

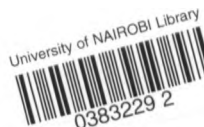
THE NUTRITIONAL KNOWLEDGE AND CHILD FEEDING
PRACTICES OF MOTHERS DISCHARGED FROM MBCONI
FAMILY LIFE TRAINING CENTRE IN 1994

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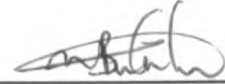
TERESA NGEYWA TUMWET



A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE
IN APPLIED HUMAN NUTRITION IN THE DEPARTMENT OF
FOOD TECHNOLOGY AND NUTRITION UNIVERSITY OF
NAIROBI, 1996

DECLARATION

I, Teresa Ngeywa Tumwet, hereby declare that this thesis is my own work and has not been presented in any other university for a degree.



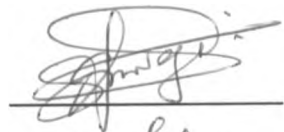
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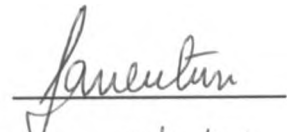
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Date: 3/11/96

Applied Nutrition Programme
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DEDICATION

I dedicate this study to my brother Geoffrey K. Butaki who encouraged and gave me the necessary support through School to always aim higher.

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ACKNOWLEDGEMENT

Special acknowledgement go to my supervisors at the Unit of Applied Nutrition Programme University of Nairobi, Dr. A.M. Omwega and Dr. J.W. Muita for their advise and encouragement throughout the study.

I, also thank my sponsor, DANIDA for providing the necessary financial support without which this study would not have been a success. Many thanks go to all ANP staff for their support. I am extremely grateful to the head of Family Life Training Programme in the Ministry of Culture and Social Services, the supervisor Mbooni Family Life Training Centre and its staff for providing the necessary support.

I am indebted to my employer, the Ministry of Agriculture, Livestock Development and Marketing for the study leave I was granted without which I would not have done this course.

Last but not least, I am extremely grateful to my husband Benson for taking care of our children Joseline, Faith and David while I was busy with this Programme. And also for giving the necessary support in love, patience and encouragement especially during the writing of this thesis.

ABSTRACT

Protein Energy Malnutrition (PEM) still remains a major health problem in Kenya and other developing countries. The factors associated with high prevalence of PEM in children are many but the immediate cause of death and malnutrition in children can be described as inadequate dietary intake and high prevalence of disease. The underlying problems leading to the immediate cause are food insecurity, poor maternal and child care, inadequate health services availability and use as well as unhealthy environment.

Various methods have been applied to reduce the prevalence of malnutrition as well as to treat severe forms. The method investigated here is the nutritional education component of institutional rehabilitation. It is assumed that mothers admitted with their malnourished children to the residential rehabilitation centres would acquire knowledge and change their child care and child feeding practices.

This study investigates the nutritional knowledge and child feeding practices of 49 mothers previously admitted to Mbooni Family Life Training centre (a residential rehabilitation centre) and compares it with that of 46 mothers with no similar exposure. The nutritional status of 129 children from the two groups of mothers was also determined and compared.

The results indicate that the nutritional knowledge of those mothers previously admitted was better than that of those not previously admitted but their child feeding practices were not different. The nutritional status of children of mothers who were not previously admitted was slightly better than that of children whose mothers had previously been admitted, however the difference was not significant ($p=0.521$). The social economic status of those mothers not previously admitted to MFLTC was better than that of those previously admitted.

This study questions the methodology of nutrition education applied in the rehabilitation centres and supports the need to identify a method that may lead to both attitude and behavioural change in the mothers with malnourished children to improve the child feeding practices once discharged from rehabilitation centres.

DEFINITIONS

Homestead - is defined as a place where a group of people live together as members of one family. It may also include friends and relatives.

Household - this is a unit of a homestead and refers to a group of people eating from the same pot and not necessarily sleeping under the same roof.

Cases - refer to mothers who were admitted to Mbooni Family Life Training Centre with their malnourished children in 1994 and came from Mbooni and Kisau divisions.

Controls - refer to matched controls of cases. Their children had never been malnourished to be admitted to a Family Life Training Centre, were neighbours of cases and had children of under five years of age.

Kwashiorkor - is defined as a form of malnutrition mainly characterised by a pot-belly and oedema, mild anaemia, no appetite, thin upper arms, apathy and thin pale weak hair. The weight-for-age is 60 - 80% of the NCHS reference median.

Marasmus - is defined as a form of malnutrition characterised by severe wasting. The child becomes very thin, bones become prominent and the skin hangs like baggy pants. The weight-for-age is less than 60% of the NCHS reference median and does not have oedema.

Marasmic-kwashiorkor - is defined as a type of malnutrition characterised by wasting and oedema. The weight-for-age is less than 60% of the NCHS reference median and has oedema.

Oedema - refers to the body swelling caused by retention of excessive fluid under the skin.

ABBREVIATIONS

AMREF	- African Medical Research Fund
ANP	- Applied Nutrition Programme
ASAL	- Arid and Semi-Arid Lands
CRS	- Catholic Relief Services
DANIDA	- Danish International Development Agency
FLTC	- Family Life Training Centre.
FLTP	- Family Life Training Programme
IDD	- Iodine Deficiency Disorders
IFAD	- International Fund for Agricultural Development
KFFHC	- Kenya Freedom From Hunger Council
MCH	- Maternal and Child Health
MCSS	- Ministry of Culture and Social Services
NCC	- Nairobi City Council
NCCK	- National Council of Churches of Kenya
NCHS	- National Centre for Health Statistics
OXFAM	- Oxford Famine
PEM	- Protein Energy Malnutrition
SPSS	- Statistical Package for Social Sciences
WFP	- World Food Programme

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Malnutrition in children under five years of age is a major problem in most developing countries including Kenya. The major presentation is that of Protein Energy Malnutrition (PEM).

Malnutrition in general can be defined as the pathological condition brought about by inadequate (or excess) intake of one or more of the essential nutrients in comparison to the physiological requirements of the body. Due to its magnitude and catastrophic impact on the child and maternal survival and development, and the fact that it can result from international political and economic crises places malnutrition as one of the most significant global problems of the day.

Usually only a small proportion of the affected children present the clinical signs of severe PEM. It is said that for each case of severe clinical PEM, there may be 10 moderate cases and 100 children of "near normal" nutritional status (Goyet et al., 1978). In many countries children with severe clinical PEM are treated at the hospitals. This is very expensive as was shown in India where hospital treatment was 5.2 times more expensive for the parents and 38 times more so to the government institute when compared to domiciliary management (Shah et al., 1971). The children besides

occupying beds badly needed by other patients in the ward, risk cross infection. Also the hospital staff are overburdened with work and do not have time to give the malnourished child and its mother the attention they need. The mother does not therefore acquire the required knowledge to take care of the malnourished child. When such children are discharged and go back to the community they usually relapse back to the same malnourished condition and are readmitted, or die. Some studies have shown that most of the affected children after admission in hospital die within twelve months of discharge (McLaren, Ammoun and Hourri, 1964; MacWilliam and Dean, 1965).

To curb this problem therefore severely malnourished children should be admitted in a nutritional rehabilitation centre where the child is rehabilitated while the mothers are given nutritional education on how to improve their family's wellbeing.

The present study aimed at establishing the nutritional knowledge and child feeding practices of mothers previously admitted to Mbooni Family Life Training Centre (MFLTC) and to compare this with that of matched controls. It also looked at the nutritional status of children exposed to the Family Life Training Centre (FLTC) in comparison to those who were not exposed.

1.2 EFFORTS UNDERTAKEN BY THE KENYA GOVERNMENT TO ERADICATE MALNUTRITION

During non-drought years, Kenya produces sufficient food that can feed its population. However malnutrition, especially that of the children, continues to be a serious problem.

The Government of Kenya recognized the need to eradicate hunger, ignorance and disease in the population immediately after independence (GOK, 1965). At that time, it was stated that hunger could only be eradicated through increased food production. Therefore, as part of the post independence corrective package, there was land reform that included land adjudication, consolidation, transfers and resettlement aimed at enabling indigenous Kenyans to have direct access to land. Although land reform may have increased food production, the problem of malnutrition has not been eradicated. So far there have been five national child nutrition surveys carried out in Kenya in the years 1977, 1978/79, 1982, 1987/88 and in 1994. These surveys show that although the percentage of stunted children in the sample population did not improve significantly there was a decline in wasting from 4.5% in 1982 to 4% in 1987/88 and an increase to 7.8% in 1994. These national child surveys and several other studies carried out by other organizations reveal that the main cause of malnutrition is poverty. In fact it is estimated that 200,000 of Kenya's children under five years of age are severely malnourished (UNICEF - ESARO, 1993).

In a bid to curb this problem of malnutrition, the Kenya Government has been supporting several nutrition intervention activities run by different ministries and organizations.

1.2.1 The Ministry of Health :- The ministry of health runs nutrition clinics alongside maternal and child health (MCH) clinics at their health centres. This program focuses on education and supplementation for malnourished children. Some of these nutrition clinics in the arid and semi-arid (ASAL) lands receive financial support from the Catholic Relief Services (CRS). Other efforts by the Ministry of Health to fight nutrition problems are through the Kenya Expanded Program on immunization (KEPI) and through running a six-months nutrition field workers training program for qualified nurses.

An evaluation of the CRS sponsored Murang'a MCH nutrition intervention program revealed that supplementation programs had a positive impact on the nutritional status of children from deprived households. The problem was prohibitive distance which cut off many eligible cases (Hoorweg et al., 1980). In a bid to curb the problem of distance, an experimental mobile nutrition intervention unit was started in Embu in 1974 whose evaluation revealed that the approach was cost effective in terms of reaching a larger target group (Dagnelis, 1979). Such an approach however might not be sustainable especially because of the transport costs.

1.2.2 The Ministry of Agriculture, Livestock Development and Marketing (MOALDM). :- The Ministry of Agriculture livestock Development and Marketing extension services contribute a lot in enhancing food production, promoting acceptable nutritional practices and enhancing household access to low cost and locally available foods. The extension messages on the above are passed to the farmers by frontline extension workers who are mainly diploma and certificate holders.

1.2.3 The Ministry of Education: - The Ministry of education runs the school supplementation program. This program has had a positive impact in terms of increased school enrolment, improved school performance and enhanced nutritional status among school children. The program is split into two. The school lunch program which concentrates in ASAL areas and the school milk program which is nationwide.

1.2.4 The Office Of The President: - The government also runs the food relief activities through the Famine Relief Committee housed in the Office of the President. Implementation of the activities of this committee is through the District Development Committees who have direct contact with the community at grassroots level. The government also has a machinery of forecasting any advent of drought through the Meteorological department. Rainfall fluctuations are used to determine expected levels of food production and therefore the food needs of different regions at

different times.

1.2.5 The Ministry of Culture and Social Services (MCSS)

A key nutrition intervention programme in operation under the MCSS is the Family Life Training Programme (FLTP). The goal of FLTP is to treat and prevent malnutrition among children. There are 14 centres managed by this programme and are distributed across the country in 13 districts. They act as nutrition rehabilitation centres for malnourished children and provide nutrition education for their mothers. Recent evaluations of the programme have revealed shortcomings in its operations especially as regards coverage (Oniang'o, 1991; Omwega, Muita and Mwadime, 1994). Based on these evaluations, the FLTP is currently undertaking major steps towards improving its outreach intervention program for greater impact and involving the communities in its work.

The present study is based on the FLTP in Mbooni Family Life Training centre.

1.2.5.1 Historical Background of the FLTP

The FLTP emerged as a result of the struggle for independence in Kenya. During this conflict, many husbands were detained or killed leaving behind wives and children without proper support. Farming potential was scarce resulting in lack of food. Therefore the British and the Swedish Red Cross Societies started a feeding programme to remedy the situation.

The FLTCs have therefore existed in the post independence period as feeding centres. After 1963, three nutrition rehabilitation centres were started at Kirathimo in Kiambu, Kigumo in Murang'a and Kanduyi in Bungoma district run by the Kenya Red Cross to assist the destitute mothers and their children. After 10 years, in 1974, the centres were handed over to the Kenya government and renamed Family Life Training Centres (FLTCs).

The success of the FLTCs has been the lives of severely malnourished children saved though there has been a high rate of about 25% recurrence either in the same child or a sibling. This is mainly because of the underlying family factors which the centres have been unable to deal with (such as poverty) (WHO/FAO, 1992).

Currently there are 14 FLTCs run by the MCSS throughout the country with financial and some technical support from Danida. These are Kirathimo, Kigumo, Kanduyi, Kwale, Kilifi, Mbooni, Ahero, Lwak, Butula, Agengo, Marigat, Kapenguria, Kirinyaga and Rwika. Mothers from the areas surrounding these centres whose children become weak or ill because of malnutrition are referred to the centres by hospital authorities, social workers, ex-clients, health visitors or other persons responsible for social welfare in the community.

1.2.5.2 The objectives of the FLTP are:-

1. To assist individual families in their efforts to improve family welfare measures.
2. To treat children suffering from severe kwashiorkor and marasmus.
3. To improve knowledge, skills and attitudes of the parents admitted to the FLTCs in the field of nutrition.
4. To encourage family and community participation in the prevention of malnutrition and take some responsibility for its treatment.

1.2.5.3 Operations of the Family Life Training Centres (FLTCs)

The FLTCs are educational institutions with a home environment. An ideal centre consists of cottages ranging from eight to twenty. It has an administration block, lecture hall, central kitchen, store and staff houses. The FLTCs have a multifaceted approach to malnutrition. They are not utilized for rehabilitation of the admitted malnourished children only but also act as training facility for their mothers in nutrition, child care, family planning, home management and simple agriculture. Admission to the centres ought to be through health facilities or if not, then the children are sent to the nearest health facility for medical checkup and treatment for any infections before being admitted. On arrival, the affected child is examined, weighed and classified into the different nutritional categories according to the Wellcome classification. The details are then recorded in the admission

register.

The Wellcome classification is diagnostic and can be applied to an individual child on admission. It uses two types of information, the weight for age (WFA) of the child and presence or absence of oedema.

Table 1 : The Wellcome classification

WFA	With oedema	No oedema
60 - 80% <60%	kwashiorkor marasmic-kwash	underweight marasmus

The duration of the admission to the FLTC is 3 weeks, but if no improvement is observed by the end of this period, the mother can extend her stay.

While at the centre, a mother is responsible for all aspects of care for her child such as washing and cleaning. Mothers also prepare common balanced meals in the central kitchen in turns with supervision from the centre staff. Each individual mother is responsible for feeding her children again with guidance from the centre staff. The mothers also participate in the cultivation of the centre garden so that they gain experience on food production and be able to prevent malnutrition through use of locally available foods on return to their homes.

1.2.6 Non-governmental Organizations :- Other non-governmental organizations involved in correcting the problem of malnutrition in different parts of the country are either involved in extension service provision or in famine relief food supply. Those involved in extension are IFAD, AMREF, KFFHC, NCKK, World Vision-Kenya and the Catholic Dioceses. Their extension activities range from nutrition and health education to assistance in improvement in general living environment. While those involved in famine relief food supply are CRS, OXFAM, Red Cross Society of Kenya, KFFHC, the WFP, and AMREF among others. The activities of these have saved lives of many especially in the ASAL areas.

1.3 STATEMENT OF THE PROBLEM

Malnutrition is a global problem caused by a multiple of factors. These include inadequate food supply, limited purchasing power, poor health conditions and incomplete knowledge about nutrition. These factors combine in different ways over time and place (Berg, 1987).

FLTCs function as nutrition intervention centres where mothers can be admitted with their malnourished children for up to 3 weeks. During these 3 weeks, mothers undergo training sessions on nutrition, child care and health, hygiene, family planning, home management and agriculture. In the same 3 weeks, children are attended to by the centre staff and growth monitoring is performed.

As can be seen from their objectives in section 1.2.5.2, the FLTP aims at reducing the rate of malnutrition in the catchment areas of the FLTCs. Yet high rates of malnutrition in the catchment areas of these centres persist more than 30 years after their establishment. From a 1990/91 study on the nutritional and health status of children admitted at Lwak, Kwale, Mbooni, Kilifi and Ahero FLTCs, it was found that Mbooni had the highest number of readmissions, and admissions of siblings. The siblings admitted in the centre totalled 160 (Omwega et al., 1992).

The problems being faced by the centres now are such that there is a high rate of readmission and only a small proportion of the malnourished children in the community are admitted to the centres.

Ever since these centres were established, the prevalence of malnutrition has not decreased even in the areas being served by these centres (FLTP, 1993). In fact the prevalence of malnutrition is expected to rise with the economic hardships. The question is whether the knowledge acquired from the FLTCs is of any use in dealing with the problem of malnutrition in the catchment areas of these centres? Does it mean that the FLTCs are not of any impact to the discharged mothers and the community at large?

The results of this study will contribute towards helping the centres reorganise their approach for more sustainable effects.

1.4 OBJECTIVES OF THE STUDY

The objectives of this study were :-

1. To determine the nutritional knowledge and child feeding practices of mothers on admission to the Mbooni FLTC.
2. To determine the current nutritional knowledge and child feeding practices of former clients of Mbooni FLTC for the period between January and December 1994.
3. To determine the nutritional knowledge and child feeding practices of mothers not previously admitted to Mbooni FLTC.
4. To compare the nutritional knowledge and child feeding practices of former clients and mothers not previously admitted.
5. To determine the nutritional status of children of former clients of Mbooni FLTC and to compare it with that of mothers not previously admitted.

1.5 RESEARCH HYPOTHESIS

Mothers whose children have been discharged from Mbooni FLTC have better nutrition knowledge and child feeding practices than those whose children have never been admitted to any FLTC.

1.6 EXPECTED BENEFITS

The information obtained from this investigation is expected to benefit the sponsors and administrators of the FLTCs and help the concerned ministry to reorganise the centres so as to improve service deliveries to the community as a whole. In so doing, it is hoped that the problem of malnutrition will be reduced at the roots. The information will also provide baseline data for any further studies in this area by interested organizations.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Malnutrition of the maternal and pre-school child is caused by multiple factors. The immediate causes are inadequate dietary intake and diseases which are linked to a number of underlying factors such as household food insecurity, the reproduction process, inadequate maternal and child health care and limited access to basic services like education. Each of these four underlying causes are affected by levels of knowledge and technology, systems of household and community organization and amounts of income and its control. These are in turn linked to a number of basic causes which are endogenous circumstances that evolve slowly within the system including traditional beliefs and practices, national resource base and the political and ideological superstructure (GOK/UNICEF, 1992). (See appendix 1).

According to a UNICEF-ESARO publication, about 150 million children under five years old are underweight and more than 20 million suffer from severe malnutrition worldwide (UNICEF-ESARO, 1993). It is estimated that 350 million women have nutritional anaemia, some 40 million children suffer from vitamin A deficiency and IDD afflicts 200 to 300 million people with goitre and at least 6

million suffer from cretinism.

Recent information suggests that malnutrition is increasing in some parts of the world, especially in Africa, south of the Sahara. PEM is the most prevalent form of malnutrition in all developing countries including Kenya. Malnutrition can be a very serious problem especially where there is infection (Vogel et al., 1974; Frank, 1980) therefore the effects of nutrition actions and health programs undertaken simultaneously are greater than the sum of their effects on the same population if these actions were to be undertaken separately (Berg, 1981).

The present study looks at some factors associated with child malnutrition at the household level and also looks at the rehabilitation process of these malnourished children.

2.2 FACTORS AFFECTING NUTRITIONAL STATUS OF CHILDREN

Much has been done on different factors that contribute to the nutritional status of a child, especially the under five in a family. These factors include maternal education, household-size, parental occupation and income, land size and food security and intra-household food distribution.

2.2.1 Maternal education

Studies on maternal education as relates to the nutritional status of their children have indicated that there is a direct and

positive relationship between the nutritional status of the children and the knowledge, attitudes and practices of their mothers (Gupta et al., 1991; Bhat et al., 1992). Maternal knowledge of nutrition and childhood diseases was important in improving the nutritional status of their children (Niameogo, 1993) and educated mothers were more likely to seek the services of modern health care professionals than less educated mothers (Elo, 1990; Zontag, Nouwen, Voorhoeve, 1993).

From these studies, it can be seen that the better the maternal education and nutritional knowledge, attitudes and practices are, the better the child's nutritional status. The FLTP addresses this issue by teaching mothers, who are admitted with their malnourished children at the FLTCs, different topics relating to the nutrition and health of the child, personal and environmental hygiene and general family life education. They learn how to prepare nutritious foods for their children by taking turns in the cooking. All the cooking, feeding or any other work done by the mothers is under supervision of the centre staff. Advice is given on immunization, breast feeding and family planning.

2.2.2 Assessing nutritional knowledge

Many studies have attempted to assess nutritional knowledge after a nutrition education. Many of these however have measured this by the impact it had caused. From their review of literature, Beaudry-Darisme and Latham were of the opinion that mothers' nutritional

knowledge improved having measured it by improved child nutritional status (Beaudry-Darisme and Latham, 1973). Kennedy and Alderman (1985) concluded from their studies in Guatemala and Haiti that maternal nutrition knowledge had improved having measured it on the basis of improved incomes which were used in turn leading to improved child nutrition. In Lesotho, a study was done to test whether maternal nutrition knowledge was a mediating factor in the association between maternal schooling and child nutritional status and whether the mechanism involved differed according to socio-economic status. The results of this study showed that the effect of maternal schooling on weight for age was mediated by the mothers' nutritional knowledge only among wealthier households. The results imply therefore that in Lesotho, nutrition education for mothers could contribute to improving childrens' growth but only in households where there is access to a minimum level of resources. For poorer households, nutrition education would not be sufficient (Ruel et al., 1992).

From these studies therefore it can be seen that assessing nutritional knowledge on its own is very difficult. The same has to be assessed through the impact it should have caused. This could be improved by making sure the assessors are the ones who gave the nutrition education themselves. Also where there is a clear set curriculum, assessment of knowledge might be easier. There should also be stratification of the study population into groups of homogeneity to reduce the effect of confounding factors. Assessing

nutritional knowledge from such a group would be easier.

2.2.3 Household size

Studies done on the effect of household size on the nutritional status of the under fives have revealed that children from larger households are significantly shorter for their height and eat nutritionally poorer quality diets than children from smaller households (Pelto et al., 1991; Rao and Gopalan, 1969) and parents are unable to allocate resources over time in such a way as to offset the inevitable advantages accruing to children born in earlier births when per capita resources were greater (Horton, 1988; Onchere, 1984). Some studies, however have supported a large household size arguing that older children in households of seven or more take care and nurture younger siblings thereby having a better nutritional status (Wolley, Weidner, Novotny, 1990).

The size of a family will influence many factors, including individual food security, intra-household distribution of food and the quality of food to be eaten. Usually, the smaller a household size the better the quality of food eaten (Chandra, 1983). In the MFLTC, the issue of family size is addressed in the teaching programme where family life education, family planning and counselling topics are covered. Emphasis is put on the advantages of a small and manageable family size.

2.2.4 Parental occupation and income

A study done in rural Bangladesh showed that a higher family income was of relatively greater benefit to the children of literate mothers than those of illiterate ones in improving the nutritional status (Bairagi, 1980). The infant deaths of lower socioeconomic classes were higher than those of upper (Govt. India, 1983). In Uganda, paternal occupation was the only household indicator related to child mortality. High mortality was related to a father's occupation as alcohol distributor and low mortality to his occupation as tobacco grower or businessman (Vella et al., 1992). In Ethiopia income and father's occupation appeared to be the major household factors influencing weight for age and weight for height indices of nutritional status of the children (Groenewold and Tilahun, 1990). In this case, the more income the occupation paid the better the nutritional status of the children.

Income is very important as relates to amount of food available at the household level because the better paying a parental occupation the more money is available for buying food at the household level and the better the nutritional status of the children. At the FLTCs, mothers are given lectures on income generating projects. They are encouraged to keep small livestock like chicken, rabbits and bees both as a source of protein for the family and for commercial purposes. They are also taught on better methods of Agriculture (crop and livestock). Membership in income generating women groups is encouraged. They are also taught how to utilize

locally available foods in making well balanced and nutritious foods so that income should not be a major limiting factor. They discuss and practice the use of some foods not utilized because of traditional beliefs and taboos.

2.2.5 Land size and food security

Studies done on land size ownership and food security revealed that land tenure patterns played an important role in determining mortality and malnutrition of children in Brazil so that children of landowners showed better nutritional status and smaller risk of death compared to children of labourers (Victora and Vaughan, 1987). In Bangladesh, almost 80% of blind children came from landless households (Cohen et al., 1985). These studies suggest that land is a very important factor in food security. When the land is available, different types of food can be grown and different animals kept. This will improve on the food available for use in the household.

In the FLTCs, mothers learn improved methods of agriculture which enable them to grow different foods especially vegetables in the demonstration plots, they also learn food preservation processes to reduce wastage at time of plenty and to have enough food during scarcity. They are also taught how to keep and care for animals like cows, goats, sheep, chicken, rabbits and bees. All these are aimed at helping the mothers manage and prevent malnutrition of their children.

2.2.6 Intra-household food distribution

Several studies have been done on intra-household food distribution. There are a variety of mechanisms by which some individuals are favoured over others through household food distribution. These include serving order, serving method, refusal to serve foods, channelling of foods and the substitution of low status foods for high status foods. In Nepal, it was found that no differences existed in mechanisms of food distribution or nutrient intake between male and female children, and the mother was last in position to be served, the men and children were given first priority (Gittelsohn, 1991). In India, it was the females especially the young females who were discriminated against when it came to inequality in distribution of food in the household (Basu et al., 1986).

In most African cultures, the male head of household is favoured in terms of food distribution, order of serving and is given the best status food. Next in line are the children especially the male children, so that female children may not get the best quality of food especially when it is scarce. The problem is even worse when the family size is big. In this case, the female children and their mothers are affected most by the scarcity because they are the last to be considered in the serving and therefore risk malnutrition. Among the Kamba of Kenya, children are highly valued leading to large family sizes (Akong'a, 1982). Yet the male child is valued more than the female child so that if there is any little food or

better quality food it is given to the male child. This increases the chances of the female child being malnourished.

At the FLTCs, the mothers are taught and supervised on how to feed the children with a balanced diet. They are encouraged to always give the children priority in terms of food distribution, order of serving and quality of food. In fact while at the FLTCs with their malnourished children, they are encouraged to cook for and feed the children first before anybody else for every meal. It is hoped that by so doing, the mothers will learn how to give the children priority once discharged from the centre and therefore manage already malnourished children and prevent malnutrition of other siblings. It is also hoped that intra-household food distribution will be improved for all children irrespective of their sex.

2.3 NUTRITIONAL REHABILITATION

Nutritional rehabilitation was originally propounded by Bengoa in 1955. He defined nutrition rehabilitation centres (NRCs) as "a centre organised either with sleeping accommodation for children, or similar to day nurseries or kindergartens where malnourished children either attend for a few hours each day or are kept overnight. The objective of which is to educate mothers through the nutritional rehabilitation of the children." (Bengoa, 1955)

Rehabilitation may be organized in the following ways:-

2.3.1 Residential rehabilitation Centres

These are usually attached to district hospitals or health centres. These centres keep mothers and infants together for a few days to a month or until the child gain weight rapidly on a local diet prepared by the mother (Bredow and Jackson, 1994; Cutting and Kumari, 1970; Jansen et al., 1986; MacWilliam and Dean, 1965).

2.3.2 Rehabilitation day care Centres

Keep children all day for three to four months. Mothers learn by taking turns in food preparation at the centre. The centre moves to a new location when all malnourished children within walking distance have recovered (Chandra and Krishnamoorthy, 1972).

2.3.3 Domiciliary rehabilitation (home)

These send a nutrition monitor or health aide to the home daily to assist the mother with the start of rehabilitation. Visits become less frequent as the child improves (Cholton and Moneti, 1989).

2.3.4 Hospital admission

This maybe necessary for a few days to control infection and mineral imbalance before a child starts any of the above programs (FAO, 1983; Chikermane et al., 1972)

All these rehabilitation intervention programs aim at educating the mother on rehabilitation and management of the malnourished child.

Two schools of thought exist on the effects of nutritional rehabilitation on the nutritional status of the children. Some authors have shown positive effects while others have not. Among the reasons given for negative effects are failure in imparting knowledge to the mothers admitted with the malnourished children (Hoorweg et al., 1982; Omwega et al., 1992; Omwega and Muita, 1991; Sivaramakrishnan and Patel, 1993), in coverage during outreach programmes (Oniang'o, 1991; Omwega et al., 1994), in improving chronic malnutrition (Fernandez et al., 1991; Jansen and Verkley, 1986) and because of inadequate facilities (Dahlin et al., 1984). Also mothers' attitude towards rehabilitation follow-up as a waste of time (Nielsen et al., 1992) because children have improved (Thornburn, 1992) and viewing the centres as feeding places and turning up only when there was food (WHO/FAO, 1992; Jansen et al., 1986) have painted a negative picture of these centres. Other studies have recommended improvement of case management in prevention of deaths in the first few days after admission (Ibekwe-VE and Ashworth, 1994) and to have a limited time of intensive treatment and educational activities in hospital, linked to MCH preventive services and a home based follow-up system (Lukmanji, Malekele and Lyamuya, 1981).

Some authors however, have supported the functions of the rehabilitation centres citing good weight gain (Eisler, Cuadra and Llona, 1969; Schneideman, Bennett and Rutishauser, 1971) and prevention of recurrence of malnutrition in the admitted children

(De Lauture et al., 1982) and positive effects on the nutritional knowledge of the mothers (Khanum and Kabir, 1989; Gueri et al., 1985).

The factors cited as making the nutritional rehabilitation centres perform poorly from the above literature are related to the mother's educational level and her attitude towards the centre and the physical facilities present at the centre.

But the positive effects of the nutritional rehabilitation centres cited are related to successful recovery and management of the children admitted to these centres and mother's educational level. A mother's educational level and attitude will determine the ability for her to grasp what is taught, practised and recommended at the centres. This can explain why factors related to a mother's educational level are cited both for and against nutritional rehabilitation centres.

From these two schools of thought, it can be seen that the factors against nutritional rehabilitation centres are beyond the centres' capability. Either the mother's educational level and attitude towards the centre are poor or the centre lacks the necessary facilities. While those for rehabilitation centres cite the benefits that the malnourished child gets. Therefore nutritional rehabilitation centres are good for taking care of the malnourished children and in the process imparting some nutritional knowledge to

the mother depending on her attitude and educational level.

At the FLTCs in Kenya, the admitted children are rehabilitated while their mothers are taught different topics relating to the health and nutrition of a child.

When the malnourished children are admitted to MFLTC, they are classified either as marasmic, kwashiorkor, marasmic-kwashiorkor or underweight cases according to the Wellcome classification of nutritional status (Table 1). The admitted children are supposed to stay in the centre for a period of 21 days. It is hoped that by the end of this period the children's nutritional status would have improved. Those who were admitted in MFLTC in 1994 stayed for an average of 30 days (3 to 72).

While at the centre, the children are given 3 meals and 5 snacks in a day (5.30 am, 8.30 am, 10 am, 12.30 pm, 2 pm, 4 pm, 6 pm, 10 pm) which is either the normal centre diet (high energy and high protein) shown in Table 2 or the therapeutic diet (high energy or liquid) whose composition is shown in Table 3. The mothers are taught and supervised on how to feed the children with these diets.

Table 2 : The normal centre diet

5.30 am	breakfast	Porridge of soya corn blend, sugar and oil.
8.30 am	(snack)	Milk
10 am	(snack)	Porridge of soya corn blend, sugar and oil.
12.30 pm	(lunch)	
	a)	Rice, cow peas, tomatoes, and oil, or,
	b)	Beans, oil, arrow roots, tomatoes and vegetables, or,
	c)	Pigeon peas, bananas, oil, tomatoes and vegetables.
2.00 pm	(snack)	Milk + fruits
4.00 pm	(snack)	Porridge of soya corn blend, sugar and oil.
6.00 pm	(supper)	
	a)	Ugali, bean stew, tomatoes and oil, or,
	b)	Nzenga, vegetables, oil and tomatoes, or,
	c)	Nzenga, bean stew, oil and tomatoes.
10.00 pm	(snack)	Milk

(SOURCE : MFLTC Menu for 1994)

Therapeutic diets are used to bring back to health those children who are severely malnourished on admission. The diets are usually of two types the high energy diet and the liquid diet. Marasmic cases are fed on a high energy diet for at least one week while the kwashiorkor and marasmic-kwashiorkor cases are fed on liquid diets until oedema disappears which is usually after one week. The children with oedema are weighed daily while those without are weighed on alternating days. Any changes in weight are studied carefully and action taken especially if the weight reduces.

Table 3 : Composition of therapeutic diets at MFLTC

Ingredient	High energy diet	Liquid diet
Sugar (gms)	60	100
Fresh milk (ml)	900	150
Corn oil (ml)	50	25

Boiled water was added to ingredients of each of these diets to make 1 litre.

The high energy diet has a caloric value of 1386 kcal while the liquid diet has 718.5 kcal.

The recommended amounts of these therapeutic diets to be given to the child per day depends on its weight. That for high energy diet is 150 ml per kg of body weight per day, while that for liquid diet is 120 ml per kg of body weight per day. The amount for each feeding is calculated from the total for the day.

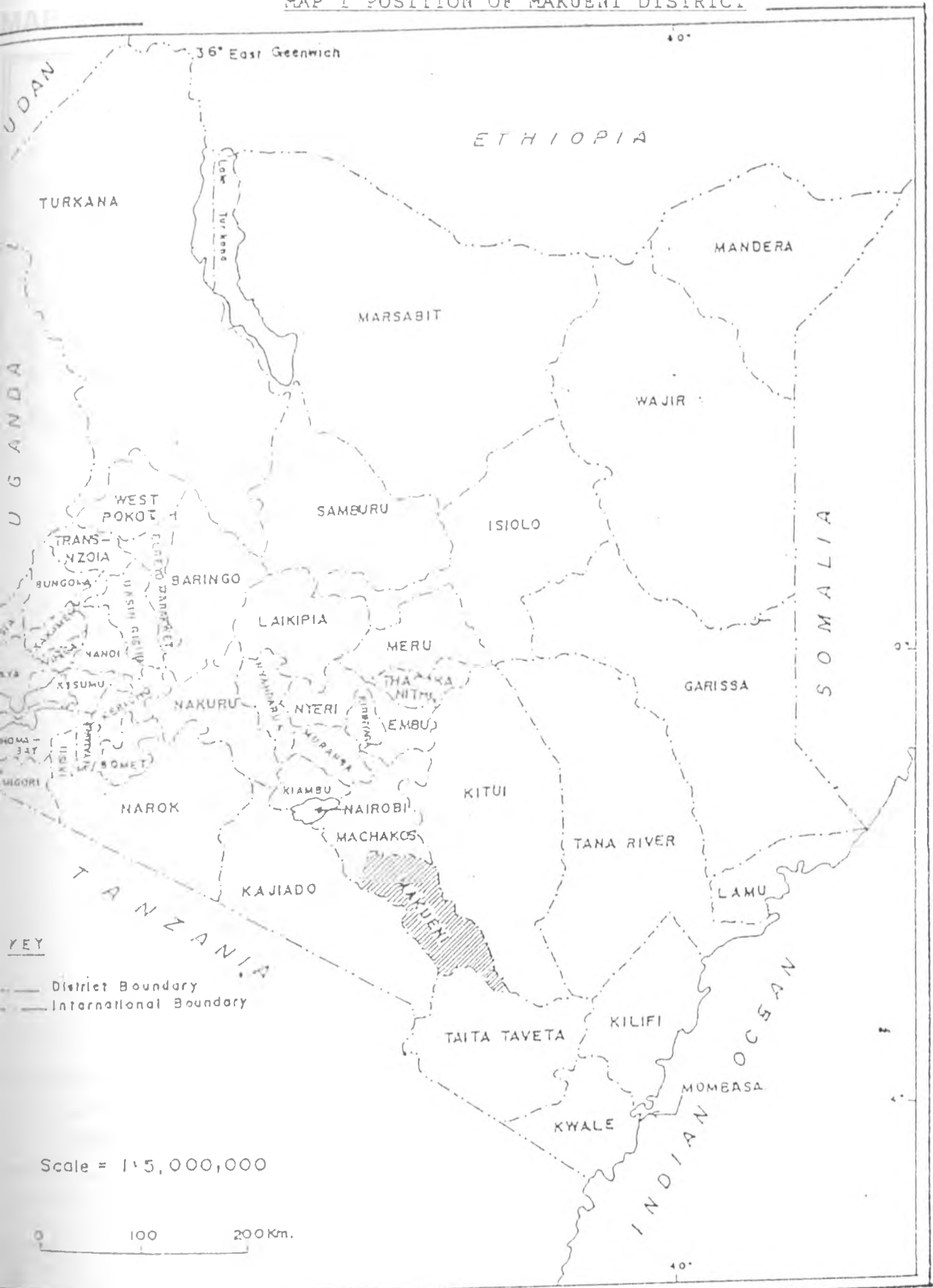
CHAPTER 3

STUDY SETTING

3.1 STUDY SITE

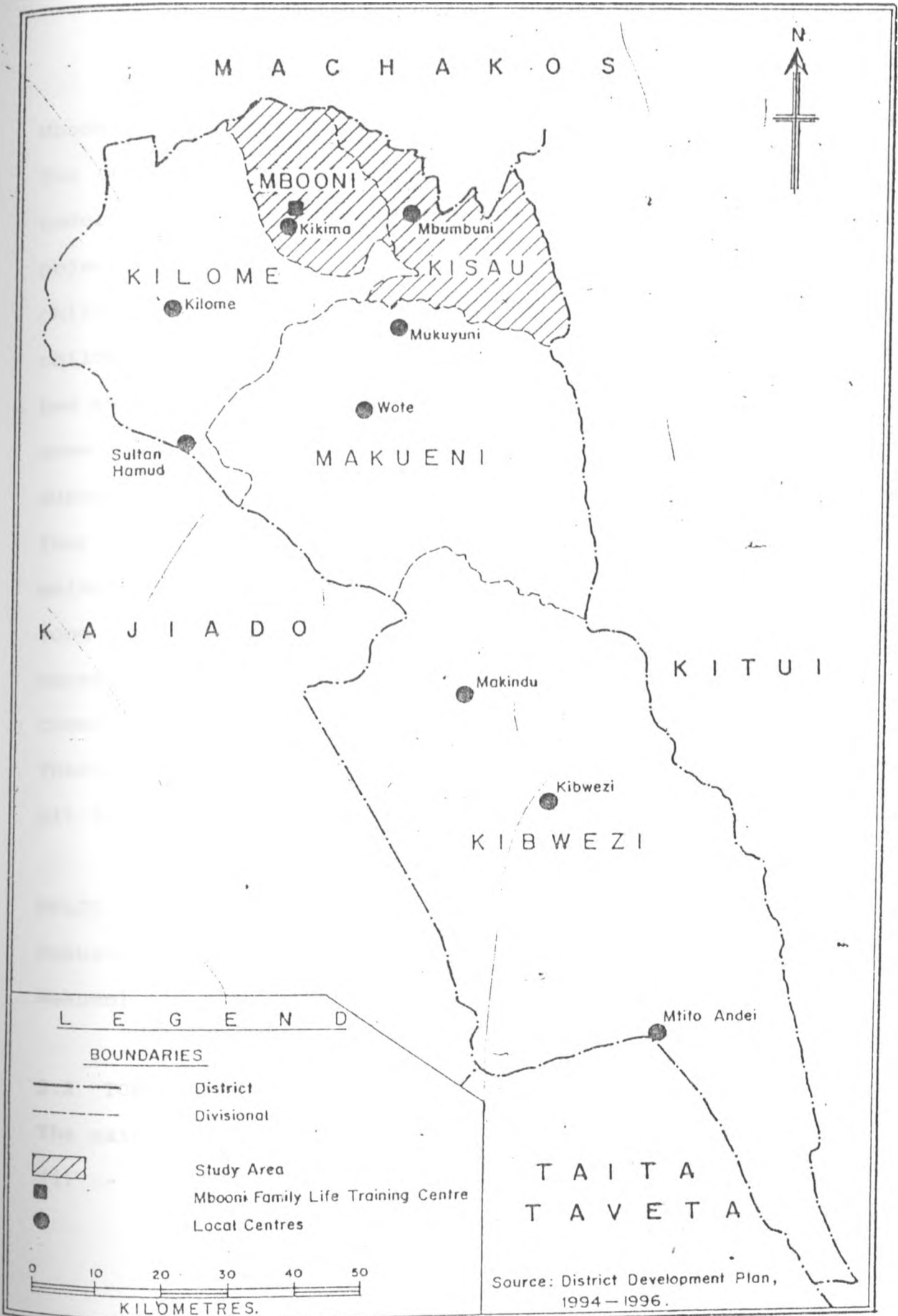
This study was carried out in Makueni district which is one of the 10 districts of Eastern province. Makueni is a relatively new district carved out of Machakos district in 1992. Most of the social and economic infrastructure in this district are inadequate. The major facilities lacking are health institutions, suitable roads, water supplies, electricity, banking and credit facilities. It borders Kajiado district to the west, Taita Taveta to the South-east, Kitui to the east and Machakos district to the north (see map 1). At the time of this study, Makueni District had 8 divisions, namely, Mbooni, Kisau, Wote, Kilome, Kibwezi, Kaiti, Matiliku and Mulala (see map 2). Follow up of cases in this study was done only in Mbooni and Kisau divisions. These occupy an area of 535 km² out of 7,263 km² of the district.

MAP 1 POSITION OF MAKUENI DISTRICT



Source : District Development Plan
Makeni District (1994-1996)

MAP 2 : LOCATION OF THE STUDY AREA IN MAKUENI DISTRICT.



Source: District Development Plan, 1994-1996.

Mbooni Family Life Training Centre (MFLTC) is in Mbooni division. The centre is run by the Family Life Training Programme (FLTP) under the Ministry of Culture and Social Services (MCSS). The main objective of this programme is to rehabilitate malnourished children in the area surrounding the FLTC. It admits malnourished children with their mothers for a period of three weeks. The centre has two administration blocks. One consists of the food store and some offices, while the other has two offices belonging to the supervisor plus deputy supervisor and an admission room. There are four staff houses and 15 cottages where the mothers stay with their malnourished children when admitted. There is a communal dining room for the mothers and their children, this also acts as a nursery classroom for the children. When food is prepared in the communal kitchen, it is brought for eating in the dining room. There is another smaller store in the dining room. There are six pit latrines for the mothers and their children.

MFLTC serves the whole of Ukambani that is Machakos, Kitui and Makueni districts. But for ease of follow-up, the two divisions of Makueni District were chosen as study area.

3.2 TOPOGRAPHY, GEOLOGY AND CLIMATE

The main land formation features in Makueni District are:

- (i) - The volcanic Chyulu hills which lie along the south western borders of the district in Kibwezi division.

ii) - The granitic Mbooni and Kilungu Hill to the south of Machakos town, these rise to a height of 1900 metres above sea level. The land rises slightly below 600 metres above sea level in Tsavo at the southern end of the district to about 1,100 metres in Mbooni division in the north.

Rainfall in the district is generally scarce and varies with altitude. Average annual rainfall ranges from slightly over 1000 millimetres in the highlands to slightly below 500 millimetres in the low-lying south and south-east part of the district. The rainfall pattern is bimodal with the long rains season being in March to May and short rains season in November to December. The temperature varies considerably with altitude.

The two divisions, Mbooni and Kisau, are found to the northern part of the district. Mbooni division is hilly with few natural and planted forests, cool and receives medium rainfall therefore has a potential for crop farming. On the other hand, Kisau division has low-lying plains with the savannah grasslands, hot and receives low rainfall giving it a potential for ranching.

3.3 POPULATION

The estimated population size of Makueni district for 1994 was 737,977. The dependency ratio is estimated at 124:100. That is every 124 dependents rely on 100 productive persons in the district

(GOK, 1993). The district is occupied by one ethnic group, the Kamba.

3.3.1 THE KAMBA - THE ORIGIN, MARRIAGE AND VALUE OF CHILDREN

3.3.1.1 The origin of the Kambas

There are several myths that try to explain where Kamba of Kitui and Machakos districts originated from.

The myth of creation says that Mulungu (God) created a couple from the skies and another from a mould. The children of these married to have the Kamba of today (Mbula, 1974). Another myth from the Kikuyu says that Gikuyu, Kamba and Maasai were brothers and their father gave them different working tools to choose from. This was to give them a socio-economic differentiation. The Kamba chose the bow and arrows and became the hunter/gatherer (Middleton, 1965).

3.3.1.2 Marriage and Related Customs among the Kamba

Marriage was a highly valued practice among the Kamba and it was almost an obligation for a man of age to marry. If a man was too poor to meet the bride wealth, it was the responsibility of his clan to raise the required wealth for him to marry at least the first wife. Creation of a polygamous family depended on a man's wealth so long as he did not marry sisters because it is a taboo. Divorce was caused by unfaithfulness which if it occurred was followed by return of the bride wealth to the man's family.

3.3.1.2.1 Other types of marriage:-

1. Iweto - this is a woman to woman marriage and happens when:-
 - a woman is barren
 - a woman has lost all her children
 - a woman has produced only girls and she can afford to pay bride wealth

A man is selected from the husband's clan to inseminate her "bride" and the children of this marriage are socially her grandchildren. This enables her to continue her line and to have social status.

2. Levirate Marriage - this is when a man inherits the wife and children of his deceased brother, paternal cousin or clansman. The inherited wife and children legally belong to the deceased man even the children he fathers.

3.3.1.3 Cultural value of children and attitudes to Family Size

Like any most African cultures, the Kamba highly valued children. The more children one had the better they were socially and the better the physical protection (Akong'a, 1982). Sons were considered more valuable than daughters.

Therefore a number of personal, social and physiological reasons encouraged and even forced people to have many children. The economic problem of bringing up children never existed because it was not the responsibility of the nuclear family alone to bring up children but even the extended family and clan as a whole (Were and

Akong'a, 1986).

Current social-economic conditions have changed most of the cultural practices but those related to marriage, number of children and their value still exist and have a bearing on the nutritional status and child care practices. They may also influence the use of the FLTCs by the community.

CHAPTER 4

METHODOLOGY

4.1 NATURE OF STUDY

This study was retrospective and cross-sectional in nature and looked at the nutritional status of children exposed to the MFLTC versus non-exposed. The study was aimed at establishing the nutritional knowledge and child feeding practices of mothers whose children had been admitted and discharged from the FLTC during the period between January and December 1994. A control mother who had never been admitted to the FLTC was found for each previously admitted mother. The nutritional knowledge and child feeding practices of the two groups were compared so as to explore the impact of nutrition teaching at the centre. A small sample of mothers who were admitted to MFLTC at the time of the study were also studied.

4.2 THE REHABILITATION PROCESS

4.2.1 The teaching Programme

While at the centre, mothers of malnourished children are taught different topics relating to the health and nutrition of the child and personal and environmental hygiene (Table 4). In Mbooni Family Life Training Centre, the mothers are taught everyday from Monday to Friday. A sample time table of this centre is presented below.

Table 4 : The teaching time-table of MFLTC

DAY	11.00 AM-12.00 PM	2.30 PM-3.30 PM
MONDAY	Nutrition and Balanced diet	Personal and Environmental hygiene
TUESDAY	Diarrhoea and vomiting	Malnutrition
WEDNESDAY	Family Planning	Antenatal and postnatal care
THURSDAY	Immunization/ growth card/ first aid	Worship and home management
FRIDAY	Weaning diet/ Breast feeding	Field day (Agriculture/livestock)

Table 4 gives the topics that are taught in MFLTC. The intention of this teaching is that the mothers acquire basic skills on the causes of malnutrition and circumstances that are likely to cause it. In the present study, questions relating to what the mothers were taught in MFLTC were used to test their nutritional knowledge.

4.2.2 Children admitted in 1994

The most common type of diagnosis in 1994 was marasmus (29.34%) (See Figure 1). Healthy children were also admitted with the malnourished ones. These were other under five year old children in the same households who could not be left on their own. The distribution of the admissions per month and sex is shown in Figure 2. This indicates that there was a depression in the admissions for the months of April, May and June and a peak for the months of December and March (range of 17 to 47).

FIGURE 1: NUTRITIONAL STATUS AT ADMISSION OF STUDY CHILDREN 1994

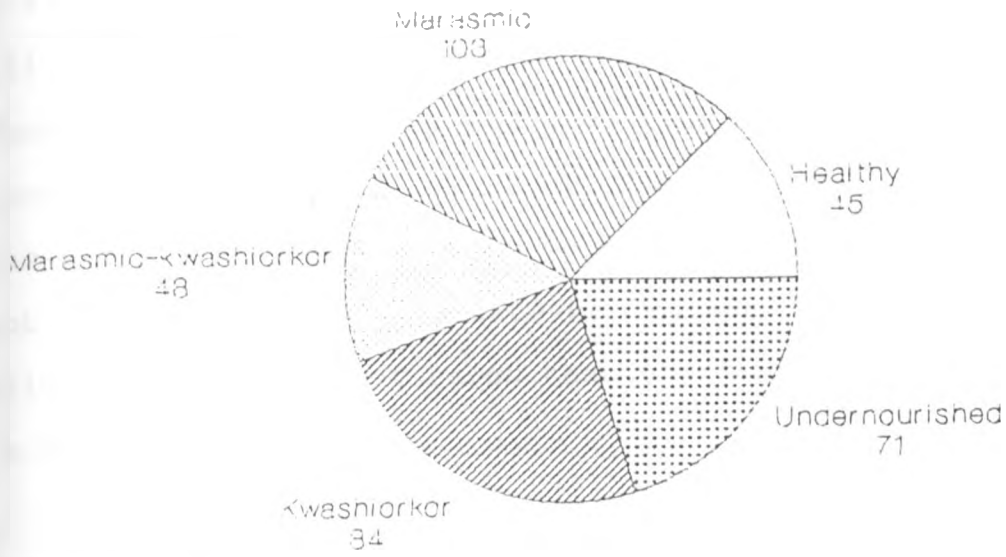
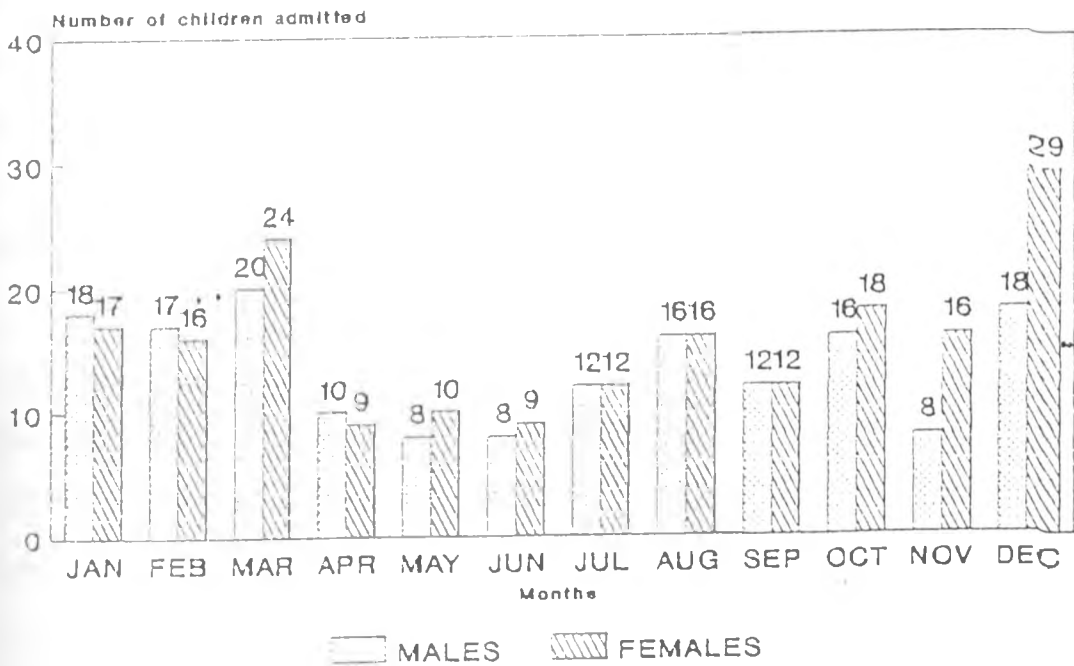


FIGURE 2: DISTRIBUTION OF ADMISSIONS PER MONTH AND SEX



4.3 EXPECTED SAMPLE SIZE

All the mothers admitted to the rehabilitation centre in the period January to December 1994 and came from Kisau and Mbooni divisions were to be included in the study. The total number from the records was 62. All attempts were to be made to trace all the mothers and not more than 30% failure-to-trace rate was to be expected and allowed. The number of cases that was finally covered was 49 that is a coverage of 79%.

4.4 THE STUDY POPULATION/SAMPLE SELECTION

Mbooni and Kisau divisions were chosen because of the following reasons:-

- (i) ease of follow-up
- (ii) Kisau division was still part of Mbooni division up to late 1994 therefore it was difficult to separate out those mothers who came from this division from those who came from Mbooni division in the admission register.

4.4.1 Selection criteria of cases

Purposive sampling of all the cases that came from Mbooni division in 1994 was done as per the time and funds availability. This division was later sub-divided into Mbooni and Kisau divisions.

4.4.2 Criteria for identification of controls

The controls in this study were those women whose children had never been admitted to any FLTC, were the nearest neighbours to the cases with children of under five years of age. This criteria was chosen to try and minimize the differences between cases and controls in terms of distance to and from a health facility, services from a health worker/nutritionists or any other personnel in the area who may be concerned with the health of the children and distance from a water point.

4.5 SURVEY TOOLS

Four different instruments were used to collect the data.

1.0 The general mother questionnaire :-

The following variables were included in this; socio-demographic, maternal characteristics, environmental sanitation and mother's nutritional knowledge. The respondent of this questionnaire was the mother of the child concerned or guardian for example an aunt.

2.0 Child questionnaire :-

Information was obtained on all the children previously admitted to MFLTC and children of control households under the age of five years. The respondent was the mother or guardian and contained the following: child characteristics, breast feeding and weaning practices, morbidity and anthropometric measurement.

3.0 Cases' centre questionnaire :-

Data was obtained from the MFLTC admission registers. It mainly concentrated on the recorded variables of nutritional knowledge on admission and on discharge, duration of admission, fall out or cases that absconded from the centre and general nutritional status of the child on admission and on discharge. This information was dependent on the quality of record keeping in the centre.

4.0 Centre questionnaire :-

In this the supervisor was the respondent and information was collected on the general characteristics of MFLTC, when it was started, how many staff they have and reasons given by the mothers for not completing the 21 days admission duration.

(See appendix 1 for details of the questionnaires).

4.5.1 Standardization of survey tools

The mother and child questionnaires were pretested on mothers who had been admitted at MFLTC during piloting. The questionnaires were then modified before actual data collection.

The length boards were standardized by measuring the length of a pole of known height twice.

4.6 SPECIFIC RESEARCH ACTIVITIES

The pretesting of the questionnaires was carried out before actual data collection. Research assistants were trained and involved in

the pretest.

4.6.1 Anthropometric measurements

4.6.1.1 Length and Height measurements

The lengths and heights of the children were measured using length boards. Recumbent length was taken for those who were two years and below. Two readings were taken for every child to the nearest 0.1 cm. The average of these two was recorded.

4.6.1.2 Weight Measurements

The weights of the children were taken by use of Salter scales (model 235 65, maximum weight 25 kg). The Salter scale was first adjusted to zero with the plastic pant before every reading. The weight was taken without any clothing on. Two readings were taken for every child to the nearest 0.1 kg. The average of these was recorded.

(See appendix 3 for methodology of anthropometric measurements).

4.6.2 24 hour dietary recall

The 24 hour dietary recall was done for a sub-sample of the study children. The amounts of food eaten by the child in the past 24 hours was estimated by measuring volumes of water of the same amount as the food. Measuring cylinders of 1000 ml volume were used. The calories and proteins contained in the food was then computed and compared with the requirements for the age.

The ages of the study children were estimated to the nearest month from their clinic cards which most of the mothers had. But where a clinic card was missing, an estimation of the child's age was done by use of local events. The mothers' ages was got from their National identity cards. The ages of the fathers of the children were in most cases got from the mothers because the fathers were rarely found at home during the study.

4.7 LIMITATIONS

The clients of MFLTC come from very many areas far from the centre and it was difficult to trace all the cases. Some cases could not be traced because of incomplete or wrong addresses as well as change of residence.

4.8 METHOD OF ANALYSIS

Data was entered in DBase 111. It was cleaned and analyzed in SPSS and anthropac. Descriptive analysis was produced as frequencies, means, cross tabulations, charts and figures. These were produced in SPSS and Harvard graphics. Further analysis was made on some of the variables using Student's t-test, chi-square and logistic regression.

After chi-square and student's t-test, thirteen independent variables showed significant differences between cases and controls at the 5% level or less. These were thought worth including in the modelling. Variables left out of this modelling were those which

showed high correlations with each other and those with some information missing.

Those included in the model were:-

- Q2 - amount of land cultivated
- TINC - total value of property
- Q4A(1) - ownership of livestock
- Q6B(1) - ownership of radio
- Q7A - main source of food previous season
- AQ4(1) - mother's marital status
- AQ9(1) - membership in income generating women's group
- AQ12(1) - if attended ante-natal clinic when pregnant
- AQ14 - age at which child stopped breastfeeding
 - AQ14(1) - at twelve months or less
 - AQ14(2) - between twelve and twenty four months
 - AQ14(3) - after twenty four months
- BQ2A(1) - knowledge of causes of kwashiorkor
- SANITA1B - ownership of bathroom
- SANITA1C - ownership of kitchen
- SANITA1E - ownership of animal shed

Forwards stepwise (FSTEP) selection was used to choose the model best representing the relationships between the cases and controls. This started with a model containing only a constant then the variable with the smallest significance level was entered into the model in this case this was ownership of a radio.

All the thirteen variables in the model that were listed on the FSTEP keyword were then examined for removal. The variables would be removed if the newly calculated significance level was more than 5%. Otherwise the next variable with the smallest significance level was entered into the model.

After each step, new significance levels were calculated and variables already in the equation were examined for either removal criteria (if the new significance levels were more than 5%) or entry criteria (if the new significance levels were less than 5%).

CHAPTER 5

RESULTS

5.1 INTRODUCTION

As indicated earlier in section 3.1, this study was carried out in Mbooni and Kisau divisions of Makueni district. It involved follow-up of clients admitted to MFLTC (cases) in the period January to December 1994 and matched mothers who had never been admitted to MFLTC (controls) from these two divisions.

Ten mothers who were admitted with their malnourished children during the study were also studied. These mothers had a mean age of 26.8 years (SD=5.29). Their nutritional knowledge and child feeding practices was also determined and the results showed that their nutritional knowledge compared well with that of controls and there was no significant difference between these mothers and the others studied in terms of child feeding practices. Their children were 16 and had a mean age of 37.25 months (SD=28.54), mean height of 80.25 cm (SD=14.52) and a mean weight of 9.672 kg (SD=3.28). The nutritional status of these ten children was such that 37.5% of them were below 60% of the reference weight for age, 43.8% were between 60% to 80% of the reference weight for age and 18.8% were above 80% of the reference weight for age.

The results given below are on the cases as defined above and their controls. The total number of former clients traced and interviewed was 49 out of 62 giving a 79% coverage of cases admitted to the centre in the year 1994.

From the findings, 36 cases were admitted to MFLTC in the period of the study from Mbooni division but only 31 (86%) were traced. Kisau division had 26 cases but only 18 (69%) were traced. Of the 13 cases which were not traced, 10 were located in parts of the divisions which were inaccessible and 3 could not be traced because of wrong address.

5.1.1 Social Demographic Findings Of former Clients Of MFLTC And Their Controls :-

The age distribution of the study population is shown in Table 5 below.

Table 5 : Age Distribution of the Study Population (%)

Age Distribution(years)	Cases (n=319)	Controls (n=275)
0 - 4	18.5	22.6
5 - 9	22.6	19.6
10 - 14	13.5	14.2
15 - 19	07.8	09.4
20 - 24	06.9	04.0
25 - 29	05.0	06.6
30 - 34	06.9	07.6
35 - 39	06.3	06.9
40 - 44	05.0	04.0
45 and above	07.5	05.1

The ages of 16 adults among the study population were not known.

There was a total of 95 households included in this study, 49 of these were cases' households (former clients of MFLTC) and 46 were controls' households. The total population was 610 people with 332 of these being from the cases' households. Out of the total population, 51.48% were males. The under fives made up 20.37% of this population. Those in the reproductive age (15 - 44 years) made up 38.2%.

Household information for the cases and controls is shown in Table 6 below.

Table 6 : General characteristics of the study population

	cases	controls
Number of respondents	49	46
Mean household size	6.79 (2.29)	6.04 (2.22)
Religion (Catholic %)	34.7	39.1
Mean age of respondents	34.3 (11.04)	30.69 (7.24)
Marital status (% married)	79	95
Respondents' educational level (%)		
None	16.3	2.2
1 - 4 years	44.9	19.6
5 - 8 years	30.6	67.4
> 8 years	8.2	10.8
Occupation (house wife %)	55.1	45.7
Educational level of spouse (%)		
None	16.3	2.2
1 - 4 years	24.5	17.4
5 - 8 years	46.9	45.7
> 8 years	12.2	34.8
Mean age of spouse	42.8 (12.65)	37.9 (8.52)
Occupation spouse (%)		
- casuals	55.1	21.7
- permanent employment	10.2	54.3
Total value of property ksh.	96462 (86426)	161366 (108258)

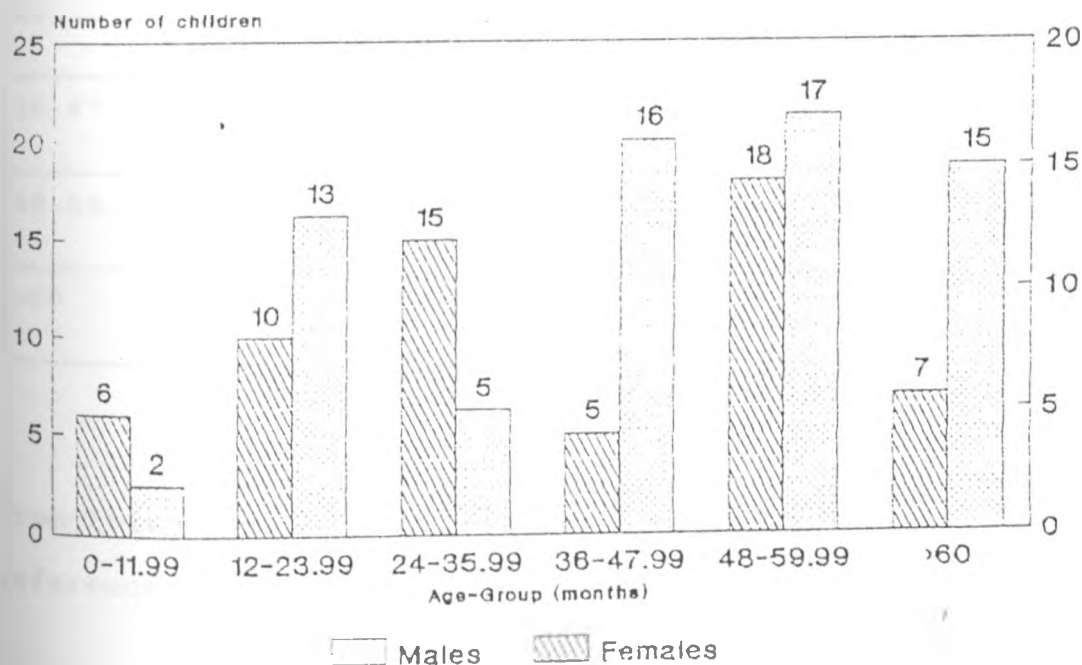
Note:- Numbers in parenthesis are the standard deviations (SD).

The average household size for both cases and controls was 6. In this area, people belonged to different denominations but the majority (34.7% cases and 39.1% controls) belonged to the catholic faith. The respondents of this study were women who were mainly married (79% cases and 95% controls). The controls seemed younger with a mean age of 30.69 years than cases whose mean age was 34.3 years. Most cases had fewer years of schooling (44.9% had 1 - 4 years) than controls (67.4% had 5 - 8 years). But most spouses for both cases (46.9%) and controls (45.7%) had 5 - 8 years of schooling. The average total value of property in Kenya shillings for cases (96,462.60) was lower than that of controls (161,366.4).

5.2 NUTRITIONAL STATUS OF THE CHILDREN STUDIED

The distribution of the children studied (cases and controls) by sex and age-group is shown in Figure 3 below.

FIGURE 3: DISTRIBUTION OF STUDY CHILDREN BY SEX AND AGE-GROUP



The cases' and controls' children included in this study were 129. Out of these, 71 were from the cases' households and the rest from the controls' households. There were in total 68 males (40 of these from the cases' households) and 61 females (31 of these from the cases' households).

Table 7 below shows the general characteristics of the cases' and controls' children.

Table 7 : Nutritional status of the study children by age-group

Age-group (months)	Cases (N=71) Controls (N=58)	proportion undernourished(%)		
		<60	60-80	>80
<11.99	cases (n=2)	1.5	0.0	1.5
	controls (n=6)	0.0	0.0	10.4
12-23.99	cases (n=11)	2.8	7.0	5.6
	controls (n=12)	0.0	12.1	8.6
24-35.99	cases (n=9)	0.0	9.9	2.8
	controls (n=11)	0.0	13.8	5.2
36-47.99	cases (n=11)	4.2	8.4	2.8
	controls (n=10)	1.7	8.6	6.9
48-59.99	cases (n=18)	2.8	12.7	9.9
	controls (n=17)	1.7	12.1	15.5
>60	cases (n=20)	7.0	14.1	7.0
	controls (n=2)	0.0	3.4	0.0

From this table, 18.3% of cases' children were below 60% of the reference median weight for age compared to 3.4% of controls'

children. The proportion of children in the 60-80% of the reference median weight for age were almost the same in both groups, 52.1% of cases' children and 50% of controls' children. Those in the more than 80% of the reference median weight for age were 29.6% of cases' children and 46.6% of controls' children.

In 1994 there was a total of 351 children admitted in MFLTC whose nutritional status on admission was as shown in Figure 1 (section 4.2.3). The mothers were 179 (one hundred and seventy nine) for the year. The case diagnosis was made by the centre staff based on weight for age and clinical examination.

The children who were admitted in 1994 gained weight considerably in the centre as shown in Table 8 below. The changes in weight were calculated between admission and discharge weights (A) and changes in weight between discharge and follow-up weights (B). The differences were then calculated per month to have a uniform duration between weights.

The marasmic/kwashiorkor cases gained a higher percentage of weight in the centre (35.26%) than the other cases. But in the community kwashiorkor cases continued to recover at a faster rate and gained more weight (73.84%) than the other cases. On the overall, the children gained more weight while at the centre than when discharged back to the community.

Table 8 : Average increment in weight in kg per month (SD).

	No.	A	B
Marasmus	24	0.77 (0.66)	0.22 (0.26)
M/kwashiorkor	6	1.28 (0.96)	0.13 (0.24)
Kwashiorkor	13	0.44 (0.81)	0.48 (1.35)
Underweight	5	1.14 (0.29)	-0.18 (0.73)

Key:- A is the difference between admission and discharge weights

B is the difference between discharge and follow-up weights

By use of Anova test Table 9 below indicates that there was no significant difference in the nutritional status of the children on discharge and on follow-up although they gained more weight at the centre than in the community. On admission, 28.2% of the children were below 60% of the reference median weight for age compared to 15.1% on discharge and 18.31% on follow-up. Those who were above 80% of the reference median weight for age were 11.4% on admission compared to 21.9% on discharge and 29.58% on follow-up. A large proportion of the children had their nutritional status falling between 60% and 80% of the reference median weight for age (60.4% on admission, 63% on discharge and 52.11% on follow-up).

Table 9 : Nutritional status of the children admitted in 1994(%)

% of median (WFA)	On admission (n=351)	On discharge (n=351)	On follow-up (n=71)
<60	28.20	15.10	18.31
60-80	60.40	63.00	52.11
>80	11.40	21.90	29.58

The results indicate that the malnourished children still remain relatively malnourished when discharged as seen in Table 10 below.

Table 10 : Nutritional status of children studied (%)

% of median	cases (n=71)	controls (n=58)
<60	18.31	3.45
60-80	52.11	50.00
>80	29.58	46.55

The nutritional status of the children in this study were grouped into severely malnourished (<60% of the reference median weight for age), moderately malnourished (60-80% of the reference median weight for age) and normal (>80% of the reference median weight for age). Only 29.58% of the cases' children were classified as above 80% of the median weight for age compared to 46.55% of controls' children. And 18.31% of cases' children were below 60% of the reference median weight for age compared to 3.45% of controls' children. On the overall there were moderate differences in the nutritional status of the children in the study population (p=0.521). Although cases' children were worse off.

5.3 NUTRITIONAL KNOWLEDGE AND CHILD FEEDING PRACTICES OF THE MOTHERS

5.3.1 : Nutritional knowledge

As stated earlier, mothers who are admitted with their malnourished children are exposed to nutritional education while at the centre.

Table 11 below gives an assessment of their nutritional knowledge as per the teaching programme (section 4.2.1).

Table 11 : Assessment of mothers' nutritional knowledge (%)

	cases (n=49)	controls (n=46)
1. Identification of kwashiorkor	81.6	67.4
Cause of kwashiorkor	85.7	67.4 *
2. Correct classification, common foods	87.8	73.9
3. Child's food, energy dense	89.8	84.8
4. Frequency of feeding 2yr old in 24hr		
≤ 3 times	4.1	2.2
3 ≤ 5 times	61.2	82.6 *
> 5 times	32.7	15.2 *
not known	2	0

* denotes a significant difference between the two groups with a
P ≤ 0.05

81.6% of the cases were able to correctly identify a child suffering from kwashiorkor from descriptions and use of a picture (appendix 4) compared to only 67.4% of controls. They were also able to correctly explain the cause of kwashiorkor better (85.7%) than controls (67.4%). That is, the cases could relate the cause of kwashiorkor to either lack of food or lack of a balanced diet. The questions asked were standardized as per the teachings offered at the centre. The knowledge on cause of kwashiorkor was significantly different between cases and controls (p=0.0344). The child weaning practices questions did not have any correct or wrong answers. Various ages of children and reasons were given by the mothers for when to introduce water, liquids, solids, juices and porridge.

However as per results, the common age of the child for when to introduce water and liquids was 0-4 months and solids and porridge was 4-6 months. In classifying common foods like bananas, irish potatoes, muthokoi, beans, fruits and vegetables in their food groups, 87.8% of the cases and 73.9% of the controls classified at least three of the six foods correctly. That is those who could correctly classify these foods into either body building, energy giving or protective. Knowledge of how to make a child's food energy dense was correct if a mother mentioned practices including increasing the density or vitamins or making proteins available (89.8% cases and 84.8% controls). Slightly more cases had received some nutritional information (63.3%) compared to 60.9% of the controls. The main source of this information was MFLTC for cases and MCH for controls. The main type of information for both groups was child care (78.3% cases and 71.1% controls). There was a significant difference between cases and controls as frequency of feeding the children 3-5 times and >5 times was concerned. There was no significant difference in knowledge between mothers who were discharged <3, 3-6 and >6 months ago before being interviewed.

Table 12 below gives an assessment of the mothers' hygiene practices.

Table 12 : Assessment of mothers' hygiene practices (%)

	cases (n=49)	controls (n=46)
Sanitation status(% ownership)		
Pit-latrine	61.2	78.3
Bathroom	14.3	41.3 *
Kitchen	55.1	80.4 *
Kitchen garden	28.6	41.3
Dish rack	12.2	21.7
Animal shed	24.5	60.9 **
Tap water	4.1	6.5

Where, * is $P < 0.01$ and ** is $P < 0.001$

Presence or absence of sanitation facilities were used to test the mothers' ability to put into practice what is taught and recommended at the Family Life Training Centre. As stated earlier on, the mothers are taught both personal and environmental hygiene while at the centre. However, more controls owned these facilities than cases. The variables that showed significant difference between cases and controls were ownership of a bathroom ($p=0.0032$), ownership of a kitchen ($p=0.0085$) and ownership of an animal shed ($p=0.0003$).

5.3.2 : Child feeding practices

As seen from Section 4.2.1, the mothers while at the centre are taught many topics relating to the child's health and nutrition. They are also supervised on cooking for the children and feeding

them. Table 13 below gives some variables that were chosen to assess the child feeding practices of the mothers in this study.

Table 13 : Child feeding practices (%)

	Cases (n=71)	Controls (n=58)
1.Age(mths) stopped breast feeding	21.56	21.48
2.Food frequency per week		
(a) Not eaten	63.90	64.40
(b) Eaten 2-4 times	60.00	63.80
(c) Eaten >4 times	54.00	48.60
3.Good feeders	85.70	87.70
4.Unwell children 7 days before proportion sought health care	50.00 42.90	36.80 66.70
5.Had diarrhoea previously	84.30	77.20
6.Managing child with diarrhoea		
(a) Give water and fluids only	48.60	52.60
(b) Take to hospital or give medicine	51.4	47.40
7.Child care taker - mother	58.60	66.70

There was no significant difference between cases and controls in their child feeding practices. All the mothers studied had similar child feeding practices. The foods that were not eaten by the children from Table 14 were green grams, peas and cassava. Those eaten 2-4 times per week were bananas, eggs, potatoes and fruits. Those that were eaten >4 times were maize meal (ugali), beans and vegetables. Most of the children studied were good feeders (85.7% cases and 87.7% controls). They had also ever suffered from diarrhoea in their life time (84.3% cases and 77.2% controls). In managing a child with diarrhoea both cases and controls had varied answers, which included giving fluids and water (48.6% cases' children and 52.6% controls' children) and taking to hospital

(51.4% cases' children and 47.4% controls' children). Out of those children who had been unwell in the past 7 days (50% cases' children and 36.8% controls' children) before the study, 42.9% of the cases' and 66.7% of the controls' were taken for treatment. The calculations of a 24 hour dietary recall which was exercised on a sub-sample of the children suggests that over 70% of the children took more energy and proteins than their physiological requirements.

5.4 FURTHER ANALYSIS

From chi-square and t-test, all the independent variables which showed significant differences between cases and controls were used in logistic regression analysis to find out which variables in combination will distinguish a case from a control. The results of this analysis are presented in Table 14 below.

Table 14 : Contribution to variance between cases and controls

Variable	regression coefficient	R-value	P-value
Land cultivated	0.5723	0.1783	0.0135*
Own livestock	1.9864	0.2239	0.0036**
Women group member	1.3503	0.2795	0.0005***
Age stopped B/feeding		-0.1769	0.0183*
<1 year	-1.9737	-0.1776	0.0138*
1-2 years	0.5303	0.0000	0.3272
>2 years	-0.3757	0.0000	0.5515
Know cause kwashiorkor	-1.6137	-0.2474	0.0017**
own a bathroom	1.2935	0.1794	0.0131*

Where, * is $P \leq 0.05$, ** is $P \leq 0.01$ and *** is $P \leq 0.001$

The outcome variable of Table 14 was becoming a control that is the child becoming well from malnutrition therefore not being admitted to the FLTC.

From Table 14 the R-value gives the partial contribution of each variable to the outcome variable. The variables that contributed positively to one moving from a case to a control were size of land cultivated, ownership of livestock, membership in an income generating women group, if a child stopped breast feeding at between one and two years and if a mother owned a bathroom. The highest contribution was by whether a mother was a member of an income generating women group which partially explained 27.95% of the variance between a case and a control. The variables that contributed negatively to one moving from a case to a control were the overall age at which the children stopped breast feeding especially, if the child stopped breast feeding at less than one year of age and knowledge of the cause of kwashiorkor. The variable that partially contributed most negatively to one moving from a case to a control was knowledge of the cause of kwashiorkor which explained 24.74% of the variance between cases and controls.

CHAPTER SIX

DISCUSSION

6.1 INTRODUCTION

This study set out to determine the nutritional knowledge of clients previously admitted to the FLTC (cases) and their child feeding practices and to compare this with that of mothers without a similar exposure (controls).

The under five population in this study was 20.37% of the population studied. This was higher than the expected percentage for Makueni district in 1994 which was 18.41%. This difference is expected because the study population was selected women of whom all had under fives unlike the general population (from which the district average is calculated) which would include some households without children or under fives. The male to female ratio of the study households was almost 1:1 as is expected in any normally distributed population and they belonged to different religious denominations although the majority were in Catholic faith.

6.2 NUTRITIONAL KNOWLEDGE

The results in the present study indicate that mothers previously admitted have a higher nutritional knowledge compared to controls. This is contrary to the findings of other studies which have shown that mothers are discharged from such institutions without much

knowledge (Hoorweg et al., 1982; Omwega and Muita, 1991; Omwega et al., 1992; Sivaramakrishnan and Patel, 1993).

Knowledge both in the present and these other studies was measured by designing a questionnaire on what the mothers should have been taught in the centre. This questionnaire was then exercised on follow up. In the present study however, although some questions did not have any correct or wrong answers like, when certain foods are to be introduced to a child or how one can treat diarrhoea, most important was the fact that more cases could correctly identify a child suffering from Kwashiorkor from descriptions and use of a picture than controls. Most of these cases also knew the correct cause of Kwashiorkor as lack of adequate food and good balanced diet.

Among the variables used in the present study to assess nutritional knowledge of the cases and controls, knowledge on cause of kwashiorkor and responses on feeding a two year old child 3-5 times and >5 times showed significant differences between cases and controls. On testing difference in nutritional knowledge between cases discharged at different times (<3 months, 3-6 months, >6 months) before the study, it was found that there was no significant difference though the numbers were very small for any statistical conclusion. This meant that whatever knowledge was acquired at MFLTC was not lost even after 6 or more months of discharge.

These findings on nutritional knowledge are similar to those found in studies carried out in Uganda and Bangladesh. In Uganda, a study was done on a Nutrition Rehabilitation Unit at Mulago Hospital where different groups of mothers discharged for up to 1 year were interviewed. The results of the interview showed that no knowledge had been lost (Schneideman, Bennett and Rutishauser, 1971). In Bangladesh the study was on follow-up of children previously admitted to a nutrition rehabilitation centre which came up with similar findings of knowledge not having been lost although the controls were of two types, those who were attending outpatient clinics and those who were healthy in the community (Khanum and Kabir, 1989).

The nutritional knowledge of those mothers interviewed on admission to the centre compared well with that of the controls showing that the better nutritional knowledge of the cases was acquired in the MFLTC.

The increase in nutritional knowledge however needs to be translated into action. The results of this study suggest that although the nutritional knowledge of the cases was good the nutritional status of their children was not very good, showing that nutritional knowledge alone does not necessarily translate into better nutritional status. Other intervening variables must therefore be sought (Hoorweg and Niemeijer, 1980).

6.3 CHILD FEEDING PRACTICES

The child feeding and sanitation practices of mothers after discharge from a rehabilitation centre are expected to change according to the teachings and recommendations given at the centre. This however is not usually the case. Sometimes the mothers cannot put into practice all that is taught because of lack of resources (Oniang'o et al., 1991) or because of other problems in the family including marital instability, mother's low educational level and having many children of pre-school age (Hoorweg and Niemeijer, 1991). Therefore knowledge of what is taught and practiced at the centre have to occur with meaningful enabling factors for the people concerned to benefit from it.

From the present study, the child feeding and sanitation practices were similar between cases and controls yet cases had a better nutritional knowledge than controls. A few variables used to assess sanitation practices however showed significant differences between cases and controls. These were ownership of a bathroom, kitchen and animal shed all in favour of controls. The implications of these findings are that the cases were not putting into practice what they knew. This could be due to lack of resources for the cases because use of these facilities is taught and practised at the MFLTC. As can be seen from Table 6, cases are worse off economically in terms of main occupation of their spouses and the total value of property.

The child feeding and sanitation practices of mothers who were interviewed on admission to the FLTC was not different from the above findings.

The calculations of the 24-hour dietary recall as described in section 5.3.2 imply that there was no relationship between the dietary intake and the nutritional status of the children. The results showed that over 70% of the cases' and controls' children ate proteins and carbohydrates above their physiological requirements yet as can be seen in Table 11, the problem of malnutrition is common in the community. The controls also had children that were severely malnourished (below 60% of the median reference weight for age). This false implication of the 24-hour dietary recall calculations could be attributed to mothers describing the foods given to the children in 24-hours in the affirmative to the teachings given in MCH clinics and MFLTC, where emphasis is placed upon feeding the children with a good balanced diet (quantity and quality) or, the children had a high rate of infection. This would mean poor utilization of the food by the body (this issue was not looked at in this study) or, that a 24-hour dietary recall may not have been a good predictor of nutritional status. Nutritional status may be determined by a well balanced long term diet in the absence of diseases.

Similar findings as the above came up in an Australian Aborigin community where five dietary survey methods (weighed dietary

intake, 24-hour dietary recall, food frequency, diet history and the 'store-turnover') were used to assess the fact validity and compare the quantitative data obtained from each method. The results showed that in comparison to the other methods, the 24-hour dietary recall tended to produce higher mean values for intake of most nutrients and there was evidence of selective recall of certain foods (Amanda et al., 1995).

6.4 NUTRITIONAL STATUS OF THE CHILDREN

A rehabilitation centre is only effective if the nutritional status of the malnourished children admitted improves while in the centre and the same is maintained after discharge. Studies done on the effectiveness of the nutrition rehabilitation centres have shown that the admitted children gain some weight while at the centre which they seem to maintain on follow up. Studies in Uganda and Guatemala have however shown that these children relapse back after being discharged (Beaudry-Darisme and Latham, 1973). This could be due to poverty and other factors in the home environment.

The socio-economic status of a family will influence the availability of resources to the household. An economically well off family is more likely to have a better nutritional status because they are more likely to purchase nourishing food. Although some studies have shown that children from lower socio-economic classes tend to register a poor nutritional status compared to those from the other classes (Hoorweg and Niemeijer, 1980; Hoorweg,

Niemeijer and van Steenberg, 1984) other studies done in Haiti and Guatemala have shown how difficult it is to show associations between social factors and the child's progress in growth (Beaudry-Darisme and Latham, 1973).

The findings from the present study were that cases were of lower socio-economic status than controls in terms of the average property owned and the main type of occupation of their spouses (casuals). This is strengthened further by the results of further analysis (section 5.4) whereby six independent variables were in combination sufficient to differentiate 89% of the cases from controls. These were the size of land cultivated, whether owned livestock, membership in an income generating women group, age at which child stopped breast feeding, knowledge of cause of kwashiorkor and ownership of a bathroom. These variables are related to the socio-economic status, knowledge and practice of the mothers and sanitation facilities. These independent variables however, contributed partially either positively or negatively to one being a control. Those which contributed negatively were if a child stopped breastfeeding at the age of less than one year and knowledge of the cause of kwashiorkor by the mother. The other variables contributed positively. The important factor for a good nutritional status of the child therefore is to have good nutritional knowledge and practices in combination with presence of resources because knowledge alone is not enough to contribute positively to the outcome variable, a mother also needs enabling

factors to accomplish what is known. This may explain why the better knowledge of the cause of kwashiorkor by the cases had a negative partial contribution to the outcome variable, but when combined with other variables they could distinguish over 89% of the cases from controls.

In MFLTC severe PEM children on admission are fed on therapeutic diets to bring their health back to normal (high energy diet for marasmic and liquid diet for kwashiorkor and marasmic/kwashiorkor cases) before being given the normal centre diet (high protein and energy). At the centre therefore, the mother and her malnourished child or children are provided with a conducive environment for eating well and putting on weight. That is why Table 8 indicates that children gained weight at a higher rate while at the Centre than after discharge. Schneideman et al. (1971) came up with the same findings in Mulago hospital in Uganda when children at the rehabilitation unit gained weight at a higher rate than in the community after discharge. In the present study however there was no significant difference in nutritional status of the children on admission, at discharge and on follow up (Table 9) although most of them gained some weight while at the centre which they seemed to maintain on follow-up. The rehabilitation process at MFLTC was not therefore very effective because although the children gained some weight while at the centre, their nutritional status was not any significantly different from that of the other children.

As can be seen from Table 10, the problem of malnutrition is in the community and not only among the cases. Over 50% (53.4%) of the controls' children were below 80% of the weight for age reference median compared to 70.4% of the cases' children. The nutritional status of a large proportion of the children studied fell in the range of 60-80% of the median weight for age showing that underweight was a big problem in this community. The main type of malnutrition in 1994 was marasmus (Figure 1). Similar experience of more marasmus cases was in the study on outpatient rehabilitation of severe PEM children in Indonesia (Husaini et al., 1982).

The problem of malnutrition in 1994 was worst in March and December (Figure 2) with the highest number of admissions 44 and 47 respectively. During both times, the female children were higher in number than the male children. In December, food is scarce and hunger is experienced in most homes because agricultural food production depends on rainfall which is seasonal and often unreliable (Kigutha, 1992). But in March, it is usually the beginning of the long rains, this would have caused high rates of infection due to the change in weather therefore high rate of malnutrition. There was a depression in April, May and June. This is during the long rains, maybe MFLTC staff could not do a lot of outreach and therefore bring in more mothers and the mothers could not get to the centre on their own because the road network is poor especially during the rainy season. The mothers could also have been busy preparing land and planting food.

Whether admission depressions or peaks depends on the farm activity and drought. When the mothers are very busy on the farms, they may not take the children to the FLTC for admission even when they are sick. When there is drought and the mothers are not very busy on the farms, admission to the centre is almost obvious.

Areas not satisfactorily answered by this study

In this study some of the areas investigated could not be measured accurately by the questionnaire. These include:-

1. Nutritional knowledge of the mother as relates to nutritional status of the child. This is because there is no standard curriculum for the centre, only general information is given to the mothers as regards health and nutrition of the child. Therefore measuring exactly what was taught at the centre was difficult and nutritional status of the child could not be directly reflected on the level of mother's nutritional knowledge.
2. Nutritional knowledge of the mother as relates to the child feeding and sanitation practices. Knowledge does not reflect the actual practice, because a mother may know what to feed the child yet may not have the food or time or because of traditional beliefs cannot feed the child that food. Therefore the child feeding and sanitation practices of the mother does not reflect her nutritional knowledge.

CHAPTER 7

CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION

From the foregoing discussion, cases had a better nutritional knowledge than controls. Although the problem of malnutrition was found in both groups, it was worse among the cases. Knowledge may not be the issue here, may be other factors such as poverty are more important. In this study, the controls were better off in terms of total value of property which may have contributed to the better nutritional status of their children.

Furthermore, from the logistic regression analysis, only six independent variables were in combination sufficient to distinguish 89% of the cases from controls. These variables were related to socio-economic, child feeding and sanitation practices and nutritional knowledge of the mothers. Therefore, availability of resources in combination with knowledge will bring good results. This also agrees with the fact that although cases had better nutritional knowledge than controls, the nutritional status of their children was not any better. Knowledge has to occur together with the enabling factors to make one put into practice what is already known.

The implications of the results of this study are that since the problem of malnutrition is in the community and the rehabilitation process at MFLTC was not effective, the mothers should be taught how to care for the children at home environment. This will imply that the problem of malnutrition in the community will be tackled at the roots.

7.2 RECOMMENDATIONS

The recommendations arising from this study are that;

1. There should be a community based nutrition rehabilitation programme so that instead of admitting mothers and their malnourished children to MFLTC, they are rehabilitated at home. This is because, as can be seen from the results, the problem of malnutrition is in the community. Moreover even those who were supposed to be controls in this study also had the problem of malnutrition, not all their children were healthy. Surprisingly, there was no significant difference between the nutritional status of the children of cases, controls and centre cases. All had some children who were <60%, 60-80% and >80% of the median reference weight for age. The only difference was that cases and centre cases had slightly more severely malnourished children than controls. The reasons for recommending a community-based nutrition rehabilitation programme in this study are:-

Foods locally available in the vicinity of the community will be used. As it was pointed out earlier, MFLTC serves a very big

area, therefore the foods which may be used in the centre during rehabilitation may not be available in all these areas.

- Also, other children, livestock, farm and any other duties at home that may need the attention of the mother will not suffer since she will be at home as the child is being rehabilitated.
- The problem of long distance, difficult terrain and poor transportation will not be encountered.
- Last but not least, the problem of widespread poverty will be manageable because the mothers will be using what is available at their homes to rehabilitate the malnourished children.

2. The teachings and recommendations of MFLTC should be specific to each individual mother, so that growing of certain crops should not be stressed at MFLTC regardless of whether the mother has access to land or not. Or stressing use of certain types of foods which may require buying yet money may not be available. This is because the teaching in MFLTC programme is a uniform one and does not take care of individual ability.

3. Also there should be an extensive study on the factors which came out significantly in this study as distinguishing a case from a control. As can be seen from the further analysis, these independent variables that were finally used to built the model were sufficient to distinguish 89% of the cases from controls.

REFERENCES

- Akong'a, J. (1982)**
Persistence and continuity in traditional pastoralism in Kitui district, Kenya.
African Journal of Sociology 11:2.
- Amanda, J.L; Smith, A; Bryce, S; Kerin O'Dea; Rutishauser, I.H.E and Mathews, J.D. (1995)**
Measuring Dietary Intake in remote Australian Aboriginal communities.
In: Kuhnlein, H.V; Pellett, P.L and Wilson, C.S (eds.) Ecology of food and nutrition .
An International Journal 34:19-30.
- Bairagi, R. (1980)**
Is income the only constraint on child nutrition in rural Bangladesh?
WHO Bulletin 58:767-72.
- Basu, A; Roy, S.K; Mukhopadhyay, B; Bharati, P; Gupta, R and Majumder, P.P. (1986)**
Sex bias in intra household food distribution; roles of ethnicity and socio-economic characteristics.
Current anthropology 27(5):536-9.
- Beaudry-Darisme, M and Latham, M.C. (1973)**
Nutrition rehabilitation centres-an evaluation of their performance.
Environmental child health.
- Bengoa, J.M. (1955)**
Nutrition Rehabilitation Centres-An evaluation of their performance.
In: Beaudry-Darisme and Latham, M.C (eds.) Environmental child health, Sept.1973.
- Berg, A. (1981)**
Malnourished people, a policy view
Poverty and basic needs series.
World Bank publication Washington D.C.
- Berg, A. (1987)**
Malnutrition; What can be done?
Lessons from World Bank experience.
The Johns Hopkins University press-Baltimore & London
- Bhat, I.A; Shah, G.N; Dhar, G.M and Mehnaz, S. (1992)**
A study on the impact of maternal knowledge and practice on the nutritional status of infants.
Indian Journal of Maternal and Child Health 3:12-5.

- Bredow, M.T and Jackson, A.A. (1994)**
Community based, effective, low cost approach to the treatment of severe malnutrition in rural Jamaica. Arch-Dis-Child 71(4):297-303.
- C.de Ville de Goyet; J.Seaman and U.Geijer. (1978)**
The management of nutritional emergencies in large populations.
WHO publication - Geneva.
- Chandra, A.P and Krishnamoorthy, K.A. (1972)**
Nutrition Rehabilitation centre - A preliminary report paper presented at IX National Conference of the Indian academy of pediatrics.
- Chandra, R. (1983)**
Family size and quality of life.
Population education news 10(1):4-8.
- Chikermame, A.S; Patel, A.J and Patel, N.R. (1972)**
The role of nutritional rehabilitation in the management of protein calorie malnutrition - A paper presented at the IX National conference of the Indian academy of pediatrics.
- Cholton, R and Moneti, R. (1989)**
Improving child survival and nutrition.
The joint WHO/UNICEF nutrition support program in Iringa. UNICEF Dar es Salaam Tanzania.
- Cohen, N; Jalil, M.A; Rahman, H; Matin, M.A; Sprague, J; Islam, J; Davidson, J; Leemhuis de Regt, E and Mitra, M. (1985)**
Social science and medicine 21(11):1269-72.
- Cutting, W.A.M and Kumari, A.D.P. (1970)**
Indian Journal Christ Medical Association 45:704
- Dagnelis, P.C. (1979)**
Mobile nutrition rehabilitation of malnourished children; Organisation, costs and results of a nutrition rehabilitation unit in Embu.
Ministry of Health Kenya/Agricultural University, Wageningen, the Netherlands.
- Dahlin, K and Dahlin, L. (1984)**
Improved health in Zimbabwe's rural areas as a result of the rural development project.
Lakartidningen, a German publication.

DANIDA/ANP. (1993)

Proceedings of the nutrition workshop at Safari Park hotel 25th-27th oct.1993.

De Lauture,H; Wone,I; Perier-Scheer,M and Penot,C. (1982)

A model for combating malnutrition in children -
Nutritional rehabilitation centres.
Journal of Family life training 1(2):18-21.

Eisler,M; Cuadra-Ravines,L and Llona-Ramirez,J. (1969)

The nutrition rehabilitation centres.
Journal of American Dietetics 55:246-51.

Elo,I.T. (1990)

Female education and the use of maternal and child health care services in Peru.
Ann Arbor,Michigan University
Microfilms International 273 p.order no.9110396.

FAO/UN-Rome. (1983)

Selecting interventions for nutritional improvement 'a manual'.
Food Policy and Nutrition Division.

Fernandez-Concha,D; Gilman,R.H and Gilman,J.B. (1991)

A home nutritional rehabilitation programme in a peri-urban shanty town.
In:Transactions of the royal society of tropical medicine and hygiene.

FLTC. (1993)

Draft final report.

FLTP

Abstract.

Frank,F. (1980)

Prevention in childhood of health problems in adult life.
WHO publication - Geneva.

Gittelsohn,J. (1991)

Opening the box: Intra household food allocation in rural Nepal.
Social science and medicine 33(10):1141-54.

GOK/UNICEF. (1992)

Children and women in Kenya - A situation analysis.
Regal press Limited Nairobi.

GOK. (1965)

Sessional paper No.10.
Government printer Nairobi, Kenya.

- GOK. (1993)**
District Development plan, Makueni district.
Government printer Nairobi, Kenya.
- Govt. India. (1983)**
Some determinants of infant mortality in Gujarat, India.
Baroda report 16:1-8.
- Groenewold, W.G and Tilahun, M. (1990)**
Anthropometric indicators of nutritional status, socio-economic factors and mortality in hospitalised children in Addis Ababa.
Journal of Biosocial science 22(3):373-9.
- Gueri, M; Andrews, N; Fox, K; Jutsum, P and St.Hill, D. (1985)**
Supplementary feeding programme for the management of severe and moderate malnutrition outside hospital.
Journal of Tropical Pediatrics 31:101-8.
- Gupta, M.C; Mehrota, M; Arora, S and Saran, M. (1991)**
Relation of childhood malnutrition to parental education and mother's nutrition related KAP.
Indian Journal of Pediatrics 58:269-74.
- Hartog, A.P and Staveren, A.W. (1983)**
Manual for social surveys on food habits and consumption in developing countries.
- Hoorweg, J and Niemeijer, R. (1980)**
The nutritional impact of the pre-school health program at three clinics in Central Province.
Kenya research report no.11.
African studies centre Leiden, Netherlands.
- Hoorweg, J and Niemeijer, R. (1982)**
The effects of nutrition rehabilitation at three Family Life Training Centres in Central Province.
Research report no.14.
African studies centre Leiden, Netherlands.
- Hoorweg, J; Niemeijer, R and van Steenbergen, W. (1984)**
Part 2: Nutritional cognition and the food consumption of pre-school children.
Research report no.21.
African studies centre Leiden, Netherlands.
- Hoorweg, J and Niemeijer, R. (1991)**
Intervention in child nutrition.
Evaluation studies in Kenya.

Horton, S. (1988)

Birth order and child nutritional status ;evidence from
Philippines.

In;Economic Development and Cultural Change 36:341-54.

**Husaini, Y.K; Sulaeman, S; Basuki, S.M; Karyadi, D; Matulesy, P and
Samsudin. (1982)**

Outpatient rehabilitation of severe protein energy
malnutrition (PEM).

In;Food and Nutrition Bulletin vol.8 no.2.

Ian McDowell and Hoorweg, J. (1977)

Environmental risk factors in outpatient recovery from
malnutrition.

Ecology of food and nutrition 6:23-30.

Ibekwe-VE and Ashworth, A. (1994)

Management of PEM in Nigeria; an evaluation of the
regimen at the Kersey nutrition rehabilitation centre.

Tropical medical hygiene 88(5):594-5.

Jansen, A.A and Verkley, M.T. (1986)

Ambulatory home nutrition rehabilitation in rural
Kenya.

Journal of Tropical Pediatrics 32:258-62.

Joan Koppert. (1977)

Nutrition rehabilitation. Its practical
application.

Tri-med Books Ltd-London.

Kabwegyere, T. (1977)

Determinants of fertility.A discussion of change in
the family among the Akamba of Kenya.

In;Caldwell, J.C (ed.) The persistence of high
fertility Part 1.

Department of demography, Canberra,
The Australian National University.

Kennedy, E.T and Alderman, H.H. (1985)

Comparative analysis of nutritional effectiveness of
selected interventions. A report for International food
Policy Research Institute, Massachussts, Washington D.C.

Khanum, S and Kabir, I. (1989)

Survival and growth of severe protein energy
malnourished children, two years after nutrition
rehabilitation in an urban nutrition centre, Dhaka
Bangladesh.

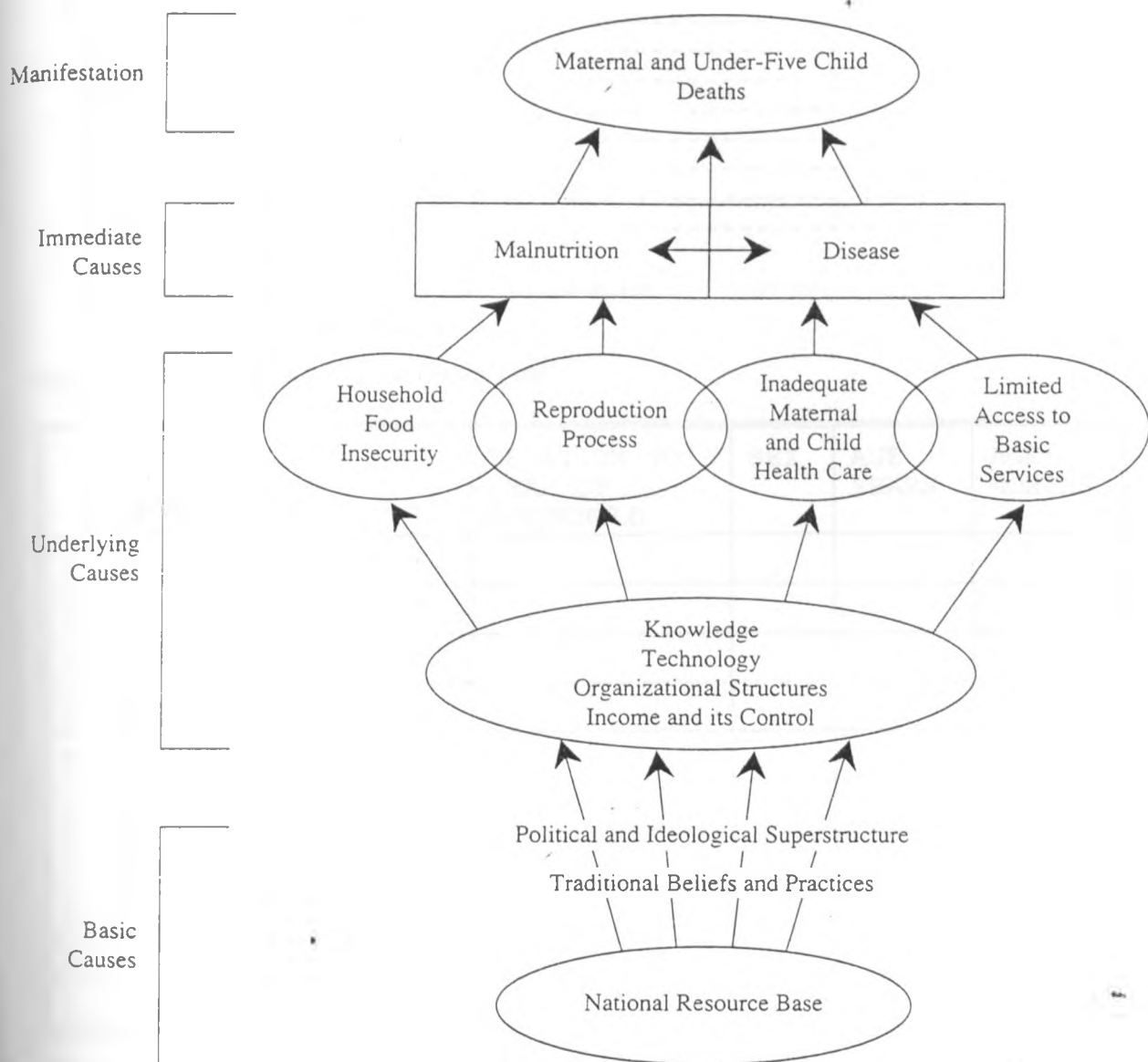
Journal of Tropical Pediatrics 35:138-9.

- Kigutha, H. (1992)**
 Effect of season on food consumption and nutritional status of small holder rural households.
 In: Food and Nutrition studies programme.
 Research report No.42.
 Ministry of Planning and National Development, Nairobi.
- Lukmanji, Z; Malekele, S and Lyamuya, V. (1981)**
 Evaluation of operational effectiveness of nutrition rehabilitation units in Tanzania.
 TFNC report No.500 Dar es Salaam.
- MacWilliam, K.M and Dean, R.F.A. (1965)**
 Progress of malnourished children after discharge from hospital.
 East African medical Journal 42:297.
- Mbula, J. (1974)**
 Penetration of christianity into the Kamba family.
 M.A. Thesis, Nairobi, UON.
- McLaren, D.S; Ammoun, C and Hourri, G. (1964)**
 Progress of malnourished children after discharge from hospital.
 Lebanese medical Journal 17:85.
- Middleton, J. (1965)**
 The Kikuyu and Kamba tribes of Kenya.
 London, International African Institute.
- Murdock, G.P. (1959)**
 Africa, its peoples and their culture.
 History, New york; McGraw Hill.
- Niameogo, C. (1993)**
 Maternal education, knowledge of child nutrition & disease and child nutritional status in the district of Ouidah, Benin.
 Ann Arbor ,Michigan University
 Microfilms International 330 p.order no.9309558.
- Nielsen, C.C; Islam, M.A; Thilsted, S.H and Ishrat, F. (1992)**
 " Why do some families become defaulters in a hospital based nutrition rehabilitation follow-up programme?"
 Tropical and Geographical medicine Journal 44:346-51.
- Nungo, R.A. (1990)**
 Cost and effectiveness of rehabilitating protein-energy malnourished pre-school children in Siaya district, Western Kenya.
 Msc. Thesis, Kabete, UON.

- Omwega, A.M and Muita, J.W. (1991)**
Health and nutritional status of children admitted at Kwale and Kilifi FLTCs.
- Omwega, A.M; Muita, J.W; Wamboi, Kogi-Makau; Mwadime, R.K.N and Muroki, N.M. (1992)**
A study on the nutritional and health status of children admitted at Ahero, Lwak, Kilifi, Kwale and Mbooni FLTCs.
- Omwega, A.M; Muita, J.W; Mwadime, R.K.N. (1994)**
The nutritional status and dietary patterns of under fives in the catchment areas of Kwale, Mbooni and Lwak FLTCs. Unit of ANP, University of Nairobi.
- Onchere, S.R. (1984)**
Agricultural and economic characteristics.
In; Ginneken, J.K.V and Muller, A.S. (eds.) Maternal and child health in rural Kenya.
An epidemiological study.
London, England Croom Helm :13-30.
- Oniang'o, R; Akach, S; Shitakha, L; Owuor, J and Mukudi, E. (1991)**
Impact evaluation of the FLTP - A study of MFLTC.
MCSS/DANIDA report.
- Pelto, G.H; Urgello, J; Allen, L.H; Chavez, A; Martinez, H; Meneses, L; Capacchione, C and Backstrand, J. (1991)**
Household size, food intake and anthropometric status of school age children in an highland in Mexico.
Social Science and medicine 33:1135-40.
- Rao, K.V and Gopalan, C. (1969)**
Nutrition and family size.
Journal of Nutrition Dietetics 6:258-266.
- Richard, C.B; Judith, E.B and Rebecca, A.T. (1980)**
Evaluation of a nutrition centre program in Africa. -
Journal of Tropical pediatrics :37-41.
- Ruel, M.T; Habicht, J.P; Pinstrup-Andersen, P; Grohn, Y. (1992)**
The mediating effect of maternal nutrition knowledge on the association between maternal schooling and child nutritional status in Lesotho.
American Journal of Epidemiology 8:904-914.
- Schneideman, I; Bennett, F.J and Rutishauser, I.H.E. (1971)**
The nutrition rehabilitation unit at Mulago hospital Kampala. Development and evaluation.
Journal of Tropical Pediatrics monograph no.13,17,1.

- Shah, P.M; Udani, P.M and Alphale, R.V. (1971)**
 Domiciliary management of kwashiorkor in a rural set-up in India; A longitudinal study of clinical, economic and social aspects.
 Indian Paediatric Journal 8:805-813.
- Sivaramakrishnan, M and Patel, V.L. (1993)**
 Reasoning about childhood nutritional deficiencies by mothers in rural India : a cognitive analysis.
 In: Social science and medicine 37(7):937-52.
- Thornburn, M.J. (1992)**
 Parent evaluation of community based rehabilitation in Jamaica.
 International Journal of rehabilitation research 15:170-6.
- UNICEF-ESARO. (1993)**
 Nutrition in emergencies , a training module.
 Nairobi, Kenya.
- Vella, V; Tomkins, A; Borghesi, A; Migliori, G.B; Adriko, B.C and Crevatin, E. (1992)**
 Determinants of child nutrition and mortality in north-west Uganda.
 Bulletin of the WHO 70(5):637-43.
- Victora, C.G and Vaughan, J.P. (1987)**
 Land ownership and infant health in Rio Grande do sul - Relationship between agricultural production, malnutrition and mortality.
 Revista Brasileira De Estudos De Populacao 4(2):127-51.
- Vogel, L.C; Muller, A.S; Odongo, R.S; Onyango, Z and De Geus, A. (1974)**
 Health and disease in Kenya.
 Nairobi, East African Literature Bureau.
- Were, G.S and Akong'a, J. (1986)**
 Kitui district, social-cultural profile.
- WHO/FAO. (1992)**
 Kenya country position paper on nutrition
 International conference on nutrition.
- Wolley, F.R; Weidner, B.L and Novotny, R. (1990)**
 The relationship of siblings to the size of rural Nigerian preschoolers.
 Asia-Pacific Journal of Public Health 4:151-5.
- Zontag, A.M; Nouwen, J.L and Voorhoeve, H.W. (1992)**
 Immunisation and nutritional status of under fives in rural Zambia.
 Central African Journal of medicine 38:62-6.

APPENDIX 1 THE MULTIPLE CAUSES OF MALNUTRITION



Source: Children and Women in Kenya
A situation Analysis 1992

APPENDIX 2 QUESTIONNAIRES

DATE OF INTERVIEW -----
 NAME OF INTERVIEWER -----
 NAME OF RESPONDENT -----
 AGE -----
 HOUSEHOLD NUMBER -----
 DISTRICT -----
 DIVISION -----
 LOCATION -----
 SUB-LOCATION -----
 VILLAGE -----

(Note: the respondent is the mother of the study child)

SOCIO-DEMOGRAPHIC INFORMATION

	NAME	RELATION TO HEAD OF HOUSEHOLD	SEX	AGE YEARS	AGE MONTHS
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Relation to head of household

- 1 = Husband
- 2 = Wife
- 3 = Daughter
- 4 = Son
- 5 = Not related
- 8 = Other

1. How much land is at the disposal of this household for use/farming? -----
2. How much of this land was cultivated last season? (acres) -----
3. How much of each of the following crops was under cultivation in the last two seasons?

A. MOTHER QUESTIONNAIRE

1. Name of mother ----- Age -----
Religion -----
2. Occupation -----
1 = housewife 2 = farmer 3 = both 1&2
8 = other(specify).
3. Level of education -----
1= none 2 = 1-4 3 = 5-8
4 = 9-12 5 = >12
4. Marital status -----
1 = married (monogamous) 5 = divorced
2 = married (polygamous) 6 = widowed
3 = single 8 = other (specify)
4 = separated
- 5a). Name of head of household ----- Age -----
Religion -----
(If head of household is the mother then fill 5b)
- 5b). Name of spouse ----- Age -----
6. Education level of head of household -----
1 = none 2 = 1-4 3 = 5-8
4 = 9-12 5 = >12.
7. Occupation of spouse/head of household -----
1 =Farmer 3 =Employed (permanent)
2 =Casual worker 8 =Other (specify)
8. What is the mother's status of availability for care of the child during the day? -----
1 = always at home
2 = partly at home (working near home)
3 = away from home for more than four hours
4 = away from home all day
8 = other (specify)
9. Is the mother a member of an income generating women group?

1 = Yes 2 = No
10. If YES, how much money did she receive from the women group last year? -----
1 =Kshs.0-100 4 =Kshs.501-1000
2 =Kshs.101-300 5 =Kshs.1001-1500
3 =Kshs.301-500 6 =Kshs.>1500
11. Where did the mother deliver the study child ? -----
1 = home
2 = hospital/health facility
3 = other (specify)
12. Did the mother attend any ante-natal services during the months she was pregnant with the child? -----
1 =Yes 2 =No
13. What was the age of the mother when this child was born?

14. At what age did the mother stop breastfeeding the child?

1 =0-6mths 4 =18-24mths
2 =6-12mths 5 =>2years
3 =12-18mths 8 =other (specify)

B. MOTHER QUESTIONNAIRE-KNOWLEDGE

1. When the child has a swollen body , red or grey hair and is miserable, what disease does he/she suffer from? (Use a picture) -----

- 1 = malaria
- 2 = kwashiorkor
- 3 = marasmus
- 4 = diarrhoea
- 5 = malnutrition
- 8 = other (specify)

2. What causes the disease in (1)? -----

3. At what age should a child be introduced to the following? -----

	Age	why
water	-----	-----
liquids	-----	-----
solids	-----	-----
juices	-----	-----
porridge	-----	-----
1 =0-2 mths	3 =4-6 mths	5 =12-24 mths
2 =2-4 mths	4 =6-12 mths	6 =>24 mths
		8 =other (specify)

4. Which foods and drinks should a child not be given during:-

Condition	Food & drinks avoided	Reasons
a = weaning	-----	-----
b = diarrhoea	-----	-----
c = teething	-----	-----
d = other sickness	-----	-----

5. What is the age at which to stop breastfeeding? -----

- 1 =0-6 mths
- 2 =6-12 mths
- 3 =12-24 mths
- 4 =>24 mths
- 8 =other (specify)

6. What kinds of foods and drinks may not be consumed for religious reasons by children and adults

	Foods and drinks avoided
a children	-----

b adults	-----

7. How often should a child of two years be fed in 24 hours? -----

- 1 =1-3 times
- 2 =3-5 times
- 3 =>5 times

8. Have you ever heard of the three food groups? -----

- 1 =Yes
- 2 =No

If yes, which are the three groups?

- 1 -----
- 2 -----
- 3 -----

If no, go to question 12.

9. Where did you get the information on the food group? -----

- 1 =FLTC
- 2 =Radio
- 3 =Health facility
- 4 =School
- 8 =Other (specify)

10. Classify the following into the three food groups

- a bananas -----
- b irish potatoes -----
- c beans -----
- d Muthokoi -----
- e fruits -----
- f vegetables -----

11. What are some of the foods available in your area that fit into each of these groups?

12. How do you prepare the child's food, to make it energy dense?

13. Have you ever been admitted to the FLTC? -----

1=Yes 2=No

If No, go to question 17.

14. If Yes, when were you last there? -----

1 =<3 mths 2 =3-6 mths 3 =>6 mths

15. How many of your children have been admitted there? -----

16a. What were some of the topics that were taught at the FLTC?

- 1 -----
- 2 -----
- 3 -----

16b. What topics did you find not useful?

17. If No, have you ever heard of any FLTC? -----

1 =Yes 2 =No

Or talked to any mother admitted there with her child? -----

1 =Yes 2 =No

18. Have you received any nutritional information? -----

1 =Yes 2 =No

If Yes, from what source? -----

- 1 =MCH clinic 4 =FLTC
- 2 =Radio 8 =Other (specify)
- 3 =Friend

And what was the information?

SANITATION

1. Observe home environment for use and presence of the following

- (a) pit latrine -----
- (b) bathroom -----
- (c) kitchen -----
- (d) kitchen garden -----
- (e) animal shed -----
- (f) tap water -----
- (g) dish rack -----

1=present and in use

2=absent

3=present not in use

2. Where do you throw your rubbish? -----

1=in the compound

2=in a pit

3=burn it up

4=bury in a pit

8=other (specify)

DATE OF INTERVIEW -----
 NAME OF INTERVIEWER -----
 NAME OF RESPONDENT -----
 AGE -----
 HOUSEHOLD NUMBER -----
 DISTRICT -----
 DIVISION -----
 LOCATION -----
 SUB-LOCATION -----
 VILLAGE -----

(Study child ----- 1 =Yes 2 =No)

A. CHILD'S QUESTIONNAIRE

1. What is the name of the child?
 Age ----- Sex -----
2. What is the birth order? -----
3. How many times has he/she been admitted in FLTC?

4. Has any other sibling been admitted to FLTC? -----
 1 =Yes 2 =No
5. Who looks after the child most of the day? -----
 1. Mother
 2. Grandmother
 3. Sister
 4. Stepmother
 5. Neighbour
 8. Other (specify)

B. BREASTFEEDING AND WEANING

1. Is the child breastfeeding? -----
 1 =Yes 2 =No
 If no, how long did he/she breastfeed? -----
2. At what age was the child introduced to other drinks/food
 apart from breastmilk?

Foods/Drinks	Age	Reason
Water	-----	-----
Juices	-----	-----
Porridge	-----	-----
Other	-----	-----
3. What is the child being fed on now? -----
4. Of the following foods, how many times do you feed the child in
 a week?

Maize meal	-----
Beans	-----
Bananas	-----
Eggs	-----
Meat	-----
Vegetables	-----
Irish potatoes	-----
Green grams	-----
Peas	-----
Fruits	-----
Cassava	-----

- 1 =2-4 times 4 =more than 10 times
- 2 =5-7 times 5 =Not eaten (specify why)
- 3 =8-10 times 6 =rarely eaten

5. Are there some foods/ingredients that you do not give this child? -----

1 =Yes 2 =No

If Yes, which ones and why?

Foods/ingredients avoided

Reason

6. Would you say that your child is a good or poor feeder? -----

If poor feeder, what do you do when the child refuses to eat? -----

7. 24 Hour Recall

Time	Dish	Amount cooked	Ingredient	Amount of Ingredient	Amount eaten by child	Left over by child

C. CHILD QUESTIONNAIRE - MORBIDITY

1. Has this child been unwell in the last 7 days? -----

1 =Yes 2 =No

If yes, what illness? -----

2. Did you seek health care? -----

1 =Yes 2 =No

If Yes, where? -----

3. What is the nearest health facility? -----

4. How long does it take you to get there? -----

5. Has the child ever suffered from diarrhoea? -----

1 =Yes 2 =No

6. How would you manage/treat a child with diarrhoea?

7. Is this child fully immunized? -----

1 =Yes card present 2 =Yes card lost 3 =No
(check card for immunization of

BCG, Polio, DPT1, DPT2, DPT3, Measles and tick).

1 =complete 2 =incomplete (check completeness for age)

8. Check BCG scar if present -----
absent -----

9. Check on growth monitoring for the following years:

Year	Number of entries
1st year	
2nd year	
3rd year	
4th year	
5th year	

D. ANTHROPOMETRIC MEASUREMENT (OF CHILDREN)

1. Weight (tolerance +/- 0.1 kg)

Name Sex Age Ist 2nd Average

2. Height (tolerance +/- 0.1 cm)

Name Sex Age Ist 2nd Average

QUESTIONNAIRE FOR THE CENTRE

RESPONDENTS NAME -----

AGE IN YEARS -----

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

NO. OF YEARS COMPLETED SCHOOL? -----

POSITION HELD AT THE CENTRE -----

1. For how long has this centre been in existence under the Ministry of Culture and Social Services (years) -----

2. How many mothers did you admit with malnourished children this year? -----

3. Who refers these mothers to bring their malnourished children to the centre? -----

- 1=social workers
- 2=hospital doctors
- 3=extension workers (agric)
- 4=other mothers
- 5=self

4. What criteria do you use in considering a child as malnourished and therefore admit? -----

5. What is the number of your staff? -----

6. What are their cadres? -----

7. What nutrition education sessions did you do from October, 1994? Times/week? -----

8. What were the main topics covered and their duration? -----

9. Did you have any demonstrations, if yes then, specify the number and type?

<u>Type</u>	<u>Number</u>
-----	-----
-----	-----
-----	-----

10. When do you consider a child as being successfully rehabilitated and therefore discharge? -----

11. Do you have any cases of mothers leaving the centre before being discharged? -----

- 1=Yes
- 2=No.

12. What reasons do they give for leaving? -----

- 1=sickness (child or herself or another child)
- 2=to go and take care of other children
- 3=husband demands she goes back
- 4=to do other work (e.g. planting, weeding, harvesting etc.)
- 5=other specify

QUESTIONNAIRE TO BE FILLED FROM THE CENTRE

DATE OF INTERVIEW -----
NAME OF INTERVIEWER -----
NAME OF RESPONDENT -----
AGE -----
HOUSEHOLD NUMBER -----
DISTRICT -----
DIVISION -----
LOCATION -----
SUB-LOCATION -----
VILLAGE -----

1. What was the nutritional knowledge of the mother on admission?

And on discharge?

2. What was the duration of the admission?

3. Did she run away from the centre or she was discharged?

4. Is the mother literate or illiterate?

5. What was the nutritional status of the child :-
(i) On admission -----
(ii) On discharge -----
6. What was the child admitted over?

7. What was:-
(i) Admission weight? -----
(ii) Discharge weight? -----
(iii) Percentage weight gain? -----
8. Were there any climatic changes that led to malnutrition of this child? -----
9. Was this child a sickly or a normal child?

10. What is the acreage of the farm occupied by the family?

A. Child Height Summary Procedure (Illustration 1)*

1. Measurer or Assistant: Place the measuring board on a hard flat surface against a wall, table, tree, staircase, etc. Make sure the board is stable.
2. Measurer or Assistant: Ask the mother to remove the child's shoes and unbraided any hair that would interfere with the height measurement. Ask her to walk the child to the board and to kneel in front of the child (if she is not the assistant).
3. Assistant: Place the questionnaire and pencil on the ground (Arrow 1). Kneel with both knees on the right side of the child (Arrow 2).
4. Measurer: Kneel on your right knee only, for maximum mobility, on the child's left side (Arrow 3).
5. Assistant: Place the child's feet flat and together in the centre of and against the back and base of the board. Place your right hand just above the child's ankles on the shins (Arrow 4), your left hand on the child's knees (Arrow 5) and push against the board. Make sure the child's legs are straight and the heels and calves are against the board (Arrows 6 and 7). Tell the measurer when you have completed positioning the feet and legs.
6. Measurer: Tell the child to look straight ahead at the mother if she is in front of the child. Make sure the child's line of sight is level with the ground (Arrow 8). Place your open left hand on the child's chin. Gradually close your hand (Arrow 9). Do not cover the child's mouth or ears. Make sure the shoulders are level (Arrow 10), the hands are at the child's side (Arrow 11), and the head, shoulder blades and buttocks are against the board (Arrows 12, 13, and 14). With your right hand, lower the headpiece on top of the child's head. Make sure you push through the child's hair (Arrow 15).
7. Measurer, and Assistant: Check the child's position (Arrows 1-15). Repeat any steps as necessary.
8. Measurer: When the child's position is correct, read and call out the measurement to the nearest 0.1 cm. Remove the headpiece from the child's head, your left hand from the child's chin and support the child during the recording.
9. Assistant: Immediately record the measurement and show it to the measurer.
NOTE: If the assistant is untrained, the measurer records the height.
10. Measurer: Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to erase and correct any errors.

* If the assistant is untrained, e.g. the mother, then the measurer should help the assistant with the height procedure.

Illustration 1
Child Height Measurement

HEADPIECE FIRMLY ON HEAD

HAND ON CHIN
SHOULDERS LEVEL

LEFT HAND ON KNEES, KNEES
TOGETHER AGAINST BOARD

RIGHT HAND ON SHINS, HEELS AGAINST
BACK AND BASE OF BOARD

HANDS AT SIDE

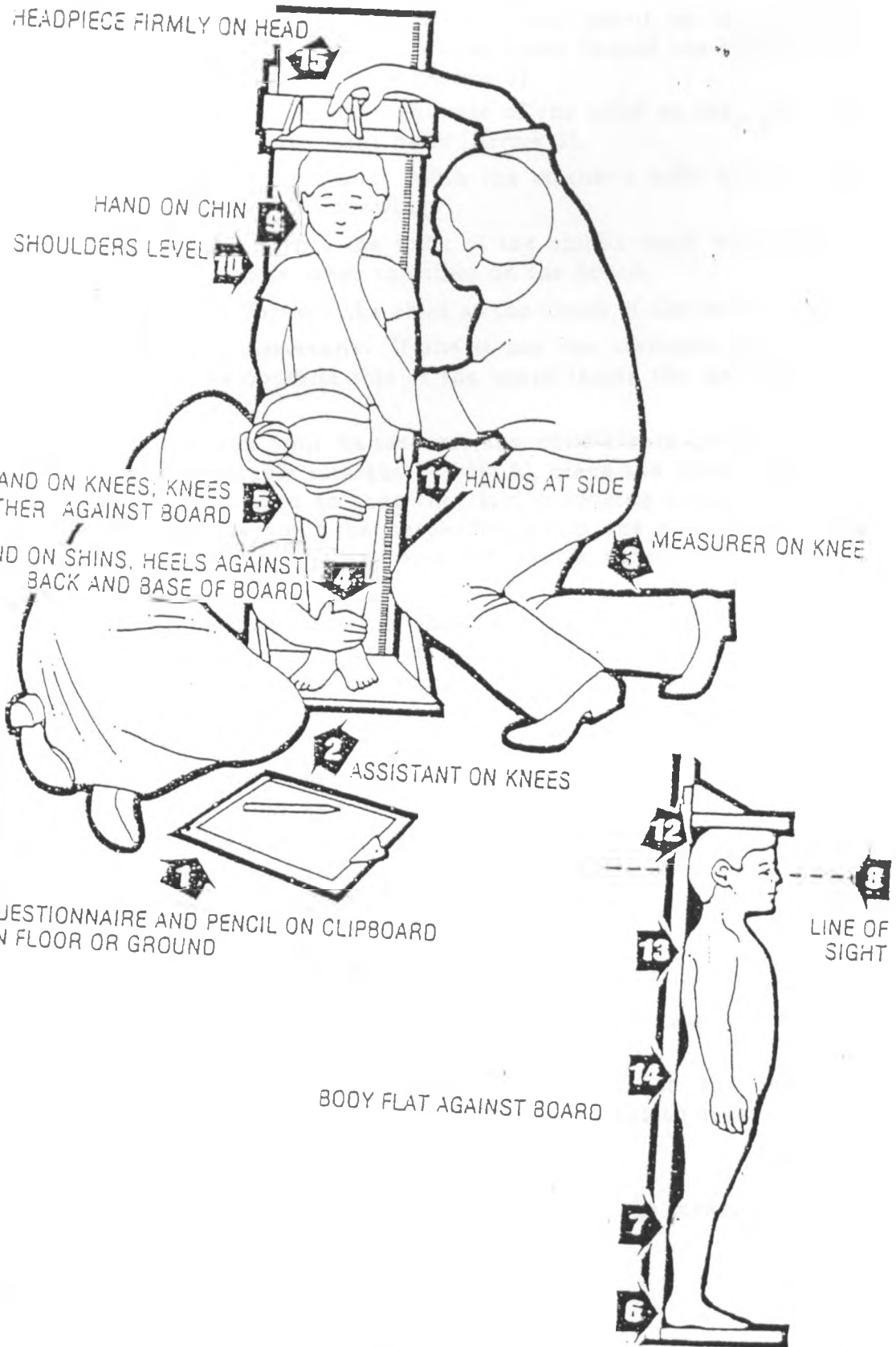
MEASURER ON KNEE

ASSISTANT ON KNEES

QUESTIONNAIRE AND PENCIL ON CLIPBOARD
ON FLOOR OR GROUND

BODY FLAT AGAINST BOARD

LINE OF
SIGHT

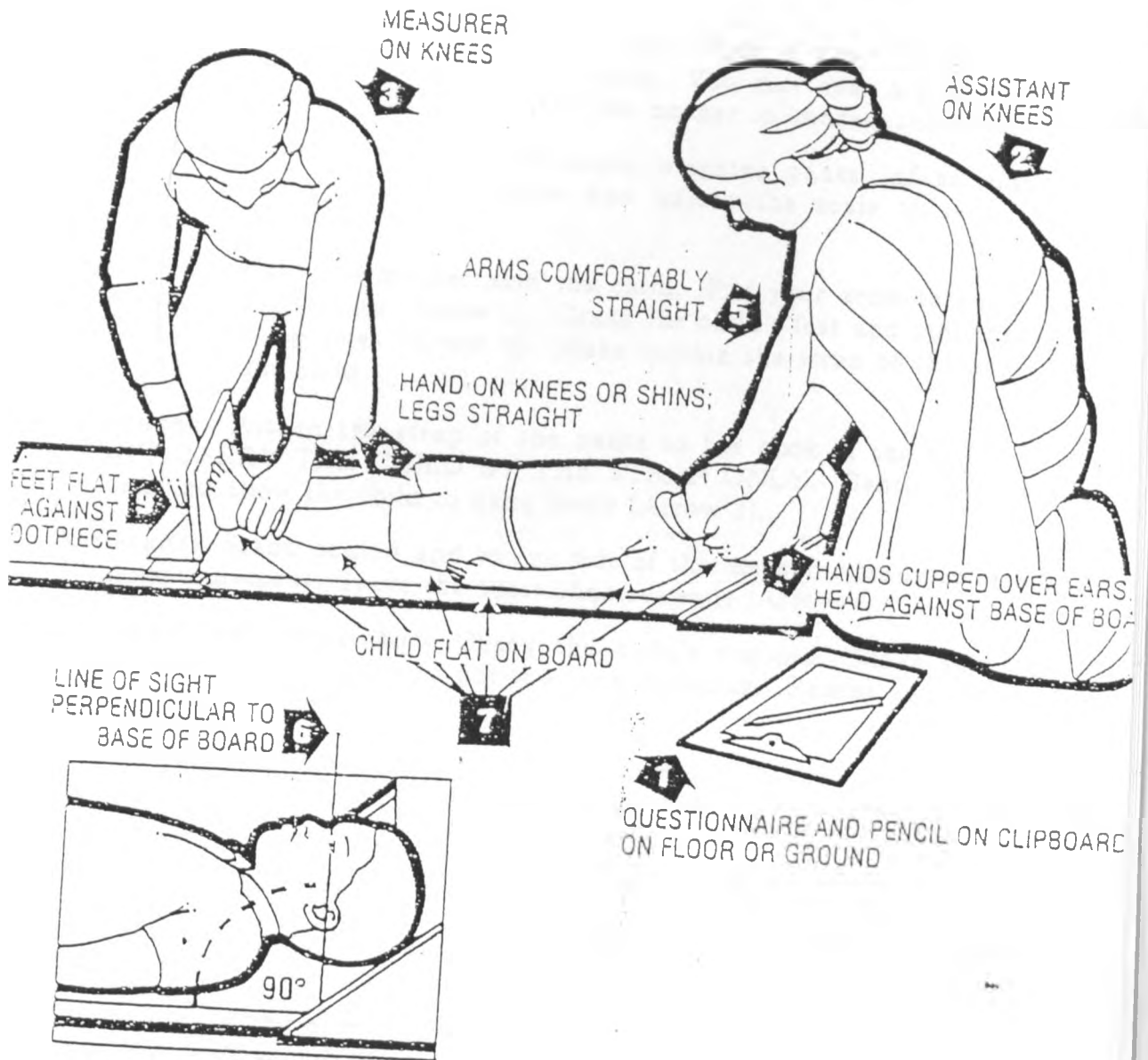


B. Child Length Summary Procedure (Illustration 2)*

1. **Measurer or Assistant:** Place the measuring board on a hard flat surface, i.e. ground, floor or steady table.
2. **Assistant:** Place the questionnaire and pencil on the ground, floor or table (Arrow 1). Kneel with both knees behind the base of the board, if it is on the ground or floor (Arrow 2).
3. **Measurer:** Kneel on the right side of the child so that you can hold the footpiece with your right hand (Arrow 3).
4. **Measurer and Assistant:** With the mother's help, lay the child on the board by doing the following:
 - Assistant:** Support the back of the child's head with your hands and gradually lower the child on the board.
 - Measurer:** Support the child at the trunk of the body.
5. **Measurer or Assistant:** If she is not the assistant, ask the mother to kneel on the opposite side of the board facing the measurer to help keep the child calm.
6. **Assistant:** Cup your hands over the child's ears (Arrow 4). With your arms comfortably straight (Arrow 5), place the child's head against the base of the board so that the child is looking straight up. The child's line of sight should be perpendicular to the ground (Arrow 6). Your hand should be straight over the child's head. Look directly into the child's eyes.
7. **Measurer:** Make sure the child is lying flat and in the centre of the board (Arrows 7). Place your left hand on the child's shins (above the ankles) or on the knees (Arrow 8). Press them firmly against the board. With your right hand, place the footpiece firmly against the child's heels (Arrow 9).
8. **Measurer and Assistant:** Check the child's position (Arrows 1-9). Repeat any steps as necessary.
9. **Measurer:** When the child's position is correct, read and call out the measurement to the nearest 0.1 cm. Remove the footpiece, release your left hand from the child's shins or knees and support the child during the recording.
10. **Assistant:** Immediately release the child's head, record the measurement, and show it to the measurer.
 - NOTE:** If the assistant is untrained, the measurer records the length on the questionnaire.
11. **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to erase and correct any errors.

* If the assistant is untrained, e.g. the mother, then the measurer should help the assistant with the length procedure.

Illustration 2
Child Length Measurement

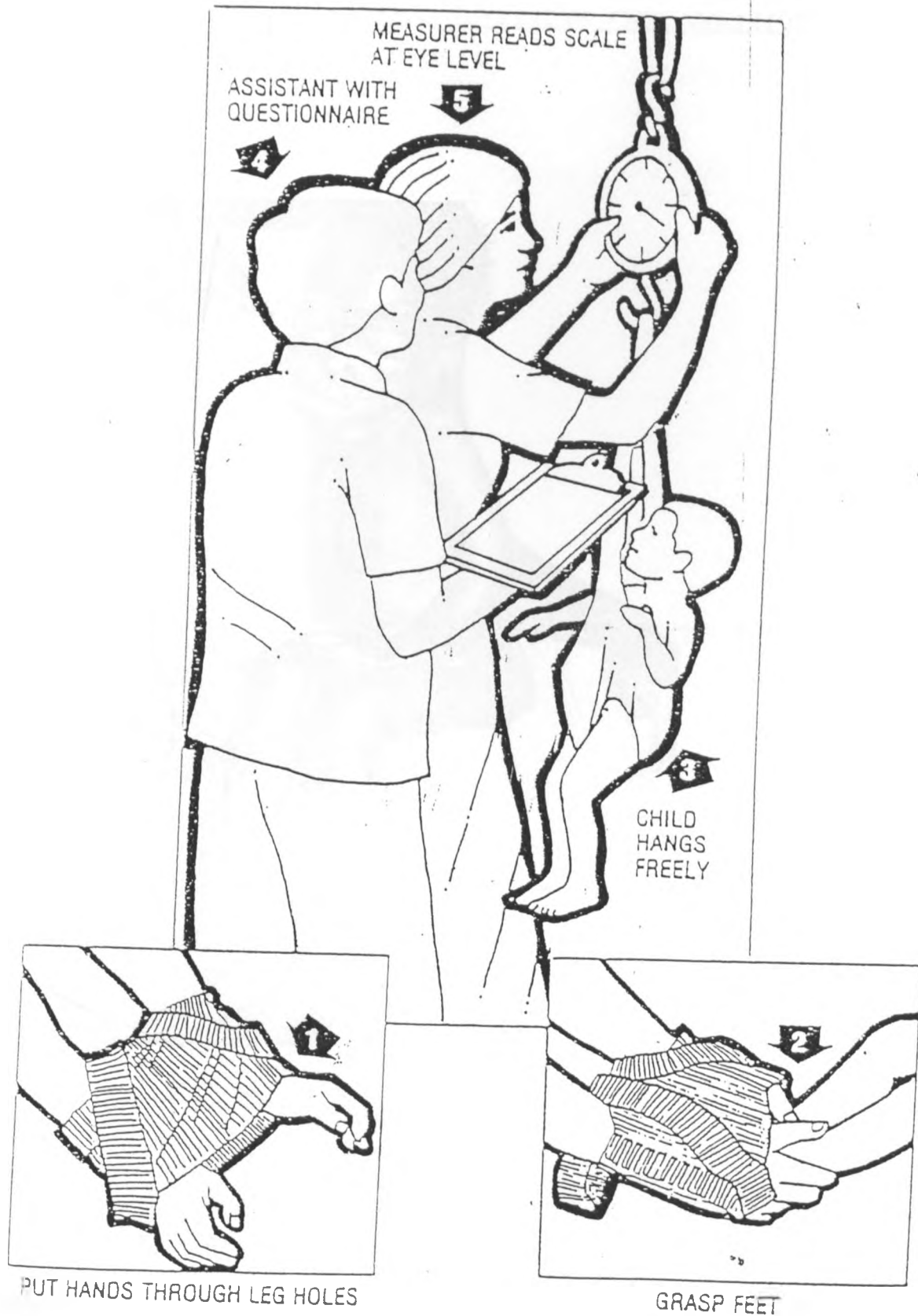


C. Child Weight Summary Procedure (Illustration 3)*

1. **Measurer or Assistant:** Hang the scale from a tree branch, ceiling beam, tripod or pole held by two people. You may need a piece of rope to hang the scale at eye level. Ask the mother to undress the child.
2. **Measurer:** Attach a pair of the empty weighing pants, infant sling or basket to the hook of the scale and adjust the scale to zero, then remove from the scale.
3. **Measurer:** Have the mother hold the child. Put your arms through the leg holes of the pants (Arrow 1). Grasp the child's feet and pull the legs through the leg holes (Arrow 2). Make certain the strap of the pants is in front of the child.
4. **Measurer:** Attach the strap of the pants to the hook of the scale. **DO NOT CARRY THE CHILD BY THE STRAP ONLY.** Gently lower the child and allow the child to hang freely (Arrow 3).
5. **Assistant:** Stand behind and to one side of the measurer ready to record the measurement. Have the questionnaire ready (Arrow 4).
6. **Measurer and Assistant:** Check the child's position. Make sure the child is hanging freely and not touching anything. Repeat any steps as necessary.
7. **Measurer:** Hold the scale and read the weight to the nearest 0.1 kg. (Arrow 5). Call out the measurement when the child is still and the scale needle is stationary. Even children who are very active, which causes the needle to wobble greatly, will become still long enough to take a reading. **WAIT FOR THE NEEDLE TO STOP MOVING.**
8. **Assistant:** Immediately record the measurement and show it to the measurer.
9. **Measurer:** As the assistant records the measurement, hold the child in one arm and gently lift the child by the body. **DO NOT LIFT THE CHILD BY THE STRAP OF THE WEIGHING PANTS.** Release the strap from the hook of the scale with your free hand.
10. **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to erase and correct any errors.

* If the assistant is untrained, e.g. the mother, then weight should be taken by one person only, the trained measurer, who should also record the measurement on the questionnaire.

Child Weight



Source: How to weigh and measure Children.
UN 1986



Source : Human Nutrition and Dietetics
Passmore et al.

APPENDIX 5 AVERAGE COST OF CROPS AND ANIMALS

<u>Animal (unit)</u>	<u>cost in Kenya shillings</u>
cow	10,000
goat	3,000
sheep	1,500
chicken	200
donkey	12,000

<u>Crop (18 kg. tin)</u>	<u>cost in Kenya shillings</u>
maize	200
beans	500
millet	300
sorghum	150
pigeon peas	150
cassava	100

Source : Local market places