THE ASSOCIATION BETWEEN UTILIZATION OF PREVENTIVE CHILD HEALTH SERVICES AND THE NUTRITIONAL STATUS OF CHILDREN UNDER THREE YEARS IN KIBERA, A SPONTANEOUS URBAN SETTLEMENT OF NAIROBI, KENYA

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DECLARATION

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

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TABLE OF CONTENTS

ABSTRACT

THE ASSOCIATION BETWEEN UTILIZATION OF PREVENTIVE CHILD
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SETTLEMENT OF NAIROBI, KENYA

Between February and May 1989 a cross-sectional survey
was conducted to assess the coverage and accessibility
of the available preventive child health services in a
spontaneous settlement of Nairobi. In particular, the
survey investigated whether there was any association
between nutritional status of children under three
years and their utilization of preventive child health
services. The study took place in Kibera, a peri-urban
area of Nairobi and a sample of 478 children was sur-
veyed.

The results showed that 22 % of the study children were
malnourished ($\leq$ 80 % Weight for Age) and there was an
increasing trend of malnourishment from the age of six
months until eighteen months. Eighteen per cent of the
study children were found to be stunted and five per
cent wasted.

The majority of the study children (79 %) had a Child
Health Card at the time of investigation.

The majority of the study children (71 %) were fully
immunized. This is a high coverage compared to the
national coverage rate of 51 % (UNICEF, 1989)

Well nourished and moderately malnourished children had
a better immunization status than severely malnourished
children.

Malnourished children in this study also participated
less frequently in the growth monitoring programme than
well nourished children. The difference in utilization
of growth monitoring services was found to be due ,in
part, to age. Utilization of growth monitoring services
decreased sharply with age, while the nutritional
status of children also deteriorated with age.

With increasing age of the child the utilization of
preventive child health services decreased.
Makina children visited the Child Welfare Clinic an
average of eight times in their first year of life,
three times in their second year of life and less than
once per year thereafter.

Younger mothers made more use of preventive child
health services than older mothers.

The researcher analysed whether the positive association between nutritional status of children under three years and their utilization of preventive child health services could be due to income or maternal care. Although household income was associated with the nutritional status of children under three years, there was no relationship between household income and utilization of preventive child health services. With respect to maternal care, the two variables; employment of the mother and caretaker of the child were neither associated with the nutritional status of the child nor with their utilization of preventive child health services. In contrast the educational level attained by the mother (also a variable of maternal care) was positively associated with the immunization status of the child.

ABBREVIATIONS

BCG   Bacillus Calmette-Guerin (BCG vaccine = vaccine against Tuberculosis)

CMR   Childhood Mortality Rate (4q1)

CPK   Church of the Province of Kenya

DTP   Diphtheria, Pertussis(=whooping cough), Tetanus

FP   Family Planning

IMR   Infant Mortality Rate (1q0)

MCH   Mother and Child Health

ROK   Republic of Kenya

SD   Standard Deviation

WHO   World Health Organization

Chapter 1. **INTRODUCTION**

Preventable diseases, particularly malnutrition and infection, are the major killers of children in developing countries today. Most of the deaths occur in young children, i.e., below five years of age. As a health care intervention the child welfare clinics (also called the under five clinics) were developed in the seventies to meet the following goals (Morley, 1973):

1. to supervise the health of all children up to five years of age

2. to prevent malnutrition, parasitic and infectious diseases

3. to provide simple treatment for the most common diseases.

Several studies showed that these health care intervention programmes are highly effective in reducing child mortality from preventable diseases. Furthermore, they can be implemented in a relatively cost effective way (Cole-King; 1975; Cunningham, 1978; Kielmann et.al., 1978). However, to be fully effective in meeting health needs, the health service system must achieve broad coverage. Although urban centres are generally favoured in terms of availability and quality of essential services, it is questionable whether these services are accessible to the urban poor living in the spontaneous

settlements. For instance, most health facilities are situated outside these areas. Other studies report that "health and other social services already existing in cities are not equitably distributed, nor are they planned, designed or implemented to help those who are in greatest need. Some called it an "inverse care law; whereby those in greatest need of medical care have the poorest access to it" (Ross-Espagnot, 1985). For the last five years governmental and non-governmental organizations in Kenya have become very much aware of the need to set up free or low cost essential services in the spontaneous settlements themselves. Many pro-grammes have now been started.

1.1. **STATEMENT OF THE PROBLEM**

In the study area known as Makina, one of the villages in Kibera, Nairobi, several organizations have opened new health facilities within the last three years. As a result, compared to other villages in Kibera, the provision of basic child health services is relatively good. These services concentrate primarily on prevent-ative programmes. Health education, growth monitoring, and immunization are three important components of these preventative programmes.

One way to measure the coverage and accessibility of

these available health services is by outcome indicators such as utilization rates or scores (Aday et al., 1975). In terms of Makina's preventative programmes, outcome indicators for utilization of services would include the following two variables, namely immunization status and utilization level of growth monitoring.

Of particular interest to the researcher was the relevance to the research problem of the law of inverse care which states: "better off families, whose need is generally least, make the optimal use of services provided, while the poorer families, whose need is greatest, make the least use of the available resources" (Zachariah et al, 1980). If indeed this law is relevant to the Makina case study, then an association should emerge between utilization of services and nutritional status. The interaction between these two variables became a primary area of inquiry during the research process.

1.2. RESEARCH OBJECTIVES

The overall goal of the study was to assess the cover-
age and accessibility of the available preventive child
health services in Makina. In particular, the
researcher examined whether there was any association
between nutritional status of the children and their
utilization of preventive child health services. In
order to achieve this goal a number of specific objec-
tives described below had to be met:

1. To determine the nutritional status of children
   under three years.

2. To determine the utilization of preventive child
   health services by children under three years.

   Sub-objectives

   2.1 to determine the immunization status of
   children under three years.

   2.2 to determine the utilization level of growth
   monitoring services by children under three
   years.

3. To determine whether there is any association
   between the immunization status and the nutrit-
   ional status of children under three years.

4. To determine the age and the nutritional status of children under three years in relation to their utilization level in growth monitoring.

5. To determine the socio-economic characteristics of children under three years and their families in relation to their utilization level of preventive child health services.

1.3. **STATEMENT OF HYPOTHESIS**

The following hypotheses were defined for this study, namely:

1. In Makina the prevalence of malnutrition among children under three years is above the national prevalence of 24 % ($\leq$ 80 % W/A).

2. The immunization status of well nourished children under three years is better than the immunization status of malnourished children under three years.

3. Malnourished children under three years participate less frequently in growth monitoring than well nourished children under three years.

1.4. **EXPECTED BENEFITS FROM THE STUDY**

Although predominantly rural, Kenya is becoming in-creasingly urbanized. Since independence the rate of urban growth has been approximately twice the national average (Unicef, 1984). Increases in the number of poor people living in cities are of particular importance. Urban poor people often live under very unhealthy environmental conditions; insufficient housing, inac-cessible clean water supplies and inadequate sanitation which result in very unhygienic conditions associated with malnutrition and a vast range of communicable and infectious diseases. In general, nutrition and health research, programme development and programme evalu-ation have focused on rural areas. But due to the increasing urbanization there is a need for research on public health intervention and programme development in urban areas. According to Ndombi (1988) urban areas do not lend themselves to pre-packaged or blue-print primary health care systems. The best is to start a small project to learn about how to implement health programmes effectively in a particular area. It was suggested that activities start in Makina Village and depending on the experience drawn in Makina similar activities can at later stages be replicated in other areas of Kibera. Since this study evaluates the utiliz-ation of the existing preventive child health services

in Makina, it will provide programme administrators and health planners with information useful for planning and improving child health delivery activities in Kibera and possibly other urban slum areas.

Chapter 2. **THE LITERATURE REVIEW**

2.1. **CHILD MORTALITY / PROTEIN ENERGY MALNUTRITION**

Preventable diseases, particularly malnutrition and infection are the major killers of children in develop- ing countries today. Most of the deaths occur in young children, i.e., below five years of age (Morley, 1973). The synergy between malnutrition and infection is well known (Scrimshaw, 1968). The malnutrition-infection synergism usually accounts for the majority (around 40 %) of all preschool deaths. Most important among the specific problems are low birth weight, including prematurity, malnutrition with diarrhoeal disease, and malnutrition with measles (Kielmann, 1987). A close relationship between levels of nutrition and mortality has been established in a number of publications based on longitudinal field studies, notably the Punjab (Kielmann, 1978) and Matlab (Chen et al., 1980) inves- tigations. The Punjab study of 3,000 children aged 1 to 36 months showed that child mortality doubled with each 10 per cent decline in body weight below 80 per cent of

the Harvard weight for age median (Kielmann et al.,
1978). In Bangladesh in a similar study of 2046 child-
ren aged 13 to 23 months results indicated that severe-
ly malnourished children, according to all indices,
experienced substantially higher mortality risk. Nor-
mal, mild, and moderately malnourished children all
experienced the same risk. All indices were found to
discriminate mortality risk: weight/age and arm-
circumference/age were strongest and weight/height was
weakest. For each index, a threshold level was noted
below which mortality risk climbed sharply (Chen et
al., 1980). Thus malnutrition is a sensitive indicator
of survival chances.

Malnutrition, however, is not the only major killer of
children in developing countries. Of the group of
childhood infections widely prevalent in the developing
world, diarrhoeal disease, acute (lower) respiratory
tract infections, malaria, and neonatal septicaemia may
be responsible for over half of all preschool deaths
even in the absence of malnutrition. Reducing either
the incidence or the prevalence of parasitic and infec-
tious disease is invariably followed by significant
reduction in child mortality (Kielmann, 1987).

Generally speaking, rural populations have higher
infant mortality rates (IMR) than urban populations.

However, the question of intra-urban variability must be considered (Viteri, 1987). It is estimated that infant and child mortality are only slightly higher in rural areas than in urban areas in Kenya, namely for urban areas IMR = 56.8 and CMR = 34.2 and for rural areas IMR = 58.9 and CMR = 34.3 (National Council for Population and Development, 1990). Specific IMR data for slum areas is lacking (Ndombi et al., 1988).

The 1978-79 National Child Nutrition Survey found that 64-75 % of the urban under fives were classified as normal by weight for height and height for age, 20-27 % as stunted only, 3-7 % as wasted only and 0.3-3 % as wasted and stunted. In contrast, amongst rural under fives, 46-66 % were classified as normal, 32-44 % as stunted only, 2-7 % as wasted only and 0-3 % as wasted and stunted (ROK, 1979). One can conclude that in terms of chronic protein-energy deficiency the rural population are worse off than their urban counterparts. Several other national studies can be cited which showed the same result (Viteri, 1987). However, it must be stressed that these studies also showed that in general urban-rural differences mirror the differences seen between children in different social classes, whether in the urban or rural population. Malnutrition levels in urban slum areas are higher than the average levels in urban settlements, a finding which highlights

the important relationship between class and nutri-
tional status. Specific anthropometric data for Kenyan
urban slum areas showed that 38-49 % of the children
under five years of age are malnourished (Ndombi et
al., 1988). Maina (1987) reported that 36.2 % of the
under fives in Korogocho, a peri-urban slum area in
Nairobi were malnourished (weight for age $\leq$ 80 %) and
27 % were stunted.

The figures recorded above obviously point to a high
prevalence of malnutrition in urban slum areas of
Kenya. The short and long-term consequences of such
high malnutrition rates on infant and child development
are severe. Most investigators argue that inadequate
nutrition negatively affects childhood mortality, the
frequency and severity of a wide range of illnesses,
physical growth, mental development, and productivity.

These findings have important implications for policy
making and planning. As malnutrition and child mortal-
ity are closely related to poverty, in order to improve
the nutritional status of a community, health pro-
grammes must be firmly integrated into general develop-
ment activities. Only when socio-economic conditions
improve overall will the health of infants and children
from poorer rural and urban households likewise improve
(Durnin,1987; Unicef,1984; Kielmann et all.,1978; Chen

et al., 1980; Ebrahim,1985).

2.2. **EVALUATIONS OF CHILD HEALTH/ NUTRITION PROGRAMMES**

Can health care make a difference? The point of this
study was to direct this question at a particular kind
of health care for children: the "Child Welfare Clinic"
or "Under five Clinic". These clinics were developed
mainly for the following reasons:

1.   to supervise the health of all children up to five
     years of age
2.   to prevent malnutrition, parasitic and infectious
     diseases
3.   to provide simple treatment for the most common
     diseases

(Morley,1973).

Results from Malawi, Nigeria, and India support the
argument that health care can make a difference. The
Malawi study showed that 40-50 % of the total under
five population was reached by Under Five Clinics. In
three years time the prevalence rate for malnutrition
in under fives decreased from 37 to 29 % . However,
attendance at the Under Five Clinic was not the only
factor. Improved agricultural methods also contributed
to improvements in nutritional status (Cole-King,1975).

In the Nigeria study 96.3 % of Imesi children aged
0-5 years were registered at the Under Five Clinic and
were visiting it on the average 24 times a year. Their
growth was being closely monitored and it was found
that there were half as many children below 60 % of
standard weight for age as in the comparison village.
Immunization rates for Imesi children were 80-90 %.
Malaria was controlled by prophylaxis and regular
treatment. Simple curative care was available and being
used regularly for the common childhood conditions.
Furthermore, the Imesi children were healthier than the
children of the comparison village. The following is a
selective sample of indicators pointing to their im-
proved health status:

(a) lower mortality rates, especially among 1-4 years
    olds

(b) significantly greater weight for age, height for
    age, triceps skinfolds thickness, and upper arm-
    circumference

(c) significantly earlier motor development

(d) significantly lower malaria and ascaris prevalence
    rates and significantly less anaemia (Cunningham,
    1978).

In the Narangwal study, India, villages were selected
in separate clusters and allocated to a control group.
Three service groups were formed in which nutrition

care and medical care were provided singly and in combination to children under three years and pregnant women. One specific finding from the study was that the groups who received nutritional and medical care services showed significant improvement of growth (weight and height) of children. In addition medical care significantly reduced postneonatal and 1-3 old mortality. Medical care also decreased illness duration of six health conditions. One of the benefits of nutrition education was the demonstration that breastfeeding was prolonged by about 2 months in the nutrition care villages. Most importantly, the researchers discovered that child mortality in the control group of villages was almost double the rate observed in service villages (Kielmann et al., 1978).

2.3. **ACCESSIBILITY AND UTILIZATION OF CHILD HEALTH SERVICES**

The studies from Malawi, Nigeria, and India all prove that highly effective intervention programmes are available which are readily implementable in a relatively cost effective way. However, in order to be fully effective in meeting health needs, the health service system must achieve broad coverage. Although urban centres are generally favoured in terms of availability and quality of essential services, it is ques-

tionable whether these services are accessible to the urban poor living in the spontaneous settlements. For instance, most health facilities are situated outside these areas. Other studies report that "health and other social services already existing in cities are not equitably distributed, nor are they planned, designed or implemented to help those who are in greatest need. Researchers call it an "inverse care law" whereby those in greatest need of medical care have the poorest access to it" (Hart et al., quoted by Ross-Espagnot, 1985).

One way to measure the coverage and accessibility of the available health services is by outcome indicators such as utilization rates or scores (Aday et al., 1975). In this study, the interest is on utilization of preventive services. The study focus on two outcome indicators, namely, immunization status and utilization level of growth monitoring services.

The following factors influence the utilization of medical services: characteristics of the health delivery system, characteristics of the population at risk and consumer satisfaction (Aday et al., 1975). Health planners need specific information on family characteristics in order to decide on the most appropriate type of medical care system for a specific community (Dever,

1984). Studies on utilization report of interactions which vary in direction and intensity. For example, some studies indicate that the number of children (under five years) in a family has a positive associ- ation with use (Selwijn, 1987; Andersen and Podell quoted by Selwijn, 1987) while other studies show a negative effect (Morris and Hare quoted by Selwijn, 1987; Amanam, 1980). Some studies report that women in the younger age groups and more educated women make more use of Mother and Child Health Services (Selwijn, 1987; Amanam, 1980). In contrast, other studies did not find any significant difference in age and education of the mothers of users and non-users of these services (Bornstein, 1972; Selwijn, 1978). Free medical care has a positive association with utilization (Selwijn, 1978; Skinner, 1978). Use of preventive services is also reported to be strongly associated with geographical accessibility measured by distance, travel time or travel cost (Dever, 1980; Shannon et al., 1974; Bosanae quoted by Dever, 1984; Bornstein et al., 1972). Utiliz- ation also interacts with socio-economic status. Indeed, this interaction was of particular interest to the researcher. Thus, keeping in mind the law of inverse care, which states: "Better off families, whose need is generally least, make the optimal use of ser- vices provided, while the poorer families, whose need is greatest, make the least use of the available

resources" (Zachariah et al., 1980), the researcher investigated whether there was any association between nutritional status of the children and their utilization of preventive child health services.

2.4. **CHILD IMMUNIZATION**

The results of the Kenya Demographic and Health Survey (KDHS) indicate that among children aged 12 - 23 months for whom health cards were available, the following percentages had received the corresponding vaccinations;

BCG   -   96.7 %

DTP 1 -   98.9 %   Polio 1 - 99.3 %

DTP 2 -   96.1 %   Polio 2 - 95.8 %

DTP 3 -   90.7 %   Polio 3 - 92.4 %

Measles - 78.0 %

(n = 1315)

The KDHS found that 44 % of all study children aged 12 - 23 months were fully immunized (National Council for Population and Development, 1989). Similar results were found in a Kenya Expanded Programme of Immunization (KEPI) survey. According to this study 51 % of the Kenyan children were fully immunized, and 69 % of the children in Nairobi were fully immunized (Unicef, 1989).

There are several studies which determined an association between the immunization status and the nutritional status of the child. In all these investigations the nutritional status was taken as the outcome indicator. Mazur and Sanders (1988), after conducting a cross-sectional study in peri urban Zimbabwe, report that those who had completed the immunization series were found to be more underweight (weight for age below NCHS standard). The results from a cross-sectional study in rural Tanzania, indicate that a positive association between completeness of immunization and both weight for age and weight for height, occurred only among children above two years of age (Fundikira, 1989). Different results were found in an earlier, longitudinal study by Kielmann (1977). Following immunization, Kielmann monitored the weight fluctuations in vaccinated and control children. He discovered that after immunization with BCG and polio the nutritional status decreased significantly in children less than six months of age. Furthermore, his study results showed that polio immunization had a greater effect on children less than 80% of the Harvard weight for age median than on well nourished children.

Chapter 3. **DESCRIPTION OF THE STUDY SETTING**

This study was conducted in Makina, one of the villages
of Kibera, Nairobi, Kenya. Kibera is a spontaneous
settlement, 5 km South East of the city centre of
Nairobi. Administratively, Kibera is one of the eight
divisions of Nairobi Province. As a part of Langata
Constituency, it is also known as Southern Division.
The 1979 census counted 143,196 people in the adminis-
trative area Kibera. According to the District Adminis-
tration at the time of this study it had an estimated
population of 200,000 - 300,000. Kibera consists of
eleven villages; Makina, Masshimoni, Lindi, Lani Shaba,
Siranga, Kianda, Kisumu Ndogo, Katukera, Soweto,
Sarangobe and Kambi. At present the land belongs to the
government. Originally the land was given to the
Nubians, who fought with the British Army during World
War Two. Since then the Nubians have occupied Kibera,
until other groups mainly Kenyans migrating into Nai-
robi from rural areas, joined them in the early 1970's.

Kibera is mainly a low-income area. The City Commission
provides tap water to the area. Water is paid for
according to the amount taken. Most houses are not
supplied with electricity because, according to build-
ing standards, they don't qualify for electrical in-

stallation. Furthermore, most residents are unable to pay the relatively high costs involved. A typical house in Kibera has an earthen floor, a metal roof, walls of mud, and consists of 1-3 rooms. The majority of the residents live in one room rented houses. Rents are low, generally 150 Ksh. per month for a one room-house in Makina. But compared to other spontaneous settlements the rents are relatively high in Makina. The environmental sanitation is poor. Most people in Makina share pit latrines. The sewage system is an open type. There is no collection of garbage. In most cases, garbage is thrown into pits and it is either burnt or buried. The roads are murram and are difficult to traverse especially during the rainy seasons.

In Makina several organizations have opened new health facilities within the last three years. As a result, compared to other villages in Kibera, the provision of basic health services is relatively good. The following health facilities are providing Child Welfare Services in Makina:

CLINIC	HEALTH SERVICES*					
Ministry of Health Clinic	1	2	(3)	4	5	6
C.P.K. Human Development Clinic	1	2	3	4		6
Crescent Aid Clinic	1	2	3	4		
Handicraft Centre Clinic	1	2	(3)	4		
Dispensaries			3			
Private doctors/traditional doctors			3			
(City Commission Clinics outside Makina)	1	2	3	4		

*Codes for Health Services:
1 Growth monitoring
2 Immunization
3 Treatment
4 Health education
5 Food aid
6 Home visits

() very limited and occasionally provided service

Immunization is free at the Ministry of Health Clinic, Handicraft Centre Clinic, and City Commission Clinics, whereas at the C.P.K. Clinic it costs 1 Ksh. the first time for a "child health card" and at the Crescent Aid Clinic it costs 10 Ksh. per visit.

The Ministry of Health Clinic is the only clinic in Makina which organizes a special clinic for malnourished under fives and which supplies some food aid (2 kg skimmed milkpowder per month) to malnourished under fives.

A more detailed description of the Child Welfare Clinics is given in Appendix 1. On the outskirts of Makina there are two City Commission maintained health facilities, namely Woodley Clinic and Langate Health Centre. In the other villages of Kibera several other non governmental organizations operate. It is up to the people to decide which facilities they prefer to utilize. To make use of the Kenyatta National Hospital Child Welfare Clinic one needs a referral card from another Child Welfare Clinic. Only complicated cases and severely malnourished children are referred to Kenyatta National Hospital.

Chapter 4. **METHODS AND MATERIALS**

4.1. **STUDY DESIGN**

This was a cross-sectional, community-based survey conducted in Makina, Kibera during the period of February through May 1989 to determine the nutritional status, immunization status, and utilization level of growth monitoring services of children under three years included in the study sample. The investigator made use of anthropometric measurements, child health cards, and interviews.

4.2. **PLANNING THE STUDY**

After IDRC (International Development and Research Centre) had agreed to sponsor this study, governmental permission was obtained. To introduce and familiarize herself with the area the investigator visited the District Officer, the Chiefs, KANU representative, all clinics and non governmental organizations working in Makina. Because no detailed map was available of the study area, the researcher had to draw a map herself, which was very time consuming as it is a residential area with a very high population density and with rambling village structures. Although the Makina residents were initially somewhat suspicious of a "mzungu"

(white person) walking through their area, they ac-
cepted it gradually and ultimately they were very
cooperative and friendly. With the help of a Kenyan
colleague six enumerators were selected; three male and
three female Kibera residents with different tribal
backgrounds. The enumerators had completed at least
Form 4 while two enumerators also had some research
experience. One enumerator had experience in weight and
height measuring. In addition to the six enumerators, a
supervisor was employed with a health educational back-
ground in another Nairobi slum area. Training was
carried out over a period of two weeks in March 1989.
Instruction was both didactic and practical. As part of
the training, 26 households were surveyed in another
part of Kibera to pretest the questionnaires and the
equipment, to improve and test the enumerator's skills,
and to try out the sampling method. During the pilot
study it had to be stressed several times that it was
more important to produce high quality work instead of
doing as many households as possible per day. At the
end of the pilot study appropriate modifications were
discussed, agreed upon and later incorporated in the
final questionnaires. Three teams were formed and the
most appropriate sampling method was chosen.

4.3. DESCRIPTION OF THE STUDY POPULATION

Because in Makina the availability of basic child
health services has improved considerably in the last
three years , only children under three years were
included in the study. As it is suggested that children
should receive their first immunization during their
first month of life, we included only children above
one month in the study. So the study population con-
sists of all children from 1-35 months living in the
study area during the survey period.

4.4. SAMPLING

Sample size determination

The main objectives of this study were: to determine
the nutritional status and the utilization level of
preventive child services of Makina children under
three years. The investigator expected that the preva-
lence of malnutrition among Makina children under three
years was above the national prevalence of 24 % ($\leq$ 80 %
W/A).

The following formula can be used to calculate the sample size for a prevalence study;

$$n = \frac{z^2\ pq}{d^2}$$ where n = desired sample size
z = standard normal deviate, 1.96 for 95 % confidence level
p = prevalence rate
q = 1 - p
d = degree of accuracy desired, usually set on 0.05.

Assuming that the prevalence rate for malnutrition would be 24 % (national prevalence rate), a minimum sample size of 280 children would be required.

$$n = \frac{1.96 \times 1.96 \times 0.24 \times 0.78}{0.05 \times 0.05} = 280$$

Assuming that the prevalence rate for immunization coverage would be 51 % (national prevalence rate), a minimum sample size of 384 children would be required.

$$n = \frac{1.96 \times 1.96 \times 0.51 \times 0.49}{0.05 \times 0.05} = 384$$

In order to be able to do tests of correlations, crosstabulations, and possibly do tests of multiple regressions, a comprehensive sample of eligible children was taken. The sample size was therefore more than the calculated minimum samle size. A sample of 478 study children was surveyed.

SAMPLING

MAKINA AREA
42 clusters

↓

26 clusters
randomly selected

↓

A comprehensive sample of 420 Households
with children 1 - 35 months included
in Study Population

↓

18 Households were excluded
due to absence after
repeated visits by
enumerator

↓

402 HH included in
the study.
Every child of eligible
age included = 478 children

↓

At 2 HH only children at home
(4 children under 3 years)

↓

Nutritional status data for 478 children (=402 HH)
All other data for 474 children (=400 HH).

Sampling method

A map was drawn of the Makina area (Appendix 2). The area is approximately 1 km by 1/2 km. Makina was divided into 42 clusters and as a team we decided on the borders per cluster and we gave every cluster a name in accordance with the name of a keypoint in that particular cluster (Appendix 3). 26 Clusters were randomly selected and plotted on the map. Fortunately these clusters were equally distributed over the Makina area. In the selected clusters all the houses were numbered in a systematic manner. In total, there were 3,456 houses (on average 130 houses per cluster). All houses where children under three years were living (as reported by the residents or their neighbours) were listed and tabulated for a total of 622 children. On the basis of this information we decided to include all children under three years living in the selected clusters in our survey. During the data collection we included all the households where children under three years were living in the sample, what worked out to be 420 households. Unfortunately, after repeated efforts, 18 out of 420 households could not be surveyed because we never found anybody at home. The final sample population included a total of 478 children from 1 - 36 months belonging to 402 households. The difference in number (622 children counted during the sampling phase, and 478 study children during the data collection

phase) is due to children under 1 month of age and children above 36 months of age who were included in our first count but after checking the exact age were later excluded from the study. The difference is also due to mothers and children who migrated back to the rural areas during the survey period.

4.5. **DATA COLLECTION**

The data collected for each child was comprised of bio-demographic characteristics, anthropometric measurements, received immunizations, frequency of participation in growth monitoring, and socio-economic characteristics of the family.

Bio-demographic data on each child included age, gender, usual caretaker during daytime and the time (in weeks) a child was absent from the urban home during the last six months. The birth date from the clinic cards was used but if the child did not have a clinic card or the age at the card seemed unreliable, the birth certificate was checked.

Anthropometric measurements taken included weight and height/length. Weight was measured by means of digital scales calibrated in 0.1 kilograms. The length of children under two years and the height of children

over two years was measured using locally made equipment. The height measurer had a detachable horizontal sliding headboard. The length measurer had a fixed headboard and a detachable sliding footboard. Fixed to the rods and boards were metal tapes calibrated in centimetres and millimetres. Weight was taken correct to 100 grams, and height/length was measured to the nearest 0.5 cm. Three weight measurements and two height/length measurements were taken per child. If there was a difference of more than 0.5 cm for height/length or 100 grams for weight the enumerator had to repeat the measuring exercise. Length was only measured for children above 3 months of age because below the age of 3 months it is nearly impossible to collect reliable length data.

Immunization data was copied from the child health card. If there was no health card available, the mother was asked about the number and types of vaccinations received by the child. Additionally, the investigator checked every child to see if a BCG scar was present.

The frequency of participation in any growth monitoring programme was checked for the last six months by child health card. How many times the child was weighed during his/her first, second, and third year was also noted according to the child health card.

Utilization of preventive child health services was also checked by the number of clinic visits during which the weight was measured and/or the child received any immunization for the last six months, according to the child health card.

Socio-economic data of the family included the following variables: household size, total monthly household income from both formal and informal activities, employment status, educational level attained by mother and head of the household, marital status, occupation and religion of the mother, and number of years the mother had been living in Kibera. The socio-economic data was collected by means of interviewing the mother or any other adult at home during the time of the investigation visit.

All health facilities in Makina were visited twice to observe the normal Child Welfare Clinic procedures and to interview the Sisters in Charge. Information was collected on available health services, clinic procedures, utilization, and problems encountered by the clinic staff.

All seven severely malnourished children included in the study were referred to clinics and, at the end of

the study, were once more followed up. Four out of
these seven had been admitted into Kenyatta National
Hospital during the time of the study.

Problems encountered.

Each working day the whole team met at 8.00 am and at
4.30 pm to divide the work and to discuss problems
which arose. During the data collection phase it was
raining heavily, making the "roads" muddy and slippery
so that moving around was difficult. To find people at
home, several visits and appointments had to be made.
Despite these difficulties the investigators managed to
finish 4-5 households/day per team. We worked two
weekends to revisit all the houses where we had found,
until that time, nobody at home during working-days.

Despite several attempts, at two households we never
found any adult at home to interview. For the four
children living in these two households we only col-
lected anthropometric data. So that the sample size of
nutritional status data is 478 study children and the
sample size for all the other data is 474 or less.
(Note; nutritional status data n = 478, other data
n = 474 or less).

Although the investigator did attempt to check clinic

records of utilization of Child Welfare Clinic services and the immunization status and nutritional status of the attending children per clinic, unfortunately it was without much result. Most of the time the records were not available or incomplete. In one case the investigator was not allowed to review the clinic records.

Supervision, Validation and Editing of the data collected.

The data collection was closely supervised. The survey forms were collected every afternoon by the investigator and checked if:

(a) the weights and heights were within permissible range. In case of extremes ($\leq$ 60% W/A, > 120 % W/A, < 70% W/H, < 80% H/A, > 110% H/A) the household was revisited by the enumerators together with the investigator and the child's measurements checked.

(b) the forms were correctly filled in and if no information was missing. Incomplete and/or incorrect forms were returned to the respective teams for necessary completion.

(c) there was consistency in the collected data.

The supervisor revisited 62 randomly selected house-

holds and checked the reliability of a part of the collected data.

The supervisor accompanied the teams once a week to correct and improve their interview techniques.

By request of the enumerators, the investigator had to revisit fifteen households to find out how to interpret wrongly plotted growth charts.

4.6.   **DATA PROCESSING AND ANALYSIS**

All data obtained was coded and checked by the investigator. The data was analyzed on a microcomputer making use of the following programmes: Data Base III Plus, CDC Anthropometric Software Package and the Statistical Package for Social Sciences (SPSS/PC+). The following statistical tests were applied in SPSS/PC+: crosstabulations, and correlations. The minimum level of significance acceptable was taken to be $p < 0.05$.

Definitions

Nutritional status

It is widely accepted that for practical purposes anthropometry is the most useful tool for assessing the nutritional status of children.

A deficit in weight for length/height is called wasting or acute malnutrition and this indicates a deficit in tissue and fat mass compared with the amount expected in a healthy child of the same height or length, and may result either from failure to gain weight or from actual weight loss. One of the main characteristics of wasting is that it can develop very rapidly and, under favourable conditions, it can be restored rapidly.

A deficit in length/height for age is called stunting or chronic malnutrition. Stunting signifies slowing in skeletal growth and it is frequently found to be associated with poor overall economic conditions. Although catch-up in height undoubtedly can occur, it takes a relatively long time even with a favourable environment (WHO Working Group, 1986).

Weight for age is a good basic indicator combining acute and chronic malnutrition, sensitive to small changes and used in most growth monitoring programmes.

There are three ways in which the observed anthropometric measurements can be related to the reference:

1. by its position within the centile distribution of the reference

2. as a standard deviation score (Z-Score)

3. as a percentage of the reference median.

Since 1977 the WHO has recommended to member countries the use of Z-Scores to express both distributions and cut-off points because Z-Scores have a statistical meaning (WHO-Working Group, 1986).

The following NCHS/WHO standards were used to complete

per child weight for age, weight for height and height

for age;

		Med. %	Z-Scores
Weight for age:			
obese	-	> 120 %	≥ 2 SD
normal	-	81-120 %	-1.9 - 1.9 SD
moderately malnourished	-	61-80 %	-2.9 - -2.0 SD
severely malnourished	-	≤ 60 %	≤ -3 SD
Weight for height:			
normal	-	≥ 80 %	> -2 SD
wasted	-	< 80 %	≤ -2 SD
Height for age:			
normal	-	≥ 90 %	> -2 SD
stunted	-	< 90 %	≤ -2 SD

(Unicef, 1983).

Immunization status

In accordance with the Ministry of Health guidelines a
fully immunized child was arbitrarily defined as a
child who has received the following vaccinations at
the given age:

```
------------------------------------
Age             Vaccinations
------------------------------------
1 month   -     BCG   , Polio 1
2 months  -     DPT 1 , Polio 2
3 months  -     DPT 2 , Polio 3
4 months  -     DPT 3 , Polio 4
10 months -     Measles
------------------------------------
```

Coverage:

Coverage was discussed only with respect to immuniz-
ation and was defined for the purpose of this study as:
The proportion of the study population in the community
(Makina children under three years) that has completed
their immunization as expected for their age.

Utilization:

Utilization was defined as:
The extend to which the available child health services
in Kenya are used by the Makina children under three
years.

To analyze the utilization data the following formulae were developed and used to calculate utilization scores;

Utilization Score Growth Monitoring Services for the last 6 months:

(a) For children < 6 months:

$$\frac{\text{\# of recorded weight measurements previous 6 months} \times 100}{\text{age child in months}}$$

(b) For children $\geq$6 months:

$$\frac{\text{\# of recorded weight measurements previous 6 months} \times 100}{6}$$

Utilization Score Growth Monitoring Services:

$$\frac{\text{\# of recorded weight measurements since child was born} \times 100}{\text{age child in months}}$$

Utilization Score Preventive Child Health Services:

(a) For children < 6 months:

$$\frac{\text{\# of clinic visits either for growth monitoring or immunization} \times 100}{\text{age child in months}}$$

(b) For children $\geq$ 6 months:

$$\frac{\text{\# of clinic visits either for growth monitoring or immunization} \times 100}{6}$$

4.7.   CHRONOLOGY OF INVESTIGATION

```
1988        1989                                                              1990
nov  dec   jan   feb   mar   apr   may   jun   jul   aug   sep   oct   nov   dec       jan   feb   mar   apr   may
<------------------->
preparation
                   <->
                   training/piloting
                    <->
                    sampling
                      <-------->
                      data collection
                            <----------------------------->
                            data entry/cleaning & analysis

                                                                <------------------->
                                                                report preparation
                                                                     <------/ /---------->
                                                                           feedback
```
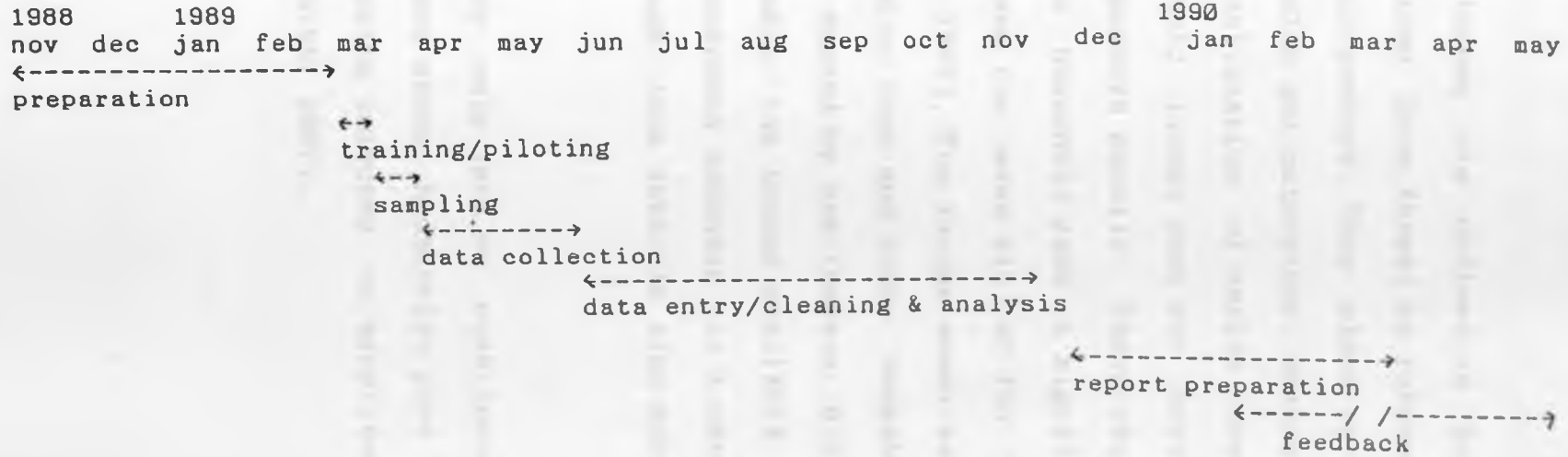
4.8. LIMITATIONS OF THE STUDY

Income

Household income was defined as total monthly cash income obtained from formal or informal activities by all household members. This might be a crude indicator for the health and nutritional status of the children and their utilization of health services since the total household income does not necessary benefit all household members equally. There are cases where the head of the household uses a significant portion of his/her income (or even all of it) for selfish ends (Lee-Smith, 1987). The income women earn is more likely to be spent on food and basic household needs than is the income earned by men (Rogers, B.L. and Yousef, N, 1988). Probably the income available to the household for joint household expenses is a more sensitive indicator although this data is also more complicated to collect.

In this study only data on cash income was collected although some urban households grow a part of their food, most being consumed as subsistence by the household (Lee-Smith, 1987).

Immunization status

Immunization data was copied from the child health
card. If there was no health card available, the mother
was asked about the number and types of vaccinations
received by the child. In these cases there exists the
possibility of recall bias because the reliability of
the mother's recall cannot be confirmed (Sackett,
D.L.,1979).

Maternal care

Employment of the mother, the usual caretaker of the
child during day time, and educational level attained
by the mother were used as indicators for maternal
care. Although these indicators might be too limited.
Maternal care is better assessed by structured observa-
tions (Pelto, G.H., 1987), the time constraints of the
study and the focus justified the methods used.

Chapter 5. **RESULTS**

The following data was analyzed in this study:

1. Population data of the study children and their
   families
2. Nutritional status data of the study children
3. Utilization of preventive child health services
   data.

Nutritional status data was collected for 478 study
children. Because at two households we never found any
adult at home to interview, for the four children
living in these two households we only collected
anthropometric data. So that the sample size of nutri-
tional status data is 478 study children and the sample
size for all the other data is 474 or less.
(Note; nutritional status data n = 478, other data
n = 474 or less).

5.1. **POPULATION DATA**

Bio-demographic data of the study children and socio-
economic data of their families were analyzed as popu-
lation data.

5.1.1. SOCIO-ECONOMIC CHARACTERISTICS OF THE FAMILY

Socio-economic data of the family included the follow-
ing variables: household size, total monthly household
income from both formal and informal activities, em-
ployment status, educational level attained by mother
and head of the household, marital status, occupation
and religion of the mother, and number of years the
mother had been living in Kibera.

Household size and composition

As shown in Table 1, the average household consisted of
1.7 children who were under five years of age, 1 child
between 5 - 15 years and 2.2 persons above 15 years.
The average household size was 4.9 persons.

TABLE 1. Summary of socio-economic characteristics
          of the households.

	mean	min	max	std.dev.
(n = 400)				
Household size	4.9	2	14	1.9
no of underfives	1.7	1	4	0.7
no 5 - 14 years	1.0	0	6	1.4
no > 14 years	2.2	1	8	0.7
(n = 410)				
Age of mother	25.4	15	50	5.2
No yrs mother living in Kibera	8.5	0	40	8.5
(n = 264)				
Income	Ksh 1645	0	8000	1285.4

Income

The mean household income was 1645 Ksh. Table 2 shows
the breakdown of Makina households by income groups.
Five income groups were arbitrarily identified:
no income, very low income group, low income group,
middle income group and high income group (Lee-Smith,
1987). The cut off points for each group are as shown
in the table. Eleven percent (n = 312) of the house-
holds who knew their monthly income, reported that they
had no cash income in the last month preceding the
interview.

TABLE 2. Distribution of households by income groups (n = 264)*.

	Income(in Ksh)	% of households	
No income	0	11 %	(29)**
Very low income group	1 - 799	10 %	(26)
Low income group	800 - 1699	39 %	(103)
Middle income group	1700 - 4999	37 %	(98)
High income group	> 4999	3 %	(8)
		100 %	(264)

---

* Respondents in 136 households did not know the monthly cash
income. In most cases these were women who did not know their
husband's income.
**( ) = actual numbers of household per income group.

Heads of the household

The majority of the households were headed by males
(90 %) who reported to be married. Eleven percent of
the head of the households were found to be either
single, divorced, separated or widowed. The majority of
the heads of households (71.5 %) had completed primary
school and 46 % had received some secondary school
education or more (see Table 3). The majority of the
heads of households (69 %) were employed as salaried
workers, 12 % were self employed, and a small propor-
tion (11.4 %) were working as casual labourers or were
jobless (see Table 4).

Mothers

The average age of the mother was 25 years. Only 3 % of
the mothers were below 18 years and 15 % were above 30
years. The majority of the mothers (86 %) were married.
The majority of the mothers (67.1 %) had primary school
education or less. In general the women were less
educated than the men (see Table 3). Almost half of the
mothers (46 %) were unemployed outside of their home
but also stated that they were not looking for a job,
however 29 % were reported to be jobless and looking
for a job (see Table 4). The majority of the mothers
(69 %) were christians and 29 % muslims. The average
mother in the study area had lived in Kibera for eight

years . Forty seven percent had lived in Kibera for
more than 5 years whereas, only 15 % of the mothers had
lived there for less than one year.

TABLE 3. Distribution of head of households and mothers by
educational level attained.

Educational level	(n = 400) % of heads of household	(n = 410) % of mothers
No education	5.9	8.2
Adult class only	0.4	0.2
Some yrs primary school	15.9	34.2
Completed primary school	25.9	24.5
Some yrs secondary school	15.8	18.8
Completed sec.school&more	29.8	12.2
Unknown	6.3	1.9
	100.0	100.0

TABLE 4. Distribution of head of households and the mothers by
employment status.

Employment status	(n = 400) % of heads of household	(n = 410) % of mothers
Salaried worker	69.2	14.3
Self employed	11.8	9.5
Casual labourer	5.0	1.0
Jobless (looking for job)	6.4	29.0
Unemployed (not looking for job)	3.7	45.8
Landlord	3.1	0.0
Unknown	0.8	0.4
	100.0	100.0

5.1.2. BIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY CHILDREN

Table 5 depicts the age distribution of the study children. The male to female ratio of children was 1.04 : 1.00 indicating slightly more males than females.

TABLE 5. Age distribution of study children (n = 478).

Age in months	n	%	Cum %
1 - 5	80	17	17
6 - 11	101	21	38
12 - 17	74	15	53
18 - 23	81	17	70
24 - 29	75	16	86
30 - 35	67	14	100
	478	100	

Caretaker of the study child

The majority of the children (81 %) were looked after by their mothers during the day. Non maternal caretakers were reported to be either a domestic worker, a grandparent, a neighbour or another child. Only six fathers (1.2 %) were caretakers. Nine caretakers were below the age of 13 years old.

Migration of the index child outside the study area

The majority of the study children (60 %) had been living continually in Kibera for the previous six months. A small proportion (18 %) had been out of Kibera for 1 - 4 weeks. While 11 % of the study children had been staying most of the time outside of Kibera during the previous six months (see Table 6).

TABLE 6.   Distribution of study children by number of weeks away from study area in previous six months (n = 474).

Migration out in weeks	% of children		Cum %
0	60	(285)	60
1 - 4	18	(85)	78
5 - 8	7	(33)	85
9 - 12	4	(19)	89
13 - 25	11	(52)	100
	100	(474)	

( ) = actual numbers of study children

5.2. **NUTRITIONAL STATUS**

5.2.1. INTRODUCTION

In this chapter the anthropometric data is presented as
a percentage of the median to be able to compare the
study results with the national statistics which were
only analysed as percentages of the median for children
under three years . Anthropometric data is presented as
Z-Scores in the appendix. However in accordance with
the WHO-guidelines the investigator has used the Z-
Score technique for the analytical part (crosstabulati-
ons and correlations) of the study.

5.2.2. WEIGHT FOR AGE, HEIGHT FOR AGE AND
WEIGHT FOR HEIGHT RESULTS

Weight for age

In Makina, 22 % of the children under three years were
malnourished (≤ 80 % weight for age). Only three per-
cent could be classified as obese (Table 7).

TABLE 7. Distribution of study children (1-35 months)
          by Weight for age* (n = 478).

Weight for age	N	%
Obese	16	3
Normal	357	75
Moderately malnourished	98	21
Severely malnourished	7	1
Total	478	100

* Using per cent median and definitions found on p.37

There was no difference in nutritional status between

boys and girls (Appendix 4, Table 1).

Furthermore, as illustrated in Table 8, there was an

increasing trend of malnourishment from the age of six

months until 18 months and thereafter a decline.

TABLE 8. Percentage malnourished children
          ($\leq$ 80 % weight for age) by age groups*.

1 - 5 months	7.5 %
6 - 11 months	22.8 %
12 - 17 months	36.5 %
18 - 23 months	25.9 %
24 - 29 months	20.0 %
30 - 35 months	19.4 %

* n = 478

As shown in Table 9 nearly all obese children in this
study were below six months of age. Fiveteen per cent
(15 %) of the children under six months could be clas-
sified as obese.

TABLE 9. Percent distribution of study children by age groups
(in months) and by nutritional status (Weight for age*)
(n = 478)

	Age								
	1-5	6-11	12-17	18-23	24-29	30-35	Total %		Total n
Obese	14.9	2.8	0	1.2	0	0	3.4		16
Normal	77.6	74.4	63.5	72.9	80.0	80.6	74.6		357
Moderately malnourished	6.3	22.8	33.9	24.7	18.7	16.5	20.5		98
Severely malnourished	1.2	0	2.6	1.2	1.3	2.9	1.5		7
Total	100	100	100	100	100	100	100 %		478

* Using per cent median

Figure 1 shows the growth curve of the average Makina child below three years. The upper and lower lines are the lines on the Child Health Card and which are used to indicate the "road to health". As illustrated in Figure 1 the nutritional status of the average study child until six months is very good however it deterio-rates the following 12 months. It should be noted however that the average study child remains on the "road to health".

FIGURE 1: GROWTH CURVE
AVERAGE STUDY CHILD
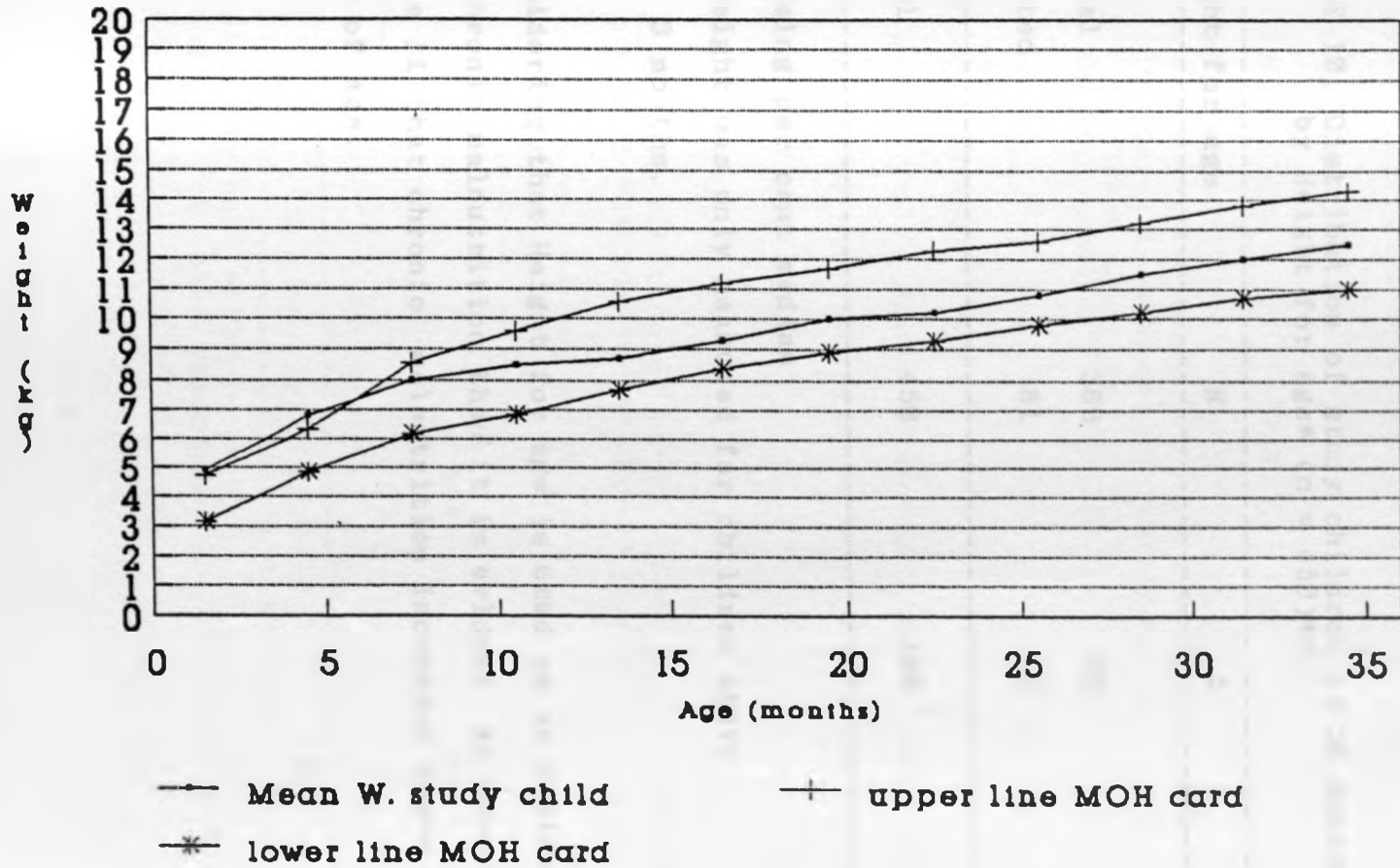
Height for Age

As shown in Table 10, 18 % of the children under three
years were stunted using 90 % of WHO/NCHS reference
data as the cut-off point.

TABLE 10. Distribution of study children (3-35 months)
by Height for age* (n = 450)**.

Height for age	N	%
Normal	369	82
Stunted	81	18
Total	450	100

*   Using per cent median

** Height was only measured for children above

    3 months.

Considering that Height for age is used as an indicator
of chronic malnutrition then it is evident as shown in
Table 11 that chronic malnutrition increased above one
year of age.

TABLE 11. Percent distribution of stunted children
(below 90 % Height for age) by age groups
(in months).
(n = 450)*

Age group	%	
1 - 11 months	12 %	(17)
12 - 23 months	22 %	(34)
24 - 35 months	21 %	(32)

----

* Height was only measured for children
  above 3 months.
( ) = actual number

Weight for height

Only 5 % of the children under three years were wasted

using below 80 % of WHO/NCHS reference data as the cut-

off point (Table 12).

TABLE 12. Distribution of study children (3-35 months)
by Weight for height* (n = 450)**.

Weight for height	N	%
Normal	428	95
Wasted	22	5
Total	450	100

----

* Using per cent median
** Height was only measured for children above 3
months.

The distributions of the Makina children by weight for age, height for age, and weight for height using Z-Scores, are given in Appendix 5, Tables 1, 2 and 3 . Detailed cross classifications by age groups are given in Appendix 6 ,Tables 1, 2, 3, and 4. Detailed figures of distributions of height for age, weight for height and weight for age are given in Appendix 7.

5.2.3. FACTORS ASSOCIATED WITH NUTRITIONAL STATUS

Bio-demographic factors, socio-economic factors and utilization scores were analyzed for their association with nutritional status of the child. As shown in table 13 and 14 the following factors showed a significant relationship with Weight for age:

1. Age of the child
2. Utilization score of growth monitoring services
3. Migration of child outside the study area
4. Length of residence in Kibera by mother
5. Immunization status child
6. Household monthly income

Nutritional status deteriorated with age of the child, increasing migration of the child, and increasing length of residence in Kibera by the mother. The relationship between nutritional status and immunization status and utilization growth monitoring services will be elucidated in the section 5.3.; "Factors associated with utilization of preventive child health services".

TABLE 13. Results of analysis of children's nutritional status as
         assessed by WAZSCR, HAZSCR, WHZSCR with other factors.

Variable	Correlation coefficient	p value	n

Nutritional status as assessed by WAZSCR

Variable	Correlation coefficient	p value	n
Age of child	-.2932	0.000	474
Utilization score growth monitoring services	.2134	0.000	376
Length of residence in Kibera by mother	-.1211	0.004	474
Migration of child outside Kibera	-.0777	0.046	474

Nutritional status as assessed by HAZSCR

Variable	Correlation coefficient	p value	n
Age of child	-.2203	0.000	447
Utilization score growth monitoring services	.1902	0.000	352
Migration of child outside Kibera	-.0863	0.034	447

Nutritional status as assessed by WHZSCR

Variable	Correlation coefficient	p value	n
Age of child	-.2203	0.000	447
Utilization score growth monitoring services	.1902	0.005	352
Length of residence in Kibera by mother	-.0662	0.025	474

* n corresponds with the number of children for who information
on that specific variable was available.

Income showed some relationship because those house-
holds with a total household income below 500 Ksh.
exhibited greater tendency toward having malnourished
children (see Table 14).

TABLE 14. Distribution of study children by household
income and by nutritional status.

	malnourished WAZCR $\leq$ -2 (n = 64)	well nourished WAZSCR > -2 (n = 242)	Chi-square result
Income per month:			
0 - 500 Ksh	15	26	
> 500 Ksh	49	216	X^2 = 5.97712
	64	242	p = 0.0145

Factors not associated with nutritional status

Analysis of correlation showed no relationship between nutritional status as measured by Weight for Age Z-Score, Height for Age Z-Score and Weight for Height Z-score and the following variables:

Socio-economic and socio-demographic characteristics of the household:

- household size
- number of children under five years in the household
- educational level attained by head of the house hold
- sex of the head of the household
- educational level attained by mother
- marital status of the mother
- employment status of the mother
- age of the mother
- religion of the mother (checked for both sexes child)

Bio demographic characteristics child:

- gender of the child
- caretaker of the child.

5.3. **UTILIZATION OF PREVENTIVE CHILD HEALTH SERVICES**

5.3.1. CHILD HEALTH CARD

The majority of the mothers (79 %) showed their Child
Health Card at the time of the investigation. Of the
mothers who could not show a Child Health Card at the
time of the interview (n = 98), 55 % reported that
they had left their cards at their rural home, 27 %
said that they had lost it and the remaining respon-
dents gave a variety of other reasons. Of those without
card five percent reported never to have been to a
clinic.

5.3.2. IMMUNIZATION STATUS

Immunization status was determined by interview or
clinic card and evidence of a BCG scar. The majority of
the study children (71 %) were fully immunized, 27 %
were partly immunized, and 2 % had not received any
vaccination. Immunization status was analysed seperat-
ely for those with and those without a card (see
Table 15). The majority of the children with clinic
card (74 %) were fully immunized and 58 % of the
children without card at the time of investigation,
were fully immunized.

TABLE 15. Percent distribution of study children
by immunization status and clinic card
status of children.

Immunization status	Clinic card shown (n=376)	No Clinic card (n=98)
Fully immunized	74.3	58.0
Partly immunized	25.4	31.0
Not immunized at all	0.3	8.0
Unknown	0.0	3.0
	100.0	100.0

As illustrated in Figure 2 and the tables 16 and 17 the immunization status improved by increasing age of the child.

TABLE 16. Percentage of children fully immunized for BCG by age group (n=474).

Age of child in months	% of children fully immunized for BCG
1 - 2	82.1
3 - 5	96.2
6 - 8	97.6
> 8	98.6

TABLE 17. % of children fully immunized for measles by age group (n=361)*.

Age of child in months	% of children fully immunized for measles
9 - 11	63.5
12 - 23	66.2
24 - 35	75.7

* only children 9 months and older included in the analysis

FIGURE 2: % OF STUDY CHILDREN FULLY IMMUNIZED BY AGEGROUP
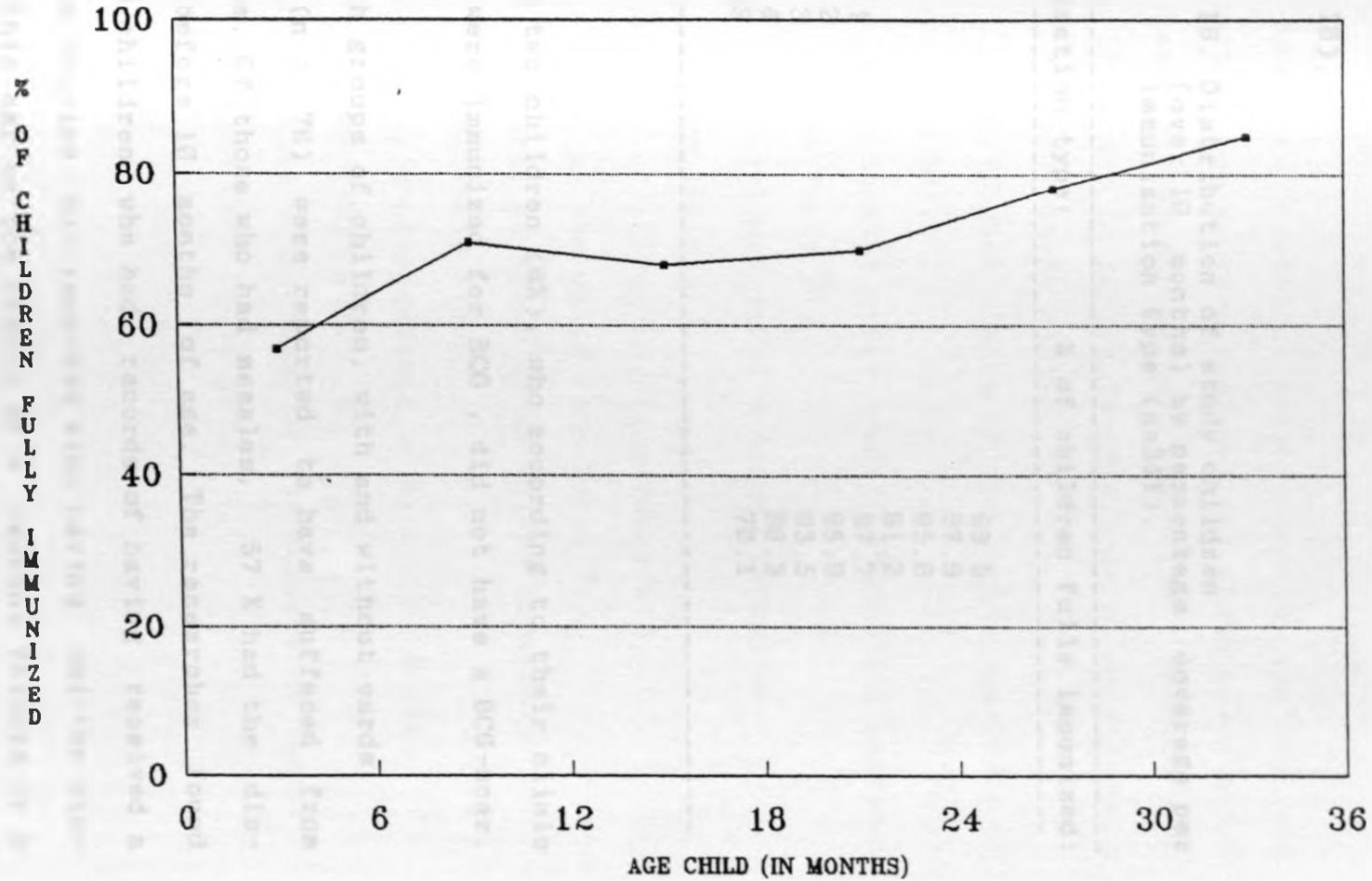
Above nine months, the age that children are supposed to have received all vaccinations, 30 % of the study children were not vaccinated against measles. At that age they had received most other vaccinations (see Table 18).

TABLE 18. Distribution of study children
(over 10 months) by percentage coverage per
immunization type (n=341).

Immunization type:	% of children fully immunized:
BCG	98.5
DTP 1	97.9
DTP 2	95.6
DTP 3	91.2
POLIO 1	97.7
POLIO 2	95.9
POLIO 3	93.5
POLIO 4	90.3
MEASLES	70.1

Twenty two children (6%), who according to their clinic cards were immunized for BCG , did not have a BCG-scar.

Of both groups of children, with and without cards, 16 % (n = 76) were reported to have suffered from measles. Of those who had measles, 57 % had the disease before 10 months of age. The researcher found twenty children who had records of having received a measles vaccine but reported also having had the disease. This may be the result of a vaccine failure or a

misdiagnosis of the mother and/or clinic staff.

Factors associated with immunization status

Bio-demographic factors, socio-economic factors and utilization scores were analysed for their association with immunization status of the child. As shown in Tables 19-22 the following factors were clearly associated with immunization status:

1. Nutritional status of the child (see Table 19 and 20).

2. Utilization score growth monitoring services (see Table 21).

3. Educational level attained by mother (see Table 21).

4. Age of the mother (see Table 21).

5. Age of the child (see Table 21).

6. Number of under fives in the household (see Table 21).

7. Length of residence in Kibera by mother (see Table 21).

8. Mother's knowledge of the purpose of immunization (see Table 22).

As shown in Table 19 and 20, well nourished and moder-
ately malnourished children had a better immunization
status than severely malnourished children.

TABLE 19. Distribution of study children by nutritional
status* and by immunization status.

	Fully immunized (n=336)	Not fully immunized (n=135)	Chi-square result
WAZSCR $\leq$ -3 SD	8	11	
WAZSCR > -3 SD	328	124	X^2 = 6.55808
	336	135	p = 0.0089

---

*as assessed by WAZSCR.

TABLE 20. Percent of fully immunized children by nutritional
status (n=471).

	% fully immunized children	n
WAZSCR $\leq$ - 3 SD·	42.1	19
WAZSCR > - 3 SD	72.6	452

Table 21 lists those variables which are significantly correlated with immunization status. The following is illustrated by this Table:

Age and educational level of the mother.

Younger mothers were better educated (correlation coefficient = -0.2325, p = 0.000, n = 465) and made more use of preventive child health services to get their children immunized.

Age of the child.

As concluded earlier, the immunization status improved with increasing age of the child.

Number of under fives in the household.

The number of under fives in a household had a negative association with the immunization status of the child.

Length of residence in Kibera by mother.

Mothers with a longer period of residence in Kibera had better immunized children than mothers who had settled recently in Kibera. However, if we relate the immuniz- ation status of children below one year of age to these two groups of mothers , there is no significant differ- ence.

Utilization score of growth monitoring services.

It is not surprising that immunization status was associated with the utilization score of growth moni-toring services since growth monitoring services and vaccination services are provided at the same time at the clinics.

TABLE 21. Results of analysis of correlations of children's immunization status* with other factors.

Variable	Correlation coefficient	p value	n**
Utilization score growth monitoring services	0.1636	0.001	376
Educational level mother	0.1242	0.004	465
Age of the mother	-0.1036	0.012	474
Age of the child	0.0878	0.028	474
No.of <5yrs in household	-0.0798	0.041	474
Length of residence in Kibera by mother	0.0776	0.046	474

* as assessed by not, partly, or fully immunized.
** n corresponds with the number of children for who information on that specific variable is available.

As illustrated in Table 22 children whose mothers knew
the purpose of immunization had a better immunization
status than children whose mothers did not know why
they immunize children at the clinics.

TABLE 22. Distribution of study children by mother's knowledge of
the purpose of immunization and by immunization status.

	Fully immunized (n=335)	Not fully immunized (n=135)	Chi-square result
Mother knew the purpose of immunization	310	116	
Mother did not know the purpose of immunization	25	19	$x^2 = 4.20824$
	------	------	$p = 0.0402$
	335	135	

Factors not associated with immunization status.

Analysis of correlation showed no relationship between immunization status of the child and the following variables:

Socio-economic and socio-demographic characteristics of the household:

- household size
- educational level attained by head of the house
  hold
- sex of the head of the household
- household monthly income
- employment status of the mother
- religion of the mother

Bio demographic characteristics child:

- gender of the child
- caretaker of the child
- migration of the child over previous 6 months.

5.3.3. UTILIZATION OF GROWTH MONITORING SERVICES

The frequency of participation in any growth monitoring programme was checked for the previous six months by child health card. How many times the child was weighed during his/her first, second, and third year was also noted according to the child health card.

Bio-demographic factors, socio-economic factors, nutritional status and immunization status were analyzed for their association with the utilization of growth monitoring services. The following factors were associated with utilization of growth monitoring services:

1. Age of the child
2. Nutritional status of the child
3. Immunization status of the child
4. Migration of the child outside the study area
5. Age of the mother

The following relations are illustrated by Table 23:

Age of the child:

Utilization of growth monitoring services decreased sharply with age , while the nutritional status of the children, like we have seen before, also deteriorated with age. (see also Figure 3, page 76).

Nutritional status of the child (WAZSCR, HAZSCR, WHZSCR):

Malnourished children under three years participated less frequently in the growth monitoring programme than well nourished children under three years. When ana-

lyzed by age group separately there is no significant difference between well nourished and malnourished children in utilization of growth monitoring services. Most likely the difference in utilization of growth monitoring services is mainly due to age.

Immunization status of the child:

It is not surprising that utilization of growth monitoring services was associated with immunization status since these two services are provided at the same time at the clinics.

Migration of the child outside the study area:

Study children who stayed most of the time in Kibera made more use of growth monitoring services than study children who migrated a lot outside the study area.

Age of the mother:

As we have seen before in relation to immunization status, younger mothers made more use of preventive child health services than older mothers.

TABLE 23. Results of analysis of correlation of children's
utilization score of growth monitoring services* with
other factors.

Variable	Correlation coefficient	p value	n**
Age of the child	-0.5790	0.000	378
WAZSCR	0.2134	0.000	376
HAZSCR	0.1902	0.000	352
WHZSCR	0.1902	0.005	352
Immunization status child	0.1636	0.001	376
Migration of the child	-0.1581	0.001	376
Age of the mother	-0.1189	0.011	376

* as assessed by utilization score growth monitoring services
over the time period since the child was born.
** Utilization score of growth monitoring services was only
calculated for the children who could show a Child Health Card
(n = 376).

FIGURE 3: UTILIZATION GROWTH MONITORING SERV. AND NUTRITIONAL STATUS CHILD BY AGE GROUP
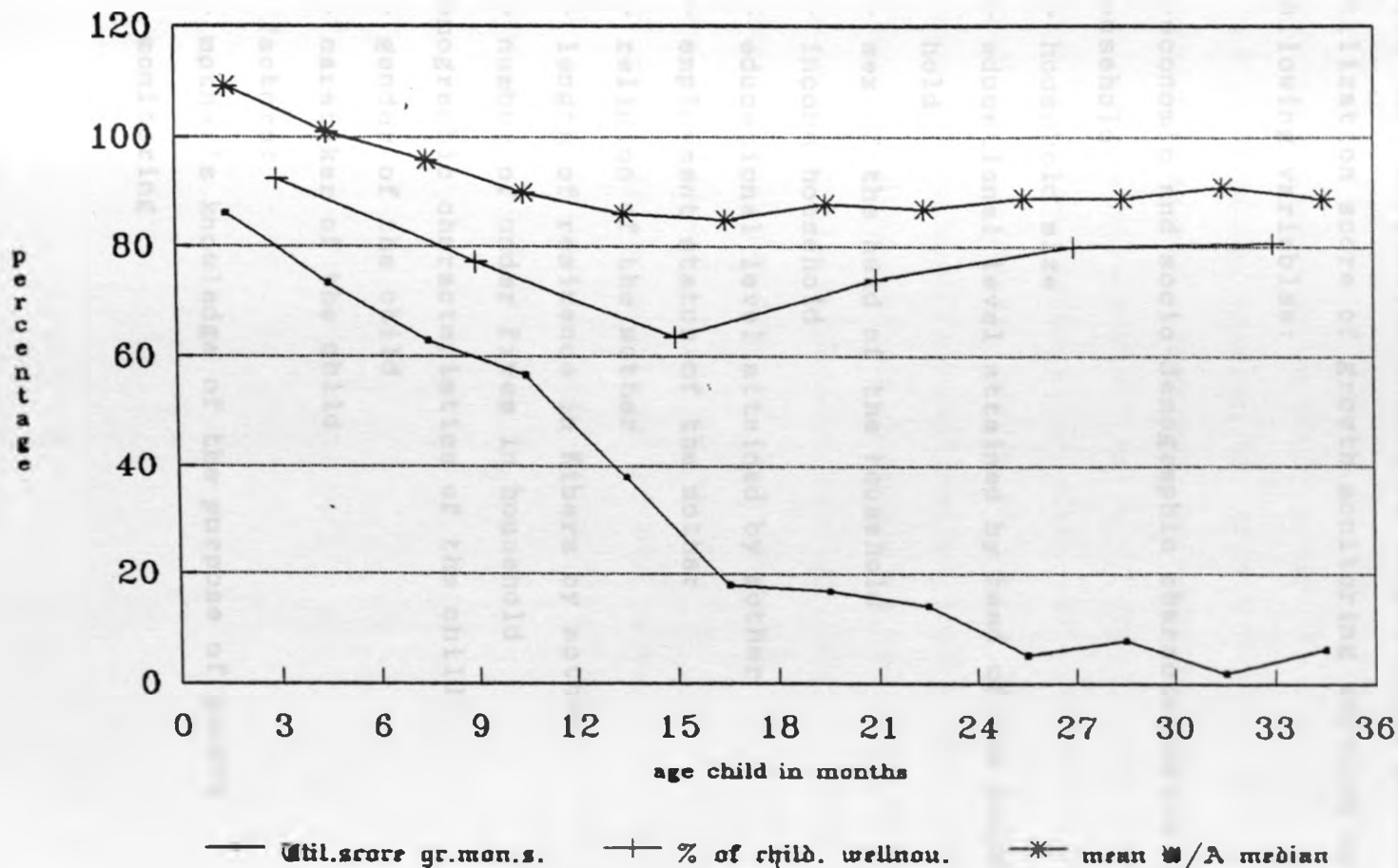
Factors not associated with the utilization of growth monitoring services.

Analysis of correlation showed no relationship between the utilization score of growth monitoring services and the following variables:

Socio-economic and socio-demographic characteristics of the household

- household size
- educational level attained by head of the household
- sex of the head of the household
- income household
- educational level attained by mother
- employment status of the mother
- religion of the mother
- length of residence in Kibera by mother
- number of under fives in household

Bio demographic characteristics of the child:

- gender of the child
- caretaker of the child

Other factors:

- mother's knowledge of the purpose of growth monitoring

5.3.4. <u>UTILIZATION OF PREVENTIVE CHILD HEALTH SERVICES</u>
<u>FOR SIX MONTHS PRECEDING TO THE INTERVIEW</u>

The utilization score of preventive child health ser-
vices for six months preceding to the interview showed
many of the features as we would expect from a combina-
tion of utilization scores of growth monitoring and
vaccination services. However, it must be mentioned
that since the utilization score of growth monitoring
services and the immunization status of the child are
measured over a longer period of time, they are more
sensitive indicators for utilization than the utiliz-
ation score of preventive child health services which
only measures utilization over the last six months. For
children under the age of six months, immunization
status, utilization of growth monitoring services, and
length of residence in Kibera by the mother were asso-
ciated with utilization of preventive child health
services (see Table 24).

For children above the age of six months the following
factors were associated with utilization of preventive
child health services:

1. Age of the child
2. Utilization of growth monitoring services
3. Nutritional status of the child
   (only WAZSCR)
4. Immunization status of the child
5. Age of the mother

(see Table 24).

The length of residence in Kibera by the mother and the
nutritional status of the child (HAZSCR) had a positive
association with the use of preventive child health
services. With increasing age of the child and increas-
ing age of the mother the utilization of preventive
child health services decreased (see Tables 24 and 25)

TABLE 24. Results of analysis of correlations of children's
utilization score of preventive child health services
previous 6 months with other factors.

Variable	Correlation coefficient	p value	n
Children (<6 months):			
Immunization status	0.4125	0.000	73
Utilization score growth monitoring services	0.7007	0.000	73
Length of residence in kibera by mother	0.2446	0.018	73
Children (6 - 35 months):			
Age of the child	-0.6221	0.000	303
Utilization score growth monitoring services	0.7017	0.000	303
HAZSCR	0.1412	0.007	299
Immunization status	0.1358	0.009	303
Age of the mother	-0.1281	0.013	303

TABLE 25. Average number of preventive child health
visits for previous 6 months by age groups
(n=376)*.

Age child in months	Average number of preventive health visits by child for previous 6 months	n
1 - 5	4.7	73
6 - 11	3.5	88
12 - 17	1.8	57
18 - 23	0.9	62
24 - 29	0.6	54
30 - 35	0.2	44

---

* Determined only for those with Child Health Cards.

5.3.5. FACTORS ASSOCIATED WITH UTILIZATION OF PREVENTIVE CHILD HEALTH SERVICES

Selection of factors determining the use of a specific child health clinic

In Makina several organizations provide child health services. It is up to the people to decide which facility they prefer to utilize. Table 26 illustrates that there is a significant association between the particular child health clinic attended in Kibera and the following factors:

1. Area of residence in Makina, Kibera

2. Religion of the mother

3. Age of the child

4. Utilization score of growth monitoring services

5. Mother's knowledge of the purpose of growth monitoring.

Area of residence in Makina,Kibera.

Mothers attended a child health clinic which was nearest to their residence. A detailed description of the area of residence of the children and the selected preventive child health clinic is given in Table 1, Appendix 8.

Religion of the mother.

Although muslim mothers lived equally distributed throughout the four areas of Makina, the majority of muslim mothers attended the Crescent Aid Clinic and the Ministry of Health Clinic.

Age of the child.

The CPK Clinic attracted more children below the age of one year while the Crescent Aid Clinic attracted the age group one to two years.

Utilization score of growth monitoring services.

As was illustrated earlier the utilization of growth monitoring services was associated with the age of the child. In light of this it is not surprising that children who attended the CPK Clinic had a relatively high utilization score and children who attended the Crescent Aid Clinic had a relatively low utilization score for growth monitoring services. Independent of

age, children who attended the Ministry of Health Clinic were more frequently weighed.

Mother's knowledge of the purpose of growth monitoring. Mothers who attended the Ministry of Health Clinic and the CPK Clinic had a much better knowledge of the purpose of growth monitoring.

TABLE 26. Factors significantly associated with the selected preventive child health clinic in Kibera

Variable	Chi-square results			
	X^2	D.F.	p	n
Area of residence in Makina	90.42732	12	0.0000	324
Religion of the mother	48.33126	8	0.0000	315
Age of the child	24.00428	8	0.0023	324
Utilization score of growth monitoring services	19.19736	8	0.0138	268
Mother's knowledge of the purpose of growth monitoring services	10.94281	4	0.0272	324

Factors not associated with the selection of the use of a specific child health clinic

Analysis of correlation showed no relationship between the selection of the use of a specific child health clinic in Kibera and the following variables:

Socio-economic and socio-demographic characteristics of the household:

- educational level attained by the head of the household
- educational level attained by the mother
- total income household
- employment status of the mother
- age of the mother

Characteristics of the child:

- immunization status of the child
- nutritional status of the child (WAZSCR, HAZSCR)

Other factors:

- Mother's knowledge of the purpose of immuniz ation

Problems experienced by mothers to visit the child
health clinic

Although 16 % of the mothers experienced some problems
in visiting the child health clinic, there was no
significant difference in utilization of preventive
child health services. The most frequently mentioned
problems were the long distance to the clinic and the
cost (see Table 27). The low income groups especially
experienced these problems (correlation coefficient =
- 0.1213, p = 0.017, n = 306).

TABLE 27. Percent distribution of mothers who experi-
           enced the following problems to visit the
           child health clinic (n = 66).

Problems: % of the mothers

----

1. Long distance to the clinic   48 %

2. Cost   35 %

3. Difficulty carrying more than one child   20 %

4. Mother has no time   12 %

5. Difficulty being in time at the clinic   8 %

6. Others   29 %

Mother's knowledge of the purpose of immunization and growth monitoring

The majority of the mothers (91 %) gave the correct answer when asked why they children should be vaccinated at the clinic (Appendix 9, Table 1) The same was true for mother's knowledge of the purpose of growth monitoring. The majority of the mothers (77 %) gave the correct answer when asked why they weigh children regularly at the clinics (Appendix 9, Table 2).

As mentioned previously, the mother's knowledge of the purpose of immunization was associated with the immunization status of the child. Furthermore, the mother's knowledge of the purpose of growth monitoring was associated with the child health clinic in Kibera she selected to attend. The mother's knowledge of the purpose of immunization was significantly associated with household income (p = 0.0166 , n = 306). The mother's knowledge of the purpose of growth monitoring was also significantly associated with household income (p = 0.0033 , n = 306) . Both were not significantly associated with the educational level attained by the mother.

Mother's knowledge of the available clinics in Kibera

A small proportion of the mothers (n = 33) did not know
of any clinic they could attend for immunization in
Kibera. The majority of these mothers had lived in
Kibera for less than one year. The City Council Clinics
and the Ministry of Health Clinic were the most famil-
iar to the study mothers (Appendix 9, Table 3).

Reasons for last clinic visit

Thirty nine percent of the children had visited a
clinic the month preceding the interview and 66 % had
been to a clinic at least once during the last six
months. As shown in Table 28 the younger children had
visited the clinic mainly for preventive reasons
(immunization, growth monitoring, health education)
while the older children came mainly for curative
reasons.

TABLE 28. Percent distribution of study children by age group and
by reasons given for last clinic visit

Reason for last clinic visit	Age child in months		
	1 - 11	12 - 23	24 - 35
	(n=180)	(n=153)	(n=141)
Curative	27	43	58
Preventive	68	53	39
Curative and preventive	2	1	0
Unknown	3	3	3
	100 %	100 %	100 %

Health education

Fifty seven percent of the mothers reported to have received some health education during their last clinic visit. The topics were mostly related to nutrition and breastfeeding (See Table 29).

TABLE 29. percent distribution of mothers who received health education during last clinic visit by subject (n = 234).

Subject of health education given
related to:

Nutrition / Breastfeeding	72 %
Diarrhoea treatment & prevention	11 %
Family planning	10 %
Usefulness to visit child health clinic	6 %
Immunization	4 %
Others	47 %

Location of visited child health clinic

For last clinic visit the majority of the children (69 %) went to a clinic situated in Kibera. Twenty one percent of the children had been to a clinic outside Nairobi for their last clinic visit.

Mother's satisfaction with the provided child health services in Kibera

Generally speaking the mothers were very satisfied with the child health services provided in Kibera. In most cases they compared the services provided in Kibera with the services they had received in the rural areas, and they came to the conclusion that the services in Kibera were much better. Most of them suggested that clinics could be improved by increasing their supply of drugs and by providing antenatal care, especially in the Ministry of Health Clinic and the CPK Clinic (See Appendix 10 and Appendix 11).

Chapter 6. **DISCUSSION**

Nutritional status

The nutritional status of Makina children was much
better than the investigator had expected. Most likely
this can be explained by the fact that the majority of
heads of households had regular employment and 40 % of
households had a middle or high income. It is interest-
ing to discover that in contradiction to the generally
accepted prejudice, not all residents living in sponta-
neous settlements are poor and unemployed.

Results showed that there was an increasing trend of
malnourishment from the age of six months, until the
second birthday. Data from the 1982 National Nutrition
Survey showed the same trend. In which case, the as-
sumption was made that the deterioration of the nutri-
tional status was the effect of the weaning crisis.

As can be expected, since income is widely accepted as
a secondary indicator of nutritional status, households
with a total household income below 500 Ksh. exhibited
a greater tendency toward having malnourished children.

The fact that the nutritional status of the child deteriorated with increasing length of residence in Kibera by the mother needs further investigation. Possible explanations are:

1. Mothers who have stayed longer in Kibera rely less on a subsistence income from food production in the rural areas than mothers who have settled more recently. More permanent residents of Kibera may need to rely solely on a cash income from local sources.

2. The longer people stay in the urban areas, the more they change their traditional diets and food practices. Urban people might rely more on processed foods, which are not only expensive but also occasionally of low nutritive value (Hussain, A,M. and Lunven, P., 1987).

3. Mothers who have lived longer in an urban area have changed their traditional breastfeeding practices. Urbanization is associated with a decline in breast-feeding (Katone-Apte, J., 1987).

Despite the longer period of residence the mother may be travelling back and forth to their home areas. This may explain why increase in migration of the children was also associated with the nutritional status of the children. Further investigations of mothers and their migratory pattern and caretaking during these periods

would be necessary to explain clearly these associ-
ations. A possible interpretation can be that children
who migrate a lot are living more in the rural areas
than in the urban areas. And since in terms of chronic
protein-energy deficiency the rural population are
worse off than their urban counterparts one can expect
this result.

It is interesting to note that, although some staff
members of the clinics assumed that children who were
looked after by their own mother would have a better
nutritional status, this was not the case. In this
study the caretaker of the child was not associated
with the nutritional status of the child. This may also
be due to the relatively small number of children
(n = 90) who were not primarily taken care of by their
own mothers.

Utilization of preventive child health services
The coverage of the Makina children by the Child Wel-
fare Clinics is good. Seventy nine percent of the study
children had a Child Health Card at the time of inves-
tigation and 71 % of the study children were fully
immunized. It seems that if the conditions are favour-
able -the services are free, the distance to the clinic
is short and the knowledge on the use of immunization
and growth monitoring is high- people make use of the

services provided. Despite the immunization coverage being good it is as yet not at its optimal level. Coverage rates of ≥ 80 % must be archieved for an effective immunization programme.

Most likely the mothers come to the clinic mainly for the immunization programme because with increasing age of the child the utilization of preventive child health services decreased sharply, and utilization was especially high for children below the age of one year. The immunization programme seems to be a well established programme, since 71 % of the study children were fully immunized and most people are very well informed about the importance of it. The growth monitoring programme is not that well established because although mothers knew why the children get weighed at the clinics, they did not seem motivated to visit the clinic only for the growth monitoring programme.

Further research is needed to find out exactly why malnourished children made less use of preventive child health services. It might be necessary to take more sensitive indicators for maternal care, to be able to state definitively that the positive association between nutritional status of children under three years and their utilization of preventive child health services is not due to maternal care.

That younger mothers made more use of preventive child health services than older mothers can, in part, be explained by the fact that younger mothers were better educated than older mothers.

Further research is also needed to investigate why there was a negative association between the number of under fives in the household and the immunization status of the child. The difference in utilization of vaccination services is, in part, a factor related to the age of the mother. It was found that the older mothers had more children under five years and lower utilization rates of vaccination services than the younger mothers. Another possible explanation, as mentioned by the mothers, could be their difficulty in carrying more than one child to the clinic.

Migration of the child and immunization status were not associated in this study. Most likely, as mothers are apparently motivated to take their children to be vaccinated, the children are taken to clinic for immunization at the scheduled time regardless of whether they are in the rural or the urban setting. Since the growth monitoring programme is not a national health programme one can expect that children who migrate a lot make less use of growth monitoring services.

The study found that while household income was associated with the mother's knowledge of the meaning of immunizations as well as of growth monitoring, a second variable, namely,the educational level attained by the mother , was not. This finding poses interesting questions. One speculation why income emerges as a significant influence is that households with higher incomes have better access to the media; they can, for example, afford to purchase a newspaper or radio.

The fact that the selected child welfare clinic was associated with the mother's knowledge on the use of growth monitoring can be explained in two different ways: either some clinics give good health education about growth monitoring so that mothers who visit these clinics have a better knowledge of growth monitoring or, conversely, mothers who have a better knowledge of growth monitoring prefer to visit specific clinics.

When asked to identify what problems they encountered in visiting the Child Welfare Clinics, mothers most frequently mentioned distance and cost. The former answer is puzzling for the distance to most clinics in Makina are relatively short. Although the services at clinics are free, cost is a more understandable problem; the mothers were most likely referring to the

Seventy three percent of the well nourished and moder-
ately malnourished children were fully immunized where-
as only 42 % of the severely malnourished children were
fully immunized.

The third hypothesis, which was that: "Malnourished
children under three years participate less frequently
in growth monitoring than well nourished children under
three years" has to be accepted. There is a significant
difference in the utilization level of growth monitor-
ing services between the malnourished study children
and the well nourished study children (p = 0.000 ,
n = 376). It must be mentioned, however, that the
difference in utilization of growth monitoring services
is, in part, due to age since utilization of growth
monitoring services decreased sharply with age, while
the nutritional status of children also deteriorated
with age.

Conclusions with regard to the study of the utilization
of preventive child health services:

The majority of the study children (79 %) had a Child
Health Card at the time of investigation. Seventy one
percent of the study children were fully immunized.
This is a high coverage compared to the national cover-
age rate of 51 % (UNICEF, 1989).

With increasing age of the child the utilization of preventive child health services decreased sharply. Makina children visited a Child Welfare Clinic an average of eight times in their first year of life, three times in their second year of life and less than once per year, thereafter.

Utilization of Child Health Services by Makina children below 1.5 years was considered better than expected. According the literature a child should visit an Under Five Clinic at least six times in the first year of life and four times annually thereafter (Cole-King, 1975). Makina children below 1.5 years visited a Child Welfare Clinic an average of eight times in their first year of life and once per three months thereafter.

Children above 1.5 years did not make optimal use of the Child Welfare Clinics. They visited the Child Welfare Clinic an average of once a year.

Since younger mothers made more use of the Child Health Services, we can expect that in the future the attendance will improve.

Conclusions with regard to the study of accessibility
of preventive child health services:

Well nourished children were better immunized and
participated more frequently in the growth monitoring
programme than malnourished children.

The investigator further analysed whether the positive
association between nutritional status of children
under three years and their utilization of preventive
child health services could be due to income or
maternal care. Indeed, household income was associated
with the nutritional status of children. However,there
was no relationship between household income and util-
ization of preventive child health services. With
respect to maternal care, two variables examined;
employment of the mother and caretaker of the child
were neither associated with nutritional status of the
child nor with utilization of preventive child health
services. The researcher also examined another indica-
tor of maternal care, namely, the educational level
attained by the mother. It was found that this variable
was positively associated with the immunization status
of the child, it had no relationship with nutritional
status.

The finding that malnourished children do not make optimal use of preventive child health services implies that community outreach has to be included in the health delivery system. One option, for example, could be house to house visits by health volunteers and follow up visits of high risk families.

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APPENDIX 1

Description Child Welfare Clinics.

The following health facilities are providing Child Health
Services in Makina:

1. Name clinic: Ministry of Health Clinic
Sponsor: Ministry of Health
Location: Makina, Kibera
Opened since: 1985
Health services provided: immunization, growth monitoring,
     health education, food aid, home visits, malnutrition
     clinic, treatment (very limited)
Cost services for under fives: free
Personnel: 2 nutrition field workers
Opening times: working-days: 2 mornings/week Under Five Clinic
                              1 morning/week Malnutrition
                                         Clinic.

2. Name clinic: Handicraft Centre Clinic
Sponsor: Family Planning Association, Nairobi City Commission,
         KWAHO, Danish Volunteer services
Location: Makina, Kibera
Health services provided: Family planning, immunization, growth
     monitoring (scale: 15 kg max), health education
Cost services for under fives: free
Personnel: 2 nurses Nairobi City Commission
           1-2 nurses Family Planning Association
Opening times: 1 day/week
Under Five Clinic and Family Planning Clinic at the same time.
Popular clinic for family planning.

3. Name clinic: CPK Human Development Clinic
Sponsor: CPK
Location: Makina, Kibera
Opened since: 1987
Health services provided: immunization, growth monitoring,
     health education, treatment adults and children, family
     planning, home visits
Cost services for under fives: 1 Ksh./child health card
                              20 Ksh./treatment children
Personnel: 2 nurses
Opening times: working-days every morning
Integrated services: Under five Clinic / family planning /
                     treatment children and adults

APPENDIX 1 (continued)

4. **Name clinic**: Crescent Aid Clinic
Sponsor: Crescent Medical Aid
Location: Makina, Kibera
Opened since: 1982
Health services provided: immunization, growth monitoring,
    health education, treatment adults and children, antenatal
    care, family planning, home visits (family planning)
Cost services for under fives: immunization: 10 Ksh./visit
                       treatment: 40 Ksh./first visit
                            35 Ksh./every next
                            visit
Personnel: Doctor, midwife, nurse, field worker family planning
Opening times: working-days: 1 morning/week Under Five Clinic
                        2 mornings/week Antenatal Clinic
                        every day treatment and family
                                planning

5. **Name clinic**: Woodley Clinic
Sponsor: Nairobi City Commission
Location: Woodley, 1-2 km from Makina
Opened since: oldest clinic close to Kibera
Health services provided: immunization, growth monitoring,
    health education, treatment mothers and children
    (limited), antenatal care, family planning
Cost services for under fives: free
Personnel: 3 nurses
Opening times: working-days: every morning: Under Five Clinic
                          every afternoon: Antenatal clinic
                          and Family Planning Clinic

6. **Name clinic**: Langate Health Centre (Otiende)
Sponsor: Nairobi City Commission
Location: Langate, 2-4 km from Makina
Opened since: 1965
Health services provided: immunization, growth monitoring,
    health education, treatment children and adults, family
    planning, antenatal care, dispensary, home visits (family
    planning), maternity ward (24 beds)
Cost services provided for under fives: free
Personnel: Clinical assistant, 6-7 nurses, 1 community field
          educator
Opening times: Every working-day all services provided

TOI
TOI
TOI

KAMBI
KAMBI
KAMBI

MAKINA
MAKINA

MAKONGENI
MAKONGENI
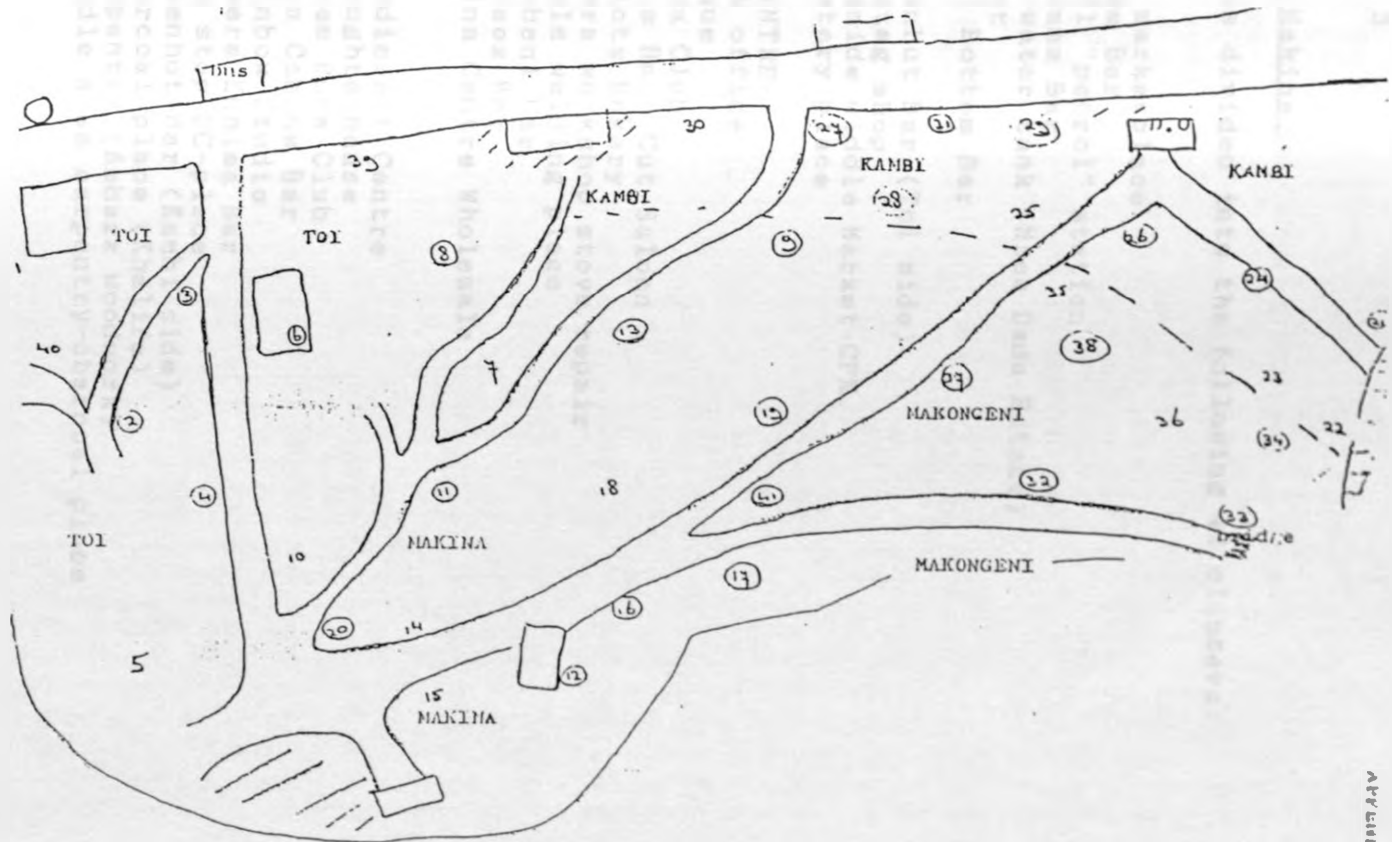
= no houses   ✕ = clinic

◯ = selected clusters

MAKINA VILLAGE

APPENDIX 3

Clusters Makina

Makina was divided into the following 42 clusters:

TOI:
   1. Toi marketplace
 *2. Akiba Bar
 *3. Kobil "petrol" station
 *4. Usalama Bar
   5. Toi water tank (Mzee Dada Estate)
 *6. Court
   7. Bell Bottom Bar
 *8. CPK
 *9. Greenhut Bar (Toi side)
 10. Ungutag shop
 39. Roadside middle Market-CPK
 40. Cemetery place

MAKINA CENTRE:
*11. KANA office
*12. Mosque
*13. Bussa Club
 14. Paris Hair Cut Saloon
 15. Elliots Bakery
*16. Kibera workshop stove repair
*17. Libale welding place
 18. Mwenbeni Bar
*19. Toffees Bar
*20. Makina Centre Wholesale

KAMBI:
 *21. Handicraft Centre
  22. Slaughterhouse
  23. Serem Busa Club
 *24. Copa Cabana Bar
  25. Rainbow Studio
 *26. Kibera Eshima Bar
 *27. Bus stop DC-place
 *28. Greenhut Bar (Kambi side)
 *29. Charcoal place (Khalifa)
  30. Carpentry (Ambeza woodwork)
 *31. Middle area carpentry-charcoal place

APPENDIX 3 (Continued)

MAKONGENI:
  *32. Ebrahim Doka General Stores
  *33. Bridge
  *34. Railway shop (Musa Jumas house)
   35. Charcoal store
   36. Water tank Mama Sophia
  *37. Mawa Bar
  *38. Canada Dry kiosk (Ali Bala)
   41. Makongeni crossing of roads
  *42. Makongeni kiosk

 * = clusters included in study.

APPENDIX 4

Distribution of study children by Weight for age and sex

TABLE 1.   Distribution of study children (1 - 35 months) by
Weight for age* and sex.

| Weight for age | MALES | | FEMALES | |
	N	%	N	%
Obese	5	2	11	5
Normal	186	76	171	73
Moderately malnourished	50	21	48	20
Severely malnourished	3	1	4	2
	244	100	234	100

----

* Using per cent median.

APPENDIX 5

Nutritional status of the study children using Z-scores
as cut-off points

Using the Z-Scores as cut-off points for weight for age
data, 16 % of the study children could be classified as
malnourished and 2 % as obese (Table 1).

TABLE 1. Distribution of study children (1-35 months)
          by Weight for age* (n = 478).

Weight for age   N   %

Obese   9   2
Normal   391   82
Malnourished   78   16
                          ---   ----
                          478   100
----
* Using z scores

As illustrated in Table 2, 33 % of the study children
could be classified as stunted.

TABLE 2. Distribution of study children (3-35 months)
          by Height for age* (n = 450)**.

Height for age   N   %

Normal   301   67
Stunted   149   33
                          ----   ----
                          450   100
----
* Using z scores
** Height was only measured for children above 3
months.

APPENDIX 5 (continued)

The difference in the percentage of stunted children classified either by per cent median or by z scores can be explained by the fact that the border cases of HAMED between 90 % and 91 % worked out to be between -2.3 and -2.6 SD. Using the per cent median classification system these children would be classified as normal while using the z scores classification system they would be classified as stunted. A similar difference in the percentage of stunted children classified either by per cent median or by z scores was found in the "Third Rural Child Nutrition Survey 1982 " (ROK, 1983). According to the report 20.4 % of the children in Central Province are stunted using the 90 % median as a cut-off point and 33.6 % are stunted using the -2 SD as a cut-off point.

6 % of the study children could be classified as wasted using the -2 Z-Score as cut-off point (Table 3).

TABLE 3. Distribution of study children (3-35 months) by Weight for height* (n = 450)**.

Weight for height	N	%
Normal	425	94
Wasted	25	6
	450	100
----

* Using z scores
** Height was only measured for children above 3 months.

APPENDIX 6

Waterlow classifications study children

Crosstabulating the weight for height and height for age data by standard deviation scores, one can conclude that 63 % of the children was well nourished, 32 % only stunted (chronically malnourished), 4 % wasted (acutely malnourished), 1 % wasted and stunted (chronically and acutely malnourished) (Table 1).

TABLE 1. Waterlow classification* Makina children (1-35 months).
      (n=450)

	WHZSCR $\leq$ -2	WHZSCR > -2	TOTAL
HAZSCR $\leq$ -2	wasted + stunted 1 %	stunted 32 %	33 %
HAZSCR > -2	wasted 4 %	normal 63 %	67 %
TOTAL	5 %	95 %	100 %

* Using z scores.

APPENDIX 6 (continued)

TABLE 2. Waterlow classification* Makina children (1-11 months).
        (n=153)

	WHZSCR ≤ -2	WHZSCR > -2	TOTAL
HAZSCR ≤ -2	wasted + stunted 0 %	stunted 20 %	20 %
HAZSCR > -2	wasted 5 %	normal 75 %	80 %
TOTAL	5 %	95 %	100 %

* using z scores.

TABLE 3. Waterlow classification* Makina children
        (12-23 months).
        (n=155)

	WHZSCR ≤ -2	WHZSCR >-2	TOTAL
HAZSCR ≤ -2	wasted + stunted 1 %	stunted 42 %	43 %
HAZSCR > -2	wasted 4 %	normal 53 %	57 %
TOTAL	5 %	95 %	100 %

* using z scores.

APPENDIX 6 (continued)

TABLE 4. Waterlow classification* Makina children
         (24-35 months).
         (n=142)

	WHZSCR $\leq$ -2	WHZSCR > -2	TOTAL
HAZSCR $\leq$ -2	wasted + stunted 3 %	stunted 35 %	38 %
HAZSCR > -2	wasted 3 %	normal 59 %	62 %
TOTAL	6 %	94 %	100 %

* using z scores

DISTRIBUTION OF STUDY CHILDREN
BY WEIGHT FOR AGE MEDIAN %
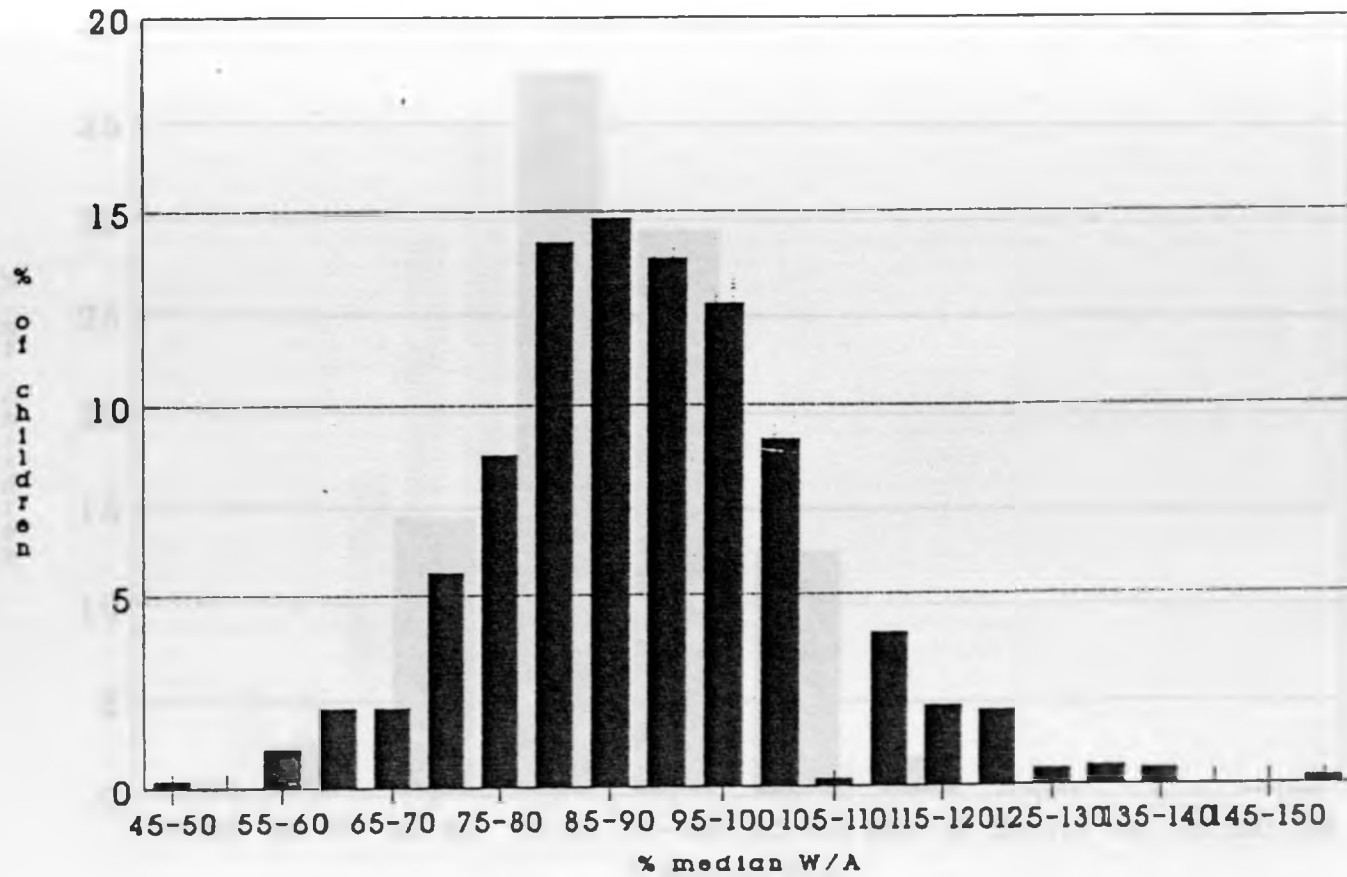
DISTRIBUTION OF STUDY CHILDREN
BY HEIGHT FOR AGE MEDIAN %
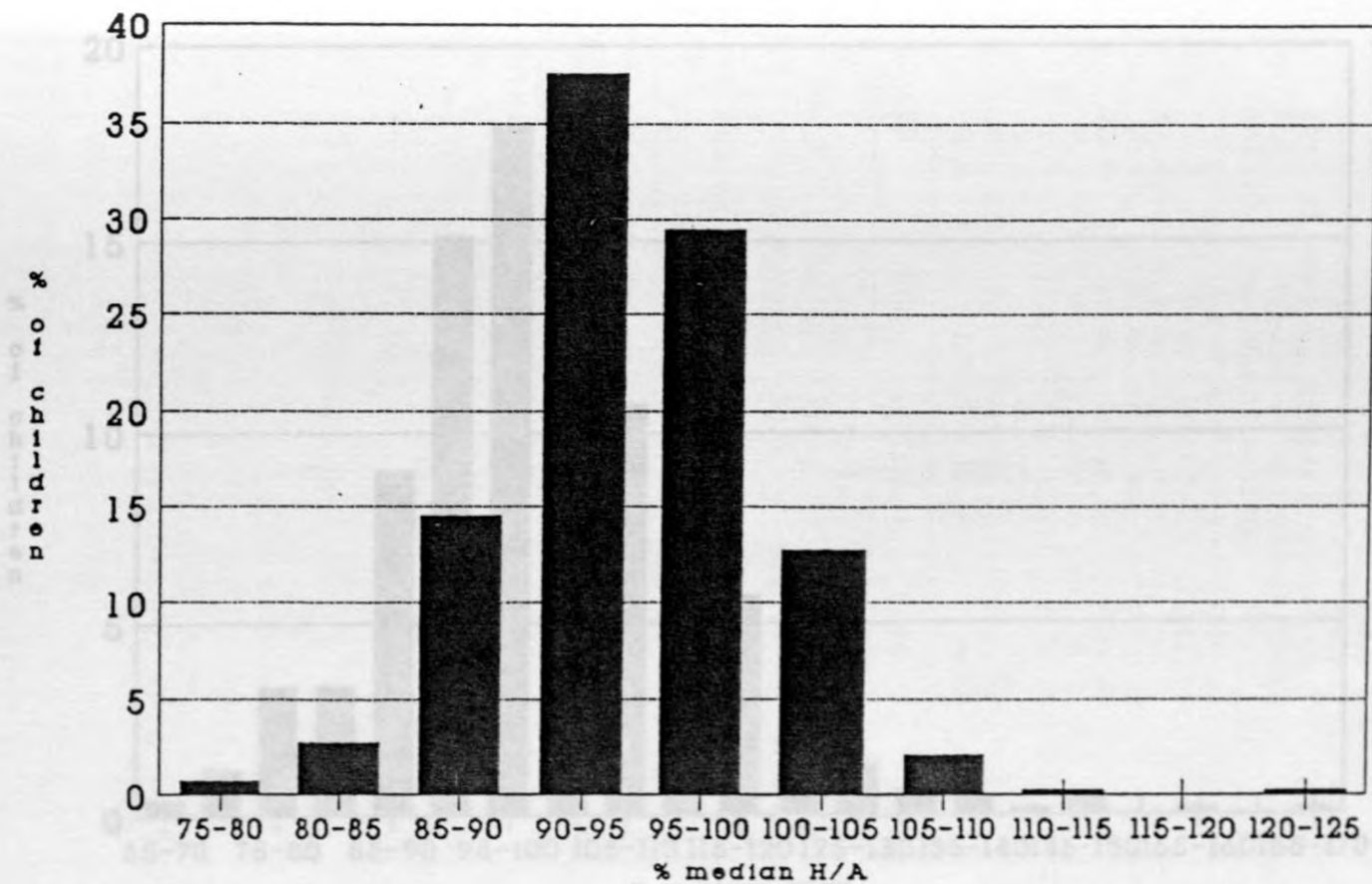
DISTRIBUTION OF STUDY CHILDREN
BY WEIGHT FOR HEIGHT MEDIAN %
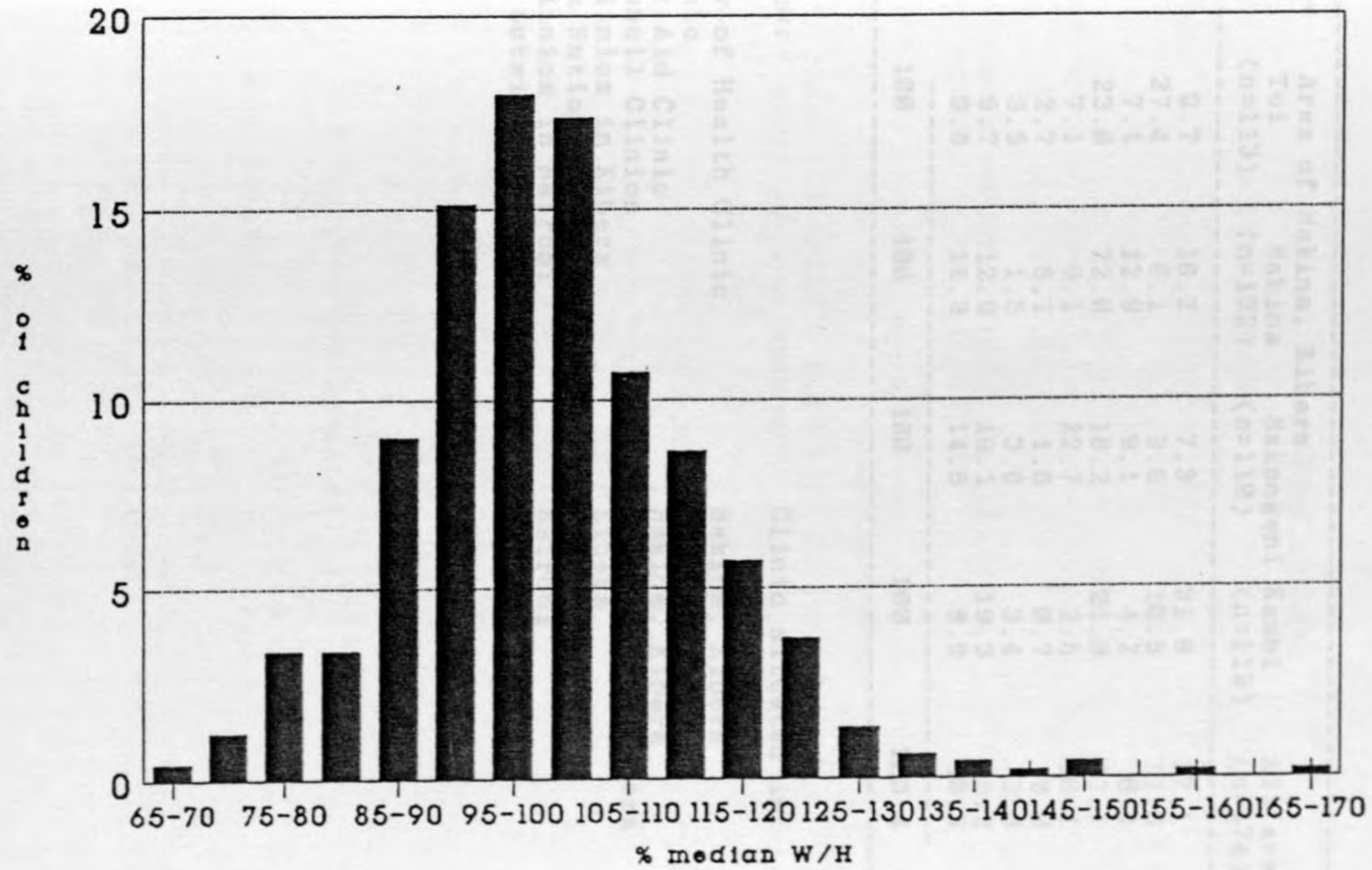
APPENDIX 8

Factors associated with utilization of preventive child health
services

TABLE 1. Area of residence of child by selected preventive child
          health clinic

```
------------------------------------------------------------------
Name clinic*    Area of Makina, Kibera
                Toi        Makina     Makongeni  Kambi      All areas
                (n=113)    (n=132)    (n=110)    (n=119)    (n=474)
------------------------------------------------------------------
1                9.7       18.2        7.3       31.8       17.1
2               27.4        6.1        3.6       10.5       11.6
3                7.1       12.9        9.1        4.2        8.4
4               23.0       22.0       18.2       21.0       21.1
5                7.1        9.1       22.7        2.5       10.1
6                2.7        6.1        1.8        0.7        3.0
7                3.5        1.5        3.6        3.4        3.0
8                9.7       12.8       19.1       19.3       15.2
9                9.8       11.3       14.8        6.6       10.5
                -----------------------------------------------
                100        100        100        100        100 %
------------------------------------------------------------------
```

Name clinic*:   Clinic situated in:

1. Ministry of Health Clinic   Makina, Kibera
2. CPK Clinic   Toi, Kibera
3. Crescent Aid Clinic   Makina, Kibera
4. City Council Clinics   just outside Kibera
5. Other clinics in Kibera   Kibera
6. Kenyatta National Hospital   Nairobi
7. Other clinics in Nairobi   Nairobi
8. Clinics outside Nairobi   outside Nairobi
9. Unknown

APPENDIX 9

Mother's knowledge of the purpose of immunization and growth monitoring and mother's knowledge of the available clinics in Kibera

TABLE 1. Reasons, given by mothers, why children
get vaccinated at the clinic.

Reasons:	% of mothers
1. To protect child against diseases	91
2. It is a rule	1
3. Wrong answer	2
4. Do not know	6

(n = 474)	100 %

TABLE 2. Reasons, given by mothers, why children
get weighed at the clinic.

Reasons:	% of mothers
1. To monitor/check the child's health	77
2. Clinic staff wants to know weight	7
3. It is a rule	1
4. Wrong answer	11

(n = 474)	100 %

TABLE 3. How widely known are the clinics ?

Percentage of the mothers who knew
the following clinics*:

1. City Council Clinics (Woodley/Langate)	70 %
2. Ministry of Health Clinic	48 %
3. CPK Clinic	35 %
4. Other clinics in Kibera	40 %

(n = 441)

---

* Mothers give more than one answer therefore
percents do not tally to 100 % .

APPENDIX 10

Opinion of mothers about the provided child health services

TABLE 1. Opinion of mothers about the provided child health
        services.

Good things:
Good health care, especially compared to provided
        health care in the rural areas   23.4
Received good advice / health education   16.7
Received good treatment   11.9
Friendly staff   7.3
Waiting time short   4.2
Others   10.1
No opinion / do not know   26.4

                                                     100.0 %

Bad things:

No drugs available   5.4
Waiting time too long   3.4
Clinic too small   3.0
Unfriendly staff   2.8
Limited and strict opening times   2.2
Others   8.2
No opinion / do not know   75.0

                                                     100.0 %
Things to improve:

Better supply of drugs   4.9
Provide also Antenatal Care   2.8
Waiting time shorter   2.6
Extend opening times   2.2
Staff has to be more friendly   2.2
Others   10.3
No opinion / do not know   75.0

(n = 474)   100.0 %

APPENDIX 11

A random selection of answers given by the mothers

A random selection of answers given by the mothers on the following questions:

Reasons why children get vaccinated at the clinic:
    To prevent infection
    To prevent measles and TB
    It is a rule in this country
    To protect from dangerous diseases
    To protect from TB, measles and pneumonia
    I was told it is good for the child.
    The nurses themselves know why they vaccinate, I do not
                                                    know why

Reasons why children get weighed at the clinic:
    To check if you give good food to your child
    To check if the child is healthy
    To know if the child is growing properly
    To check if the child is malnourished
    The nurse likes to know the weight
    To check if you take care of the kid properly.

Opinion of mothers about the provided child health
services:

Good things:
    It is good to prevent sickness
    They teach about family planning
    They treat well and very fast
    They advised me nicely about the proper food to give to the
    baby
    They refer the bad cases to Kenyatta Hospital
    There is a Child Welfare Clinic every day
    They advice what to do when the baby is sick
    The clinic is near
    The clinic is clean
    They do not make any difference between religions, although
    it is a mission clinic
    They ask you to bring your neighbour who does not bring her
    child to the clinic
    They do not insult people
    They do not chase people away, if they are late at the cli-
    nic
    They give good advice
    They always check the child's weight
    There are pictures on the wall which gave you an idea on how
    to take care of your child

APPENDIX 11 (Continued)

Bad things:
    Lack of drugs
    You have to pay for the services and I do not always have
    money
    The clinic staff start their duties very late while the
    mothers have to be in time at the clinic
    The clinic is too small
    The mothers have to be there at a specific time
    Some staff members are very harsh to the mothers
    Waiting time
    The toilets are locked
    If the child is sick they send you to another place
    At the clinic they always speak Kikuyu and not the national
    language
    If you have never taken your child to the clinic before,
    they insult you

Things to improve:
    They should expand their clinic
    The staff should be more friendly
    They should give patients medicines
    They should work (open) the whole day
    They should reduce the cost for treatment

Health Serv. Utilization Survey   FORM 1 (HOUSEHOLD PROFILE)

LOCATION _____   HOUSEHOLD NO. !___!___!___! !___!___!___!___!___!

NAME OF HEAD OF HH _____   NAME OF RESPONDENT _____

OCCUPATION HEAD HH _____   RELATION OF RESP. TO HEAD OF HH _____

NAME OF ENUMERATOR _____   DATE OF SURVEY   !___!___!___!___!___!___!

Ser No.	Name	Sex 1.M 2.F	Age (yrs)	Relation to H. HH	Marital status	Educ. level	Employm. status	Approx. monthly income
1								
2								
3								
4								
5								
6								
7								
8								

RELATION TO
HEAD OF HH
1. Head
2. Spouse
3. Son/Daughter
4. Grand-child
5. Parent/Relative
6. Visitor/Guest
7. Domestic worker
8. Others

MARITAL STATUS
1. Single
2. Married
3. Divorced
4. Separated
5. Widowed
9. Unknown

LEVEL OF
EDUCATION
1. None
2. Adult class only
3. Some prim. educ.
4. Completed prim. educ.
5. Some sec. educ.
6. Compl. sec. educ. or more
9. Not applicable/Unknown

EMPLOYMENT
STATUS
1. Self-employed
2. Salaried worker
3. Casual labourer
4. Jobless(looking for paid job)
5. Unemployed(not looking for paid job)
6. Landlord
9. Not applicable

129

APPENDIX 12.   Preventive Health Serv. Utilization Survey

FORM 2

DATE OF SURVEY : ___:___:___:___:___:___:

NAME OF ENUMERATOR _____

LOCATION _____

HOUSEHOLD NO. :___:___:___: :___:___:___:___:___:

NAME OF HEAD OF HOUSEHOLD _____

NAME OF RESPONDENT _____
RELATIONSHIP OF RESPONDENT TO CHILD: :___:
    1. Mother
    2. Father
    3. Brother/Sister
    4. Grandparent
    5. Domestic worker
    6. Other, please specify _____

_____

1. NAME OF THE INDEX CHILD(1-36 MONTHS):_____

2. SEX OF THE CHILD: :___:
    1. Male
    2. Female

3. DATE OF BIRTH OF THE CHILD: :___:___:___:___:___:___:
    99. Unknown

4. AGE VERIFIED BY HEALTH CARD OR BIRTH-CERTIFICATE: :___:
    1. Yes
    2. No

5. AGE IN MONTHS: :___:___:

6. WEIGHT: :___:___:___:___: :___:___:___: :___:___:___:

7. HEIGHT/LENGTH(3-36 MONTHS): _____

    :___:___:___:___: :___:___:___:

8. CHILD HEALTH CARD: :___:
    1. Yes
    2. No

    if Yes, continue on page 3, question 14
    if No, continue on page 2, question 9

THIS IS FOR MOTHERS **WITHOUT CHILD HEALTH CARD**

9. WHY DOES HE/SHE NOT HAVE A CHILD HEALTH CARD : :___:
   1. Child have never been to a clinic
   2. Card got lost
   3. Card left at home(rural home)
   4. Other, please specify _____

10. HAS YOUR CHILD EVER RECEIVED :

    BCG   :___:

    DPT 1   :___:
    DPT 2   :___:
    DPT 3   :___:

    POLIO 1   :___:
    POLIO 2   :___:
    POLIO 3   :___:
    POLIO 4   :___:

    MEASLES   :___:

    1. Yes
    2. No
    9. Unknown

11. BCG SCAR PRESENT: :___:
    1. Yes
    2. No

12. HAS YOUR CHILD EVER HAD MEASLES ? :___:
    1. Yes
    2. No
    9. Unknown

    IF YES,
       AT WHAT AGE (IN MONTHS): :___:___:

13. WHEN WAS THE LAST TIME YOUR CHILD VISITED A CLINIC FOR :

    IMMUNIZATION : _____

    WEIGHING   : _____

THIS IS FOR MOTHERS WITH CHILD HEALTH CARD

<u>CHECK CHILD HEALTH CARD</u>

14. LAST 6 MONTHS: WEIGHED

```
: : : : : : :
: : : : : : :
: : : : : : :
-----------------------------
:___:___:___:___:___:
```

LAST 6 MONTHS: RECEIVED IMMUNIZATION

```
: : : : : :
: : : : : :
-----------------------------
:___:___:___:___:___:
```

1. Yes
2. No

15. HOW MANY TIMES WAS THE CHILD WEIGHTED DURING HIS/HER

FIRST YEAR : :___:___:

SECOND YEAR : :___:___:

THIRD YEAR : :___:___:

16. IMMUNIZATION RECEIVED (BY CARD) :

BCG   :___:

DPT 1   :___:
DPT 2   :___:
DPT 3   :___:

POLIO 1   :___:
POLIO 2   :___:
POLIO 3   :___:
POLIO 4   :___:

MEASLES   :___:

1. Yes
2. No

17. BCG SCAR PRESENT (CHECK YOURSELF): |___|
    1. Yes
    2. NO

18. please, ask the respondent :
    HAS YOUR CHILD EVER HAD MEASLES ? |___|
    1. Yes
    2. No
    9. Unknown

    IF YES,
       AT WHAT AGE (IN MONTHS): |___|___|

CHECK CHILD HEALTH CARD

19. WHEN WAS THE LAST TIME YOUR CHILD VISITED A CLINIC FOR   :

    IMMUNIZATION (BY CARD) : _____

    WEIGHING (BY CARD) : _____

20. PERSON LOOKING AFTER CHILD(1-36 MONTHS) USUALLY DURING
    DAYTIME : |___|

    1. Mother
    2. Father
    3. Grandparent
    4. Domestic worker
    5. Other, please specify _____

    IF IT IS NOT THE MOTHER, AGE CARE-TAKER : |___|___|

21. HAS THE CHILD CONTINUALLY BEEN LIVING IN KIBERA FOR THE LAST
    6 MONTHS ? |___|
    1. Yes
    2. No

    IF NO,
    HOW LONG WAS HE/SHE LIVING OUTSIDE OF KIBERA(IN WEEKS):

                                            |___|___|

22. WHEN WAS THE CHILD'S LAST VISIT TO A HEALTH FACILITY ?

    _____

    VERIFIED : |___|
    1. Yes
    2. NO

23. WHAT WAS THE REASON TO VISIT THE CLINIC :

24. DID THE CLINIC STAFF ADVISE OR TEACH YOU ANYTHING DURING THAT
     VISIT ? |___|
    1. Yes
    2. No
    3. Unknown

    IF YES,

        WHAT ?

25. NAME CLINIC LAST BEEN (CHILD 1-36 MONTHS) : |___|
    1. Ministry of Health Clinic at D.O. place
    2. C.P.K. Clinic
    3. Crescent Aid Clinic
    4. Kenyatta National Hospital
    5. City Councel Clinic (Woodley)
    6. Other, please specify : _____

26. PLEASE TELL US THE   THINGS YOU LIKE AND THE THINGS YOU DO NOT
    LIKE AT THAT CLINIC

    GOOD THINGS:

    BAD THINGS:

27. IS THERE ANYTHING WHICH YOU THINK COULD IMPROVE   THE SERVICES
    AT THAT CLINIC ?

28. NAME MOTHER : _____

(if this is the mother's second child below 3 yrs. in this house-
hold look for the following information under index child
(name) : _____. (end interview)

29. AGE MOTHER : |___|___|

30. MARITAL STATUS MOTHER : |___|
     1. Single
     2. Married
     3. Divorced
     4. Seperated
     5. Widowed
     9. No answer/Unknown

31. MOTHER'S LEVEL OF EDUCATION : |___|
     1. None
     2. Adult class only
     3. Some primary education
     4. Completed primary education
     5. Some secondary education
     6. Completed secondary education or more
     9. Unknown

32. MOTHER'S EMPLOYMENT STATUS : |___|
     1. Self-employed(e.g. trader)
     2. Salaried worker
     3. Casual labourer
     4. Jobless(looking for paid job)
     5. Unemployed(not looking for paid job)

33. OCCUPATION MOTHER : _____

34. RELIGION MOTHER : |___|
     1. None
     2. Christian
     3. Muslim
     4. Other
     9. Unknown

35. HOW LONG IS THE MOTHER ALREADY LIVING IN KIBERA :
     _____ YEARS OR _____ MONTHS OR _____DAYS.

36. FOR WHAT REASONS DO YOU BRING YOUR CHILD TO THE CLINIC ?

IF THE ANSWER IS : FOR IMMUNIZATION OR
                   FOR WEIGHING

37. WHERE DO (DID) YOU GO FOR IMMUNIZATION OR FOR WEIGHING ?

NAME CLINIC :|___|

1. Ministry of Health Clinic at D.O. place
2. C.P.K. Clinic
3. Crescent Aid Clinic
4. Kenyatta National Hospital
5. City Councel Clinic (Woodley)
6. Other, please specify : _____

38. DO YOU EXPERIENCE ANY PROBLEMS TO VISIT THE CHILD HEALTH
    CLINIC ? |___|

1. Yes
2. No

IF YES, WHICH PROBLEMS ?

39. WHY DO YOU THINK, THEY WEIGH CHILDREN REGULARLY AT THE
    CLINIC ?

40. WHY DO THEY VACCINATE CHILDREN AT THE CLINIC ?

41. WHERE CAN YOU GO FOR IMMUNIZATION IN KIBERA, AND HOW MUCH
    DOES IT COST ?

NAME CLINIC	COST PER IMMUNIZATION
1.	
2.	
3.	
4.	
5.	