the house rent or loan				
f.Paying for children's education (fees, uniforms, books, shoes)				
g.Determining the amount for household saving				
h.Keeping the household saving				
FOOD				
a.Providing food for the family				
b.Planning for meals (decide on what to eat)				
c.Determining the types/amounts of food to buy				
d.Deciding where to obtain or buy the foods				
e.Selecting/Choosing foods at the store or market				
f.Paying for the foods at the store or market				
g. Preparing or cooking the meals				

h. Distributing foods among family members				
CHILD CARE, HEALTH AND FEEDING				
a.Making sure that your children eat the foods they are given				
b.Determining what your children eat at home				
c.Taking care of your sick child				
d.Determine the type of medical care for your sick child				
e.Taking your sick child to the medical clinic or hospital				
f.Helping children with their school work				
g.Giving your children spending money				
h.Attending to or taking care of your children				

1b. How much do you participate in **making** these decisions compared to your mother or mother-inlaw?

Decision	Participation			
HOUSEHOLD INCOME AND PURCHASES	None	Little	Same	A lot
a.Purchasing family clothings				
b.Paying the electricity/water/phone				
c.Purchasing woman's personal needs				
d. Purchasing medicines or medical care				
e.Paying the house rent or loan				
f.Paying for children's education (fees, uniforms, books, shoes)				
g.Determining the amount for household saving				
h.Keeping the household saving				
FOOD				
a.Providing food for the family				
b.Planning for meals (decide on what to eat)				
c.Determining the types/amounts of food to buy				
d.Deciding where to obtain or buy the foods				
e.Selecting/Choosing foods at the store or market				
f.Paying for the foods at the store or market				
g. Preparing or cooking the meals				
h. Distributing foods among family members				
CHILD CARE, HEALTH AND FEEDING				
a.Making sure that your children eat the foods they are given				
b.Determining what your children eat at home				
c.Taking care of your sick child				
d.Determine the type of medical care for your sick child				
e.Taking your sick child to the medical clinic or hospital				

f.Helping children with their school work				
g.Giving your children spending money				
h.Attending to or taking care of your children				

(If your mother or your mother-inlaw is staying in your household, please answer both questions 2a and 2b. If not, please answer 2a only)

2a. How much do you participate in **implementing** these decisions compared to your husband?

Decision	Participation			
HOUSEHOLD INCOME AND PURCHASES	None	Little	Same	A lot
a.Purchasing family clothings				
b.Paying the electricity/water/phone				
c.Purchasing woman's personal needs				
d. Purchasing medicines or medical care				
e.Paying the house rent or loan				
f.Paying for children's education (fees, uniforms, books, shoes)				
g.Determining the amount for household saving				
h.Keeping the household saving				
FOOD				
a.Providing food for the family				
b.Planning for meals (decide on what to eat)				
c.Determining the types/amounts of food to buy				
d.Deciding where to obtain or buy the foods				
e.Selecting/Choosing foods at the store or market				
f.Paying for the foods at the store or market				
g. Preparing or cooking the meals				
h. Distributing foods among family members				
CHILD CARE, HEALTH AND FEEDING				
a.Making sure that your children eat the foods they are given				
b.Determining what your children eat at home				
c.Taking care of your sick child				
d.Determine the type of medical care for your sick child				
e.Taking your sick child to the medical clinic or hospital				
f.Helping children with their school work				
g.Giving your children spending money				
h.Attending to or taking care of your children				

2a. How much do you participate in **implementing** these decisions compared to your mother or mother-inlaw?

Decision	Participation			
HOUSEHOLD INCOME AND PURCHASES	None	Little	Same	A lot
a.Purchasing family clothings				
b.Paying the electricity/water/phone				
c.Purchasing woman's personal needs				
d. Purchasing medicines or medical care				
e.Paying the house rent or loan				
f.Paying for children's education (fees, uniforms, books, shoes)				
g.Determining the amount for household saving				
h.Keeping the household saving				
FOOD				
a.Providing food for the family				
b.Planning for meals (decide on what to eat)				
c.Determining the types/amounts of food to buy				
d.Deciding where to obtain or buy the foods				
e.Selecting/Choosing foods at the store or market				
f.Paying for the foods at the store or market				
g. Preparing or cooking the meals				
h. Distributing foods among family members				
CHILD CARE, HEALTH AND FEEDING				
a.Making sure that your children eat the foods they are given				
b.Determining what your children eat at home				
c.Taking care of your sick child				
d.Determine the type of medical care for your sick child				
e.Taking your sick child to the medical clinic or hospital				
f.Helping children with their school work				
g.Giving your children spending money				
h.Attending to or taking care of your children				

F) CHILD INFORMATION

Now, we would like some information on your child who is involved in this research.

1. Date of birth in day, month and year?
___/___/_____

2. Child's weight at birth ____ lb ____ oz
_____gm

This information is from (tick one) birth certificate _____
mother's recall _____

3. Was the child born on time or prematurely (that is, early or carried at least 8 1/2 months)?

On time _____
Prematurely _____
Don't know _____

In relation to all of your children (biological and step children) in the household

4. How many older sisters does this child has? ____
How many older brothers does this child has? ____
How many younger sisters does this child has? ____
How many younger brothers does this child has? ____

Birth order of this child ____

G) CHILD CARE AND CHILD FEEDING

1. When you are working away from home, who takes care of this child?

Husband ____
Older children ____
Grandparents ____
Relatives ____
Neighbours ____
Friends ____
Househelper ____
Other, please state _____

If you are not working, are you at home to take care of child x?

Yes _____ No _____

If no, who takes care of this child? _____

2. Does this child commonly take breakfast before he goes to school?

Yes _____ No _____

If not,
why?_____

3. During the week days, does this child commonly take

a) Breakfast at home _____ other _____(specify)
(If not at home,
why?_____)

b) Lunch at home _____ other _____(specify)
(If not at home,
why?_____)

c) Dinner at home _____ other _____(specify)
(If not at home,
why?_____)

4. Does your child bring any food from home to school? Yes _____ No _____

5. Do you give your child pocket money everyday? Yes _____ No _____

6. If yes, how much do you give a day? RM_____

7. How much do you give for Transportation RM _____
Food only RM _____

8. In general, how would you perceive your child's food intake?

I think my child eats too much food _____
I think my child eats the right amount of food _____
I think my child does not eat enough food _____

Why do you think so?_____

_____

8. How would you perceive your child's intake of foods from animal sources (beef, chicken, fish, milk, egg)?

I think my child eats too much of these food _____
I think my child eats the right amount of these food _____
I think my child does not eat enough of these food _____

Why do you think so?_____

_____

H) CHILD HEALTH PERCEPTION

1. In general, would you say this child's health is excellent, good, fair or poor?

Excellent 1
Good 2
Fair 3
Poor 4

2.Please indicate according to the numbers below for the following statements:

5.....Definitely true
4.....Mostly true
3.....Don't know
2.....Mostly false
1.....Definitely false

Statement	Number
a. This child's health is excellent	
b. This child was so sick once I thought he or she might die	
c. This child seems to resist illness very well	
d. This child seems to be less healthy than other children I know	
e. This child has never been seriously ill	
f. When there is something going around, this child usually catches it	

(Mother, please don't fill below)

Total score for current health _____
Total score for prior health _____
Total score for resistance/susceptibility to illness _____
Total score for general health _____

I) NUTRITION KNOWLEDGE ASSESSMENT

Direction: For each question, draw a circle around the number of the best answer (most correct).

Healthy Food Choices

1. The food highest in cholesterol is:
    1.Vegetables
    2.Grains
    3.Fruits
    4.Meat
    5.Don't know

2. The best way to improve an inadequate diet is to:
    1.Increase foods that are high in fat
    2.Increase the variety of food intake
    3.Take vitamin and mineral supplement
    4.Increase foods that are fresh
    5.Don't know

3. Which of the following is an iron-rich choice?
    1.Spinach
    2.Fish
    3.Beef
    4.All of the above
    5.Don't know

4. It is important to eat several different kinds of food everyday because
    1.Different foods have different taste
    2.Different foods have different nutrients
    3.Eating the same foods everyday can make one lose interest in eating
    4.Eating the same foods everyday upsets the digestive system
    5.Don't know

Nutrition and Scholastic Achievement

1.Children who eat less food than necessary will likely have
    1.Impaired mental and physical development
    2.Impaired moral and social development
    3.Increased mental and social development
    4.Increased moral and physical development
    5.Don't know

2.Low mental development and low physical activity of children is largely due to
1.Deficiency of vitamin E
2.Deficiency of iron
3.Lack of calcium
4.Low intake of vitamin C
5.Don't know

3.Eating balanced meals help to sustain energy for school work for
1.2 hours
2.3 hours
3.4 hours
4.5 hours
5.Don't know

4.Hungry school children show
1.High attention due to low blood sugar levels
2.High diligence due to low blood sugar levels
3.Low concentration due to low blood sugar levels
4.Low performance due to high blood sugar levels
5.Don't know

Nutrition and Growth

1.A child's growth rate is influenced by
1.Heart size
2.Sleep
3.Heredity
4.Posture
5.Don't know

2.Amin and Aminah are in Standard 1. Amin is 5 feet tall and Aminah is 4 feet tall. Which of the following BEST explains the height difference
1.Aminah does not eat enough vitamin
2.Children grow at different rates
3.Tall children grow at faster rates
4.Amin drinks more milk than Aminah
5.Don't know

3.Which age group is most harmed by being undernourished?
1.Young children
2.Adolescents
3.Young Adults
4.Older adults
5.Don't know

4.Seriously undernourished children have

1.Larger heads and higher brain weights than well-nourished children
2.Larger heads and lower brain weights than well-nourished children
3.Smaller heads and higher brain weights than well-nourished children
4.Smaller heads and lower brain weights than well-nourished children
5.Don't know

Nutritional Needs

1.Foods from animal sources are important for your children because

1.They are body building foods
2.They are energy foods
3.They are regulating foods
4.They are ill fighting foods
5. Don't know

2.Rice, rice noodles and bread are important for your child because they

1.Help your child to resist illness
2.Provide energy to your child
3.Help to build body
4.Help to resist illness
5. Don't know

3.Your child needs vitamin A for the following except

1.For bone and teeth
2.For cell growth and health
3.For better eyesight
4.For normal appetite
5.Don't know

4.A calcium deficient diet for your child can cause

1.Anemia
2.Poor bone formation
3.Bleeding gums
4.Poor eye sight
5.Don't know

Nutrition and Health

1.A possible long term effect of eating many foods high in SUGAR is
   1.Diabetes mellitus
   2.High blood pressure
   3.Obesity
   4.Osteoporosis
   5.Don't know

2.Which of the following is a TRUE statement?
   1.A very high-protein diet is necessary to build muscles
   2.Milk is needed at all ages for calcium
   3.Lemon juice can help reduce fat in your body
   4.The color of eggs affects the nutritional value
   5.Don't know

3.Young children need to eat nutrient dense food because they are growing and they eat in small amount. A nutrient dense food is one that provides
   1.Few nutrients compared to calories
   2.Many calories but few nutrients
   3.Many calories but no nutrients
   4.Many nutrients compared to calories
   5.Don't know

4. The benefit of fiber is
   1.It is not expensive
   2.It protects from frequent colds
   3.It helps to prevent cancer
   4.It is found in almost all food
   5.Don't know

Direction: For each item, please put an X to the letter of the correct answer
T (True) F (False) DK (Don't know)

Healthy Food Choice

1.Dark leafy green vegetables such as spinach are a good source of vitamin A and C T___ F___ DK ___

2.Honey and brown sugar are more nutritious than white sugar T___ F___ DK ___

Nutrition and Scholastic Achevements

3.Eating breakfast makes no difference in children's school performance
T___ F___ DK ___

4.Good nutrition is important to a child's ability to learn T___ F___ DK ___

Nutrition and Growth

5.Growth and health are not related to the foods your child eats
T___ F___ DK ___

6.A fat child always eat a lot of foods than a thin child T___ F___ DK ___

Nutritional Needs

7.Children need nutrients that are different from the nutrients that adults need.
T___ F___ DK ___

8.The body needs folic acid for muscle strength T___ F___ DK ___

Nutrition and Health

9.Eating too much foods high in fat increases risk for heart disease
T___ F___ DK ___

10.What your child eats now can influence his/her future health
T___ F___ DK ___

Food Preparation and Handling

11.Boiling and cooking vegetables too long will not destroy the nutrients in the vegetables
T ___ F ___ DK ___

12.The way you handle or prepare foods does not influence the amount of nutrients and the safety of the foods T ___ F ___ DK ___

J) HOUSEHOLD FOOD SECURITY

We also would like to know about your household food supply in terms of its adequacy for you, your children and in general all the household members. For each item, please circle only one number that best describes the current food situation in your households.

1: Not true or never happens
2: Sometimes true or sometimes happen
3: Always true or always happen

Items:

1. I worry whether my food will run out before I get some more money to buy more
   1 2 3

2. The food that I bought just didn't last and I didn't have money to get more
   1 2 3

3. I ran out of the foods that I needed to put together a meal and I didn't have money to get more food
   1 2 3

4. We eat the same things for several days in a row because we only have a few different kinds of food on hand and don't have money to buy more 1 2 3

5. I can't afford to eat properly 1 2 3

6. I am often hungry, but I don't eat because I can't afford enough food
   1 2 3

7. I eat less than I think I should because I don't have enough money for food
   1 2 3

8. I cannot afford to give my child (ren) a balanced meal because I can't afford that
   1 2 3

9. My child (ren) is/are not eating enough because I just can't afford enough food
   1 2 3

10. I know my child (ren) is/are hungry sometimes, but I just can't afford more food
    1 2 3

CHILD'S INFORMATION

CHILD'S CODE: _____ **SCHOOL'S CODE:**____

MOTHER'S CODE: _____ **DATE:** _____

NAME:_____

STANDARD:_____ SEX: M F

ETHNICITY: _____

TYPE (S) OF SCHOOL ASSISSTANCE RECEIVED:
1._____
2._____
3._____

HOUSEHOLD INCOME: RM_____

HOUSEHOLD SIZE: _____

NUMBER OF CHILDREN: _____

BIRTH ORDER: _____

PARENTS' MARITAL STATUS: M D W

CHILD'S GUARDIAN: _____

MOTHER'S OCCUPATION: _____

FATHER'S OCCUPATION: _____

DATE OF BIRTH :___/___/_____

DATE OF ASSESSMENT:___/___/_____

HEIGHT: _____(INCH/CM) WEIGHT: _____(LB/KG)

APPENDIX B

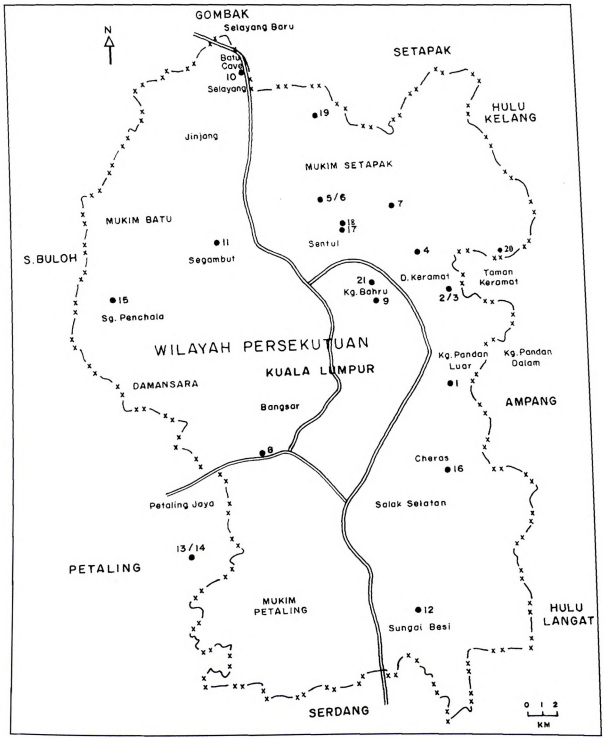
LIST AND LOCATION OF SCHOOLS

PRIMARY SCHOOLS IN WILAYAH PERSEKUTUAN WITH CHILDREN WHOSE PARENTS/GUARDIANS ARE FROM LOW INCOME CATEGORY

(1-21 were involved in the present research and their locations are listed on the map)

1. SK KAMPUNG PANDAN
2. SK DATOK KERAMAT 1
3. SK DATOK KERAMAT 2
4. SK POLIS DEPOT
5. SK SENTUL 1
6. SK SENTUL2
7. SK SETAPAK
8. SK BANGSAR
9. SK KAMPONG BARU
10. SK KAMPONG SELAYANG
11. SK SEGAMBUT
12. SK SUNGAI BESI
13. SK PETALING 1
14. SK PETALING 2
15. SK SUNGAI PENCHALA
16. SK BATU 3 ½ CHERAS
17. SK BANDAR BARU SENTUL
18. SK SERI PERAK
19. SK TAMAN KOOPERASI POLIS
20. SK DESA TUN HUSSEIN ONN
21. SK RAJA MUDA
22. SRK JALAN HANG TUAH 1
23. SRK JALAN HANG TUAH 2
24. SRK JALAN TEMERLOH
25. SRK LASALLE JINJANG 1
26. SRK LASALLE JINJANG 2
27. SRK PUTERI PANDAN 1
28. SRK PUTERI PANDAN 2
29. SRK PADANG TEMBAK 1
30. SRK PADANG TEMBAK 2
31. SRK JALAN KUANTAN 1
32. SRK JALAN KUANTAN 2
33. SRK DATOK ABU BAKAR 1
34. SRK DATOK ABU BAKAR 2
35. SRK JALAN PEEL

LOCATION OF THE TWENTY ONE (21) SK SCHOOL INVOLVED IN THE RESEARCH



APPENDIX C

PILOT STUDY REPORT

PILOT STUDY

Test-retest Reliability of Research Instruments and Validity of Teacher's Height and Weight Measurements of School Children

Introduction

Two pilot studies were conducted with permission from the Malaysian Ministry of Education and the Wilayah Persekutuan Department of Education. The first pilot study was done to assess the test-retest reliability of the five instruments (Food allocation, Participation in Household Decision Making and Implementation, Child Health Perception, Nutrition Knowledge and Household Food Security) used in the research study on growth determinants of school children from primarily low income households in Kuala Lumpur. Although the reliability of the three instruments (except Participation in Household Decision Making and Implementation and Food Allocation) and the validity of the four instruments (except Participation in Household Decision Making and Implementation) above have been investigated and concluded to be satisfactory, the investigations have been primarily done in United States and Guatemala (Eisen et al., 1980); Radimer et al., 1992; Engle and Nieves, 1993; Martin and Hoover, 1993). Therefore, the suitability of the instruments for the Malaysian population (mothers) may be questionable.

The second pilot study was conducted to assess the validity of weight and height measurements of the school children by the school teachers. A report on the role of teachers in School Health Service in terms of their performance in detecting abnormalities in school children (Ayyamani, 1986), indicated that the teachers assessments of the children's health corresponded 93% with the doctor's responses. However, the use of the same available instruments in the schools, especially if the weighing scales (bathroom scales) or height measuring devices are unreliable, may influence both the teachers' and doctor's measurements of the children's weight and height. The previous study though, did not state if the doctor was using different instruments (weighing scale and height measuring device) than those used by the teachers. Therefore, in this validity study, children's weight and height measurements

taken by their teachers using the available instruments in their schools were compared to the investigator's measurements using a more reliable weighing scale and measuring unit.

Methodology

Two different samples and procedures were used in these pilot studies. While the reliability study used mothers as respondents, the subjects in the validity study were teachers and children.

Sample

In the reliability study, the sample consisted of thirty five mothers. All of these mothers lived in Petaling county (see Appendix D) as their children were attending school at Sekolah Kebangsaan Petaling 1. For the validity study, 120 children from five Standard 1 classes in five Sschools (SK Petaling 1, SK Datuk Keramat 1, SK Kampung Pandan, SK Kampung Baru and SK Bangsar) were measured by the their classroom teachers and the investigator.

Procedures

Prior to both studies, the investigator had obtained permission from the Malaysian Ministry of Education and Wilayah Persekutuan Department of Education. Both studies were conducted from October – November 1997. Upon permission, the investigator went to inform the school principals on the pilot studies that would be conducted in the respective schools. The investigator then proceeded to set the dates for classroom visits with the teachers and the school children.

In the reliability study, children in a Standard 2 class (n=35) were given two forms in an envelope – an information sheet on the pilot study and a questionnaire containing the five instruments. The children were instructed to give their mothers the forms and return the questionnaire to the classroom teacher within 3-4 days after the

initial receipt. Four weeks after the receipts of the questionnaires from the children, the investigator made another visit to the participating class. Each child was given the same forms (information sheet and a questionnaire) for their mothers. The same procedures as mentioned above were followed in the administration and collection of the instruments from the children.

In the validity study, the investigator contacted each classroom teacher for appropriate dates to perform the weight and height measurements of the children. Each teacher was instructed to measure the children using the available instruments in his/her school. Then, the investigator measured the children using Seca weighing machine (Seca Corp., Columbia MD) and a portable adult/infant measuring unit (Perspective Interprises Inc., Portage MI).

Statistical Analysis

Pearson Product Moment Correlation Coefficient and Chi-Square measures of association (Cramer's V and Contingency Coefficient) were utilized to assess the test-retest reliability of the five instruments. Paired sample t-test was performed on both of the teachers' and investigator's measurements to assess the validity of the teacher's measurement. Significance level for all the tests are at 0.05 level. All data analyses were done with SPSS 7.5 (Norusis, 1997).

Results and Discussion

Table 26 shows the education level of the mothers in the reliability study and the distribution of children from each participating school in the validity study. In the validity

study, all of the schools had bathroom scales with varying units of precision e.g. only two schools used bathroom scales that can measure to the nearest 250 gram (0.25 kg) while the bathrooms scales in the other three schools had a precision of 500 gram (0.5 kg). For the height measuring device, three schools had a similar unit which consists of a metal stand board and an adjustable measuring rod attached to the board. The unit can measure to the nearest millimeter (0.1 cm). For the other two schools, a tape measurement attached to the wall of the classroom was utilized to measure the children's height. The precision of the tape was only 0.25 cm.

The results of the reliability study (correlation between the first and second administrations of the questionnaires) is presented in Table 27. For the child health status instrument, the three components of health status (recent health, previous health and susceptibility and resistance to illness) and the overall health status showed significant correlations ($p \leq 0.01$) for test-retest reliability with a range of $r = 0.43$ to $r = 0.91$. In the decision making and implementation category, correlations of each component of household decisions (income and expenditures, food and child care, health and feeding) and total decision were assessed. All of the correlations were significant ($p \leq 0.01$) with a range of $r = 0.52$ to $r = 0.92$. For mother's nutrition knowledge, scores from each component of the nutrition knowledge questions and overall score indicate significant correlations between the first and second administrations of the instrument. Assessment of associations using the Chi-square method also indicate that there are significant associations between mothers' responses on the first and second administrations of the Household Food Security and Food Allocation questions as indicated by the values of Cramer's V and Contingency Coefficient. Table 28 presents the results for the validity

study. For both weight and height measurements, no significant difference was observed between the teacher's measurements and that of the investigator indicating that the teachers' measurements are valid to be used for future research on growth assessment of primary school children.

The reliability study indicates that the assessment of test-retest reliability of the five instruments is satisfactory as judged by the significant associations between the first and second administrations of the instruments. However, caution must be exercised in the interpretation of association using the Chi-square method. While correlation can assess the magnitude and direction of the association, Chi-square measures can only assess the magnitude or strength of the association. In the validity study, the consistency of the investigator's and teacher's measurements was higher for the height than the weight measurements. This can be attributed to the use of a more accurate height measuring device (based on its precision of measurement) compared to the less accurate bathroom scales in the schools. The higher means for weight and height measurements of the teachers (height = 116.228 and weight = 20.486) compared to that of the investigator (height = 116.171 and weight = 20.455) may also imply that the measurements of the teachers can lead to slightly less number of school children being identified as having growth problems (stunting and wasting). Although, the validity study indicates that the teacher's measurements are valid to be used in growth assessment of the primary school children, there is a concern that the validity of the measurements will be compromised if the sample size is larger than the one used (n=8005) in this present study.

Table 26

The Distribution of Mother's Education Level, Number of Children by School and Child's Gender in the Reliability and Validity Studies.

Variable	n	(%)
I)Test-retest Reliability Study		
Mother's Education level	35	
Primary	9	(25.6)
Lower Secondary	15	(42.9)
Upper Secondary	5	(14.3)
Degree	3	(8.6)
Others (Certificates)	3	(8.6)
II)Validity Study		
Number of Children by School	120	
SK Petaling 1	22	(18.3)
SK Datuk Keramat 1	25	(20.8)
SK Bangsar	26	(21.7)
SK Kampung Pandan	24	(20.0)
SK Kampung Baru	23	(19.2)
Child's Gender	120	
Male	57	(47.5)
Female	63	(52.5)

Table 27

Correlations and Chi-square Associations Between the First and Second Administrations of the Instruments (n=35)

Variable	r	Cramer's V	Contingency Coeff.
I)Child Health Status			
Previous Health	0.43 **		
Recent Health	0.78 **		
Susceptibility Resistance to Illness	0.91 **		
Total Health	0.90 **		
II)Decision Making			
Income and Expenditures	0.85 **		
Food	0.57 **		
Child Care, Health and Feeding	0.52 **		
Total Decision Making	0.70 **		
IIi)Decision Implementation			
Income and Expenditures	0.91 **		
Food	0.67 **		
Child Care, Health and Feeding	0.92 **		
Total Decision Making	0.81 **		
IV)Nutrition Knowledge			
Healthy Food Choices	0.55 **		
Nutrition and Scholastic Achievement	0.71 **		
Nutrition and Growth	0.78 **		
Nutrition and Health	0.44 **		
Nutritional Needs	0.71 **		
Food Preparation	0.46 **		
Total Nutrition Knowledge	0.70 **		

Table 27 (cont'd)

Variable	r	Cramer's V	Contingency Coeff.
V)Food Allocation Rule		0.62 ***	0.53 ***
Needs Rule			
Equality			
VI)Household Food Security		0.91 ***	0.79 ***
Household Food Secure			
Household/Individual Food Insecure			
Child Hunger			

** $p \leq 0.01$ *** $p \leq 0.001$

Table 28

Mean Scores for Teachers' and Investigator's Height and Weight Measurements (n=120)

Variable	M	SD	t	p-value
I)Height Measurement				
Investigator	116.17	5.47	-0.74	0.46
Teachers	116.23	5.72		
II)Weight Measurement				
Investigator	20.45	3.73	-1.68	0.10
Teachers	20.50	3.70		

Conclusion

All of the instruments (Food allocation, Participation in Household Decision Making and Implementation, Child Health Perception, Nutrition Knowledge and Household Food Security) had satisfactory test-retest reliability. Although several of these instruments had reported satisfactory internal reliability for their populations, no attempt was taken to assess internal reliability of these instruments using the Malaysian sample. In terms of the validity of height and weight measurements of the teachers, although both showed no significant difference with the measurements made by the investigator, there is a possibility that the use of a larger sample size may result in significant discrepancies between the investigator and teacher's height and weight measurements of the children. Consequently, the validity of the teachers' height and weight measurements of the school children may be compromised. If the height and weight measurements of the children are part of the health assessment in the School Health Service program, then, it is recommended that the Ministry of Education and Ministry of Health provide a more accurate weight and height measuring devices for all primary schools in the future.

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APPENDIX D

FOCUS GROUP REPORT

FOCUS GROUP REPORT
July 27th, 30th and August 3rd, 1996

PURPOSE

The purpose of these focus groups was to obtain information that will be used to study the relationship between the resources and decision making power a mother has and the health and growth of her children. Specific objectives of the focus group:
1)To identify food allocation rules in the mother's household
2)To describe mother's perceptions of child care, health and feeding
3)To describe the decision making power of a mother in her household
4)To identify income allocation rules and expenditures in the mother's household

STUDY PROCEDURES

The participants for the focus groups were married Malay women residing at MSU apartments. They were recruited from the MSU Malaysian Student organization listing of names, addresses and phone numbers of Malaysian students currently attending Michigan State University. The investigator contacted the participants by telephone. Upon their verbal consent to participate in the focus groups, the investigator delivered the consent form personally to each participant.

Three focus groups were conducted on July 27, 30 and August 3 at 1518D Spartan Village (the investigator's apartment). The three groups will be categorized as A, B and C in the following discussion. Questions used in the focus group were developed by the investigator to represent four areas - food allocation, child care/health/feeding, decision making and income allocation. The discussion was held in the native language of Malaysia (Bahasa Malaysia) and lasted about 90 minutes. Each session was audiotaped to facilitate further analysis.

As there are participants with children and others with none, some of the questions on food allocation and child care/feeding/health were asked with caution. Participants with no children or with only small child (infant or toddler) were asked to relate their experiences when they were children themselves and/or from having seen other families (relatives, sisters, brothers). Participants with children were mainly asked about their immediate families (children and husbands).

During the discussion, the investigator took brief notes on the common opinions and perceptions expressed by the participants. The investigator analyzed each tape (for each session) to complement her notes and wrote a detailed report for each session. The three reports were analyzed to detect the themes in the three sessions and following this, a final report was prepared.

BACKGROUND INFORMATION OF PARTICIPANTS

Seventeen married Malay women participated in three focus groups. The majority (14) of them were the spouses of Malaysian students and the rest were students themselves, who were attending Michigan State University at the time of the study. The age range of the participants was 25 to 41. Nine of them have job positions in Malaysia (currently are on unpaid leave) and eight of them were housewives (5 of them have worked before). Thirteen of these participants have children in the age range of 2 months to 15 years old. Among the working women, the distribution of education level is as follows: 1 (Msc), 4(B.Sc.), 1(Diploma) and 3 (Teacher's college). Among the non working women: 4(B.Sc.) and 4(Secondary school).

Although these women may not represent the low income population in Malaysia as their spouses or themselves can be categorized as "professionals" (based on their occupations in Malaysia), they do share several characteristics with the low income population. First, the majority of these women came from poor families and/or big families in 'rural' villages (during their childhood). Second, some of them have lived in low income and/or rural areas because of their current job positions (e.g., teachers who are posted in rural villages). Third, these women came from a culture where traditions, beliefs and values are considered still strong and homogenous despite their socioeconomic background. It was felt that these women's life experiences were appropriate to represent at least some aspects of the low income population.

RESULTS

Family meals

The homemakers were asked: "How would you describe your typical family meals (eating together/separate) in a day? How different/similar are the foods for the children and the adults in your household? Are there any cultural beliefs on food (e.g., restricted or recommended foods) for children of all ages?

All the homemakers agreed that at least one meal a day (dinner or lunch), all the family members will eat together. If both parents (or only husbands) are working from morning to evening, and children are at schools, then dinner will be the "family meal". If both parents (or only husbands) are teachers or lecturers who have flexible hours, lunch will be the "family meal". Only one homemaker stated that her family members will sit together for all three meals (breakfast, dinner and lunch). One homemaker indicated that she never eats with her family (husband and children) because she will be busy serving them during the meals. Another homemaker said that as long as she knows that her family members (especially children) eat every meal, she is not concern about getting the family to eat the meals together.

For foods served to the family, all homemakers agreed that when the children reach 2 years old and are able to eat adult foods, they will be served the same foods prepared for the adults. However, all the homemakers said that children and husbands/adults will be accommodated by preparing dishes which are both hot/spicy and not hot/spicy or the same foods (e.g. meat and vegetables) with different methods of

cooking (e.g. curry chicken and chicken soup). Several homemakers said that sometimes if the foods are too spicy/hot for the children, the foods will be washed several times with water so that the children can eat. One homemaker mentioned that in her family, it is very typical to have a special dish for the youngest child (chicken in soy or tomato sauce) which is not spicy/hot and may or may not be the same as the other food dishes prepared for the rest of the family members.

All the homemakers agreed that food beliefs known to them are only for infants, weaning children and small children and not for the older children. However, for those with children, they did not exercise these beliefs strictly on their children as their mothers or grandmothers did. All homemakers agreed that food beliefs are not as prevalent today as they were before (e.g., when they were small children), probably because mothers nowadays are more educated and "westernized". The beliefs that were mentioned by them: some foods are not appropriate for infants and small children due to their "cold" or "hot" properties which can lead to upset stomach; rice porridge with no meat or vegetable as transition food for the weaning child; foods which can bring "worms" in the stomach e.g., guava, coconut; use of honey in water or milk as honey is good for the child. Some comments included:

"Both my husband and I are working during the day and the kids are in school, so the only time we can get together is during dinner."

"I make sure that my family eat together at night."

"My husband comes home for lunch at the time the children are back from school. They will eat together and I will serve them especially the children."

"I will prepare dishes that are not too hot so that the children can eat. For my husband and me, we have a side chili dish."

"My husband likes hot/spicy foods but my children do not eat any of those foods. So, If I were to cook fish for that day, I will prepare two fish dishes - one is fish in spicy gravy and one is fried fish in soy sauce gravy."

"My mother used to say that this is not good and that is not good for my child, but I did not follow what she said. To me as long as the child does not have any problem when eating the food, she can eat what she wants."

The homemakers did stress the importance of the family members sitting and eating together at least one meal a day. All of the homemakers agreed that the foods prepared for the meals accommodate the children and husbands/adults. Food restrictions or beliefs for children may not be common today as they were before because mothers today may be more aware of the nutritional values of the foods, there is more variety of foods today and more foods are accessible to families because of higher income.

Food distribution among household members

Homemakers were asked about their food distribution in the family: "How is food distributed in your family - among husband, wife and children?

In Group B and C, the majority of the homemakers stated that the husbands will get the priority for foods, followed by the children and finally themselves. Some aspects of husband priority - If the father is not present at meal times, mother will keep aside foods for the father, mother will give her portion to the father, mother will serve the husband first, mother will give the best portion of the food to the father (e.g., chicken part which is all flesh), father will take the share of the food first followed by the children and mother. These homemakers gave reasons for husband priority as -

a)By taking care of the husband well, he will help the wife (e.g., taking care of the children).

b)Since the wife is at home all day long, she is able to eat whenever she wants. However, the husband is not able to do so.

c)Respect for the husband as it is how she was brought up by her parents (her mother gave priority to the father) or as in Islam, the husband is the leader of the family (the person who is responsible to lead and care for his wife and children).

d)Husband needs good food because he is working.

One homemaker in Group C said that her children are her priority in that the children will get the best of the foods, followed by her husband and herself. She also mentioned that when she was pregnant and nursing, she would still give priority to the fetus/nursing child by eating foods more (in quality and quantity) than her husband. Compared to the majority of homemakers in Group B and C who gave priority to the husbands, homemakers in Group A frequently mentioned that food is distributed equally among the family members and food is prepared in large quantity so that each family member can eat to their desire. Only one homemakers in this group mentioned that she gives priority to her husband. Some of the comments included:

> "If the father is not at home for the meal, I will remind the children to leave some of the food dishes for their father or I will keep aside a portion for him before giving the rest of the food to my children."
>
> "In my family, there is no such thing as who gets the priority. All of us eat together and help ourselves to the food dishes but of course in our minds, we do think about others."
>
> "When we have meals together, I will serve my husband first with the food dishes and then to my children."

"Some wives show love and respect to their husbands by greeting them at the door when the husbands come home from work and take off their ties. For me, by giving him priority in foods is one way to show him my love and respect."

All the homemakers have some rules which govern their distribution of foods to their family members. Among the homemakers with children, the majority gave priority to their husbands when they distribute the foods.

Food distribution among the children

Homemakers were asked "How would you allocate foods among your children only?" Most of the homemakers said that in general, foods are distributed equally to the children during the first serving. Only after that the children will be given more upon requests. Homemakers frequently mentioned that they would let their children help themselves to the food (without any restriction).

Besides the two distribution rules above, several other criteria related to food distribution to children were mentioned. Three homemakers said that their priority is to the child whom they perceive as "picky eaters" or "too thin". One homemaker said that one of her children likes to eat, but when she sees that the child is very active, she does not restrict the child's food intake. Age and only sex child were also mentioned - priority is more for the younger children in that the older ones know how and where to get the foods themselves and for only boy or girl child in the family. Gender difference was mentioned by several homemakers in Group A and B in that to them, boys usually do not have eating problems compared to girls as boys eat a lot and not picky eaters. Therefore, their priority would be the girl children. Some of the comments included

"I have two girls, one likes to eat and the other will not eat unless I make sure that she eats. So, I really have to pay attention to her."

"I give each child equal portion of the foods. If they have finished their shares and ask for a second helping, then I will give some more."

"To me it is not appropriate to restrict the amount of food given to the children. I will let them eat what is there on the table."

Equal distribution is the food distribution most frequently mentioned by the homemakers, followed by demand distribution. However, there are other factors such as child is a picky eater, child is thin, child is younger compared to the other siblings and only girl/boy child within a family which these homemakers would also consider along with the equal or demand distribution rules.

Planning and preparing meals

Homemakers were asked about their perceptions of planning and preparing meals: "What do you think about the importance of planning and preparing meals? Who does these activities in your family?" All of the homemakers agreed that planning is more important than preparing the meals because by having a part in planning for the meals, they get to know what is being prepared for the family members. Some of them stated that meal planning starts when they shop for groceries for that week or day.

The majority of the homemakers plan all the meals in their families although sometimes, they have some inputs from the spouses. One homemaker said that her husband does most of the meal planning but she likes it this way because she does not have to worry about meal planning. Another homemaker mentioned that since her husband is particular about foods, he frequently participates in the meal planning. All of the working homemakers who have house helpers stated that they will still plan the meals and the helpers will prepare according to their instructions. Some of their comments were

> "Planning the meals means that the mother will know what is served to her family. If you don't plan but just take orders to prepare, you won't have control."
>
> "My husband does most of the meal planning. Sometimes, I just get tired of thinking what to plan for the meals. So, when he does that, I don't have to worry anymore."
>
> "I will still do the meal planning and the grocery. Then I will instruct the househelper to cook what I have planned."

Planning is more important than preparing the meals for all the homemakers. Although the majority of them are meal planners and they do sometimes receive inputs from their spouses, there were two homemakers whose spouses frequently do the meal planning. However, they were not opposed to this arrangement and actually welcomed it.

Factors influencing planning and preparing meals

Homemakers were asked about the factors which they consider when they plan and prepare the meals for their families: "What factors would you consider when you plan and prepare the meals?" For the working homemakers with no house helpers, time and convenience are the two frequently mentioned. They will opt for food dishes which are easy to prepare (simple) and does not take much of their time. Two working homemakers said that they will prepare the next day meal the night before or early in the morning before they leave for work. One homemaker said that during the weekdays, she will buy groceries which do not require a lot of time to prepare (e.g., instead of buying spinach or bean sprouts which have to be picked by hand, she will buy cabbage or green beans). Only on weekends she will cook special food dishes for her family which require more time.

For the majority of the non-working mothers and one working mother with a house helper, time was not a constraint for them. However, they did mention that sometimes they do prepare food dishes which do not require elaborate preparation because they are lazy or busy with other activities (taking care of children, housework).

Preparing meals which are "balanced" in that if it is a meal, it has to consist of rice, meat/fish/seafood and vegetables or the foods have to be balanced in terms of preparation (e.g. if the protein dish is prepared in coconut milk then the vegetables will only be stir fried or if today the meals consist of curry which has coconut milk then the next day, it will be fish in hot gravy with no coconut milk). Other meal planning principles used by the homemakers included the following: food is filling, food is variety (not the same food dishes for two days in a row), food is liked by all and food will not be wasted were frequently mentioned by the homemakers. One homemaker said that to get her children to eat, she has to make the food dishes "attractive" (e.g., by having red, green and whites in the vegetable dish). Although cost was mentioned as a factor considered in meal planning, all of the homemakers stated that it is not so much of a concern compared with the other factors mentioned above. Some of the comments included

> "My husband does not like to eat out. Because I work too, I have to find time to cook for the next day which I do the night before. He is not particular about foods, but as long as there is gravy, it is fine. So, I prepare food dishes which are easy and simple."
>
> "When I do the grocery, I will buy the vegetables and fish which are easy to prepare. After I get home from teaching on weekdays, I will cook the food for my family. My husband likes to eat "special" foods but I can only prepare them during the weekends."
>
> "I am not working, so I have the time in the world to cook for my family. I will make sure that there is rice, one vegetable dish and meat/fish/egg dish for the meals."
>
> "I want them to eat foods which they like so that there will be no waste and at the same time the foods are filling."

Time and convenience are factors which are important for the working homemakers but not so much to the non working ones. Evidently, cost is not a limiting factor to all, probably because of their socioeconomic status (they are able to purchase foods) and the availability/low prices of the foods in Malaysia. As for nutrition factors, they only mentioned on the importance of having a balanced meal which contains the three major food groups in Malaysian diets (grain, vegetable and protein). They also mentioned that foods should be prepared using various methods of preparation, foods should be variety which according to them the same foods should not be prepared/served too often and the foods will make the stomach full (filling).

Nutrition knowledge

The homemakers were asked "Most of you mentioned the importance of preparing meals which are balanced, filling and have variety. What do you think about nutrition knowledge or information in your every day life?

Compared to Group A and C, homemakers in Group B agreed that they do not place much importance on "good nutrition" for their families as they do on getting their children to eat. One homemaker said that she never restricts her children from eating candies, sweets and ice-cream but sometimes she does exercise control on how much they eat. As long as the children want to eat, nutritional values of the foods (fat, sugar) are not important. She also mentioned that if one day she cooks 'heavy foods' (curry or dishes with coconut milk), then the next day, she will make 'light foods'. Another homemaker said that if she is too concerned about nutrition (this food is good and that is not), then her children will not eat because her children are picky eaters.

In Group A, the homemakers said that nutrition knowledge or information is more important now than before because the concerns of pollution, pesticides, fast foods and junk food (snacks such as colored wafers and crackers, candies, sweets). Although all agreed that nutrition is very important, they do not exercise it well because of lack of information or not being exposed to it when they were young.

In Group C, the consensus was that nutrition knowledge or information is very important and that the homemakers try to incorporate this into feeding their family members. One homemaker said that she knows that the growth of her children depends on the foods she feeds them. She is always concerned about the children eating a balanced meal at meal times but does not restrict them from eating ice creams, candies, chips and sweets because she too likes these foods. A working homemaker with a house helper said that as much as she is concerned about nutrition for her children, she is not able to practice it because of the presence of her in-laws and house helper who may not think that nutrition is important. She also mentioned that although she tries to control her children's consumption of 'unhealthy' snacks, her husband always gives in to the children. Another homemaker in this group said that nutrition is important in her family and she tries to incorporate this into the planning/preparing the meals and in restricting her children's consumption of snacks only after they have their meals. Some comments included:

> "You cannot be concerned about nutrition all the time. If I remember, I practice it but if I don't, it does not matter."
>
> "All my children are picky eaters; for example, they don't like vegetables at all. If don't let them eat what they want, how can they be healthy?"
>
> "A friend of my husband told him that to get the children to grow well, we have to feed them the right foods. I do my best to do that by preparing good meals. I know that too much candies or sweets or ice creams are not good for the children but I believe that one can do nothing if it is already his fate to get sick. So, that is

why I am not concerned about my children eating these foods."

"To me, I am very concerned about nutrition, especially the nutritional values of foods. But, the more concerned I am, the fatter I become."

"My husband and I are concerned about our children eating candies, chips and ice creams. We make sure that they eat their meals first before they can eat the snacks."

Nutrition knowledge or information may be important to the homemakers but the degree of importance may vary among the groups and individuals. The importance of nutrition knowledge may be influenced by factors such as the child is picky eater, lack of nutrition knowledge, nutrition was not bring stressed when they were young, or presence of others who do not think good nutrition is important.

Concerns on children's eating habits

Homemakers were asked "What are your concerns about children's eating habits, particularly that of school age children?" In all groups, these concerns which were frequently mentioned by the homemakers:

a)Many school children do not take breakfast at home, instead they are being given spending money by their parents. One homemaker in Group B who is a teacher, related her experience - she is teaching in a rural village which is a low income area, but the school children do not eat breakfast but receive money to spend at the school canteen. Similarly, a homemaker (housewife) in Group A who has lived in Kuala Lumpur in a 'high-income' area, said that many of the children she knew in her housing area were given money by their parents for their breakfast and lunch.

b)In Malaysia, there is a regulation that school canteens cannot sell food items which are considered "junk foods" (sweets, candies, crackers/chips). However, the "non-junk" foods (fried mee/rice, Malay cakes, etc.) sold are not nutritious, expensive, little in amount and not prepared in a clean condition.

c)Mothers are not exercising control over what the children are eating whether at home or in school. The majority of the homemakers stated that mothers just give in easily to their children's food requests, mothers do not put an emphasis on breakfast, mothers do not monitor the foods their children buy at schools and mothers are not involved in or not paying attention to their children's food consumption.

d)Before, it was common for school children to bring foods from home to be eaten during recess time. However, today, there is a trend that this practice is inappropriate. Children are embarrassed to bring foods to schools and they rather buy foods at the school canteens

e)With higher incomes of parents and availability of 'unhealthy' snacks and fast foods, children's eating habits are less healthy today than before.

In terms of meals for children, all homemakers agreed that at least 2 meals a day is a must for the children. Although all agreed that breakfast is very important for children, most of the homemakers said that they do not force their children to eat breakfast before going to school. Two homemakers in Group B said that their children do not take breakfast at home. They will give the children money to spend but at the same time they will advise the children on the kinds of foods to buy. Two homemakers in Group C said that they prepare breakfast for the children but if the children do not eat the foods, they will let the children take the foods to school along with the daily spending money. Another homemaker in group C mentioned that as long as her children drink milk-based beverages for breakfast, she is not worried about them being hungry at school. She also does not give money to her children for spending but the children do take foods to school. One homemaker in Group A said in her family, breakfast is a must for her school children because she believes that children cannot concentrate or participate in school when they are hungry.

All of the homemakers in Group A indicated that in their families, the children are given one of these - vitamin C, multivitamin, iron pill, fish oil/capsules. In Group C, two mothers mentioned that they gave vitamins or iron pills to their children, especially if they are young. The reasons for taking these were blood is not enough (anemic), to increase child's appetite or the child always has a cold. Two homemakers in Group C said that as long as they know their children are eating well, they do not see the need to give them vitamins. Two other comments frequently mentioned by the homemakers were that their children do not like to eat rice and to them rice is the best for children as it is "heavy" and "filling", while others (rice vermicelli, spaghetti, bread) are not. Another comment was that their children like to drink milk and refuse to eat foods but to them this is "okay" as milk is "filling". This is true whether the child is a toddler/preschooler or school age children. Some of the comments included

> "I do prepare breakfast for my husband and children but I don't force the children to eat. Maybe it is too early to eat and the children are still full from last night."
>
> "My girl cannot take breakfast because it makes her vomit."
>
> "School children today are different from before. They do not want to bring foods to school and they rather spend money on the canteen foods like their friends do."
>
> "Breakfast and lunch are a must but dinner is optional for my children."
>
> "The school canteens are not allowed to sell junk foods but the foods they sell are not nutritious and sometimes dirty."
>
> "Some of my children are anemic and not healthy like other children. So the doctor gave them vitamin and iron pills."

"My children eat well and they only resist 'stone and stick' (metaphor). I do not see why I should give them vitamins."

It seems that there is a conflict between the concerns that these homemakers have regarding the eating habits of school children(skipping breakfast, buying canteen foods, mothers not exercising control over children) and their actual practices. Unlike those in Group A and C, homemakers in Group B did not mention anything on the use of vitamins but it may not necessarily mean that they do not give them to their children.

Healthy child

Homemakers were asked " How do you know that a child is healthy? What do you think of a fat or chubby child?" Similar responses to the definition of a healthy child from the three groups were the children eat well (balance, quality and quantity and the portion eaten should be appropriate for his/her age and not portion eaten by an adult) and the children are not easily sick or if they are sick, they will recover quickly.

Some of the homemakers in Group B said activity level is also important in classifying the health status of a child. Two homemakers defined health in terms of the child is physically (growth), mentally and emotionally healthy. One homemaker said that she does not think that her child is healthy because he does not like to eat "Malaysian foods" and it is difficult to get him to eat rice. She was also concerned that her child eats only "Western foods" such as milk, cereals, cheese and pizza.

Several homemakers in Group A and B said that they are familiar with the notion that mothers tend to associate the body size of their children with health status (the bigger the healthier) and mothers think that 'fat' or 'chubby' during the early childhood is 'okay' as it will not be permanent. Frequent responses from homemakers in all three groups were a fat child is not active, he is sick or he has a big appetite despite his activity level. Some comments included

"My sister in-law is proud that her children are bigger than mine and she keeps asking me the foods I feed my children."

"One of my children prefers Western foods (pizza, cheese, cereals) to Malaysian foods. I am worried that he is not eating healthy foods. The doctor said that he is short for his age. Maybe he is not healthy because of the foods he eats."

"If the child just sits around the house and does not play, something is wrong with him/her."

"They are healthy if they have good appetites and they are not sick."

"To me, the child is healthy if he/she has appropriate height and weight, is happy and not depressed with her life, acts as a child, eats well and has good behaviors."

The homemakers' definition of a healthy child encompasses the child's food intake (balanced meal, good quality foods and appropriate quantity for age), appetite, sickness status, growth, activity level and to a lesser degree, mental and emotional health and intake of "Malay foods" or "rice".

Child's growth

Homemakers were asked "How do you know that your child is at the appropriate weight and height? How concerned are you with the growth of your child if the child is a girl or a boy?"

Similar and frequent responses in all three groups were: growth charts in the doctor's office (especially for young children), genetic factors (looking at the parents' weight and height), comparison to other siblings or children at the same age and child is not frequently sick. Several homemakers stated that they use "common sense" because as mothers, they would know when a child is thin, stunted, fat or tall when they see one.

In all three groups, although all the homemakers agreed that their concerns for a child's growth was equal for boys and girls, some homemakers stated that girls may receive extra attention for several reasons -- girls are the ones who do not like to eat, fat or chubby girls may be teased by their friends or fatness in a girl may persist into adulthood and consequently she will not be attractive or desirable. Some comments included:

"I cannot compare my child with his friend because both my husband and I are large people compared to his friend's parents."

"When I bring my child to the doctor, she will tell me if the child is appropriate for his weight and height. She will show my child's weight and height on the growth chart."

"My son has no problem in eating but my daughter does not like to eat. I think she is too thin."

"My daughter does not eat well because she has a lot of stress at school. Most of the children in the class are Chinese and she has to compete with them. She used to be chubby but now she looks like a skeleton."

"My girl is only 12 years old but she is plump. Some of the undergraduate students thought that she is 16 and she was embarrassed about that."

Although a growth chart was mentioned frequently in the three groups, this may be influenced by the fact that many homemakers have younger children whose growth has been monitored by the doctors. Only two homemakers said that they brought their children to the doctors to get information on their growth. "Common sense" as mentioned by several mothers may be based on a combination of factors such as comparison with other siblings or children, health state and genetics.

Household decision making

Homemakers were asked "How would you describe your participation and/or control in decision making as related to food (grocery, meal planning, preparation), child care/feeding and household expenditures on food, bills and others?" The majority of the homemakers stated that the decisions related to foods (grocery, meal planning, preparation, distribution) and child care/feeding/health are more of a mother's domain while household expenditures are more of a father's domain, but they agreed that "big" decisions (e.g., child's education, buying a house) require cooperation and that their husbands will discuss these with them.

For non working homemakers, it was common to see that they only have partial or no participation and control in decision making related to household expenditures. Three of the non working homemakers stated that when it comes to decisions on household expenditures, they do not have much participation. Their husbands will do the grocery shopping or determine which foods to buy based on cost (in the presence of the wife), paying the bills and buying clothes or necessities for their family members. However, these homemakers do get monthly pocket money. Two other non working homemakers said that their husbands will give a portion of his money to them to manage. This money is mainly for groceries, child and personal expenses and bills (water, rent, electricity, phone). For both working and non working mothers, their husbands have the final word in the decisions related to household expenditures regardless of the mothers' participation.

Working homemakers have more participation and control in the decision making related to household expenditures because they have their incomes to buy the things if their husbands decide not to buy them. Some comments included:

> "Each month he gives me some money and this is for groceries and other expenses for me and the children."

> "My husband is very particular about the prices. If I were to choose mushrooms which are quite expensive but good quality, he would try to find the ones which are cheaper but less good and pay for them."

> "We have a fixed amount of food budget for each month which is not enough. My husband said that I am a big spender on foods. So, I have to use my money to buy foods."

> "I am not working and I do not handle any money except for my pocket money. My husband does all the spending and he seldom consults me on the things he bought."

> "It used to be that the decisions on all household expenditures are in his hands and I do not have any say in it. Now, at least, he lets me go through the receipts on the things that he buys but I still do not have any say in it."

The homemakers share a similarity in that they have more participation and control in decisions related to food (preparation, planning, buying), child care, health and feeding. However, there is a difference between the working and non working homemakers in their participation and/or control in decisions related to household expenditures. The working homemakers have more participation and/or control in the decisions than their non working counterparts just because they have control on their own incomes.

Pool income and access to spouse's income

Homemakers were asked "How common is it for you to pool your income with your husband's? What is your income used for? How easy is it for you to have access to/ control of his income and for him to have access to your income?"

None of the working homemakers pool their incomes with their husbands'. Although their husbands give them money for household expenses, the homemakers' incomes are used to supplement the household expenses (e.g., to buy foods or for child's school expenses were the ones frequently mentioned by these working mothers). Besides the money given by their husbands, these working homemakers (except for one) do not have access to the rest of their husbands' incomes. Their husbands also do not have access to their wives' incomes.

For the non working homemakers, besides the money given by the husbands for pocket money, groceries, child/wife expenses and bills, these homemakers too do not have access to the rest of their husbands' incomes. Some of these homemakers said, although they do not have access to their husband's income, their husbands will buy them the things they want. Both the working and non working homemakers have never asked their husbands about what their husbands do with the remainder of the incomes after money for household expenses and wife's pocket money. Some comments included:

> "He has his own money and I have mine. Every month he gives me some money for the house and if it is not enough, I will use mine."

> "In my family, it is my husband's responsibility to buy foods. Each month he will give me money for "wet" food (fresh foods from the market) and he will buy the "dry" foods (sugar, rice, coffee, etc.). After he allocates his money for other things, if he needs more, I will give him some of mine. Otherwise, I use my money to buy extra foods or for the children."

> "My husband takes care of both his and my incomes but I have my own bank account. I only need to ask him the money for groceries, transport or other expenses."

> "He keeps the money and I do not ask him about the things he spends it on but he will give me pocket money and buy me things if I ask him to."

Pooling of income is not common among the working homemakers in these groups. Although their husbands do give them money for household expenses, the homemakers will use their incomes to supplement the household expenses. Also, it is not common, at least for these groups of homemakers, to "pry" into how their husbands spend their incomes.

Household expenditures

Homemakers were asked "What are the common monthly expenditures in your household?"

The common ones given were: Water, electricity, phone, rent, baby sitting/child care, house helper, loans (car and home), transportation, recreation, food, pocket money, financial responsibility to older parents, medical expenses, child expenses (books, trips, clothes), emergency and savings.

Child figures

Homemakers were asked "If I want to know how you would classify your child's growth (weight and height) by asking you to indicate on either of these child figures, which one do you think is easier for you to make an identification? Which one do you think is appropriate in our Malay culture?" (Show them the 'paper cut' (A) child figures and 'hand drawn' (B) child figures)

All the homemakers preferred the A child figures because they could see the curves of the figures better compared to that of the B figures which are hidden by the clothes. They also mentioned that it is hard to concentrate on the B figures because of the clothes, hair and face (mouth, nose, lips) which seem more prominent than the body curves. Several mothers in Group B said that to make the A figures more comprehensible, the normal figure should be put apart from the rest of the figures. This is to avoid the tendency to pick on the normal figure and to make it easy for comparing the other figures to the normal or standard figure.

The majority of the homemakers said that in Malaysia now, mothers are familiar with the A figures especially in government clinics and so it is appropriate to use the figures as long as the private parts (genitals and breasts) are not shown. Some comments included

> "The 'hand drawn' figures are difficult to see because you have the clothes, hair and face. I like the paper cut figures because I can see all the curves at the right place."

> "I don't think you will have any problem in using the paper cut figures in Malaysia. Mothers are more receptive nowadays because they may have seen similar figures at the clinics too. In my area, there is a clinic "Desa Clinic' which has similar pictures of naked people hanging on the doctor's office."

All homemakers preferred the 'paper cut' figures to the 'hand drawn' figures. It may be that the 'hand drawn' figures need more revisions so that the curves are more explicit (like the paper cut figures are) and that the other features of the figures (hair, face, dress) do not overshadow the body curves.

APPENDIX E

UCRIHS Letters of Approval

MICHIGAN STATE
UNIVERSITY

September 3, 1997

TO: Jenny Bond
236 Food Science & Hum. Nut.

RE: IRB#: 97-535
TITLE: GROWTH STATUS DETERMINANTS OF SCHOOL-AGE CHILDREN FROM LOW INCOME HOUSEHOLDS IN THE URBAN AREA OF KUALA LUMPUR: A FOCUS ON INTRAHOUSEHOLD FACTORS
REVISION REQUESTED: N/A
CATEGORY: 2-C
APPROVAL DATE: 08/15/97

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/ CHANGES: Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)432-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:bed

cc: Zalilah Mohd Shariff

OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

University Committee on Research Involving Human Subjects (UCRIHS)

Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX 517/432-1171

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MSU is an affirmative-action, equal-opportunity institution

MICHIGAN STATE
UNIVERSITY

January 2, 1997

TO: Jenny Bond
236 Food Science & Hum. Nut.

RE: IRB#: 96-411
TITLE: PILOT-STUDY: MOTHERS' PERCEPTION OF INTRA-HOUSEHOLD RESOURCE ALLOCATION, CHILD CARE, FEEDING AND CHILD HEALTH
REVISION REQUESTED: 12/15/96
CATEGORY: 1-C
APPROVAL DATE: 07/03/96

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

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Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:bed

cc: Zalilah Mohd Shariff

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MICHIGAN STATE
UNIVERSITY

July 3, 1996

TO: Zalilah Mohd Shariff

RE: IRB#: 96-411
TITLE: PILOT-STUDY: MOTHERS' PERCEPTION OF INTRA-HOUSEHOLD RESOURCE ALLOCATION, CHILD CARE, FEEDING AND CHILD HEALTH
REVISION REQUESTED: N/A
CATEGORY: 1-C
APPROVAL DATE: 07/03/96

The University Committee on Research Involving Human Subjects (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

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If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)432-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:bed

cc: Jenny Bond

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APPENDIX F

Malaysian Ministry of Education and Wilayah Persekutuan Department of Education Letters of Approval

BAHAGIAN PERANCANGAN DAN
PENYELIDIKAN PENDIDIKAN,
KEMENTERIAN PENDIDIKAN,
PARAS 2, 3 DAN 5, BLOK J,
PUSAT BANDAR DAMANSARA,
50604 KUALA LUMPUR

Telefon: 2556900
Kawat: "PENDIDIKAN"
Faks: 03-2554960

Ruj. Tuan KP (BPPP)13/15
Ruj. Kami Bil.48(8)
Tarikh: 29 Sept 1997

Pn. Zalilah Mohd. Shariff,
1408/1 Batu 6,
Jalan Puchong Petaling,
58200 Kuala Lumpur.

Tuan,

Kebenaran Bagi Menjalankan Kajian Ke Sekolah-Sekolah, Jabatan-Jabatan Dan Institusi-Institusi Di Bawah Kementerian Pendidikan Malaysia

Adalah saya diarah untuk memaklumkan bahawa permohonan puan untuk menjalankan kajian mengenai

"Growth Status Determinants Of School-Age Children From Low Income Households In The Urban Area Of Kuala Lumpur: A Focus On Intrahousehold Factors".

telah diluluskan

2. Kelulusan ini adalah berdasarkan kepada hanya apa yang terkandung di dalam cadangan penyelidikan yang puan kemukakan ke Bahagian ini. **Kebenaran bagi menggunakan sampel kajian perlu diperolehi daripada Ketua Bahagian/Pengarah Pendidikan Negeri yang berkenaan.**

3. Puan juga dikehendaki menghantar senaskhah hasil kajian puan ke Bahagian ini sebaik sahaja selesai kelak.

Sekian dimaklumkan, terima kasih..

" BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DR. ABD. KARIM B. MD. NOR)
b.p. Pengarah Perancangan dan Penyelidikan Dasar Pendidikan,
b.p. Pendaftar Besar Sekolah-Sekolah dan Guru-Guru,
Kementerian Pendidikan Malaysia.

JABATAN PENDIDIKAN
WILAYAH PERSEKUTUAN,
JALAN RAJA MUDA ABDUL AZIZ,
50300 KUALA LUMPUR.

Telefon: 2919044

Ruj. Tuan:
JPWP 03-1293/Jld. 1 /(2)
Ruj. Kami:
Tarikh:

3 Januari 1998

Zalilah Mohd. Shariff,
1408/1 Batu 6, Jalan Puchong,
Petaling,
58200 Kuala Lumpur.

Puan,

KEBENARAN MENJALANKAN PENYELIDIKAN DI SEKOLAH-SEKOLAH WILAYAH PERSEKUTUAN.

Dengan hormatnya saya diarah memaklumkan bahawa permohonan puan untuk menjalankan kajian mengenai :-

"Growth Status Determinants of School-Age Children From Low Income Households In The Urban Area Of Kuala Lumpur: A Focus On Intrahousehold Factors",

adalah diluluskan tertakluk kepada syarat-syarat seperti berikut :-

a. **Kelulusan ini adalah berdasarkan kepada apa yang terkandung di dalam `sampel kajian' yang telah diluluskan oleh Kementerian Pendidikan dan Jabatan ini sahaja.**
b. **Puan dikehendaki mengemukakan senaskah `sampel kajian' dan hasil kajian puan ke Jabatan ini sebaik sahaja lanya selesai.**
c. **Sila kemukakan surat kebenaran ini ketika berurusan dengan Guru Besar sekolah yang berkenaan.**
d. **Kebenaran ini dilanjutkan dan hanya sah sehingga 31 Mac 1998 sahaja.**

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

3/1/98

(MAHAT BIN SAMSUDIN)
Bahagian Perhubungan dan Pendaftaran
b.p. Jabatan Pendidikan
Wilayah Persekutuan.

* (Sila catatkan bilangan ini di dalam segala surat-menyurat)

REFERENCES

REFERENCES

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