

U MATERNAL NUTRITIONAL KNOWLEDGE AND THE NUTRITIONAL
STATUS OF CHILDREN 6-24 MONTHS OLD IN A POOR
PERI-URBAN COMMUNITY
KIBERA \ \

BY
ESTHER WANGUI WAIHENYA

'A thesis submitted in (part) fulfillment of the
requirements for the degree of Master of
Science in Applied Human Nutrition
in the University of
Nairobi
1994

DECLARATION

This thesis is my original work and has not been submitted for a degree in any other University.

E. W. Waihenya 22.3.94

 E.W.WAIHENYA Date

'This thesis has been submitted for examination with our approval as University supervisors.

(i) *Kogi Makau* 22.3.94

 DR. WAMBUI KOGI-MAKAU, Ph.D. Date
 Lecturer,
 Applied Human Nutrition,
 Department of Food Technology and
 Nutrition.
 University of Nairobi.

(ii) *Mujita* 22.3.94

 DR. J.W. MUJITA, Date
 Lecturer,
 Applied Human Nutrition
 Department of Food Technology and
 Nutrition.
 University of Nairobi.

TABLE OF CONTENT

	Page
Title.....	1
Declaration.....	2
Table of content.....	3
Abstract.....	8
List of abbreviations	10
Operational definitions.....	11
Dedication	13
Acknowledgement	14
CHAPTER	
1. INTRODUCTION.....	15
1.1 Statement of the problem.....	16
1.2 Aim of the study.....	18
1.3 Research objectives.....	18
1.4 Hypothesis.....	19
1.5 Expected benefits from the study.....	19
1.6 Limitations.....	19
2. REVIEW OF THE LITERATURE.....	20
2.1 Problem of malnutrition.....	20
2.2 Dangers of malnutrition.....	24

2.3	Causes of malnutrition.....	25
2.4	Nutrition education.....	34
2.5	Mothers nutritional knowledge and child nutritional status.....	44
2.6	Choice of indicators of nutritional status.....	47
3.	DESCRIPTION OF THE STUDY AREA.....	50
3.0	Introduction.....	50
3.1	Justification of selection of study site.....	50
3.2	Social geography.....	51
3.3	Infrastructure.....	53
4.	RESEARCH DESIGN AND METHODS.....	57
4.1	Summary.....	57
4.2	Study design.....	57
4.3	Study population.....	57
4.4	Determination of sample size.....	58
4.5	Sampling frame.....	59
4.6	Sampling method and procedure.....	59
4.7	Instrument design and pretesting.....	60
4.8	Field station, recruiting and training of field assistants.....	60
4.9	Data collection techniques.....	61
4.10	Data processing.....	65
4.11	Familiarization with study area.....	66

5. RESULTS.....	68
5.0 Introduction.....	68
5.1 Socio-demographic characteristics of the study population.....	68
5.2 Nutritional knowledge.....	77
5.3 Sources of nutrition information.....	83
5.4 Nutritional status of the study children.....	86
5.5 Attitude and practice of mothers towards child feeding.....	93
6. DISCUSSION.....	102
6.1 Mothers nutritional knowledge.....	102
6.2 Sources of nutrition information.....	104
6.3 Child nutritional status.....	105
6.4 Attitude and practice towards child feeding...	111
7. CONCLUSIONS AND RECOMMENDATIONS.....	116
REFERENCES.....	120
APPENDICES.....	129

LIST OF TABLES

Page

1	Distribution of children 6-24 months by age and sex.....	72
2	Distribution of households by the type of fuel used.....	76
3	Symptoms of morbidity experience of children seven days prior to the survey.....	77
4	Levels of maternal nutritional knowledge according to scores.....	78
5	Sources of nutrition information.....	85
6	Distribution of mothers by required nutrition information.....	86
7	Length of preferred period for teaching nutrition education.....	87
8	Distribution of children by weight-for-age according to age.....	88
9	Distribution of children by height-for-age according to age.....	89
10	Significant maternal nutritional knowledge components with child nutritional status.....	94
11	Distribution of mothers by preferred age for stopping breastfeeding.....	95
12	Maternal method of stopping breastfeeding and child nutritional status.....	96
13	Constituents of weaning foods for dish 1 and 2.....	98

14	Food considered to be good for children by the mothers and the reasons.....	100
15	Foods considered to be bad for children by the mothers.....	101

FIGURES

1	Household size.....	69
2	Age and sex distribution of the study population.....	70
3	Frequency of feeding children by weight for age...	81
4	Increasing energy density for children's food.....	83
5	Maternal nutritional scores and weight for age....	91
6	Maternal nutritional scores and height for age....	92
7	Maternal nutritional scores and weight for height.....	93

APPENDIX

1	Maps of Kibera sub-location.....	129
2	Map of Makina village.....	130
3	Questionnaire administered to the mothers.....	131

ABSTRACT

The principal objective of this study was to determine the relationship between maternal nutritional knowledge and the nutritional status of children 6-24 months old.

Information on child nutritional status, nutritional knowledge of the mother and information on mothers attitude and practices towards child feeding was collected in a cross-sectional study of 363 households with children aged 6-24 months and a population of 1644 persons in Makina Village in Kibera Sub-location. Selection of the cluster was through random sampling. Chi-square test was used to test for statistical differences between nutritional status of children and maternal nutritional knowledge. Correlation was also done.

The results showed that almost all the mothers (97.5%) were exposed to nutrition education and the main source of nutrition information was Maternal and Child Health and Family Planning Clinics. Other sources of nutrition information were insignificant and were unlikely to distort the information obtained from the clinics. With this high exposure the mothers would be expected to make use of the knowledge to improve the nutritional status of their children.

The results also showed that mothers' nutritional knowledge was high with a mean score of 72.4 percent. This was not surprising given the high exposure to nutrition information. The lowest score was 36.6% while the highest was 100%. There was a positive correlation between maternal nutritional knowledge scores and number of years of schooling. Majority of the study children 58.4 percent were underweight, 1.9 percent were wasted, while 86.2 percent were stunted.

Findings of the study indicated that although no significant relationship was found overall, between maternal nutritional knowledge and child nutritional status, some components of nutritional knowledge were significantly related to nutritional status. Inability of the mother to recognize presence of signs of undernutrition, Marasmus, Kwashiorkor and their treatment had a significant negative relationship with weight-for-age of the child. Equally important was the feeding frequency of both well and sick children.

In conclusion, maternal knowledge on certain aspects of nutrition, for example, dangers of introducing food to a child too early, frequency of feeding a sick child, and signs and treatment of Kwashiorkor and Marasmus help to enhance the nutritional status of children and therefore, any nutrition education programme should emphasise those components.

LIST OF ABBREVIATIONS

PEM	Protein Energy Malnutrition.
CBS	Central Bureau of Statistics.
MCH/FP	Maternal Child Welfare Clinics and Family Planning.
WHO	World Health Organization.
NCHS	National Center for Health Statistics
UNEP	United Nations Environmental Programme.
UNICEF	United Nations Children's Fund
DO	Divisional Officer
CPK	Church of Province of Kenya
CHWS	Community Health Workers.
SPSS	Statistical Package for the Social Sciences.
SD	Standard Deviation
PP	Page
HH	Household
IDRC	International Development for Research Centre
NORAD	Norwegian Development Corporation
SAPs	Structural Adjustment Policies
URTI	Upper Respiratory Tract Infections
FAO	Food and Agricultural Organization.

OPERATIONAL DEFINITIONS

Knowledge: Knowledge means verbalized or demonstrated ability to reproduce from memory facts, principles, and recipes related to nutrition.

Total Score: This is the total number of correct responses.

Maternal: Under this context maternal will imply the mother of the child and in instances where the mother is absent in case of death then the person who looks after the child will be interviewed.

Sources of nutrition information: This refers to where the Nutrition information was obtained from.

Dependency ratio: The dependency ratio describes the relation between the potentially self supporting portion of the population and the dependent portions at the extremes of age.

Attitude: A way of feeling, or thinking .

Stunted: Children in the study population who are too short for their age, when compared with NCHS

reference standards i.e. below -2 SD or Z scores from the median.

Wasted: Children who are too thin for their height compared to NCHS reference standards i.e. below -2 SD or Z scores from the median.

Household: To maintain consistency in the study, the household was defined as all persons eating and sleeping under the same roof who belong to the same father and mother at the time of the survey.

Weaning: The process by which breast milk is progressively supplemented with other foods, liquid, semi-solid and solid.

Food Avoidance: Practice of withholding certain food items that would normally be consumed.

Peri-urban: This is an area in the outskirts of the city.

DEDICATION

This work is dedicated to my husband Dr. Waihenya Chomba and our children Njambi and Muthoni for their understanding, encouragement and support through the project.

ACKNOWLEDGEMENT

I thank the University of Nairobi for having offered me an opportunity to pursue the Applied Human Nutrition Course and the Ministry of Health for giving me a study leave.

I thank Dr. Wambui Kogi-Makau and Dr. J.W. Muita for the overall guidance and supervision of the project. I thank Prof. A.A. Kielmann who assisted greatly to the proposal development. Mr. Mwadime who guided me in the data analysis. My thanks also go to A. Burgess and G. A. Etyang for their contribution in the development of the questionnaire.

I sincerely thank Florence Ndung'u the nutritionist incharge of Kibera Nutrition Clinic, the Chief of Kibera area, the Assistant-Chief, Beatrice Mburu, Margaret, Mwelevi and the mothers who assisted greatly in the provision of the data.

Special thanks go to NORAD for offering me a scholarship for the two years and the IDRC for funding the research project.

CHAPTER 1

1. INTRODUCTION

The main aim of nutrition education, at the community level, is to persuade people to modify their way of life with a view to improving their health and nutrition through better use of available traditional and modern resources (Jelliffe, 1969). Nutrition education is much more than mere supplying of information. It tries to convince people who have different cultural concepts of food and disease and also to motivate them to want to make appropriate changes. Changing peoples behaviour is a difficult process and a lot still remains to be learnt on the best ways to undertake effective nutrition education. The modifications in behavior that are often the aim of nutrition education, for example, those related to food habits and child rearing practices; tend to be particularly deeply woven into the cultural patterns of communities and as such people are often resistant to change (Jelliffe, 1969).

Nutrition education programmes focus on malnutrition and its causes, introduction of supplementary foods, adequate feeding of children and prevention of diarrhoea among others. Most nutrition education is directed at mothers, because they are the main providers of primary care for

their children and the understanding of basic nutritional and health measures strongly influences the quality of the care they provide.

Poverty is often an important causative factor of poor nutritional status in childhood, but a considerable proportion of this problem could be avoided if the available food resources were put to better use. Nutrition education emphasizes this aspect and is therefore considered to be one of the most important methods of combating malnutrition (Jelliffe, 1969). However, the effectiveness of nutrition education in improving child nutrition status has been doubted by several authorities. This is because most of nutrition education is unevaluated (Hornik, 1985) and the fact that it is hurriedly given as an add on to curative services and so only a few people have access to nutrition information.

1.1 STATEMENT OF THE PROBLEM

Malnutrition in pre-school children in low income communities mostly has its onset during the weaning age and results mainly from poor feeding and poor health practices. Nutritional status and child survival rates can be improved by nutrition education that teaches improved practices (Zeitlin and Formacion, 1981).

The middle and high income groups, are likely to have adequate resources to purchase enough food for everybody in the family. Hence, maternal nutritional knowledge may only play a minor role towards the nutritional status of the children except where early weaning is practised which may result in the child being overweight. However, in a marginal society where funds are often insufficient, the capacity to buy enough food is limited.

Ignorance of the special needs of children and inappropriate cultural beliefs often cause families to give their children diets that are less in quantity and quality (Martorell and Ho, 1982). Nutritional knowledge, therefore, would not only include weaning pattern and nature of food to be given to the child but also the importance of the child as a high priority individual within the family. The child consequently should be provided with enough food despite what the rest of the family consumes. This is because if a child is malnourished during the age of 6-24 months they do not catch up in growth in later years (King, 1985).

Although various nutrition education programmes operate in Kenya, there is no properly documented information on current child rearing practices. Most nutrition educators when they go into the community, do not possess such information and thus give information more or less arbitrarily (Oniang'o, 1987). This investigation sought

to find out whether in a low socio-economic society maternal nutritional knowledge influences child nutritional status, and also find out mothers' attitudes and practice towards child feeding practices with an aim of exposing the current wrong child feeding practices. There is also need to find out the mothers' views on nutrition teaching, since there is very little documentation to this effect in Kenya, in a view to improving the nutrition education curriculum.

1.2 AIM OF THE STUDY

The overall aim of the study, is to contribute insights to the current nutrition programmes, in order to make them more relevant to the community needs, in a view to improving child nutritional status.

1.3 RESEARCH OBJECTIVE

To determine the relationship between maternal nutritional knowledge and the nutritional status of children 6-24 months old.

Sub- Objectives

1.3.1 To assess the nutritional knowledge of mothers with children aged 6-24 months.

1.3.2 To determine the nutritional status of children

6-24 months old in the study population.

1.3.3 To establish the source of mothers nutritional knowledge.

1.3.4 To establish the attitude and practice of mothers towards child feeding practices.

1.3.5 To determine the relationship between maternal nutritional knowledge and the nutritional status of the child.

1.4 HYPOTHESIS

In a low income community maternal nutritional knowledge has a positive influence on the nutritional status of their children.

1.5 EXPECTED BENEFITS

The results of the study will be useful to institutions and Government ministries for planning nutrition intervention programmes.

1.6 LIMITATIONS

1.6.1 I will limit myself to mothers with children 6-24 months in a poor peri-urban community.

1.6.2 Time is limited and the study has to be completed within three months.

CHAPTER 2

LITERATURE REVIEW

2.1 PROBLEM OF MALNUTRITION

Malnutrition is a pathological condition resulting from absolute or partial deficiency or excess of one or more essential nutrients. Deficiency rather than excess has been observed in developing countries (Jelliffe, 1969). Child malnutrition has been reported to be the most widely spread disorder known in tropical and sub-tropical areas (McIaren et al. 1983).

Children in the early stages of life are the most affected by nutritional deficiencies. As a result of their rapid growth, they need about twice as much protein and energy in relation to the overall body weight as adults require (Eckholm and Record, 1976). The age at which children are most vulnerable to malnutrition is between seven and thirty six months, when nutritional problems are primarily associated with weaning (Jelliffe, 1969). Pregnant and nursing mothers, who also need extra food, form a second nutritionally vulnerable group (Eckholm and Record, 1976).

Protein energy malnutrition (PEM) is the most widespread form of malnutrition in developing countries. The world

Health Organization (WHO) report of 1970 states that on average three per cent of children under five years in low income countries suffer from severe PEM (third degree malnutrition that is, or below 60 per cent of the standard body weight for age). Twenty five per cent are estimated to be suffering from moderate malnutrition (second degree or 60-75 per cent of norm) and an additional 40-45 per cent is generally agreed to have mild malnutrition (first degree or 75-90 per cent of norm). Where evidence of severe forms of malnutrition exists there are many more children with moderate and mild forms of malnutrition (Jelliffe et al. 1975).

According to the Central Bureau of Statistics (CBS,1982) report, using the National Center for Health Statistics (NCHS) reference values, 24 per cent of children below five years in Kenya, were below 90 per cent, of the median height-for-age and were, therefore, considered to be stunted; three per cent fell below 80 per cent of the median weight -for-height and were considered to be wasted. A recent study by Ngare in conjunction with Government of Kenya assisted by UNICEF (1994) revealed that 37 percent of the children were stunted, six percent were wasted and 27 percent were underweight (results not published). It appears that malnutrition is increasing.

PEM is manifest in children through various degrees of growth retardation. Wasting (low weight for height) is

considered to be a sign of recent or current PEM while stunting (low height for age) is an indicator of chronic PEM. The most severe forms of PEM are Kwashiorkor which is characterised by low weight (i.e below 80 per cent of the median plus oedema) and marasmus which is characterised by very low weight (i.e below 60 per cent of the median), (Linda and King 1979). PEM results from insufficient nutrients intake (Linda and King, 1979).

In addition to energy and protein shortages, the problem of undernutrition encompasses numerous specific vitamin and mineral deficiencies that usually, but not always co-exist with overall underfeeding (Bengoa, 1973). By far the most widespread of these is anaemia, a condition often resulting from inadequate intake of iron or other vitamins as well as from iron losses from hookworm. Widespread in rich and poor countries alike, anaemia afflicts 5 to 15 per cent of adult men. In Africa 6-17 per cent of men are anaemic and 15-50 per cent of women. In children frequency of anaemia is between 30-60 per cent (WHO, 1972). In 1990, four out of 10 women in the developing world were suffering from anaemia. Among pregnant women, more than half were affected (UNICEF, 1995). The incidence of anaemia varies greatly in different parts of Kenya, the coastal region being the most severely affected. Mortality rates of iron deficiency anaemia in Coast Province General Hospital were 12.7 percent for males and only 3.7 percent for

females (Jansen, 1987). Anaemia saps the energy needed to work and raises susceptibility to disease, it also multiplies women's risk of dying during child birth (Bengoa, 1973).

Vitamin A deficiency affects mainly infants and young children (WHO, 1972). Deficiencies of vitamin A rank as the leading cause of blindness in many developing countries. Literally "dry eye" is the general term for ocular disorders that range from an inability to see in dim light to total blindness. World wide, between 20,000 and 100,000 children go blind for want of vitamin A (Bengoa, 1973). In a survey carried out in a hospital in Indonesia over a ten year period (1958-1968) xerthalmia was found to be the cause of blindness in 50-60 percent of the cases among preschool children (WHO, 1972). In Kenya, the Department of Nutrition Research Centre carried out a number of investigations in the northern part of Machakos District and found vitamin A deficiency in pre-school children (Jansen, 1987). In 1994 Ngare in his survey within 14 districts in Kenya reported that eight percent of children below six years had severe vitamin A deficiency while 33 percent were moderate.

Iodine is an important mineral deficiency. Iodine deficiency results in goitre which is an enlargement of the thyroid gland. The disease mainly affects people in the developing countries (WHO, 1972). In Kenya studies

done (Bohdal et al. in 1964-68) show that goitre cases among Kenyan school children ranged from 17.9 per cent at the coast to 72.4 per cent in the highlands of the Rift valley. A second follow up study in 1974 show significant improvement but still only a moderate decrease in goitre rates (Jansen, 1987). In 1994 another follow up study was done by Gitau in 45 districts (results unpublished). Results show that 16 percent of the children below six years had goitre. Out of these 1.2 percent had visible goitre while 14.4 percent grade one goitre. This is an immense improvement and it can be attributed to increased use of iodized salt. Endemic goitre occurs in all ages. Severe goitre can be the cause of obstructive problems and has been associated with endemic cretinism and deaf-mutism in many parts of the world (Clement, 1976 as quoted in Beaton and Bengoa).

2.2 DANGERS OF MALNUTRITION

Malnutrition and undernutrition are both direct and indirect causes of death during infancy and early childhood. In the 1970s about 6 per cent of all deaths among infants and young children (up to the age of four years) in Latin America were attributable directly to malnutrition while 57 per cent were associated with various types of malnourishment (Eckholm and Record, 1976). Severe PEM, if untreated is fatal but even in children treated in hospitals the mortality rate may be

as high as 40 per cent (WHO, 1972). More than a quarter of all world's deaths occur among children of underfive, and undernutrition has been reported as an underlying cause (Eckholm and Record, 1976). In Machakos District in Kenya, Van Ginneken and Muller in 1984 reported that malnutrition as an underlying cause of death, in early childhood, ranked second.

Children with mild and moderate PEM grow at a slower rate than normal (WHO, 1972). Undernutrition also causes higher vulnerability to infection. Clinical observations suggest that malnourished individuals may respond to infection differently from the well nourished individuals (WHO, 1972). An organism that may be relatively harmless to the well nourished child may give rise to severe or even fatal infection in the malnourished child (Scythe et al. 1971). Malnutrition mainly interferes with the cell mediated immunity which is an important defence against measles, tuberculosis and chickenpox (Scrimshaw et al. 1968). Undernutrition also results in decreased work output (Kielmann, 1976) and reduced life expectancy (WHO, 1972).

2.3. CAUSES OF MALNUTRITION

Malnutrition is caused by several inter-related factors, some of them being socio-economic, cultural factors as well as infection (Morley et al. 1968, Addy, 1975,

Bennet ,1971, Vamoer 1969 as quoted in Taylor and Taylor, 1976).

2.3.1. Economic Factors

Poverty is the major underlying cause of undernutrition. It tends to receive special attention because it is easily measured and directly influences food consumption (Myrdal, 1970). Poverty is pervasive in much of the third world and the capacity of families to purchase or to produce food is limited (Martorel and Ho, 1983), both in variety and quantity. Poverty exists everywhere but its extent in a considerable number of countries is massive. The world Bank estimates that 750 million people in the poorest nations live in extreme poverty with annual incomes of less than US \$ 75 or Ksh.5250 (National Research Council, 1977).

Nutritional problems are aggravated in urban situations because food has to be bought rather than grown and inappropriate foods are promoted by aggressive advertising (Myrdal, 1970). Thus the depressed socio-economic factors such as family income and family composition often contribute to reduced food intake (Kielmann et al. 1976). Unequal food sharing, is more likely to occur in households where overall diets are deficient. A mothers earned income may more often be used for an infants food than a fathers income (Mitzer et al.

1984).

Poverty and malnutrition can constitute a vicious cycle. Because of poverty children become malnourished and grow up deficient in both mental and physical abilities. Nutrition related health problems cause higher absenteeism from school and malnourished children are more likely to drop out of school than those whose nutrition is adequate. Disadvantaged in terms of mental faculties, these children will have low earning power as adults and thus will lack the resources required to provide adequate nutrition for their children. Unless this cycle is broken through special programmes aimed at the nutritionally disadvantaged, economic growth is likely to widen both nutritional and income inequalities (Odada and Ayako, 1988).

2.3.2. Cultural Factors

The knowledge, attitudes and beliefs of a child's caretaker may be the most important determinants of whether the child will be well nourished. A mother's beliefs about the nutritional content of foods and her understanding of the causal factors of disease may have powerful effects on a child's well being (Mitzer et al. 1984).

In all cultures there are practices which are harmful from the point of view of health and nutrition, for example, the restriction of protein foods for pregnant women with a view that the children will be too big and with-holding of eggs for small children because it is believed that they will delay a child from talking (Latham, 1979).

Also affecting decisions to breastfeed or not to breastfeed are social philosophies, convenience and relative costs and 'prestige' of breastfeeding. Women may also succumb to the preferences of their households in such decisions (Pelto, 1981 as quoted in Galler, 1984).

Ignorance of the special needs of children and inappropriate cultural beliefs and practices often cause families to give their children diets that are less in quantity than those they could provide (Martorel and Ho, 1983). Similarly according to Berg's view, "Sometimes ... malnutrition occurs simply because food habits are inappropriate ..." It is not uncommon, for example, to find children suffering from malnutrition in households in which incomes are adequate. Surveys in Central and South America, Africa and Asia found children normal diets to be commonly 20 to 30 percent inadequate, and sometimes as much as 55 per cent inadequate in the face of adequate adult diets (Dema, 1965). Even among the poor, childhood malnutrition could apparently be avoided

(Berg, 1981). Zeitlin and Formacion (1981) hold a similar view.

Feeding customs in addition to breastfeeding, mothers use of time, that is, how much time she spends with the child, and how well she supervises the child's nutrient intake affects the child's on going nutritional status (Popkin, 1980 as quoted in Galler, 1984). In many cultures, lack of proper child care is an additional resource constraint which makes it difficult to use available foods to supplement infant diets (Zeitlin and Formacion, 1981). In rural India (Golpadas, 1975 as quoted in Zeitlin and Formacion, 1981) found that low income mothers left their babies for most of the day in the care of siblings who had not reached school going age. Although food may be available in the home, these siblings cannot be expected to feed the infants adequately. Similar findings have been reported by Emrich (1977 as quoted in Zeitlin and Formacio, 1981) in Guatemala. Kielmann et al. (1976) similarly state that child neglect influences quality and quantity of a child's diet.

Inappropriate age for introducing supplements to a child affects the nutritional status (Mitzner et.al 1984). Delayed complementary feeding, until 12 months has been practiced in many parts of Africa. This is detrimental to proper growth of the child since milk alone can only

support adequate growth of the baby for four to six months and thereafter if milk is not supplemented with other foods growth faltering occurs (King, 1985). Introduction of supplements before the age of three months are an important cause of diarrhoea and therefore, a cause of undernutrition in children (King, 1985).

Periods of unusual danger in the life cycle attract a number of ritual prescriptions of foods. It is common to with-hold solids at the first signs of diarrhoea or other infections, thus precipitating PEM (Puffer and Serrano, 1973). A study in Guatemala showed that for every episode of illness there was an average reduction of daily food intake by 19 percent of calories and 18 per cent reduction in protein. With-holding of foods during illness is a practice that can seriously reduce a child's chance of recovery (Mitzner et, al.1984). Diet history data revealed that 33 percent of mothers in the slums of Nakuru town, avoided certain foods, for example milk and beans in the children's diets during diarrhoea episodes. Children were also fed fewer times than in the absence of diarrhoea (Mambo, 1990). The reduction of dietary intake during illness can be as serious as the metabolic effects of infection (Ebrahim, 1983). Most acute infections also reduce appetite and tolerance of food. In many parts of the world there are cultural practices that dictate dietary restrictions. Dietary intakes have been shown to be reduced by 20 to 40 per cent (Martorell and Yarbrough,

1983).

Nutrition education encourages mothers to feed their children when they are ill, more frequently, with nourishing foods and to increase amounts when the child has recovered for catch up growth.

Witchcraft is believed to be the cause of malnutrition in some cultures, for example, evil eye or other spiritual causes (Kakar et al. 1972 as quoted in Mitzner et al. 1984). The treatment of the malnourished child would mean taking the child to a witch doctor instead of taking the child to the hospital for proper treatment. This may result in the death of the child.

The role of nutrition education, therefore, is to discourage harmful practices and encourage those that are beneficial.

2.3.3. Infections

Just as undernutrition aggravates disease, infections may conversely cause nutritional stress in those whose diets would otherwise be barely adequate. Infections in the gastro-intestinal tract, for example, diarrhoea and vomiting reduce the body's ability to extract nutrients from food and even more significantly, nearly all infections trigger an increased elimination of protein

nitrogen through body wastes (Eckholm and Erik, 1976). Moreover, well meaning parents often put children on diets less nutritious than usual in accordance to local notions about which foods are appropriate for the sick (Eckholm and Erik, 1976).

Few babies between 6-24 months old in developing countries escape diarrhoea and many suffer repeated episodes (WHO, 1972). This is because six months of age is the onset of greater mobility and at least partial weaning from the breast. It is a time of extra ordinary increase in exposure to infection (Chen and Schrimshaw, 1983 as quoted in Martorell and Ho, 1984). Diarrhoeal episodes increase because of unsanitary living conditions and personal habits where the child's food and feeding utensils are contaminated by the bacteria and viruses that cause diarrhoea (Eckholm and Erik, 1976).

All illnesses have marked effects on nutrients metabolism and utilization. Infections usually raise the body's overall nutrient requirements (FAC, 1974 as quoted in Hornik, 1985). Zeitlin (1984) estimated that 6-24 months old children require 30 per cent additional protein in order to counteract the effects of infection. It is well established that infection is often a major factor in precipitating acute nutritional deficiencies (Hutt, 1969). A number of clinical deficiency states are precipitated by infection. An epidemic of diarrhoeal

disease or measles may be followed by kwashiorkor. Similarly, keratomalacia, scurvy and beri-beri have been observed following infection. Anaemia follows various parasitic infections including hookworms (Puffer and Serrano, 1973).

It is, therefore, evident that infections raise the body's overall nutrient requirements through increased tissue breakdown and that, they always make the nutritional status of children worse. Some of the infections can be prevented by making sure that children are immunized for all immunizable childhood diseases, such as, Tuberculosis, Diphtheria and measles among others (Jelliffe, 1985). Knowledge of the mother on the importance of immunizations will motivate her to seek protection for her child at the appropriate time and take the child for medical attention as soon as the child is taken ill.

Other infections can be controlled by observing strict personal and environmental hygiene in order to minimize diseases such as diarrhoea and vomiting and also infestation of worms (Jelliffe, 1985). A mother's knowledge of these simple measures can help to ensure that the child is sick less often and this will reduce a child's drain in the nutrients thus resulting in improved child nutritional status.

Mother's knowledge on feeding the child with appropriate diets will ensure that the child is healthy. Healthy children are better able to fight infection and they recover much faster, with fewer complications (Cameron and Hofvander, 1983). Parents with little knowledge of the needs of their children are likely to feed them on wrong foods. This is likely to make the child vulnerable to malnutrition (Jelliffe, 1985).

2.4 NUTRITION EDUCATION

2.4.1 Introduction

Nutrition education may be defined as education of the public aiming at a general improvement of the nutritional status, mainly through the promotion of appropriate food habits, elimination of unsatisfactory dietary practices, introduction of better food hygiene, and more efficient use of food resources (Jelliffe, 1983). The purpose of nutrition education is to achieve an improvement in the knowledge, attitudes, motivation, skills and behaviour of individuals who are in the nutrition education process (Jelliffe, 1983). In developing countries, nutrition education is aimed at the improvement of individual food consumption, more in particular that of small children (Zeitlin and Formacion, 1981) with the aim of improving child nutritional status.

2.4.2 Historical perspective of nutrition education

The need for nutrition education in developing countries gained international recognition in 1950 when the first report of the Joint Food and Agriculture Organization/World Health Organization (FAO/WHO) Expert Committee in Nutrition, (as quoted in Zeitlin and Formacion, 1981) emphasized the importance of nutrition in the health sector. By 1958 the same committee reported, "Education in nutrition is a necessary part of practical programmes to improve humanity," and recommended as channels for nutrition education, schools, Maternal and Child Welfare Clinics (MCH) and public health centres, community development and related programmes, and agricultural extension and home economics extension services. The 1960s saw an emphasis on audio-visual aids and the creation of programmes in which nutrition education was placed at a level of priority equal to that of other project activities, rather than being considered a casual adjunct to curative health (Bagchi, 1977 as quoted in Zeitlin and Formacion, 1981).

In Kenya, nutrition education was introduced in 1968 as a result of recommendations made after a National Nutrition Survey conducted between 1964-1968 by Bohdal et al. which revealed that there was widespread undernutrition, in the country. In their findings they stated that mothers were found to be ignorant as to the needs of a child, in the

weaning and later period. Bohdal et al. felt that a considerable part of malnutrition could be prevented by giving a simple guideline to the mother on child feeding. Basic rules of hygiene were found not to be respected and this resulted in high incidence of intestinal parasites and diarrhoea in children below the age of two years. Various ministries, for example, the ministry of Health, Education, Agriculture, Culture and Social Services were charged with the responsibility of incorporating nutrition education in their training programmes so that trainees could embark on some form of nutrition instruction after qualifying in addition to their other tasks (Bohdal et al. 1968). Ministry of Health identified Karen College as a training college for nutrition instructors in the Maternal and Child Welfare Clinics (MCH) and in the community. The primary concern of the nutrition instructors was to be the instruction on weaning and feeding of a child according to age, and according to availability of foods, demonstration of food preparation, principles of hygiene, prevention of nutritional deficiency diseases and diarrhoea (Bohdal et al. 1968).

Nutrition education programmes prior to the 1970s had a limited scope and were mainly concerned with the presenting 'tip of the iceberg' problems, for example, clinically diagnosed (severe) malnutrition among the 'risk groups' of mothers and children (Jelliffe, 1983).

Nutrition education was mostly associated with advice on infant feeding with some distribution of food supplements and vitamin and iron tablets. Guidance on nutrition was through non-formal face-to-face education, often without demonstrations on the use of actual foods or supplements (Jelliffe, 1983).

Between 1970s to 1980s, programmes further developed in two complementary but different directions: one toward community self-care schemes, in which community members work part time as lower-level field extension workers. The other one was involved in centrally organized programmes providing health, community development, agricultural or other services (Zeitlin and Formacion, 1981). The change from the 1970s came about as a result of more research being undertaken demonstrating the complex causes of malnutrition and using a wider multidisplinary approach including the services of cultural anthropologists, communication and curriculum development specialties, agriculturists, economists, planners, social psychologists et cetera. More attention has now been paid to prevention of diseases, stressing the relationship between fertility control and food production (Jelliffe, 1983).

2.4.3 New directions for nutrition education

It became apparent that nutrient density and viscosity

were two important aspects of diets for children and little attention had been given to these factors in either research or nutrition education. Lack of attention to viscosity is associated with difficulties in measuring it. The whole weaning process is based on the transition from liquid to solid foods. Low fat staples diets provide a particular dilemma to young children. When boiled or steamed all staples take up about 80% water and are of handleable consistency. However, at this dilution they have about one Kcal per gramme and a typical one-year-old child needs at least a kilogramme a day which their small stomachs are unable to accommodate. This consequently leads to underfeeding the child. Oil and fats are the main dietary ways of escaping from the above dilemma, because these substances profoundly alter food viscosity and increase calorie density of the food (Schurch, 1982).

In Kenya the problem of energy density has now been realized and in some parts of the country especially Embu District, promotion of growth of oil rich crops is being encouraged by the Ministry of Agriculture. This includes soya beans, sunflower groundnuts and sim sim. Health workers are emphasizing their use and importance to the mothers, in order to promote increased energy intake and vitamin A absorption especially for the children (Ngaruro, 1995 Verbal communication).

2.4.4 Target groups for nutrition education

Although nutrition education effort can be directed at different audiences, such as policy makers health professionals and teachers (groups that can in turn influence present and future generations of mothers) nutrition education is most commonly aimed at mothers because the target groups for dietary changes are young children, pregnant and lactating mothers belonging to population groups with a high prevalence of malnutrition (Beaton and Bengoa, 1976). The target groups for nutrition education are all those persons who affect the eating habits of these groups, and most immediately the mothers themselves (Zeitlin and Formacion, 1981). The venue for nutrition education may be MCH clinics, chiefs barazas and women groups (Beaton and Bengoa, 1976).

Studies of the reasons for malnutrition in pre-schoolers in low income communities indicate that most malnutrition at weaning age results from poor feeding and health practices. Nutritional status and child survival rates can be improved by nutrition education that teaches improved practices. If family food resources are sufficient to deflect about 5 per cent of total family calories to the preschooler, then nutrition education can play a significant role (Zeitlin and Formacion, 1981). Below this poverty threshold, however, nutrition education is ineffective without accompanying increases

in real income.

The optimal use of available resources for a family depends on weighing of desired ends. A parent may value the survival and growth of children at weaning age and so she will opt to forgo other things at the expense of feeding the child. In some families optimizing one end may be done only at the expense of the other end (Hornik, 1985). Nutrition education should be a relevant component in any project whose aim is to increase the food resources or income available to a population with members suffering from malnutrition (FAO, 1983), in order to optimize use of available resources.

2.4.5 Primary themes for nutrition education

Themes for nutrition education change from time to time to meet the challenges evolving from new knowledge. The present themes emphasize prevention of diseases by teaching improved environmental sanitation and personal hygiene. Similarly, care of the sick child, is also emphasized for example on the treatment of diarrhoea with the use of oral rehydration fluids, importance of continued feeding of children during illness, discontinuation of deleterious practices as purging or withdrawal of breastmilk (Zeitlin and Formacion, 1981).

Importance of breastfeeding as well as nutrition and

health benefits and economic benefits of breastfeeding are emphasized to counteract the influence from advertisements on commercial formula milks. Mothers are advised to breastfeed their children as long as possible (Zeitlin and Formacion, 1981).

Adequate nutrient intakes during and after weaning are considered very crucial hence the nutrition education emphasizes frequent feeding of children (5-6 times a day) and importance of adding oil to the child's food in order to increase energy and reduce bulk (Cameron and Hofvander, 1983). Also included is education on recognizing the symptoms of malnutrition of the child. Knowledge of the symptoms of malnutrition will enable the mother to make an early diagnosis and seek for help early enough (Zeitlin and Formacion, 1981).

Supplementation of diets of pregnant and lactating women is emphasized since the mother's health has a direct bearing on the health of the child. Mothers are, therefore, advised to increase their food intakes. Adequate child spacing is advocated as child spacing gives the mother adequate time and care for each child (Zeitlin and Formacion, 1981). Gretel (1983) noted that, the 6-12 month post birth period, coincident with much malnourishment of the children, is after a time of renewed pregnancy which has debilitating side effects for the mother. The mother, is therefore, unable to cope with

the increased demand of specially preparing food for the child and the pregnancy.

2.4.6 Effectiveness of nutrition education

The effectiveness of nutrition education has been doubted. Hornik (1985) states that this is due to the fact that most nutrition education is unevaluated. He contends that most nutrition education is given by hurried health workers in the course of providing curative medical services. He argues that nutrition education made available in this way is not likely to be of adequate quality; it is provided too haphazardly as an "add-on" to curative care; too off-handedly by professionals with only a limited and outdated knowledge. Even if such nutrition education were done well it could not reasonably be expected to make much of a difference: it would miss the great majority of those at risk, who do not regularly come into contact with the health system; and its effects would be attenuated by other, often contradictory messages received from other sources. Hornik's skepticism seems widely shared as Hornitz (as quoted in Hornik, 1985) notes that many observers feel that nutrition education has accomplished little. This further raises the question of whether nutrition education can be effective at all.

2.4.7 Nutrition problems that nutrition education can alleviate

According to Hornik (1985), nutrition education cannot do much in situations where malnutrition is attributable to poverty. Although it is perhaps not reasonable to expect that education will persuade a poor family to spend more money on better food, Hornik, argues that nutrition education can help promote the adoption of many low cost or cost free practices to improve the nutritional status of the most vulnerable family members, especially children. These areas include emphasis on breastfeeding since the decline in breastfeeding especially in urban women is a well known problem.

Nutrition education can be useful when there is lack of knowledge about the amount and kind of food the young child needs and also in the control of nutrient wastage for example the treatment of diarrhoea. Prominent among these is oral rehydration, the regular administration of a simple, inexpensive solution which has been shown to be highly effective. Also of value would be the spread of such simple ideas as the importance of continuing to encourage ill children to eat regularly despite their lack of appetite (Hornik, 1985).

Nutrition education has been found to be effective when combined with food supplements. Hornik (1985) reports

that in Morocco nutrition education in association with food supplements was found to produce greater change in nutritional status than that associated with food supplementation alone. A study done in Kenya, by Hoorweg and Niemeijer (1981) on nutritional impact of the Pre-school Health Programme in the rural areas in Central Province, showed that nutrition education had no effect and stated that the small improvement in nutritional status was due to supplementation with oil and milk.

A study done in Indonesia showed that nutrition education by village volunteers supported by radio and action posters, produced a distinct improvement in nutritional status (Hornik, 1985). However, there is no clarification as to the type of group in terms of socio-economic status and whether it was an urban or rural population.

2.5. MOTHERS NUTRITIONAL KNOWLEDGE AND CHILD NUTRITIONAL STATUS.

A few studies have been done on relationship between maternal nutritional knowledge and child nutritional status. Walia and Gambhir (1975) for example conducted a nutritional survey in India in the families of 100 undernourished children and studied the nutrient intakes of these children and compared them with relatively well nourished children belonging to the same socio-economic group living in the same slum area. A significant difference was found between the caloric intakes of the

two groups which was explained by earlier introduction of semi-solids in the diets of well nourished children. On an arbitrarily prepared knowledge and belief score, the mothers of well nourished children were found to be as ignorant about essential facts regarding nutrition as the mothers of the undernourished. The differences between the nutrient intakes of the two groups of families were the result of traditional habits and were not based on superior knowledge regarding nutrition matters. This study did not show whether there were some aspects of nutrition education that were significantly related to child nutritional status.

A similar study was conducted in rural Kenya by Hoorweg and Niemeijer (1980) on the impact of nutrition education at three health centres in Central Province. Mothers from similar socio-economic backgrounds were divided into two groups as a function of how frequently they had visited the health clinics. The two groups were compared on the following indicators: nutrition knowledge, maternal food preferences, food consumption of the children during the previous day and the nutritional status of the children. The mothers who had attended the clinics more frequently appeared to have more knowledge and more so about the need to supplementing a young child's diet at an early age. No significant difference in child nutritional status was observed between the children of mothers who attended clinics more frequently and those who attended

less frequently; the average values of weight-for-age, height-for-age and weight for height, as well as the percentage of children falling below critical values of these measures were virtually the same in both groups.

A study in rural India, on maternal nutritional knowledge and child nutritional status, showed that total maternal nutritional knowledge score is significantly related to weight-for-age and weight-for-height (Rita et al., 1988).

From the literature reviewed there is no conclusive evidence to show that maternal nutritional knowledge always leads to improved child nutritional status especially in low income communities. Some studies show a positive relationship between maternal nutritional knowledge and child nutritional status while others show that the nutritional knowledge of the mother does not help in the improvement of the child nutritional status.

The nutrition educators in Kenya are faced with a dilemma as to whether nutrition education is totally useless especially when dealing with low income communities where most of the malnutrition in children occurs. There is a need, therefore, to provide data on mothers knowledge on nutrition and health related matters and nutrition components that are significantly associated with improved child nutrition status in low income communities. Such kind of data would help the nutrition

educators to select and highlight only the vital aspects of nutrition for teaching purposes in the community without wasting time on unnecessary details. As yet, such information for Kenya is scanty.

It appears, therefore, that only a few studies have been done in Kenya to determine the relationship between maternal nutritional knowledge and child nutritional status. As yet, relatively little is known on maternal views on the source of nutrition information in Kenya. Such information once available will contribute significantly towards the improvement of nutrition education teaching in the community. Some authors have expressed their views that the teaching of nutrition is haphazardly done and taught and so it would be useful to find out whether the community feels this way with a view to improving the teaching of nutrition.

2.6 CHOICE OF INDICATORS OF NUTRITION STATUS

Where objective of nutrition education is the reduction or control of nutritional problems, nutrition education should be evaluated by measuring change in nutritional status. In developing countries, most nutrition education programmes are aimed at the more common nutritional problems, such as protein energy malnutrition, vitamin A deficiency and iron deficiency anaemia.

The only indicators of nutritional status that are applicable on a large scale and for which a sizeable experience is available are those based on anthropometric data of growing children. The influence of nutrition on anthropometric indicators appears to operate mainly through the adequacy or inadequacy of protein and energy (Keller, 1982 as quoted in Schurch, 1982). Anthropometric indicators are thus best applicable in the evaluation of nutrition education programmes that aim at reducing protein energy malnutrition in children.

The use of height-for-age and weight-for-height as primary indicators of nutritional status in children was recommended by (A joint FAO/UNICEF/WHO Expert committee on Nutritional Surveillance 1976 as quoted in Schurch, 1982). Deficit in height for age was termed 'stunting' and that of weight for height 'wasting'. It is also recommended that weight for height be used as an indicator of present state of nutrition and height for age as an indicator for past nutrition (Waterlow, 1977 as quoted in Schurch, 1982).

It is recommended that the measurements of a study population should be related to the NCHS reference population by standard deviation scores (Z-scores) rather than as a percentage of the median. The use of centiles is not recommended because of the fact that in less developed countries a large number of children are so far

outside the range of the reference population that they cannot be accurately classified by centiles (Waterlow, 1977 as quoted in Schurch, 1982).

CHAPTER 3

DESCRIPTION OF THE STUDY AREA

3.0 INTRODUCTION

The study was of cross-sectional design and was carried out in Kibera sub-location of Kibera division in Nairobi province. Kibera division includes Karen, Langata, Woodley and Kibera. The area had a heterogeneous community in terms of ethnicity but was more homogenous in terms of socio economic levels.

3.1 JUSTIFICATION OF THE SELECTION OF THE STUDY SITE

The study was conducted in Kibera Sub-Location, a peri-urban area of Nairobi. Peri-urban populations comprise mainly of emigrants from the rural areas who come to town in search of employment. They are usually of low educational level and mainly secure low paying semi-skilled or casual jobs. They depend on the meagre salaries for food, housing, transport and schooling for their children (Fred, 1977).

The peri-urban population are usually exposed to new feeding habits and so their feeding habits consequently change. This is due to the fact that the food they were exposed to in the rural areas, may not be available in

town and are, therefore, forced to use substitutes (Freedman, 1973 as quoted in Fred 1977). The choice of food may be influenced by many factors especially money available for purchase of food, nutritional knowledge, mass media and socio-cultural factors such as withholding of food for some vulnerable groups (Fred, 1977).

3.2 SOCIAL GEOGRAPHY

3.2.1 Origin and location of Kibera

Kibera was originally a military reserve whereby the land was allocated to ex-Sudanees soldiers and their families who fought for the British in the first world war. They were first settled in 1912 (Temple, 1976 as quoted in Clarke, 1970). Since then, the Nubians (Sudanese, ex-servicemen) occupied Kibera until other Kenyan communities from western province started joining them in the 1950s. This change came about as a result of the state of emergency which had caused a forced exodus of many Kikuyu residents and an influx of immigrant workers from the central and western regions of Kenya. After independence and in the early 1970s, there was a further influx of people into Kibera because the people who had been forced out of Nairobi during emergency, were now streaming back and putting the squeeze on housing. Other people migrated from the rural areas and with no jobs ended up setting up illegal structures in Kibera, a

process that continues up to date.

Nairobi is situated on 1.19 degrees south of the equator and 36.59 degrees east of the Prime Meridian. The administrative boundary covers an area of 690 square kilometres (268 sq.miles). It is by far the smallest administrative province in Kenya but yet the most important in terms of the activities and functions it performs. Apart from being the capital city of Kenya it is the centre of several local, national, regional and international organisations including UNEP and HABITAT headquarters.

Nairobi stands at an altitude of 1650 metres (5,425ft) above sea level. It has a sunny temperate climate rarely falling below 24°C during the day and 10°C during the night. There are two rainy seasons, the long rains from March to early June and short rains from October to December.

Kibera is the second largest slum settlement in Nairobi after Mathare Valley. It is located to the Southwest, of Nairobi, approximately 6 Kilometers from the city centre. Kibera sub-location is divided into nine villages namely, Mashimoni, Kambi-muruu, Kianda, Lindi, Laini-saba, Soweto, Makina, Gatwikira and Siranga (see Map Appendix 1 pp.129). The survey was carried out in Makina village (see Map Appendix 2 pp.130).

3.2.2 Population

According to the 1979 population Census, Nairobi had a population of 827,775 which accounted for (37%) of the total national urban population (CBS, 1979). Nairobi's current population annual growth rate is 5-7% (Socio-Economic Profiles 1990). The 1989 population census show that the population of Nairobi at that time was 2 million people (verbal communication, Kekovole, 1993).

In 1979 Kibera sub-location had an estimated population of 62,645 people. Existing population figures combine data from the slum section with that of surrounding housing estates. Kibera Sub-location is estimated to have between 300,000-500,000 people (Anonymous, 1987) but because of the fluidity of the population the actual population figure cannot be determined.

3.3 INFRASTRUCTURE

3.3.1 Transportation system

Kibera has poor access roads within the slum as the only major murram road serving the area is riddled with pot holes which make the road almost impassable to small vehicles. Within Kibera slums there is no public transport hence most people have to walk for long distances to access public transport.

Very few houses had electricity in Makina (3.3%), and so the rest (96.7%) were depending on paraffin for lighting.

Makina village has only a few public telephone booths one at the law courts and the other one at the divisional headquarters and a few people have private telephones.

3.3.2 Health facilities

Health facilities accessible to Kibera residents comprise both government and private health clinics. The government facilities are Langata, Woodley, Dagoretti Health Centres, situated in the periphery of the slum and the Nutrition clinic at the Divisional headquarters. The private facilities were Trinity Church of the (C.P.K) and the Crescent aid. Health facilities that had nutrition education programmes were the Nutrition Clinic and Dagoretti.

There are few churches within Makina and the most prominent was Trinity church of the (C.P.K) and a mosque.

Within Kibera Sub-location there are no primary schools but there are three Primary schools which are situated on the periphery and are run by the City Council.

3.3.3 Water and sanitation

Water used in Makina was from pipes and most households (95%) were buying water from central water points where a 20 litre jerrican was sold for fifty cents equivalent to \$ 0.05. Few residents (4.7%) had their own water taps and 0.3 percent obtained their water from the river. During the period of survey there was a shortage of water in the study area.

All the households (approximately seven) in one block shared a pit latrine which was not kept clean. The latrines were shallow and emitted foul smell. There was no provision of latrines for small children, hence their faecal disposal was indiscriminate.

There was no provision of garbage disposal and refuse from the houses was dumped in the open spaces between the blocks of houses. This resulted in a lot of stench from the rotting refuse. Burning of refuse was not evident.

There were no proper drains to carry water from the houses and so the water discarded from the houses was left to flow along the footpaths.

3.3.4 Administrative organization and welfare centres

Kibera division is headed by the Divisional Officer (D.O) assisted by the chief and the sub-chief. Each village is headed by a Kanu Chairman and under him there are a few Kanu youth wingers who are supposed to keep order. At the divisional headquarters there is also a social welfare officer.

There are social welfare organizations that operate in Kibera Sub-location for example Undugu Society of Kenya which deals with youth programmes, the Kenya Red Cross and Water for Health.

CHAPTER 4

METHODOLOGY

4.1 SUMMARY

A cross-sectional survey was carried among 363 mothers to find out whether there is a relationship between maternal nutritional knowledge and child nutritional status in a poor peri-urban community and also establish mothers attitude and practices towards child feeding practices. Mothers with children aged 6-24 months living in Kibera formed the study population.

4.2 STUDY DESIGN

A cross-sectional survey was carried out for a period of three months between June and August 1990. A pretested structured questionnaire was used as the survey tool (appendix 3 pp. 130).

4.3 STUDY POPULATION

The study population consisted of mothers with children between 6-24 months of age, living in Kibera. This age group was chosen because it is the age when both early signs of deterioration in nutritional status and the peak

in wasting, associated with the weaning period start to show.

4.4 DETERMINATION OF SAMPLE SIZE

Desired sample size was predetermined before the survey was conducted. For determination of minimum sample size, an assumption of 24 percent stunting rate (which is the most current national level) was used (Third Nutritional Survey, C.B.S, 1983).

The confidence level limit of 95% and the range of error of expected results of 5% was used. The following formula was used to determine the minimum sample size.

$$n = Z^2 pq/d^2$$

where:

n = Sample size

z = Confidence level

p = Proportion Undernourished

q = Proportion well nourished

d = Degree of accuracy desired at 0.05

Therefore,

$$n = 1.96^2 \frac{(0.24)(0.76)}{0.05^2} = 280$$

In order to allow for attrition the figure was increased by 20%: 20% of 280 = 56 + 280 = 336 Children

The minimum sample size required was 336 children but since the number of children in the cluster were only

slightly above this number, all the children were included in the survey and they were a total of 363.

4.5 SAMPLING FRAME

A total of 363 children aged 6-24 months were identified and a list of the children was established after visiting all the household units within Makina village. The households with the sample children were identified, by noting down the door number and in instances where there were no numbers, the households were marked using chalk on the door. All the children aged 6-24 months in the cluster were, therefore, included in the study.

4.6 SAMPLING METHOD AND PROCEDURE

The sampling method used to select the children was cluster and for the selection of the cluster Kibera Sub-location was divided into nine clusters according to the existing nine villages. The names of the nine villages were as follows: Mashimoni, Lindi, Kianda, Makina, Kambi Muru, Soweto, Line-Saba, Siranga, and Gatwikira. The names of the nine clusters were each written on a piece of paper which was then folded and put in a container. One cluster was randomly selected and the selected cluster was Makina village. One cluster was chosen on the assumption that the whole of Kibera Sub-location is a slum area and so one cluster will be representative of

the rest of the clusters.

Since there was no list of households to be used as a guide, all the households in Makina village were visited and those that had children aged between 6-24 months were marked. A total of 363 households had children aged 6-24 months. A total of 363 mothers were interviewed.

4.7 INSTRUMENT DESIGN AND PRETESTING

A structured questionnaire was designed and then pretested on 20 respondents for practicability and usefulness during the pilot survey which was done in February 1990 in Kianda village. After the pilot survey the questionnaire was modified.

4.8 FIELD STATION, RECRUITING AND TRAINING OF FIELD ASSISTANTS

Kibera MCH/FP clinic which is situated next to administrative offices of Kibera Division served as the investigators working base. The field assistants met there every morning to collect weighing scales, stadiometers, questionnaires and any other instructions for the day.

Kibera has an established system of identifying the community health workers (CHWS) who participate in

surveys conducted in Kibera. The nutritionist in-charge of Kibera nutrition clinic who is also the co-ordinator of the community health workers identifies and notifies the CWHS whose turn it is to participate in a survey. This system was used in recruiting three field assistants for this survey. They were 'O' level school leavers who were fluent in both English and Kiswahili.

The three field assistants had participated in other surveys and were familiar with weighing of children and interviewing. One day was used for training the field assistants on administration of the questionnaire.

4.9 DATA COLLECTION TECHNIQUES

During data collection two field assistants paired and the third one paired with the investigator. This was alternated everyday especially during the early weeks. The questionnaire was administered to the 363 mothers who had been identified earlier with children aged 6-24 months..

Supervision of work during the interviews was constantly done to ensure that the information was correct and no questions were left unanswered. Any errors or omissions were discussed with the field assistants and then the households were revisited the next day or as soon as possible. A close frequent contact with each field

assistant was maintained especially in the first few days, to ensure uniformity.

4.9.1 Socio - demographic information

During the interview information on selected household characteristics was collected. This included occupation of the head of the household, marital status, educational level, age of the mother and the number of children in a household. Possession of a radio and television was also established.

4.9.2 Nutrition knowledge

The nutritional knowledge of the mother was assessed through a questionnaire. The mother was asked a set of questions on aspects of nutrition and child rearing practices which included the following areas:-

- . Importance of breastfeeding
- . Age of weaning and reasons for weaning
- . Frequency of feeding a sick child and a normal one
- . Causes, signs and treatment of malnutrition
- . Causes and prevention of diarrhoea
- . Interpretation of growth chart
- . Food groups
- . Importance of immunization
- . Importance of child spacing

. Nutrition during pregnancy and lactation

4.9.3 Weight measurement

Weight measurement was taken for one child only in a household and in instances where a mother had two children within the age group 6-24 months the older child was weighed. This was because there is a likelihood of the older child being deprived of breastmilk at too early an age because of the short birth interval and is therefore at a greater risk of undernutrition than the younger sibling. Children who were ill on the day of the survey were excluded. A salter scale was used for weighing which was calibrated before and after each measurement.

Before weighing the child, the mother was asked to remove the child's shoes and clothing leaving only a pair of shorts and a single vest. The child was placed in the weighing plastic pants which were then suspended from the hook of the salter scale which had already been calibrated to zero with the empty pant. Two measurements for each child were taken and the average was calculated to the nearest 0.1kg. and recorded as the child's weight as recommended by United Nations, (1986). The accuracy of weighing scales was validated by weighing an already weighed two kilogramme packet of maize flour.

4.9.4 Length measurement

Length was determined by placing the child lying on its back on the stadiometer with the footrest placed firmly against the child's feet so that they were perpendicular to the base of the board. The child's knees were pressed down against the stadiometer and the foot rest was moved to rest firmly against the sole. The child's head was made to be straight and level to the headrest and that the eyes were facing up. The child's length was read from the tape measure to the nearest 0.1 cm. Two measurements for each child's length were taken and the average was calculated and recorded as the child's height.

4.9.5 Morbidity data

Morbidity data for the children was collected. Each participating mother was asked whether her child had been sick during the seven days prior to the survey. If the child was reported to have been sick the mother was asked to describe the symptoms of the illness. If the child was sick on the day of the survey then the mother was not interviewed.

4.9.6 Child health cards

Child health cards were used to verify the child's data

of birth and the age was recorded in months.

4.9.7 Sources of nutrition information

Information on sources of mothers' nutrition information was also collected by questioning the mother.

4.9.8 Mothers attitude and practice towards child feeding

Information on mothers attitude and practice towards child feeding was similarly collected using a questionnaire. Attitude comprised aspects of how the mother feels towards child feeding practices, by classifying them as good or bad while practice referred to what the mothers were practising for example the number of times she fed a child per day.

4.10 DATA PROCESSING

After completion of the survey all the open ended questions were coded with the help of the three field assistants. The data was entered in the computer using DBase III plus programme, and then, frequency distributions for all variables were produced for purposes of data cleaning. Errors and wrong entries were corrected after counter-checking with the raw data. Frequencies were run using SPSS.

Data on the child nutritional status was processed using Anthro' package which indicated the standard deviations for weight-for-age, weight-for-height and height-for-age. It is recommended that measurement of the study population should be related to NCHS reference population by standard deviation (Z-Score) rather than as a percentage of the median. Therefore, Z-Score has been used for reporting the results.

Statistical analysis used were percentages to describe the characteristics of the population, means, standard deviations and Chi-square to find out whether there was a relationship between mothers nutritional knowledge and child nutritional status. Correlations were also done.

4.11 FAMILIARIZATION WITH STUDY AREA AND STUDY POPULATION

4.11.1 Preliminary visits

The research permit for conducting the survey in Kibera was obtained in November, 1990. Prior to carrying out of the survey, a visit was made to the Divisional Officer (D.O) of Kibera division to introduce the proposed survey and explain its purpose, objectives and activities. Consent was given by the administration.

4.11.2 Ethical consideration.

During the sampling period the investigator explained to the residents the objectives of the survey at the same time requesting for consent from those mothers who had children aged 6-24 months to be interviewed later on. Any questions raised by the community were also answered before the actual research begun. The mothers were also informed that the information was confidential.

4.11.3 The weather

Having described the sewage and refuse disposal in this settlement (refer pp. 53) it was fortunate that the weather though cold brought very little rain. The conditions during the wet season cause difficulties in mobility.

4.11.4 Problems encountered

During the actual administration of the questionnaire, the respondents were already familiar with the investigator and the field assistants and so no further explanation was required unless for those mothers who had moved to the area after sampling was done. Majority of the mothers agreed to be interviewed and it was only about one percent of the mothers who refused to participate.

CHAPTER 5

RESULTS

5.0 INTRODUCTION

The objective of the study was to establish whether any relationship exists between maternal nutritional knowledge and child nutritional status in a poor peri-urban area in Nairobi. Included also was the determination of mothers' attitude and practices towards child feeding. Three hundred and sixty three children aged 6-24 months were the target of the study. These results are based on 363 households.

5.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

5.1.1 Household size

A total of 363 households were surveyed covering a population of 1644 persons. The majority of the households (95.6%) were male headed. The household size ranged from 2 to 12 persons with a mean of 4 persons. The household size was clustered around 3-5 persons with fewer households having more than five persons as shown in figure 1 (pp.69).

Distribution of Households by Size

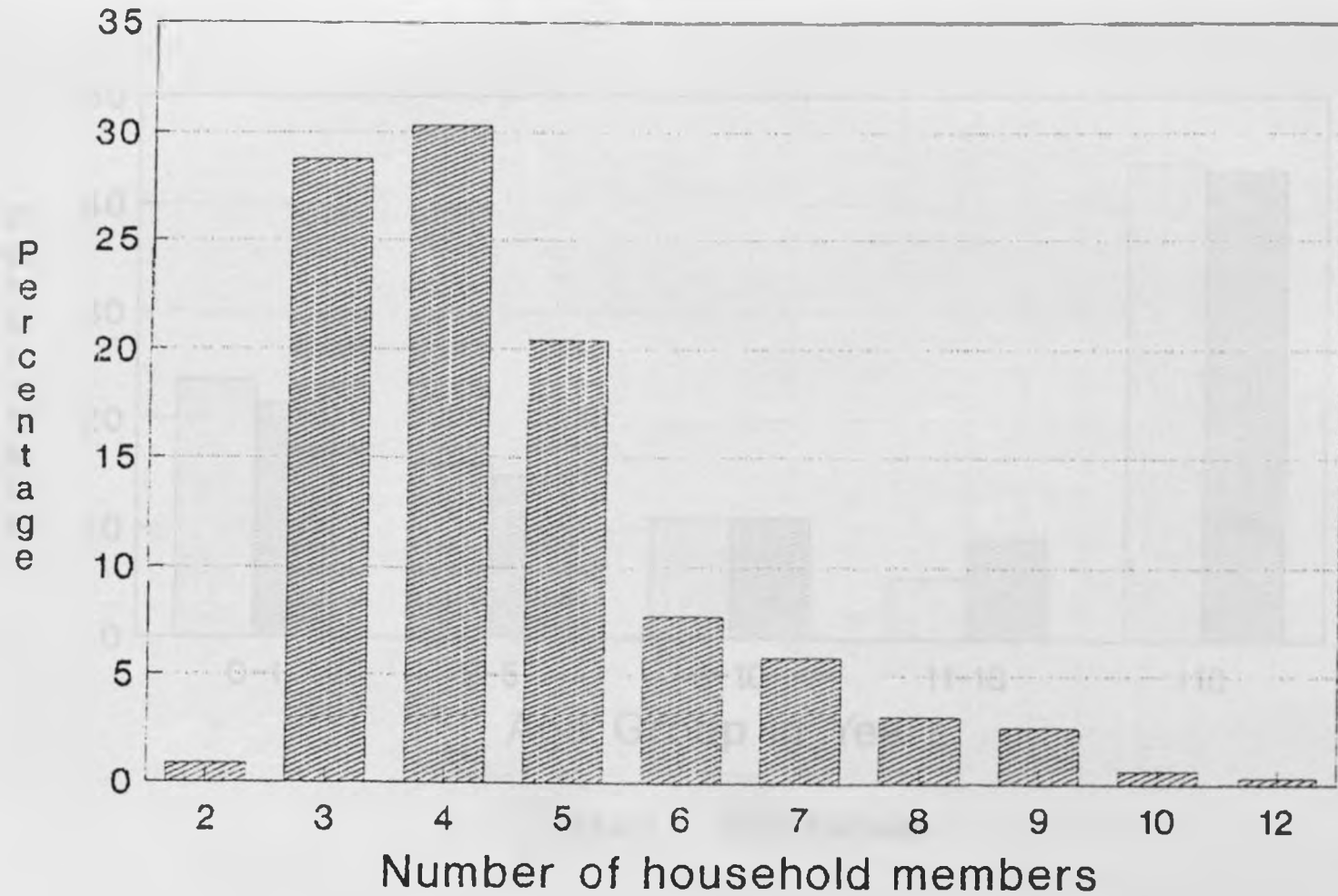


Fig.1

AGE AND SEX DISTRIBUTION
OF THE STUDY POPULATION



Fig. 2

5.1.2 Age and sex distribution of the study population

The age and sex distribution of the study population are shown in figure 2 (pp.70). Nearly half (56.7%) of the population was below 18 years. Population below 15 years of age and above 65 years was 869 persons while population above 15 years and below 65 years was 775 persons. Dependency ratio was $869 / 775 = 1.2:1$ multiplied by 100 = 120:100. Out of the total population (1644), 22.6 percent were in the age group 0-1 year.

A total of 567 children under five years of age were covered in the study. Nearly half of the households (49.3%) had only one child below five years while 45.5 percent had two children. Few households (5.2%) had more than two children below five years. There was a total of 817 males 827 females and the male to female ratio was 1:1.01 with no great variations in the age categories.

According to age distribution of parents, fathers were significantly older in this population with a mean of 30.5 years compared to that of the mothers 24.7 years. Youngest age group of parents was 15-19 years. Few fathers, (0.6%) were in the age group 15-19 compared to 11.3 percent of the mothers. More mothers (46%) were in the age group 20-24 years whereas for the fathers it was age group 25-29 years (12.3%). Few fathers (4.6%) were

over 44 years and this similarly applied to the mothers (1.1%).

A total of 363 children 6-24 months were studied and the mean age was 13.9 months. The number and sex of the children is shown in table 1. The male to female ratio was 1.2:1

Table 1. Distribution of Children 6-24 Months old by Age and Sex

Age (months)	Males n=198 (%)	Females n=165 (%)	Total n=363 (%)
6-12	40.9	48.5	44.4
13-18	32.3	31.5	31.9
19-24	26.8	20.0	23.7
Total	100.0	100.0	100.0

5.1.3 Ethnicity, religion and marital status

Residents of Makina village were from different ethnic backgrounds but the predominant ethnic groups were Luhya (43.3%), Nubian (20.5%), Luo (14.0%) and other minor groups which included Kamba, Kikuyu and Kisii. About three quarters of the household heads (74.7%) were Christians while 25.3 percent were Moslems.

Majority of the mothers (95%) were married while 4.1

percent were single and 0.8 percent were divorced. Twelve out of 14 single mothers were in the age group 15-24 years while two were in the age group 25-34 years. The youngest mother was 17 years old.

5.1.4 Educational level and employment status

The mean number of years of schooling for the mothers was seven while for the fathers it was nine years. About two thirds of the mothers (62.3%) had attained primary level of education compared to 35.8 percent of the fathers. More fathers (48.4%) had attained secondary level of education compared to 28.6% mothers. Only 0.6 percent of the fathers had no formal education compared to 8.8 percent of the mothers. Mothers educational level ranged from 0-13 years while for the fathers the range was 0-17 years. The fathers, therefore, had attained more years of education than the mothers.

Two thirds of the fathers (65.1%) had regular employment compared to only 3.9 percent of the mothers. About one fifth of the fathers (22.8%) were on casual employment compared to (1.1%) of the mothers. Seven point eight percent of the fathers engaged in self-employment compared to (5.1%) of the mothers. Only 4.3 percent of the fathers reported that they had no jobs while majority of the mothers (89.8%) reported that they had no jobs.

5.1.5 Residential status

Three quarters of the respondents (75.8%) had lived in Makina for a period exceeding one year prior to the study period. The rest (24.2%) stated that they had resided in Makina for a period of less than one year.

5.1.6 Housing

Majority of the houses in Makina were semi-permanent with mud walls and corrugated iron sheets. More than half of the households had concrete floors while the rest had earth floors. Few houses had plastered walls. There were several rooms joined together forming an 'L' shape or 'U' shape. Each room was holding a family and in very few cases two families shared a room.

Most families (89.8%) had rented accommodation while only 10.2 percent owned the houses that they were occupying. Majority of the rooms were poorly lit because of poor ventilation and were very dark during the day making it difficult to see clearly. The blocks of houses were very crowded and only very narrow corridors separated them from each other.

5.1.7 Possession of radio and television

Nearly three quarters (72%) of the households, were in

possession of a radio while only 3.3 percent were in possession of a television.

5.1.8 Fuel used for cooking

Table 2 shows the distribution of study households by the type of fuel used. Most of the households used paraffin for cooking. Two thirds (62%) of the households used only one type of fuel while 38 percent used more than one type of fuel.

**Table 2. Types of Fuel Combinations Used for Cooking
Within the Households**

Type of Fuel	N=363 (%)
Paraffin alone	47.9
Paraffin & Charcoal	34.4
Charcoal alone	15.1
Paraffin & Gas	0.6
Charcoal & Firewood	0.6
Charcoal & Electricity	0.3
Gas alone	0.3
Charcoal + Gas	0.3
Any other	0.6
Total	100.0

5.1.9 Morbidity experience

Nearly three quarters of the children (73.8%) had experienced some form of illness seven days prior to the survey as shown in table 3. Of all the children who had been sick, 70.2 percent were reported to have had two types of illnesses. Illnesses such as diarrhoea and vomiting were grouped together while upper respiratory tract infections (URTI) that is, cough, common cold and running nose were similarly grouped together. Illness combinations as mentioned by the mothers are shown in

table 3. The most common illness was diarrhoea and vomiting followed by URTI.

**Table 3. Symptoms of Morbidity Experience of Children
7 Days Prior to the Survey**

Illnesses	N=363 (%)
Diarrhoea & Vomiting	30.0
URTI	27.5
Fever	6.3
Others	9.9
No illness	26.2
Total	100.0

5.2.1 MOTHERS NUTRITIONAL KNOWLEDGE

To test their nutritional knowledge, the mothers were asked a set of 41 questions on nutrition. Each question was given a score of one and the total maternal nutrition knowledge score was determined by computing a knowledge score based on the proportion of correct responses to the questions. Some of the items included were: best feed for a baby below four months, age of weaning, frequency of feeding a child and recognition and treatment of malnutrition among others (refer to appendix 2 pp.). The score was used as an indicator of nutritional knowledge.

The mean score was 29.7, the standard deviation was 4.7. the range was 15-41. The mothers were classified into three levels of knowledge. The lower limit, was set at -1 standard deviation below the mean (25 points) while the middle limit was set at > -1 to $< +1$ (25.5-34.4 points). The upper limit was set at $> +1$ standard deviation above the mean score (34.5-41 points). The mothers average scores of nutritional knowledge are shown in table 4. Mothers with scores below -1 standard deviation below the mean, were regarded as having low knowledge, while those with scores above +1 standard deviation were regarded as being highly knowledgeable.

Table 4. Levels of Maternal Nutritional Knowledge
According to the Scores

Scores	Percentage of mothers n=363
Low < -1 S.D. (< 25 points)	14.0
Average > -1 to $< +1$ S.D. (25.1-34.4 points)	71.3
High $> +1$ S.D. (34.5-41 points)	14.6

5.2.2 Best feed for a child below four months

The mothers were asked to name the best feed for a child below four months of age. Majority of the mothers (94.2%)

stated that breastmilk was the best feed and 3.3 percent stated that cow milk was the best, while 1.7 percent of the mothers mentioned porridge. Majority of the mothers (84.3%) were well versed with the knowledge on advantages of breastfeeding.

5.2.3 Age of weaning children

Mothers were asked to state the appropriate age for starting weaning their children. The ages at which weaning should be started varied very little in that most of the mothers (90.9%) mentioned the period within which weaning is recommended to start, that is, 4-6 months. Few mothers (3.9%) suggested that weaning should be introduced before the age of four months and (3.9%) above the age of six months. Only 1.4 percent of the mothers stated that they did not know when weaning should be started.

5.2.4 Frequency of feeding a young child

The mothers were asked to state the appropriate number of feeds per day for a child below two years. Mothers mentioned varied frequencies and the number of feeding times ranged from three to six as shown on figure 3 (pp.81). The recommended frequency of feeding young children is 5-6 times a day. The mothers who mentioned the recommended feeding frequency were 36.1 percent.

Those who mentioned 3-4 feeds were 60.3 percent while 3.6 percent of the mothers stated that they did not know.

5.2.5. Feeding frequency of a sick child

Slightly more than half of the mothers (51.8%) stated that a sick child should be fed more frequently than a child who is not sick, while (42.1%) of the mothers stated that they should be fed less frequently. Few mothers (5%) stated that sick children did not require any additional food and 1.1% percent indicated that they did not know the feeding frequency of sick children. This clearly shows that knowledge on feeding frequency of a sick child was lacking among the mothers.

There were more wasted children (3.9%) from households where mothers stated that sick children should be fed less frequently than normal, than from households where mothers stated that sick children should be fed more frequently (0.5%). The difference, however, was not significant using a Chi-square test ($P < .20$).

Frequency of Feeding Children Below Two Years by Weight for Age

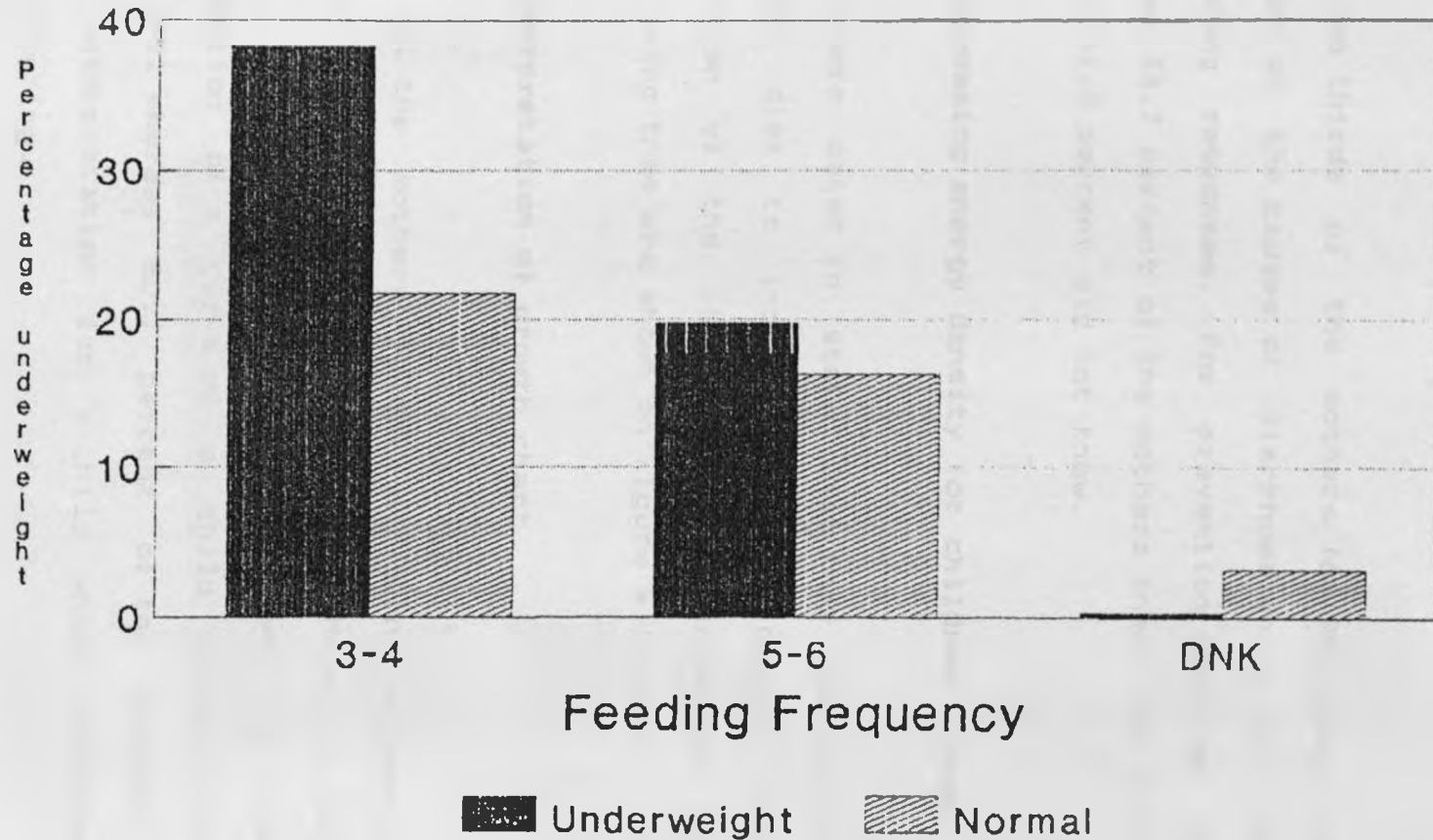


Fig. 3

5.2.6 Causes of diarrhoea

About two thirds of the mothers (68.9%) gave correct responses on the causes of diarrhoea while 31.1 percent gave wrong responses. For prevention measures against diarrhoea 58.7 percent of the mothers knew how to prevent it while 41.3 percent did not know.

5.2.7 Increasing energy density for children's food

Mothers were asked to state what they can add to the childrens' diet to increase calorie density and the distribution of the items and the percentage of the mothers using them are shown on figure 4 (pp.83).

5.2.8 Interpretation of growth chart

Nearly all the mothers (97.8%) had been exposed to the road to health growth chart cards. Majority of the mothers (80.2%) were able to give a correct interpretation of a curve of a child who was gaining weight well whereas 80.7 percent of the mothers gave correct interpretation for a child whose curve showed growth faltering.

Food Items Mentioned by Mothers for Increasing Energy Density for a Child's Food

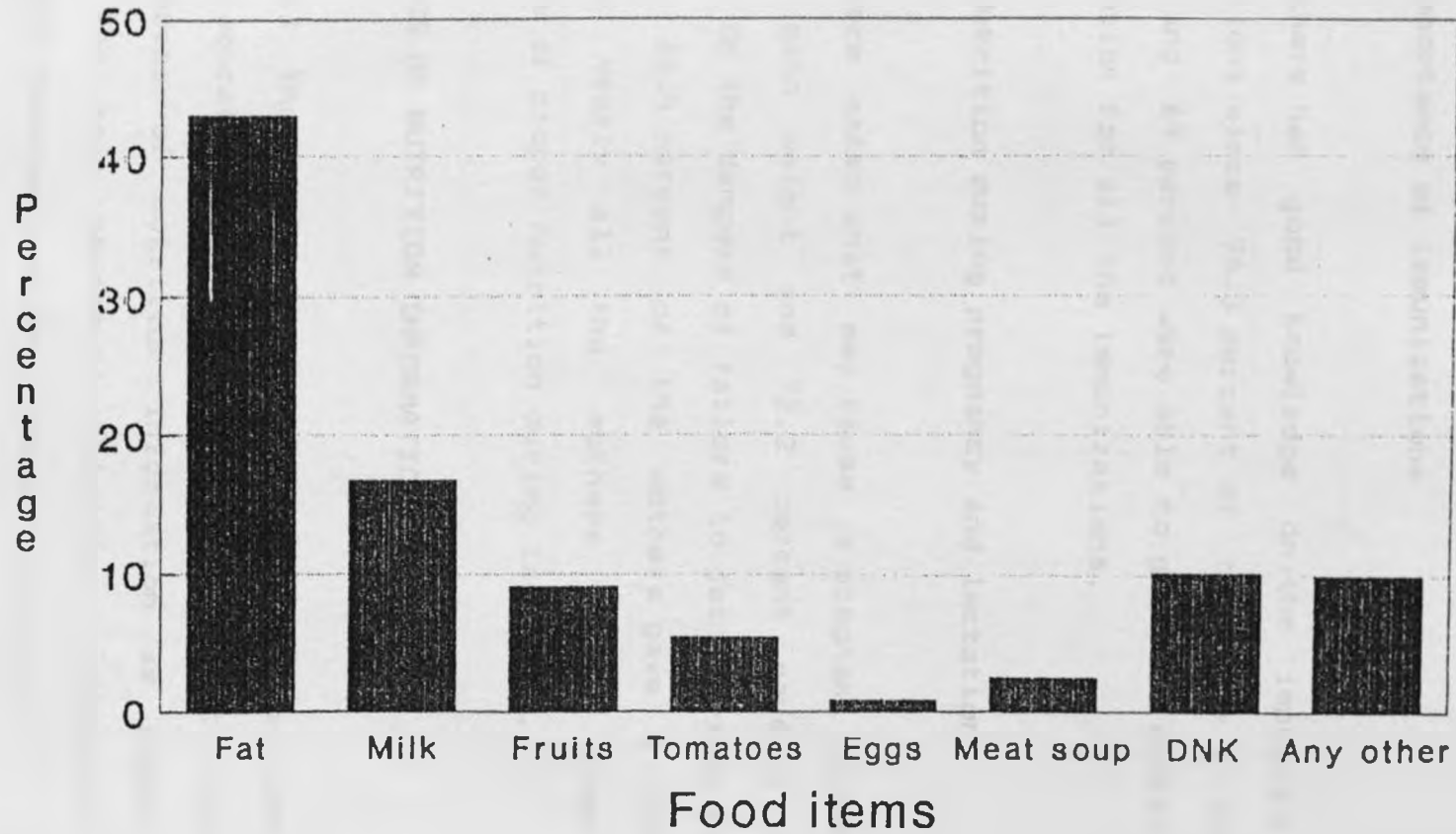


Fig 4

5.2.9 Importance of immunizations

Most mothers had good knowledge on the importance of immunizations since 98.3 percent of them gave a correct response and 89 percent were able to give the correct age of completion for all the immunizations.

5.2.10 Nutrition during pregnancy and lactation

Mothers were asked what may cause a pregnant mother to fail to gain weight and 72.2 percent gave a valid response. On the dangers of failure to gain weight during pregnancy 66.4 percent of the mothers gave a correct response. Nearly all the mothers (98.6%) knew the importance of proper nutrition during lactation.

5.3 SOURCE OF NUTRITION INFORMATION

Almost all the mothers (97.5%) had been exposed to nutrition education, hence only (2.5%) had not. Table 5 shows sources of nutrition information as stated by mothers. The main source of nutrition information was hospital and Maternal and Child Health Clinics .

Table 5. Distribution of Mothers by Sources of Nutrition Information

Sources	N=363 (%)
Hospital/MCH/FP	65.6
Radio & MCH/FP	10.2
Radio	6.6
School & MCH/FP	5.0
School	4.7
Friends/Relatives	2.2
Relatives & MCH/FP	2.0
School/Friends	0.8
School/Radio	0.6
No nutrition information	2.5
Total	100.0

Table 6 shows topics in nutrition where mothers indicated that they required more information. Many mothers (91.7%) stated that they needed more information on nutrition while (8.3%) of the mothers felt that they did not require more information. The topic which was most popular was how to combine food items properly in order to prepare balanced meals for children followed by appropriate food for a sick child.

Table 6. Distribution of Mothers by Topics in which more Information was Required

Topic	N=363 (%)
How to prepare balanced meals	51.7
Appropriate food for a sick child	12.7
Weaning diet	6.1
Family Planning	4.7
How to Prevent disease/diarrhoea	4.4
What to do when a child has no appetite	1.7
Others	6.1
No response	12.6
Total	100.0

Table 7 shows the session duration preferred by the mothers for teaching of nutrition in the MCH/FP. Majority of the mothers preferred a period of between 30 minutes to 1 hour per session.

**Table 7. Length of Preferred Period for Teaching
Nutrition Education by the Mothers**

Duration	N=363 (%)
30 minutes - 1 hour	53.2
Over 1 hour	30.0
Less than 30 minutes	16.0
No response	0.8
Total	100.0

5.4 NUTRITIONAL STATUS OF THE STUDY CHILDREN

The nutritional status of the study children was assessed using the indicators weight-for-age, weight-for-height and height-for-age according to the NCHS reference standard. Using the cut off point recommended by WHO, (1983) the study children who fell below $-2SD$ of the above indicators were considered malnourished and above $-2SD$ well nourished.

5.4.1 Weight -for-age

Weight-for-age reflects both previous growth and present nutritional conditions and is therefore an indicator of either acute or chronic undernutrition and children who fall below -2 standard deviation are undernourished. According to this categorization (58.4%) of the study children were undernourished. Table 8 shows the number of

underweight children according to age. Significantly more children in the age category 6-12 months were underweight than those in the older age categories (Chi-square = 38.257, df=2, P-Value = $P < 0.001$)

Table 8. Distribution of Children by Weight- for-Age and Age

Weight/Age Z Score	Age in months		
	6-12 N=161 (%)	13-18 N=116 (%)	19-24 N=86 (%)
Above -2SD (normal)	24.2	50.8	51.5
Below -2SD (underweight)	75.8	49.1	48.5
Total	100.0	100.0	100.0

Fifty seven per cent of the male children were undernourished compared to 58 percent of the female children. There was no significant difference in the proportions by sex.

5.4.2 Weight -for-height

Weight-for-height measures current nutritional condition of an individual. Values less than -2.00 standard deviation of standard weight-for-height indicate wasting. Out of all the study children only (1.9%) were wasted. More children in the age group 6-12 months were wasted but the difference was not significant. No child over 18

months was wasted. More males (2.5%) were wasted compared to females (1.2%) but the difference was not significant.

5.4.3 Height -for -age

Height-for-age measures chronic malnutrition. Values less than -2.00 standard deviation of the standard height-for-age indicate stunting. Most children (86.2%) as shown in table 9 were stunted. Significantly more children in the age category of 6-12 months were stunted compared to children in the older age categories. More girls (88.5%) than boys (84.3%) were stunted but the difference was not significant ($P > .20$).

Table 9. Distribution of Children by Height-For-Age and Age

Height/Age Z-score	Age in months		
	6-12 n=161 (%)	13-18 n=116 (%)	19-24 n=86 (%)
Above -2SD (normal)	3.0	16.4	30.2
Below -2SD (Stunted)	96.9	83.6	69.8
Total	100.0	100.0	100.0

$$\chi^2=19.5 \quad df=2 \quad P=0.001$$

5.4.4 Maternal nutritional knowledge and child nutritional status

Mothers' nutritional knowledge scores were compared with the nutritional status of their children. In the category of mothers with low scores, 7.4 percent of the children were underweight, those with average scores had 42.1 percent, while those with high scores had 8.8 percent. There was no significant relationship between overall maternal nutritional knowledge score and weight-for-age of the children using Chi-square test. Figures 5 (pp.91) shows maternal nutritional knowledge scores and weight-for-age of the children.

Mothers' nutritional scores were also compared with height-for-age of the children. Of the mothers with low scores, 11.6 percent of their children were stunted, those with average scores had 61.2 percent and those with high scores had 13.5 percent. There was no significant relationship between mothers' nutritional knowledge scores and height-for-age of the children. Figure 6 (pp.92) shows maternal nutritional scores and height-for-age of the children and Figure 7 (pp.93) shows maternal nutritional scores and weight-for-height of the children. Of the mothers who had low scores 0.6 percent of their children were wasted while those with average scores had 1.4 percent. None of the children of the mothers with high scores were wasted.

Maternal Nutritional Scores and Weight for Age of Children

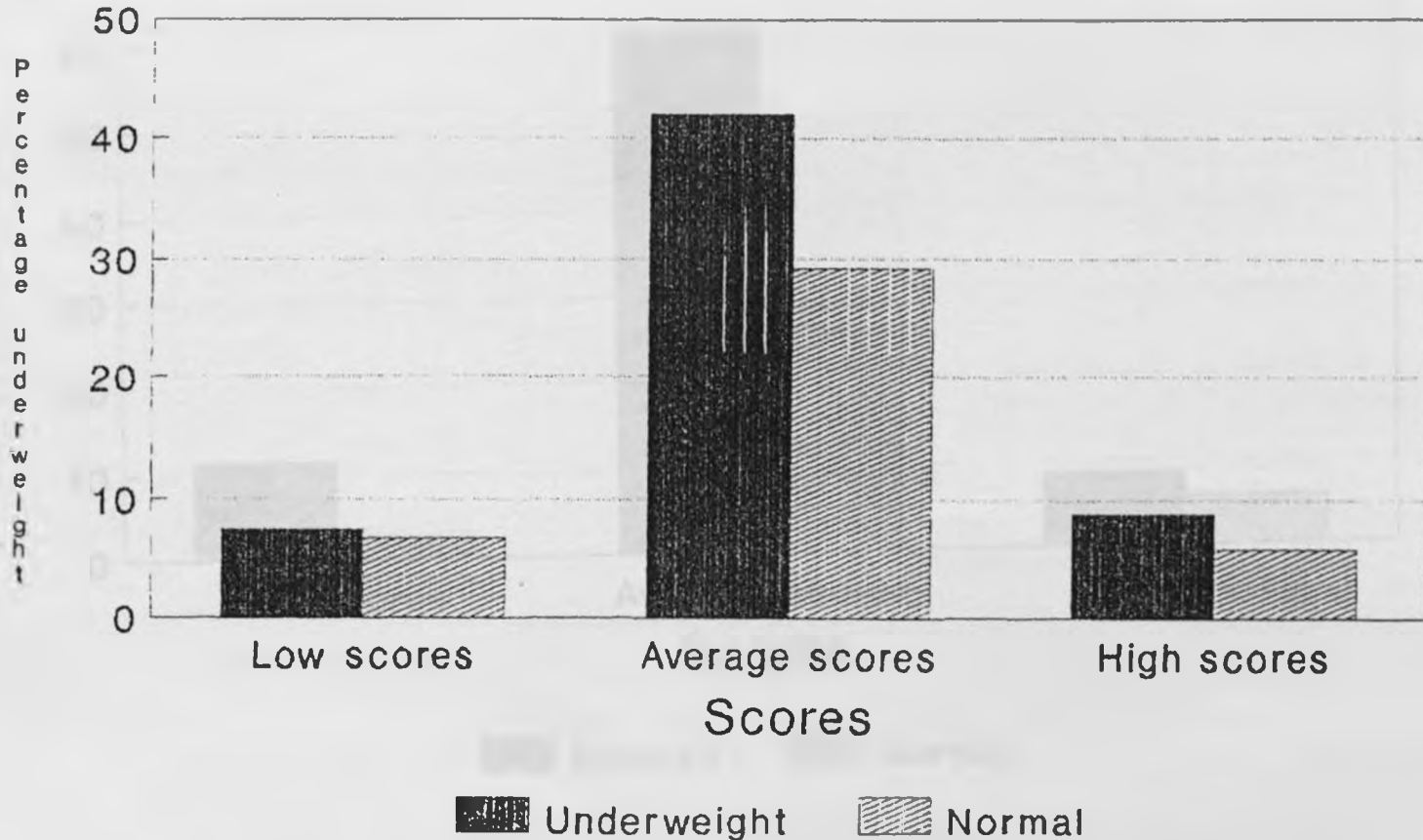


Fig.5

Maternal Nutritional Scores and Height for Age of Children

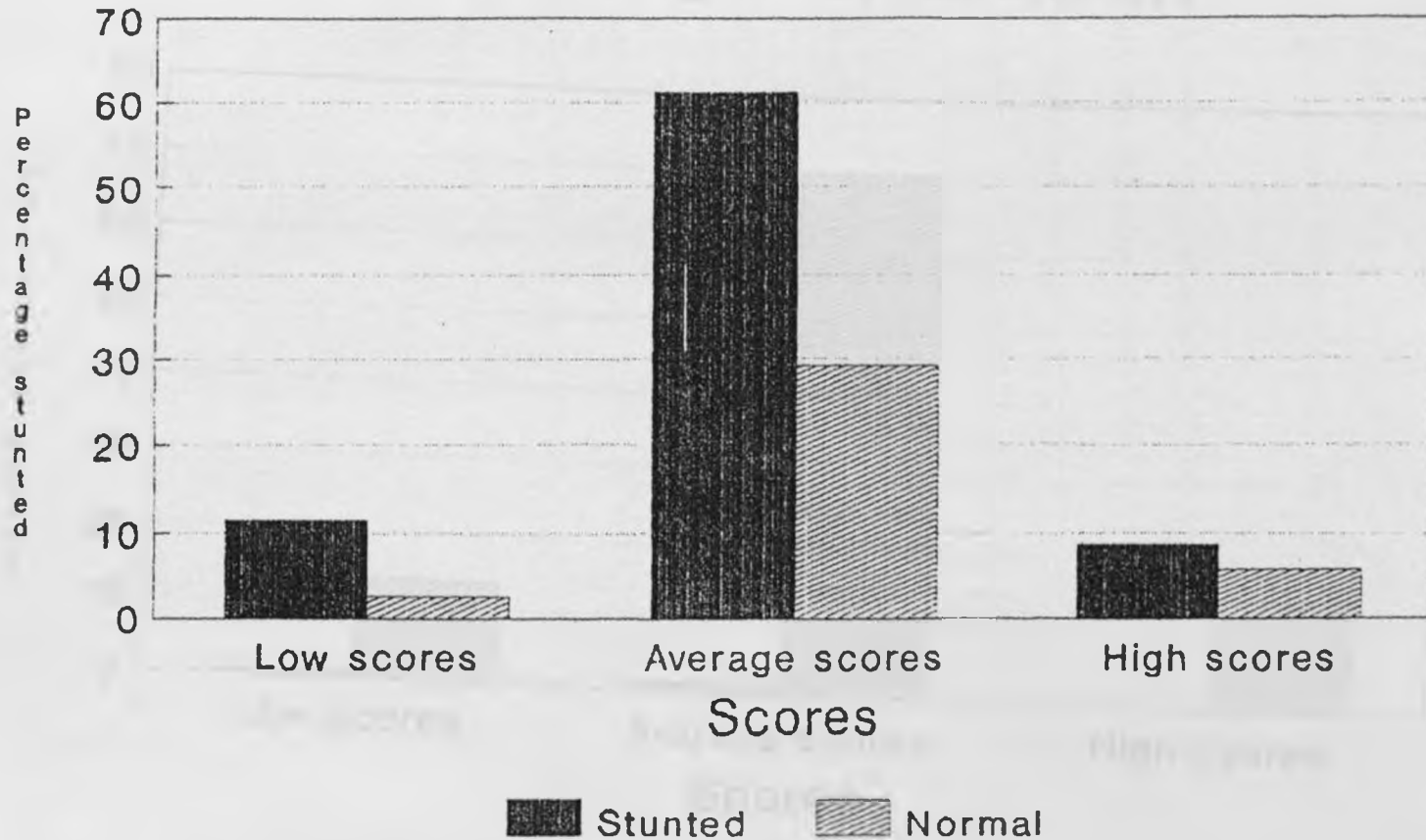


Fig.6

Maternal Nutritional Scores and Weight for Height of Children

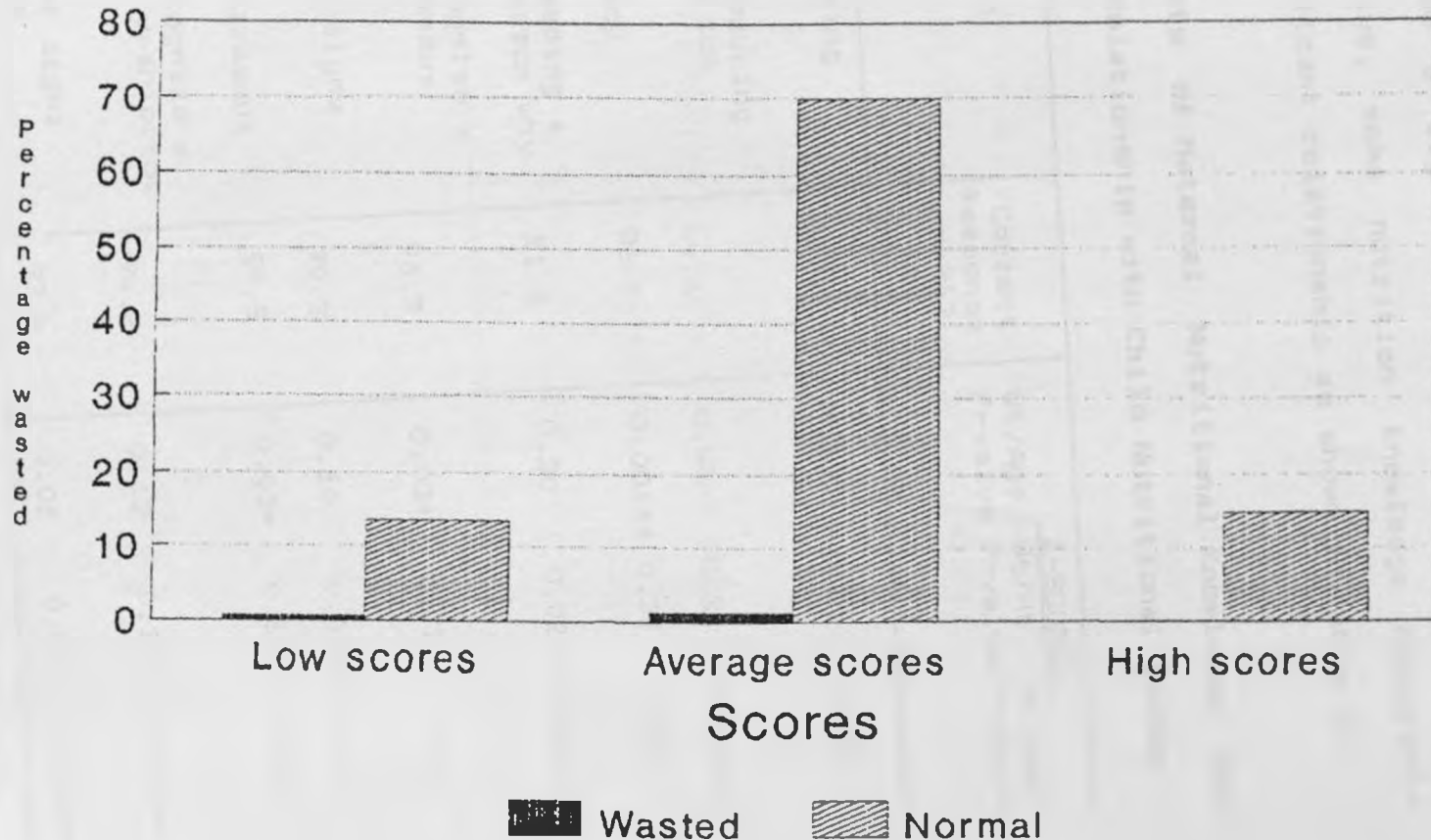


Fig.7

Although the overall maternal nutritional knowledge failed to show a significant relationship with child nutrition status, some nutrition knowledge components showed a significant relationship as shown in table 10

Table 10. Components of Maternal Nutritional Knowledge that had a Significant Relationship with Child Nutritional Status

Knowledge Component	Correct Response n=363 (%)	Z-SCORES		
		Wt/Age P-value	Wt/Ht P-value	Ht/Age P-value
. Reasons for weaning a child	88.4	0.30	0.84	0.05*
. Dangers of introducing food to a child too early	44.6	0.46	0.36	0.004**
. Feeding frequency	36.1	0.001**	0.30	0.50
. Frequency of feeding a sick child & reason why	51.8	0.30	0.02*	0.001**
. Ability to recognize a child with marasmus (malnourished)	98.3	0.03*	0.72	0.32
. Recognition of signs of marasmus	79.3	0.10	0.01**	0.61
. Treatment of marasmus	59.5	0.03*	0.65	0.95
. Ability to recognize a child with Kwashiorkor from a picture	94.2	0.13	0.33	0.007**
. Recognition of signs of Kwashiorkor	93.4	0.08	0.40	0.004**

* Significant at P-value 0.05

** Highly significant P-value < 0.02

5.5 ATTITUDE AND PRACTICE OF MOTHERS IN CHILD FEEDING

5.5.1 Duration of breastfeeding

All the mothers felt that children should not be breastfed for less than 12 months. Over half (59%) stated that breastfeeding should continue until two years as shown in table 11 and should be discontinued thereafter. The longest period suggested for breastfeeding was three years while the usual period of stopping breastfeeding was 18 months.

Table 11. Distribution of Mothers by Age for Stopping Breastfeeding

Age in Months	N=363. (%)
>12-18	2.2
>18-24	59.2
>24-30	7.4
>30-36	31.2
Total	100.0

Mothers were asked how they stopped breastfeeding their children while those who were still breastfeeding, were asked how they intended to stop breastfeeding. Majority (55.4%) of the mothers stated that they stopped their children gradually whereby they started by reducing

feeds during the day and then stopping the night feeds altogether, 40.8 percent stopped abruptly, while 3.8 percent who were still breastfeeding did not know how they would stop. Although ways of stopping breastfeeding were varied, there was no significant relationship between method of stopping breastfeeding and the nutritional status of children as shown in table 12. Chi-square test was used for testing significance.

Table 12. Maternal Method of Stopping Breastfeeding and Child Nutritional Status

Nutrition Status	Abruptly n=146 (%)	Gradually n=201 (%)	Do not Know n=16 (%)
Underweight	58.2	59.7	43.7
Stunted	86.9	86.1	81.2
Wasted	1.4	2.5	0

5.5.2 Problems related to feeding of children

Mothers were asked which time period, their children had problems of refusing to feed. Of all the children, 61.2 percent had no problems of feeding under normal circumstances, that is, when the children are not feeling unwell, while 37.8 percent had problems of feeding at all times. However, there was no significant difference between the nutritional status of children who had problems of feeding and those who had no problems of

feeding. More children had problems of feeding at 6 months of age (9.1%) and at 12 months (6.1%).

Mothers were asked to state what was causing their children to refuse to feed. About 20.4 percent of the mothers said that they did not know the reason. Breastfeeding was said to be the cause by 6.3 percent of the mothers while worms were attributed to be the cause by 1.7 percent of the mothers.

5.5.3 Weaning foods for children

Mothers provided information on what they thought were appropriate dishes for weaning their children. They were required to provide information on two dishes so that they could show a variety of food combinations. The constituents of food mentioned for the two dishes are shown in table 13. The most common type of weaning food for dish 1 was the cereal which was mentioned by 53.9 percent of the mothers followed by tubers which were mentioned by 42.9 percent. There was poor response on how to increase calorific value of weaning foods, especially with addition of fat, as only 10.9 percent of the mothers mentioned its use.

In dish 2, tubers as a weaning food, featured more prominently (39.9%) while, cereals accounted for 31.1 percent. Only a few mothers (0.3%) mentioned enrichment

of cereal with sugar while, 20.6 percent stated that they added fat to the tubers.

**Table 13. Constituents of Weaning Foods for Dish 1
and 2**

Type of Food	Dish 1 N=363)	Dish 2
Cereal alone	9.4	9.9
Cereal + fat or sugar	3.0	0.3
Cereal + other	41.6	20.9
Tubers plain	25.3	5.7
Tubers + fat	8.0	20.6
Tubers + others	9.9	13.5
Others	2.8	19.8
No response	0.0	9.0
Total	100.0	100.0

5.5.4 Responsibility of feeding children

Mothers were asked to indicate whether they had fed their children for all the meals, three days prior to the survey, or whether they had left the children under somebody else's care. Most mothers (95.3%) reported that they had fed their children for all the meals while 3.8 percent reported that their children were fed by neighbours and 0.9 percent were fed by siblings. The meals fed to the children by other people were mainly lunch and snacks.

5.5.5 Good food for the children

The mothers were asked whether, there were some foods, that they considered to be particularly good for their children. Most mothers (79.9%) stated that there were some foods that were particularly good for their children. The foods and reasons why they are considered to be good are listed in table 14.

**Table 14. Food Considered to Be Good for Children
by the Mothers and the Reasons**

Type of food	N=363 (%)	Reasons N=290	(%)
1. Cereals (ugali, rice porridge)	31.4	Child likes Adds energy Food is soft Body building	14.3 12.2 4.1 0.8
2. Tubers	31.4	Child likes Adds energy Food is soft Body building Others	16.8 8.0 2.2 1.4 3.0
3. Protein foods (milk, eggs beans)	13.7	Child likes Adds energy Body building Others	5.2 4.4 1.6 2.5
4. Fruits/ Vegetables	0.6	Child likes Adds energy	0.3 0.3
5. No food preference	20.1		
6. No response	2.8		
Total	100.0		79.9

Table 15 shows foods that mothers considered to be bad for the children. Cereals ranked highest followed by tubers. The common reasons given as to why the food was considered to be bad was due to a belief that the foods would cause constipation and diarrhoea.

**Table 15. Foods that Were Considered to Be Bad for
Children by the Mothers**

Food Items	N=363 (%)	Reasons	(%)
Cereals (ugali, maize porridge)	23.9	Child cannot chew Constipation Causes Kwashiorkor Child refuses Causes diarrhoea Not balanced Stomachache Others	7.4 5.5 2.8 2.4 0.8 0.6 0.3 4.1
Tubers (potatoes, bananas, sweet pota_ toes)	7.2	Causes diarrhoea Not balanced Stomachache Constipation Others	4.1 0.8 0.6 0.3 1.1
Cassava	1.1	Causes Kwashiorkor Constipation Stomachache Others	0.3 0.3 0.3 0.3
Milk	0.3	Causes Kwashiorkor	0.3
Beans	1.9	Causes Diarrhoea Constipation Others	1.4 0.3 0.3
Fruits (pineapple pawpaw)	0.8	Causes diarrhoea Others	0.3 0.6
Cereal + vegetables	0.3	Causes Kwashiorkor	0.3
Others	3.0	Others	3.0
No bad food	61.4		
Total	100.0		38.6

CHAPTER 6

DISCUSSION

6.1 MOTHERS NUTRITIONAL KNOWLEDGE

The mothers nutritional knowledge score was high since the mean score was 72 percent, only 14 percent of the mothers had a score below 58 percent and 14.6 percent scored above 84 percent. The study's hypothesis was that mothers nutritional knowledge in a low income community has a positive influence on the nutritional status of children. The results from this study indicate that overall mothers nutrition score did not have a significant relationship with the nutritional status of the index child. Similar findings were reported by Hoorweg and Niemeyer, (1982) where they conducted a survey in Central Province, Kenya where they compared child nutritional status of frequent and infrequent visitors to the health centres. Contrasting findings were reported by Abbi et. al (1989) who found that in rural India, total maternal nutrition knowledge score is significantly related positively to child's weight-for-age, height-for-age and weight-for-height.

The failure to show a relationship between overall nutrition knowledge score and child's nutrition status

may be due to the fact that the mothers do not have money to put into practice what they know bearing in mind that the majority (88.9%) were unemployed. Fathers employment status in this study failed to show a significant relationship with child nutrition status. Mitzer et al. (1984) argue that a mothers earned income may more often be used for an infants food than a fathers income. Other authorities are of the opinion that if family food resources are sufficient to increase about five percent of total family calories to the pre-schoolers, then nutrition education can play a significant role. This would also depend on the number of non-preschoolers in the household. However, below a level where this increase of calories is not possible, then nutrition education would be ineffective without accompanying increases in real incomes (Zeitlin and Formacion, 1981). In the present study households with more than one pre-schooler had more underweight children although the difference was not significant.

There are new trends in nutrition education that are now emphasizing an increase in energy density of a child's food or drink in order to increase calories (Church, 1979 as quoted in Schurch, 1982). Knowledge on how to increase energy density was low. Mothers knowledge on how to increase calories for a child's food was found to have a positive relationship with a child's weight-for-age although not significant. Lack of knowledge on how to

increase the calorie density of a child's diet may lead to underfeeding and this will result in failure to gain weight (King, 1983). In view of this trend, the issue of increasing a child's food density should be aggressively addressed.

6.2 SOURCES OF NUTRITION INFORMATION

Nutrition education coverage was very high because 97.5 percent of the respondents had been exposed to nutrition education. This probably explains why the mothers' nutritional knowledge scores were high. The coverage was high in contrast to sentiments raised by Hornik (1984) that nutrition education is so haphazardly done as an add on to curative services that it is unlikely to reach a good number of the population.

The main source of nutrition information was hospital and maternal and child welfare clinics (MCH/FP). Other minor sources were radio, school, friends and relatives. It would then appear that the role played by mass media as an alternative source of nutrition information is minimal. Some authorities for example Hornik, (1985) are concerned that the teaching at the MCH/FP clinics risks being distorted by knowledge from other sources which are likely to have a wider coverage. This does not appear to be the case because only (11.3%) of the mothers obtained nutrition information from school and radio while (2.2%)

obtained their information from friends and relatives. The rest, had contact with the MCH/FP Clinics.

Mothers who scored highly in the nutrition knowledge had indicated that their source of nutrition information was the MCH/FP Clinics. This could be attributed to the fact that the nutritional topics were covered at the clinics several times and therefore, the mothers had a better grasp of the facts. The nutritional scores of the mothers had a positive correlation with the educational level attained by the mothers. This is not surprising because schooling helps somebody to retain information learnt better and they can also read the information at their own time from books and charts.

Majority of the mothers (53.2%) preferred a duration of between 30 minutes to one hour for nutrition teaching. In practice the period set aside for nutrition teaching in the clinics is 15-30 minutes which seems to be too short a period according to the mothers.

6.3 NUTRITION STATUS

6.3.1 Weight-for-age

A child's weight-for-age reflects both previous growth and present nutritional conditions. In this study more than half (58%) of the children had low weight-for-age

(undernourished). This is a very high figure considering that the national urban average is 16.7 percent (Odada and Otieno, 1990). A survey done by Maina (1989) in a slum area in Korogocho showed that 36.2 percent of the children had low weight-for-age which also seems to deviate a lot from the national urban average. These high figures may be due to the fact that the survey was conducted in June and July, a period which was preceded by prolonged drought that was present from end of December until April. This resulted in an increase in food prices which could have made access to adequate food intake difficult.

Among the factors that were positively related with low weight-for-age was household size. Households with more than five persons had significantly more underweight children. Similar findings were reported by Mbungu (1990), Fred (1977) and Maina (1989). The household size ranged from 2-12 persons with a mean of 4 persons per household. The national mean number of persons in a household is 3.8 (CBS, 1982). Maina (1989) in Korogocho reported a household size of 2-13 persons with a mean of 5 persons. Undernutrition in large families is high especially when the families are poor making it difficult for the family to afford enough food for the family members. Religion of the head of household was significantly related with weight-for-age where more children from Moslem headed homes were underweight. This

is probably due to the fact that the households headed by Moslems had significantly large household sizes.

Inability of the mother to recognize signs of undernutrition, Marasmus, Kwashiorkor and their treatment had a negative relationship with weight-for-age of the child. It has been argued that underfeeding of children to some degree occur, when mothers cannot recognize malnutrition, particularly when it involves weight-for-age, (Zeitlin and Formacion, 1981) and these findings seem to support this.

6.3.2 Weight -for -height

In Kenya nutritional wasting or acute malnutrition, affects only a small proportion of the child population (CBS, 1984). A child's weight-for-height is an indicator of nutritional wasting and primarily reflects severe short term deprivation of food in its immediate nutritional history, for example, during episodes of disease or times of food shortage. In this study 1.9 percent of the children were wasted. This figure was close to the national average of 3 percent (CBS, 1982). Other studies in the slums of Nairobi reveal higher rates. Maina (1989) found that 4.9 percent of the children in Korogocho were wasted.

Mothers knowledge on frequency of feeding a sick child

had a positive relationship with weight-for-height of the index child. Mothers who stated that a sick child should be fed fewer times than normal had a significantly higher number of wasted children. This is a dangerous trend due to the fact that infections usually raise the body's overall nutrient requirements (FAO, 1974). Zeitlin (1984) estimated that children 6-24 months old require 30% additional protein in order to counteract the effects of disease. Restricting food at this time, when more calories are required results in deleterious effects to the child, and wasting is the end result due to this sudden deprivation of food. Underfeeding during illness has been reported as one of the primary causes of acute malnutrition (Martorell and Yarbrough 1983). During illness a child should be fed more than 5 times per day (King, 1985).

Failure of the mother to recognize signs of a marasmic child from a photograph had a negative relationship with wasting. This is supported by Zeitlin and Formacio (1981) who are of the opinion that a possible explanation of underfeeding of children is failure of the mothers to recognize malnutrition. They found that 3/5 of mothers whose children had 2nd and 3rd degree malnutrition thought that their babies were developing well.

6.3.3 Height-for-age

A Child's height is an indicator of its long term nutritional status. Children with low height-for-age commonly referred to as stunting, may have suffered from chronic or long term undernutrition. A child who has received an inadequate diet for much of its life will be shorter than normal but will not necessarily look thin or appear undernourished (CBS, 1984). In this study the proportion of stunted children (86.2%) was higher than the national urban average of 56.9% (Odada & Otieno 1990). Findings of surveys done in the slums showed lower rates (27%) for Korogocho (Maina, 1989) and 29% for Pumwani (Mbungu, 1990). The difference in the prevalence perhaps could be attributed to the high cost of living due to inflation. It could also reflect deteriorating standard of living.

Household size was negatively related to stunting of the index child. In households with more than seven persons, 100% of the index children were stunted while those households with 5 to 6 persons 90.2% of the children were stunted. Similar findings were reported by Melke (1990). It would appear that household size had an influence on the high stunting rate of the children.

The number of children below 5 years in a household had a significant relationship with stunting. Over half of the

stunted children, (52.7%) were from households with two or more children whose ages were below five years. Similar findings were reported by Maina (1989) who found that (75%) of the stunted children came from households with two or more children who were below five years. This may be attributed to the fact that, short birth intervals have been associated with malnutrition (Fred, 1977). This is because the 6-12 months post birth period which coincides with much malnourishment of the children, occurs after a time of renewed pregnancy with its debilitating side effects for a mother (Pelto, 1983). The mother in this condition feels weak and is not able to take proper care of the young child who needs special attention during this period.

Mothers knowledge on reasons for weaning had a positive relationship with height-for-age. This supports the view expressed by Zeitlin and Formacion (1981) that most malnutrition during weaning can be improved by nutrition education that teaches improved practices.

Correct responses as to why weaning should not be introduced too early had a positive relationship with a child's height-for-age. This could be attributed to the fact that the foods given to the baby during this time are usually starchy foods which the baby is not able to digest but they fill the stomach and the baby sucks on the breast less. This food may also be unhygienically

prepared and this often leads to infection and undernutrition (King, 1985). Knowledge on frequency of feeding a sick child was positively related to weight-for-age. This could be due to the fact that chronic underfeeding of sick children results in stunting and failure to catch up in height due to higher demands of energy during illness.

6.4 ATTITUDE AND PRACTICE TOWARDS CHILD FEEDING

Breastfeeding is said to be vital for the growth of a baby and mothers are usually advised to breastfeed their children as long as possible (King, 1985). In this study more than half (59.2%) of the mothers stated that they would like to breastfeed their children for two years. The shortest time suggested was 18 months and the longest was three years. The shortest period suggested for breastfeeding falls within the national average of 18.2 months (CBS, 1982). The national urban average for Nairobi is seven months and this is far below what the mothers suggested. However, the preferred period for breastfeeding may not reflect the actual practice. This could be due to a mother becoming pregnant too soon, or the child refusing to breastfeed earlier than two years. The longer period suggested by the mothers could be attributed to the fact that 88.9 percent of these mothers were unemployed and were at home with the children most of the time. Breastmilk substitutes are expensive and

mothers may have no choice but to breastfeed their children. There was no significant relationship between the duration period suggested by the mother and child nutritional status.

Age at which a child is weaned is very critical to the well being of a child. Early weaning that is, before the age of 3 months is said to be detrimental to the health of the baby because the baby is not able to digest starch and there is high risk of infection, due to contaminated food. Late weaning beyond 6 months is also bad because beyond this age breastmilk is unable to support adequate growth and this could trigger off malnutrition (Mitzer et al. 1984). In this study the mothers had the knowledge on when to wean the child and so the reason behind the children's poor nutritional status may not be due to mothers' ignorance but due to other factors. There was however, no significant relationship between the mentioned age of weaning and the nutritional status of the index child.

In the study the weaning foods mentioned by the mothers were cereals and starchy foods such as bananas and potatoes. A child's stomach is small and so he cannot eat enough of a bulky, starchy food to get all the energy that his body needs. In order to give the nourishment that he needs, the child should be fed more often about five times a day and in gradually increasing amounts to

satisfy both the appetite and the nutritional needs (Mitzner et, al.,1984). Only 36.1 percent of the mothers stated that a child should be fed five times a day. Knowledge on frequency of feeding young children seems to be lacking because the question put to the mother was the number of times that a child should feed per day if food and liquids were available and so one could have expected the mothers to mention more feeding times than they actually did.

Although the feeding frequency and child nutrition status had no significant relationship there could be a possibility that the mothers fed their children fewer times than recommended as evidenced by a high percentage of underweight.

Oils and fats are now being considered as the most important addition to weaning diets to prevent and treat malnutrition (Dearden et, al. 1980 as quoted in Schurch, 1982), by increasing energy density (King, 1985). In this study, mothers were asked what they can add to a child's food in order to increase energy and only 43 percent of the mothers mentioned fat. It appears, therefore, that there was lack of knowledge on how to increase calorie density for a child's food. There was some relationship, though not significant between mothers knowledge on addition of energy to a child's food and weight-for-age and this, perhaps, partly explains the high levels of

undernutrition. This seems to support the view that ignorance of the special needs of children often cause families to give their children diets that are less in quality, than those they could provide (Reynaldo and Ho, 1983).

In many cultures, lack of good child care as an additional resource constraint, makes it difficult to use available foods to supplement infant diets (Zeitlin 1981). This may be due to the fact that the mothers may go away to work and leave the children under somebody else who may not take good care. In this study most of the mothers (95%) indicated that they had fed their children for the previous three days prior to the survey. The high child undernutrition rate cannot therefore be attributed to lack of proper child care since the mothers spent most of their time with the children.

It is usually recommended that a child's food should contain food items from each of the three food groups namely energy giving, body building and protective foods for good health. When mothers were asked to mention three food items that they can use to prepare a balanced meal for a two year old child only 33.1 percent of the mothers mentioned food items from the three food groups. This is not surprising because general knowledge on food groups was poor as only 10.2 percent of mothers were able to place food items correctly in the different food group

group.

The poor knowledge on the nutritive value of foods is also reflected when mothers were asked to state the foods that they considered to be good for the children. The main criteria was based on whether the child liked that food. The poor knowledge could be attributed to the fact that 43 percent of the mothers stated that they had not been exposed to food groups and the 57 percent who had been exposed said that they forgot the food groups easily while others said that they found them confusing. However, there was no significant relationship between maternal knowledge on food groups and child nutrition status. The usefulness of teaching three food groups is currently being questioned and the emphasis now is on frequency of feeding the children. The mothers also seemed comfortable with this approach since they argued that they could only feed their children with the foods they had.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions.

The aim of the study was to find out whether mothers' nutritional knowledge had a relationship with the nutritional status of children aged 6-24 months in a low income population. Almost all the mothers in the study area are exposed to nutrition information, and the main source of information is MCH/FP Clinics. Despite this, many mothers still required more nutrition information. However, there was no relationship between mothers nutritional knowledge score and the child nutritional status. Nevertheless, some nutrition knowledge components were negatively related with child nutritional status. They included Dangers of introducing food to a child too early (before the age of three months) and frequency of feeding a sick child. Mother's knowledge on some aspects of nutrition helps to promote good child nutritional status and hence lack of nutritional knowledge can be a cause of poor child nutritional status.

Mothers (in the study) are inadequately enlightened on: dangers of introducing foods to a child too early, frequency of feeding a sick child, signs and treatment of

Kwashiokor and Marasmus, how to increase calorie density of a child's food and the food groups. All the above mentioned nutrition knowledge components are crucial to a child's growth and any nutrition education programmes should re-emphasize these components.

Mothers in the study area view breastfeeding as important and preferred breastfeeding duration of two years. Cereals are the main weaning foods. The criteria for classifying a food as good was based on the child's liking for the food while for bad food it was whether the food had an effect on the child, for example, causing diarrhoea or constipation.

Stunting of the children is the main problem in this study population. Children in the lower age categories were at a greater risk of stunting. The problem of underweight ranked second with children aged 6-12 months being at a higher risk.

7.2 Recommendations

When designing nutrition education programmes aimed at improving the nutrition status of children, the following should be focused on:

- 1) In areas of low income populations, nutrition education should be accompanied by income generating activities for the mothers to put into practice what they learn. This is because, in this study some mothers had high scores in nutritional knowledge, yet their children were malnourished thus indicating that they needed money to buy food.
- 2) Intensify family planning services since most children with poor nutritional status were mainly from households with more than five persons.
- 3) Nutrition education curriculums should emphasise nutrition knowledge components that have a significant relationship with child nutritional status, these are, frequent feeding of sick children, increasing calorie density of children's food, dangers of introducing food to a child too early and emphasis on recognition of signs of deficiency diseases.

- 4) In order to reduce the high rate of stunting in children mothers should feed their children more frequently, that is, five to six times a day.

Further Research

- 5) There is need for further research to find out whether there could be something wrong in the way the above topics are presented because the mothers are well informed in other aspects covered in nutrition education.
- 6) There is need for more studies on the relationship between maternal nutritional knowledge and child nutritional status in other parts of the country for comparative purposes.

REFERENCES

Abbi, R. et al., (1988): Mothers Nutrition Knowledge and Child Nutrition Status in India.

Food and Nutrition Bulletin Vol. 10 No.3.

The United Nations University. pp.51-54.

Anonymous, (1987): Situation Analysis of Slum Dwellers in Kibera Estate, Nairobi. Study carried

out under the Auspices of African

Evangelistic Enterprise of East Africa and

the Trinity Church Kibera, Human

Development Project. pp. 32-33.

Bengoa, J.J., (1973): The State of World Nutrition.

World Health Organization, Geneva. pp.16. Berg,

A., (1973): The Nutrition Factor, its Role in

National Development. Washington. The

Brookings Institution. pp. 5,6.

Beaton, G.H., and Bengoa, J.M., (1976): Nutrition in Preventive Medicine. World Health

Organization. Geneva. pp. 83,240-255,277-

284.

Bohdal, M. et al., (1968): Nutrition Survey and

Campaign against Malnutrition in Kenya.

Report to the Ministry of Health of Kenya
on the WHO/FAO/UNICEF assisted project.
Nairobi. pp.14, 171.

Cameron, M. and Hofvander, Y., (1983): Manual on
Feeding Infants. Oxford University Press.
pp. 92-96 ,110-115.

C.B.S. (1983): Third Rural Child Nutrition Survey
1982. Ministry of Finance and Planning,
Kenya. pp.16.

Clark, D., (1970): Landlords and Tenants in Kibera.
Sociological Working Paper No.103. Nairobi.
A survey carried out in Kibera. Institute of
Development Studies. University of Nairobi.
pp. 2-5.

Devades, R.P., (1975): Nutrition Education in
Developing Economies. Proceedings of 9th
Congress of Nutrition Mexico 1972. Karger,
Basel. Vol.4 pp.248-255.

Dema, I.S., (1965): Nutrition in Relation to
Agricultural Production. Rome. Food and
Agricultural Organization of the United
Nations.

Eckholm, E. and Record, F., (1976): The Two Faces of Malnutrition. World Watch Institute.

Washington. World Watch Paper 9. ISBN, 0-9/6468-08-9. pp. 5-11, 63.

Ebrahim, G.T., (1983): Nutrition in Mother and Child Health. Macmillan Press Ltd. pp.97-98.

Fred, T.S., (1977): Food Population and Politics. International Planned Parenthood Federation. pp. 13-16.

Galler, J.R., (1984): Nutrition and Behaviour. Plenum Press. New York and London. pp.455-458.

Gitau, (1994) : Iodine Deficiency (Unpublished).

Hoorweg, J. and Niemeijer, R., (1981): The Impact of Health Education at Three Health Centres in Central Province, Kenya. African Studies Centre, Leiden, the Netherlands. pp. 37.

Hoorweg, J. and Niemeijer, R., (1980)
The Nutritional Impact of the Pre-school Health Programme in Central Province, Kenya. ASC Research Report No.11. African Studies Centre, Leiden, the Netherlands.

Hoorweg, J. and Niemeijer, R., (1982)

The Effects of Nutrition Rehabilitation at three Family Life Training Centres in Central Province, Kenya. ASC Research Report No.14. African Studies Centre, Leiden, the Netherlands.

Hornik, C.R., (1985): A State of the Art Review.

ACC/SCN, State of The Art Series. Nutrition Policy Discussion Paper No.1. Rome. pp. 19-23 ,36-41.

Hutt, M.S.R., (1969): Malnutrition and Infection. East African Studies. Journal of Tropical Paediatrics 15:153

Jansen et al, (1987): Food and Nutrition in Kenya. A Historical Review. Published by Department of Community Health, Faculty of Medicine. University of Nairobi with assistance of UNICEF.

Jelliffe, D.B. and Jelliffe, E.F.P., (1983): Advances in International Maternal and Child Health. Oxford Press. Vol.2 pp.138, 142-144.

Jelliffe, D.B., (1969): Child Nutrition in Developing Countries. U.S. Department of State Report. Agency for International Development Office of the War on Hunger. Washington D.C. 20523.

pp.95.

Jelliffe, D. B., (1985): Child Health in the Tropics.
Edward Arnold (Publishers) Ltd. 41 Bedford
Square, London. pp.12.

Keekovole, (1993): Verbal Communication.

Kielmann, A.A. et al., (1976): Etiological
Determinants of Protein Calorie
Undernutrition in a Rural Child Community.
ACTA TROPICA Separatum Vol.33, 4 AG., Basel
pp.344-350.

King, F.S., (1985): Helping Mothers to Breastfeed.
Published by African Medical and Research
Foundation. Nairobi. pp. 98-107.

Latham, M., (1979): Human Nutrition in Tropical
Africa. Food and Agricultural Organization
of the United Nations. Rome. pp.42.

Linda, D. and King, M. (1979): Nutrition in Kenya.
Problems, Programs Policies and
Recommendations for Action. A USAID Staff
Report. pp.1-4.

Maclaren, D.S., (1983): Nutrition in the Community.

Nutrition Education and the Planning Process. Edited by Jelliffe P.E. Wiley & Sons Ltd. pp.103-108.

Maina, G.W., (1988): ' Ecology of Pre-school Malnutrition in Peri-urban Nairobi''. An Msc. Thesis, University of Nairobi. pp.89.

Mambo, J.W., (1990): Dietary Management During and in Absence of Diarrhoea in Children 4-36 Months of Age in Peri- Urban Nakuru. An Msc. Thesis, University of Nairobi. pp.74, 82.

Martorel, R., (1982): Nutrition and Health Status Indicators. The World Bank ,Washington D.C. U.S.A. pp.10-11.

Mbungu, N., (1985): Nairobi City Commission Urban II. Health/ Nutrition/ Family Planning Project Baseline Survey Report.

Mitzer, K. et al., (1984): Improving the Nutritional Status of Children During the Weaning Period. Printed by the Graphic Arts Service. Massachusetts. Institute of Technology. pp.31-53, 56-59, 91-100.

Myrdal, G., (1970): The Challenge of World Poverty.

New York ,Pantheon Books.

Mosley, W.H. and Lincoln, C.L., (Editors), (1984):
 Child Survival Strategies for Research.
 population and Development Review.
 Supplement to Volume 10. Published by
 Martorell, R. and Ho, T. J. Printed in the
 United States of America. pp.9-10, 50-52.

National Research Council, (1977): World Food and
 Nutrition Study. National Academy of
 Sciences. Washington D.C. pp.34,41

Ngare, (1994) : Vitamin A Deficiency (Unpublished).

Ngaruro, R. (1995): Verbal Communication.

Odada, J.O and Ayako, A.B, (Editors), (1988): The
 Impact of Structural Adjustment Policies on
 the Wellbeing of the Vulnerable Groups in
 Kenya. Report of Proceedings of a Workshop.
 Printed by English Press Ltd. Enterprise
 Road, Nairobi, Kenya. pp.41, 48.

Odada, J.O and Otieno, A.B,(Editors), (1990): Socio-
 Economic Profiles. Published by Ministry of
 Planning and United Nations Children's Fund.
 Kenya. pp. 192-193.

- Oniang'o, R., (1987): A Study of Maternal and Infant Practices in Kenya. A Paper presented in a Workshop.
- Puffer, R. and Serrano, C., (1973): Patterns of Mortality in Childhood. Publication No.262, Washington D.C., Pan American Health Organization.
- Scrimshaw, N.S. et al., (1968): Interactions of Nutrition and Infection. WHO Monograph, Ser. No. 57.
- Schurch, B.,(Editor), (1982): Evaluation of Nutrition Education in Third World Communities. Nestle Foundation Publication Series. Hans Huber. Publishers, Bern Stuttgart Vienna. pp.46- 47,25,101-109.
- Taylor, C.E. and Taylor, E.M., (1976): Multifactorial Causation of Malnutrition. A Text for Public Health Workers. D.S McLaren, England. U.S. Agency for International Development,(1981): Aid Programme. Evaluation. Discussion Paper No.10. pp.111-112
- United Nations, (1986): How to Weigh and Measure Children. Department of Technical Co-

Operation and Statistical Office. New York.
pp. 30-38, 45-48.

United Nations Children's Fund, (1995): The State of the
World's Children. Published by Oxford University
Press pp.19.

Walia, B.N.S. and Gambir, S.K., (1975): The
Relationship between Childhood Malnutrition
and Maternal Knowledge and Beliefs. Indian
Paediatric Journal. pp.563-568.

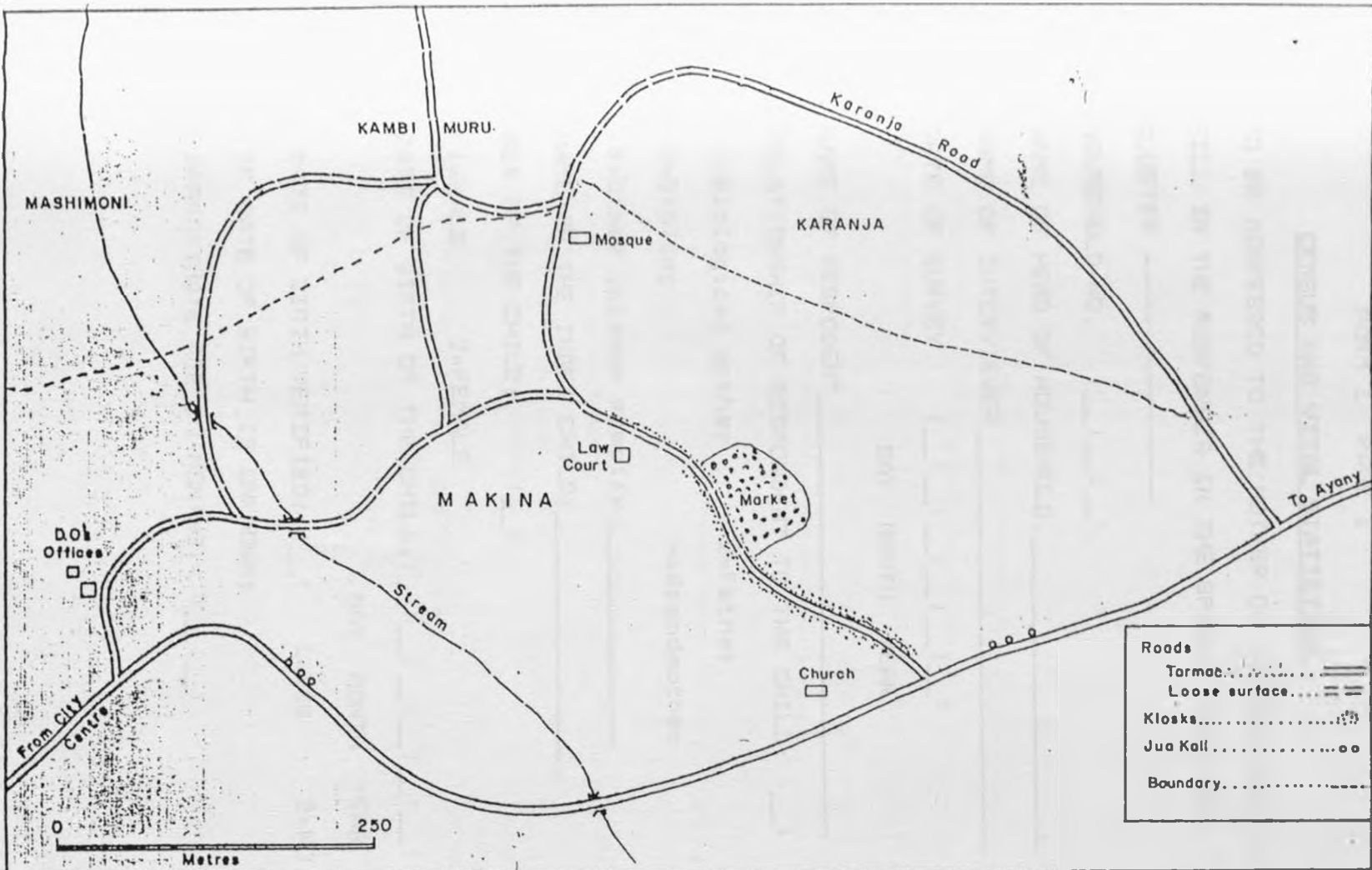
World Health Organization, (1983): Measuring Changes
in Nutritional Status. Guidelines for
Assessing the Nutritional Impact for
Vulnerable Groups. Geneva.

World Health Organization, (1972): Nutrition. A Review
of the WHO Programme 1965-1971. Geneva pp.6-
10.

Zeitlin, M. and Formacion, C. (1981): Nutrition
Education. Oelgeschlager, Gunn & Hain,
Publishers, Inc. pp.8, 14, 18, 78-79.

APPENDIX 2

MAP OF MAKINA VILLAGE



MAKINA VILLAGE

APPENDIX 3

QUESTIONNAIRE

FORM 1 PAGE 1

CENSUS AND VITAL STATISTICS

(TO BE ADDRESSED TO THE MOTHER OR MOTHER SUBSTITUTE)

(FILL IN THE RESPONSES IN THE SPACES PROVIDED)

1. CLUSTER -----
2. HOUSEHOLD NO. |_|_|_|
2. NAME OF HEAD OF HOUSEHOLD. _____
3. NAME OF INTERVIEWER _____
4. DATE OF SURVEY |_|_|_|_|_|_|_|

DAY MONTH YEAR

5. NAME OF RESPONDENT _____
6. RELATIONSHIP OF RESPONDENT TO THE CHILD; |_|_|

1=Biological mother	2=Father
3=Sibling	4=Grandmother
5=Other ,please specify _____	

7. NAME OF THE INDEX CHILD; _____
8. SEX OF THE CHILD; |_|

1=MALE	2=FEMALE
--------	----------

9. DATE OF BIRTH OF THE CHILD; |_|_|_|_|_|_|_|

DAY MONTH YEAR

10. DATE OF BIRTH VERIFIED; |_|_| 1=YES 2=NO

IF DATE OF BIRTH IS UNKNOWN;

11. APPROXIMATE AGE IN MONTHS; |_|_|_|

KIBERA SURVEY FORM NO. 2

HOUSEHOLD NO. : ___ : ___ : ___ :

HOUSEHOLD PROFILE

Ser No.	Name of Household Member	Sex	Age Mos/Yrs	Rela to HH	Marital Status	Employ Status	Educ level	Relig	Ethnic Grp

CODES

- | | | | |
|--|---|--|--|
| <p><u>SEX</u> M=1
F=2</p> | <p><u>RELATION TO HH</u>
1= Head of HH
2= Wife/husband
3= Son/daughter
4= Parent of HH
5= Other relatives</p> | <p><u>MARITAL STATUS</u>
1= Single
2= Married
3= Divorced/Seperated
4= Widowed</p> | <p><u>EMPLOYMENT STATUS</u>
1= Casual worker
2= Regularly employed
3= Self employed
4= Go to school
5= Housewife
6= Unemployed</p> |
| <p><u>EDUCATION LEVEL</u> Write down no. of years in school.</p> | <p><u>RELIGION</u>
1= Christian
2= Muslim
3= Others</p> | | |

HOUSEHOLD CHARACTERISTICS

(Write the corresponding code number in the box provided)

1. Source of water |__|

Code: 1= common tap

2= own tap

3= river

4= rain

2. Type of fuel used |__| |__|

Code: 1= paraffin

2= charcoal

3= gas

4= electricity

5= others, specify _____

3. Observe whether there is a radio. |__|

Code: 1= yes, 2= no

Observe whether there is a TV. |__|

Code: 1= yes, 2= no

4. Family housing |__|

Code: 1= rented

2= own

5. For how long have you lived in Kibera? |__|

Code: 0= less than 1 year

1= one or more

6. Has the child been sick for the last 7 days? |__|

Code: 1= yes, 2= no.

7. If yes, (ask), what illness? |__|

Code: 1= cough

2= diarrhoea

3= running nose

4= vomiting

5= fever

6= others, specify

FORM NO. 3.

NUTRITIONAL KNOWLEDGE. (To be coded later) 1= valid response

2= invalid response

9= do not know

(Write the responses given in the spaces provided)

1. Which type of feed is best for a baby under 4 months of age? _____ |__|
2. Why is this type of feed best for a baby? Name 1 reason _____ |__|
3. At what age should the first food other than breast milk be given to the baby?
months |__|__| _____ |__|
4. Why do we give children other foods around this age?
Give one reason.
_____ |__|
5. What is likely to happen to the child if other foods are introduced earlier than this age?
_____ |__|
6. What is likely to happen to the child if other foods were introduced later than the recommended age?
_____ |__|
7. How many times in a day should a child of two years be fed if food and liquids are available? _____ |__|

8. Should the frequency of feeding a sick child be different from that of a well child? 1=yes, 2=no |__|
9. If no, (ask), why? _____

10. If yes, (ask), how? _____ |__|
11. What is one of the signs that a child is not eating enough food? _____ |__|
12. (Show a picture of a marasmic child to the mother and then, ask), is this child healthy 1=yes, 2= no |__|
13. If no, (ask), what do you notice as being wrong with the child?
Mention two signs (1) _____ |__|
(2) _____ |__|
14. What do you call this condition? _____ |__|
15. What causes this condition? _____ |__|
16. Can a child with this condition be cured? 1= yes. 2=no |__|
17. If no, (ask), why not? _____
18. If yes, (ask), how can it be cured? _____
_____ |__|

Figure 1



FIGURE 2



19. (Show a picture of a child suffering from Kwashiokor to the mother and then, ask), is this child healthy?

yes=1, no=1 _____ |__|

20. If answer is no,(ask), what do you notice as being wrong with the child? Mention 2 signs.

_(1)_____ |__|

_(2)_____ |__|

21. What do you call this condition?

_____ |__|

22. What causes this condition?

_____ |__|

23. Can a child with this condition be cured? 1=yes, 2=no

_____ |__|

24. If answer is no, (ask) why not_____

25. If answer is yes,(ask), how can it be cured?

_____ |__|

26. When do you consider a child to have diarrhoea?

_____ |__|

27. What do you think causes diarrhoea? Name two causes

_(1)_____ |__|

_(2)_____ |__|

28. How can diarrhoea be prevented? Give one suggestion

_____ |__|

29. If you are asked to prepare a meal for a two year old

child, what three food items would you include excluding water if food was available?

(1)_____ (2)_____ (3)_____ |__|

30. What can be added to a childs food, or drink, in order to

give the child more strength _____ |__|

31. Have you heard of the three food groups? 1=yes, 2=no |__|

32. If yes, (ask), state the three food groups

(1) _____ (2) _____ (3) _____ |__|

33. Which food group does each of the following foods belong

Maize flour _____ |__|

Potatoes _____ |__|

Sukumawiki _____ |__|

Beans _____ |__|

Milk _____ |__|

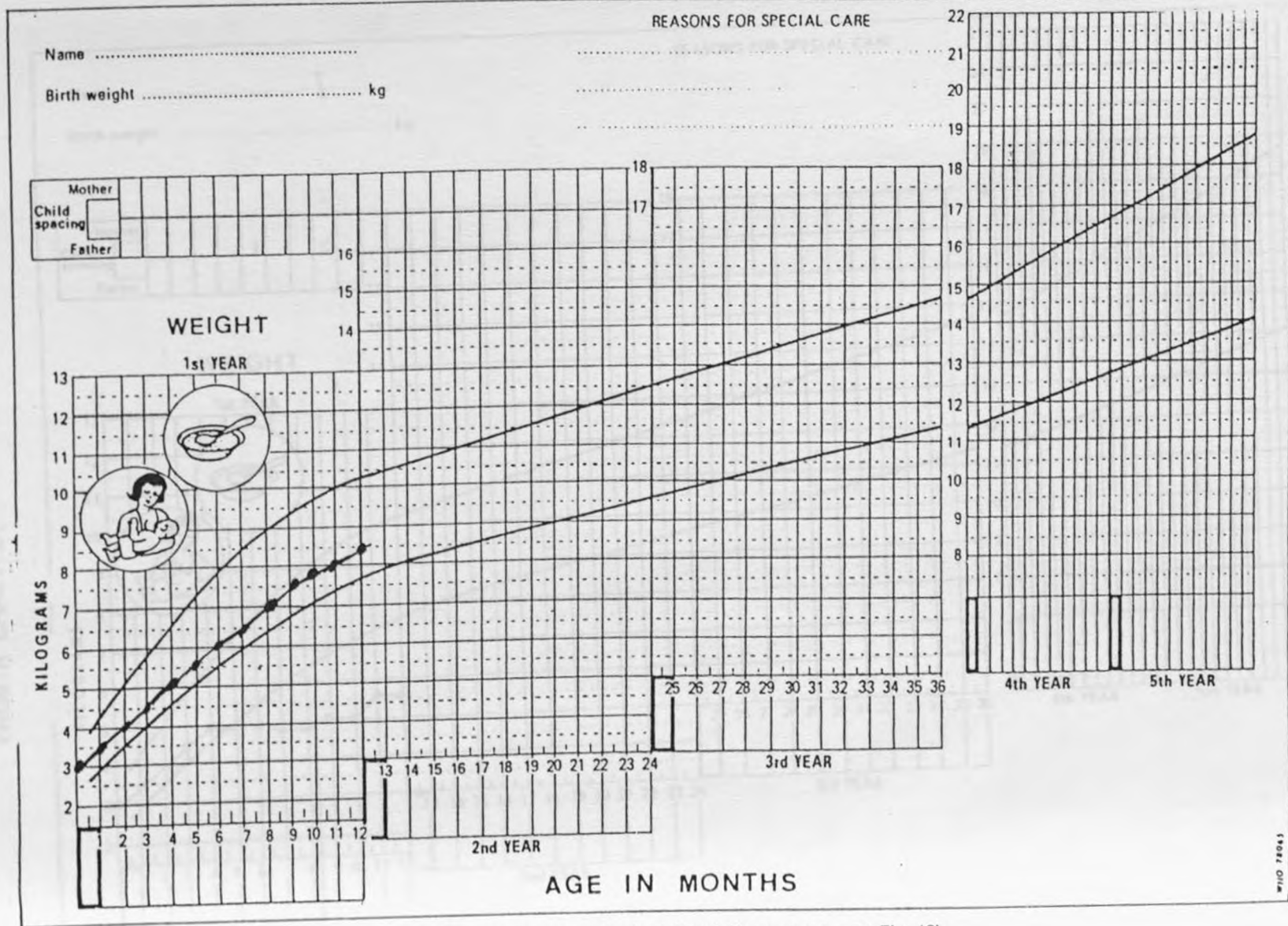
Oranges _____ |__|

34. Interpretation of a growth chart.

Two road to health growth chart cards will be shown to the mother and the following questions will be asked:-

Have you seen this type of card before? 1=yes, 2=no |__|

GROWTH CHART 1



140

GROWTH CHART 2

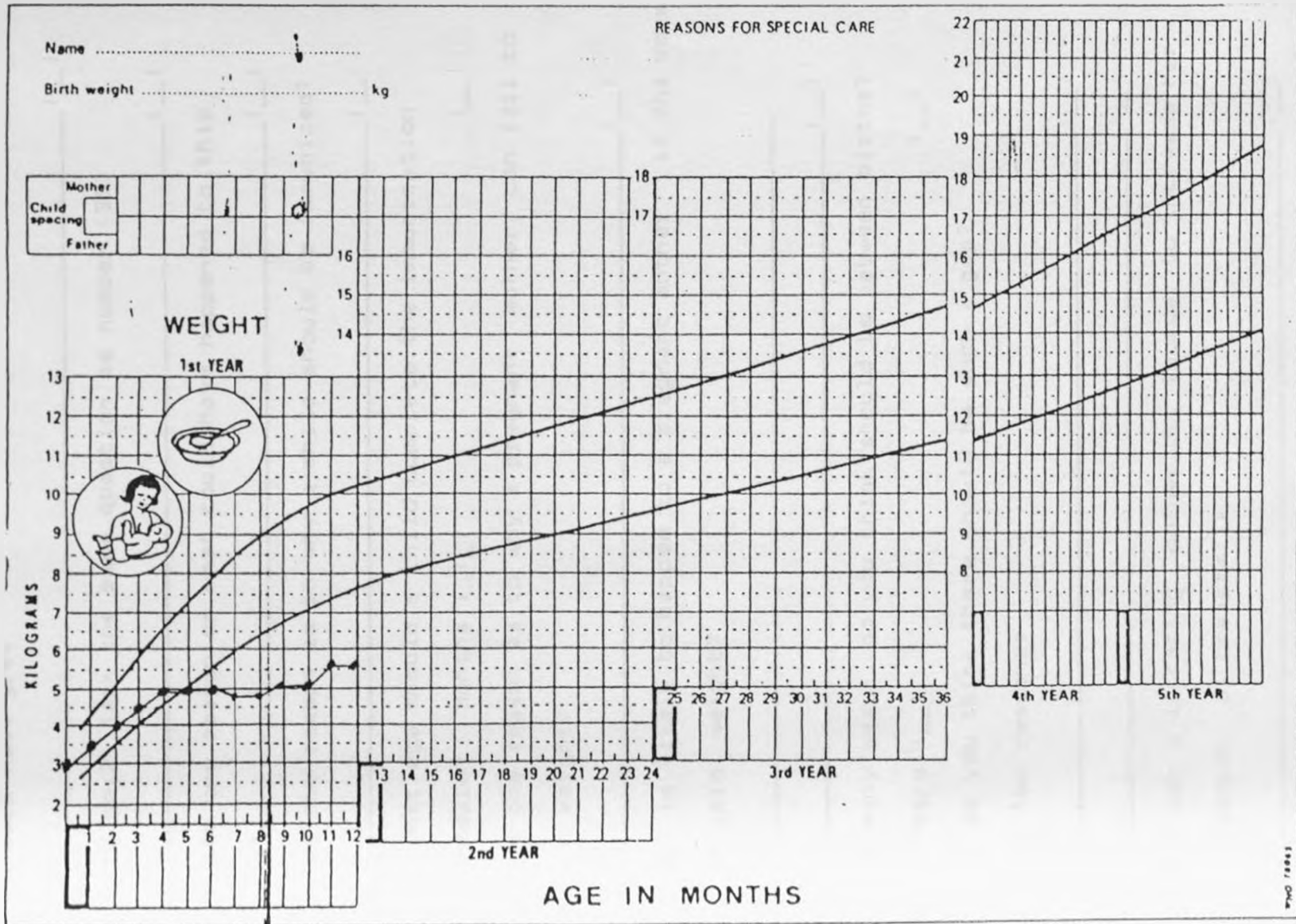


Fig. 2. WHO prototype growth chart (face) (for reverse, see Fig. 12)

35. If yes, (ask), explain how the child whose growth is shown on card no.1 grew
_____ |__|
36. Card no.2. (ask the same question as number (35))
_____ |__|
37. State one reason on what could have happened to this child?
_____ |__|
38. Give one reason as to why a child should be immunized?
_____ |__|
39. By what age should a child complete the immunization schedule? Months |__| |__|
40. Give one reason as to why a pregnant mother, can fail to gain weight?
_____ |__|
41. What is likely to happen to a pregnant mother if she does not gain weight?

_____ |__|
42. How many years do you think should be between births?
Years |__| |__|
43. Why do you think there should be such a gap?
Give two reasons:
(1) _____ |__|
(2) _____ |__|
44. What can a lactating mother do, in order to increase her amount of breastmilk?
_____ |__|

PART B. ATTITUDE /PRACTICE

45. What is the best age at which to stop breastfeeding a child?

Months |__|__| |__|

46. Has this child ever had problems related to feeding?

1=yes, 2=no |__|

47. If yes, (ask), from what age? months |_|_|

|__|

48. If yes, (ask), what was the cause of the problem?

|__|

49. Mention two dishes of food that you consider suitable for weaning a child?

50. In the last 3 days have you fed your child yourself during all the meals? 1=yes, 2=no |__|

51. If no, (ask), which meals did you feed the child.

52. If other person feeds the child, what is the reason?

53. Who feeds the child?

Tick one 1= Child feeds self

2= Sibling feeds child

3= Please specify, other |__|

When? _____

54. Are there some foods that you consider to be particularly good for your child? 1= yes, 2=no |__|

55. If yes, (ask), mention 2 of the foods

Good foods

Reason why.

56. Are there others that you consider to be bad?

1= yes, 2=no |__|

57. If yes, (ask), mention 2 foods and state why each is bad

Bad foods	Reason why
-----------	------------

(1) -----

(2) -----

58. Are there some foods that are particularly good for lactating mothers? 1= yes, 2=no |__|

59. If yes, (ask), name them 2. _____
Reason _____

60. How do you intend to stop breastfeeding the index child?

61. Are there some foods that should be avoided by pregnant women? 1= yes, 2=no |__|

62. If yes, (ask), give some examples and reasons

List	Reasons
------	---------

SOURCE OF NUTRITION KNOWLEDGE.

63. Have you ever had any teaching on how to feed your child?

1= yes 2=no |__|

64. If yes, ask, where did you get the teaching from?

- 1=school |__|
- 2=mass media (radio,tv.posters etc.) |__|
- 3=friends/relatives |__|
- 4=hospital /mch |__|
- 5=women group |__|
- 6=chiefs baraza |__|
- 8= other |__|

65. Has anybody demonstrated to you the preparation of the following?

A weaning food? 1=yes, 2=no |__|

66. If yes, (ask), by who? _____

67. Suitable food for a sick child? 1=yes, 2=no |__|

68. If yes, (ask), by whom? _____

69. Oral rehydration solution? yes = 1 ,no =2 |__|

70. If yes,(ask), by whom? _____

71. Is nutrition education useful to you? yes=1,no=2 |__|

72. If yes, (ask), state one most important reason why.

73. If no, (ask), state the one most important reason why.

74. (If the mother has been taught on the three food groups then, ask), how do you find the teaching of the three food group easy or difficult to follow? 1=easy 2=difficult

|__|

75. If answer is difficult ,(ask), state your reason why.

76. Do you feel that you need more information on nutrition education? yes=1, no=2 |__|

77. If yes, (ask), in what?

78. How long would you like the teaching to take?

1= short time __less than 30mins. |__|

2= average ____30 mins_1hr. |__|

3= long _____over 1 hr. |__|

ANTHROPOMETRY

1. Weight (kg)

(Tolerance +/-0.1 kg)

1 st	2nd	Average
__ __ __	__ __ __	__ __ __

2. Height (cm)

(Tolerance +/- 0.5 cm)

1st	2nd	Average
__ __ __	__ __ __	__ __ __