FACTORS ATTRIBUTED TO THE PREVALENCE OF EARLY COMPLEMENTARY FEEDING OF INFANTS IN EASTLANDS AREA OF NAIROBI

BY:

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DECLARATION

I, Catherine Kegehi Ashene, hereby declare that this Dissertation is my original work and has not been presented for a degree in any other university.

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DEDICATION

This work is dedicated to Aleyao Zato Binioube. You are the wind beneath my wings.

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LIST OF ABBREVIATIONS

ACC/SCN:	Administrative Committee on Coordination/Standing Committee on Nutrition
AFASS:	Acceptable, Feasible, Affordable, Sustainable and Safe
AIDS:	Acquired Immune Deficiency Syndrome
APHRC:	African Population and Health Research Centre
GOK:	Government of Kenya
HIV:	Human Immunodeficiency Virus
KDHS:	Kenya Demographic and Health Survey
MCH:	Maternal and Child Health
MoH:	Ministry of Health
NCC:	Nairobi City Council
SPSS:	Statistical Package for Social Sciences
WHO:	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Artificial Feeding: Feeding an infant on breast milk substitutes (WHO, 1999).

Breast Milk Substitute: Any food being marketed or otherwise presented as partial or total replacement for breast milk (WHO, 1999).

Commercial Infant Formula: Breast milk substitute formulated industrially in accordance with applicable Codex Alimentarius standards to satisfy the nutritional requirements of the infants up to six months of age (WHO, 1999).

Complementary Feeding: The gradual introduction of foods other than breast milk and breast milk substitutes to infants. It is the term currently used to refer to the period when the child is introduced to new foods and is preferred because it conveys the notion that foods are not intended to displace or replace breast milk, but to complement it (Benoist, 1999)

Complementary Foods: Any food other than breast milk or breast milk substitutes given to infants during the period of complementary feeding (Benbouzid, 1999).

Exclusive breastfeeding: Giving an infant no other food or drink apart from breast milk and water with the exception of drops or syrup consisting of vitamins, mineral supplements or medicine (Adapted from WHO, 1999).

Exclusive Replacement Feeding: Breastfeeding is completely substituted with suitable breast milk substitutes that will provide the nutrients that the infant needs (MoH and GOK, 2006).

Full Weaning: Total cessation of breastfeeding (Monte and Giugliani 2004).

Home-Prepared Formula: Infant formula prepared at home from fresh or processed animal milks, suitably diluted with water and with the addition of sugar (WHO 1999).

Premature Complementary Feeding: Introduction of other foods and drinks to infants less than 6 months old in addition to breast milk.

Replacement Feeding: Feeding a child who is not receiving any breast milk with a diet that provides all the nutrients the child needs. During the first six months this should be with commercial formula or home prepared formula with micronutrient supplements (WHO, 1999).

Weaning: The transition from exclusive breast-feeding to the cessation of breastfeeding (Monte and Giugliani, 2004).

ABSTRACT

The complementary feeding period is a critical transition stage in a child's development and calls for special care and management by caregivers. The period becomes more critical when it is introduced early in the child's life, before they have built up sufficient immunity, thus endangering their survival even more. A better knowledge of mothers' current complementary feeding practices and their decision-making criteria is needed to help them improve the nutritional rationality of their decisions. In other words, it's not just enough to know what the mothers are doing regarding child feeding but also why.

The main objective of this study was to establish current complementary feeding practices of mothers in Eastlands area of Nairobi with regard to timing and also to ascertain reasons behind the practice of early complementary feeding. A descriptive case study was employed in order to help meet this objective. Three hundred and twenty three mothers and primary caregivers of infants 0-12months were interviewed during their visit to the City Council run MCH clinics in Eastlands. The main data collection tool was a semi-structured questionnaire, which was used to interview the respondents.

Multistage probability sampling was used in sample size selection to ensure equal chance of selection for all respondents and in this way minimized bias. Purposive sampling was used in selecting the three study Divisions; Pumwani, Makadara and Embakasi since these fall in the Eastlands area of Nairobi. Simple Random Sampling was used in the second stage to select one health facility from each of the Districts while constant sampling fraction was used to calculate

the number of respondents to be interviewed from each health facility. Lastly, all the mothers that gave consent were interviewed in each clinic until the required sample size was attained. The statistical package for social sciences (SPSS) and Microsoft Excel software were used in management and analysis of data. Various statistical tests including t, F and Chi square tests and Pearson's R and Spearman's Rho were used to establish measures of central tendency, spread, levels of significance, Confidence Intervals and relationships and differences among variables.

The findings of the study showed that complementary foods are introduced early in Eastlands area with only 7.7% of the respondents exclusively breastfeeding for six months. The remaining 92.3% introduced foods before the child attained the age of six months. This proportion was highly significant ($P<0.01$) when subjected to the one sample t test. Thirty one point eight percent of the respondents introduced complementary foods at two months and below while 68.6% introduced complementary foods between two and four months. The mean age of introducing complementary foods was 3.4 months (95% CI 3.19-3.61)

Half the respondents (50.2%) said they introduced complementary foods before the recommended six months because the child was hungry/not satisfied by breast milk alone. Eleven point six percent gave their reason as insufficient breast milk. In both cases, child crying and failure to sleep at night were the cues for the mothers that the child was hungry/not satisfied or that their breast milk was not sufficient for the baby.

Knowledge of the mothers about the recommended age to introduce complementary foods was fairly good with 60.3% answering correctly (six months). Only 7.7% said they didn't know while

15.2% gave the recommended age as 4 months. 82.2% of those that answered correctly said they had been informed about it during visits to the clinics/hospitals. On the question of whether they knew dangers of early complementary feeding to the child, only 0.3% were classified as having very good knowledge. Majority (45.1%) had very basic knowledge of this while 35.2% had no idea that early complementary feeding posed risks to the child.

There were several suggestions from the mothers on how they can be helped to introduce complementary foods in a timely manner and not earlier than six months. The most common recommendation (23.2%) was that they should be advised on the dangers or risks to the child of early complementary feeding. 17.5% suggested that mothers should be taught about the recommended age to begin complementary feeding while 12.1% felt that there really isn't anything that can be done about the problem of early complementary feeding-it is inevitable.

The problem of early complementary feeding seems to be an educational one in that mothers are not receiving the information they need to help them make beneficial infant feeding decisions. There is need for much more to be included in the infant feeding information given to mothers. They need to be guided on other ways of gauging milk sufficiency other than child crying which is not a good indicator of poor milk supply. Furthermore, they should be advised on how to improve their milk output for example through dietary improvement. They should also be told not only the recommended age but why six months is the recommended age, including dangers to the child of beginning complementary foods earlier. In the case of mothers who need to go back to work before the child is six months old, they should be encouraged to express breast milk and be reassured of its ability to stay fresh even without refrigeration for up to 8 hours.

Last but not least, other family members, friends and relatives should also be informed about proper infant feeding recommendations so that they can support the mothers and not put undue pressure on them to begin complementary foods early.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The complementary feeding period is a critical transition stage in a child's development and calls for special care and management. Indeed, the continued faltering growth of many children worldwide suggests that complementary feeding practices remain inadequate in terms of timeliness, quality, quantity and safety (Saadeh, 2003).

However, the full impact of optimal breastfeeding and complementary feeding on reduction in mortality and morbidity and improved health and development may not be realized unless women and caregivers adopt recommended practices regarding infant feeding. The World Health Organization (WHO) defines optimal behaviours as exclusive breastfeeding for the first six months, breastfeeding with complementary feeding starting at about six months of age, and continued breastfeeding in the second year of life and beyond (ACC/SCN, 2000).

Studies that distinguish between exclusive and partial breastfeeding however show that high percentages of infants in developing countries are breastfed exclusively for very short periods (2.5 months at most). More over, complementary foods are introduced much earlier than the recommended age of 6 months, often even in the first month of life (UNICEF and GOK 1998).

The early introduction of foods and fluids displaces breast milk and in this way exposes the child to diarrhoea and respiratory illness which research has shown have a higher prevalence in infants receiving foods or fluids other than breast milk (including water, teas and non human milk). Early introduction of cereals and vegetables can inhibit the absorption of breast milk iron

through chelation by phytates, thus potentially resulting in iron deficiency. In addition, consumption of large volumes satiates the infant, reduces the frequency of suckling and consequently reduces breast milk output (Tontisirin and Yamborisut, 1995).

1.2 STATEMENT OF THE PROBLEM

Many studies show that inappropriate complementary feeding practices are important determinants of malnutrition among young children. These practices include premature or late introduction of foods other than breast milk (Saadeh, 2003; Onayade et al, 2004; Monte and Giugliani, 2004). As such, the global strategy on infant and young child feeding recognizes the urgency to reduce the more than 7 million deaths annually due to malnutrition associated with inappropriate infant feeding practices.

Knowledge acquired about child feeding over the last twenty years has led to a significant change in the current feeding recommendations for breastfed children in relation to the prior recommendations (4 months). Breast milk alone can properly feed infants in the first six months of life, but from then on, complementary feeding is necessary. In other words, complementary foods should be introduced around six months and not before (Monte and Giugliani, 2004).

Complementing breast milk before 6 months of age is unnecessary and discouraged since it does not provide any advantages in terms of weight gain. If anything, it is frequently associated with illness episodes and growth faltering. Furthermore, in 2002, a world consensus was reached, establishing that there's no benefit that outweighs the risks and disadvantages of the early introduction of complementary foods before 180 days of life (Monte and Giugliani 2004).

Nevertheless, the Kenya Demographic and Health Survey (KDHS) 2003 shows that complementation of breast milk in Kenya starts early. Most of the complements given are plain water; water based liquids or juice, other milk or porridge. Sixty percent of children less than 3 months of age are given complementary foods in Kenya. This figure would most likely rise if the statistics on the age group 4-5 months were included.

Currently, the available information on infant feeding in Kenya does not indicate which geographic areas or population groups have the highest prevalence of early complementary feeding. It is also not clear why mothers supplement breast milk early. The most common reasons given for early complementary feeding include insufficient breast milk and convenience. The other reason cited is the mother's work. Mothers may introduce fluids and foods too early because they need to work, either in formal settings or during harvesting and sowing (UNICEF and WHO, 1999).

However, these are but indicators of a larger problem and there's need to find out the underlying familial, medical and cultural attitudes and norms, demographic and economic conditions, commercial pressures and national and international policies and norms behind this practice. There is therefore need to address the most common reasons caregivers introduce foods before the recommended six months which is possible only if these reasons are known. Clearly, determinants and constraints to the timely introduction of complementary foods still need to be identified and researched in depth.

1.3 AIM OF THE STUDY

To contribute to efforts aimed at reducing the rate of malnutrition associated with poor complementary feeding practices.

1.4 PURPOSE OF THE STUDY

To evaluate the magnitude of and reasons behind the practice of early complementary feeding of infants 0-6 months old.

1.5 JUSTIFICATION OF THE STUDY

Timely complementary feeding of the breastfed child is critical for optimal child growth and development. Unfortunately for sub Saharan Africa, the proportion of infants prematurely given complementary foods remains high (ranges between 25 and 75%).

In the last few years, some important advances in breastfeeding promotion have been made, but the same cannot be said of timely complementary feeding. Few if any studies have been done on the prevalence of early complementary feeding; hence not much is documented about it. Consequently, there are very few education programs that specifically target discouragement of this practice.

One possible reason for lack of data in this area is absence of indicators to measure non-compliance of WHO/UNICEF infant feeding recommendations. As a result, information on early complementary feeding has to be inferred from the statistics on exclusive breastfeeding, leading to anomalies in interpretation. For example, the indicators showing rate of exclusive breastfeeding (5% for Kenya) do not provide insight on what is happening with the proportion

not breastfeeding exclusively (95%). Of this 95%, it is not clear what proportion are in fact receiving replacement foods (which are not considered complementary), solid foods, semi solid foods or those not being breast fed at all. This leaves one wondering as to what the problem is before the age of six months; is it a premature introduction of complementary foods or the cessation of breastfeeding?

Data on those not following feeding recommendations would help answer this and other questions, including reasons why the feeding recommendations are not being followed. It would also enable formulation of relevant and appropriate programs through giving insight on the nature of the underlying problems for example whether it is an issue of lack of knowledge or if in fact it is a question of lack of support mechanisms for the mothers to implement the feeding recommendations.

Early targeted anticipatory guidance is needed to address the most common reasons why caregivers introduce other foods before the recommended age but first, determinants and constraints to the timely introduction of complementary foods need to be identified and researched in depth.

1.6. HYPOTHESES

1. The practice of premature complementary feeding of infants 0-6 months is widespread in Nairobi.

2. The mothers and caregivers who practice premature complementary feeding do so out of ignorance about the dangers this poses to the health and nutrition of their children.

1.7. MAIN OBJECTIVE

The main objective of this study was:

To find out the extent to which infants in Nairobi's East lands area are given complementary foods before six months of age and ascertain reasons behind this practice.

1.7.1. SPECIFIC OBJECTIVES

The specific objectives of the study were:

1. To determine the age at which mothers/caregivers in Nairobi's East lands begin complementary feeding.
2. To establish the decision-making criteria of mothers/caregivers in Nairobi's East lands regarding the age at which they introduce complementary foods to their infants.
3. To establish the level of knowledge of these mothers/caregivers about the recommended age for introduction of complementary foods.
4. To evaluate the level of awareness of mothers/caregivers on the dangers of early complementary feeding.
5. To find out what the mothers/caregivers think can be done to help them introduce complementary foods at the recommended time and not earlier.

1.8. EXPECTATIONS

This study is expected to provide information to health professionals, managers, stakeholders and policymakers that can then be used as a basis for gearing more effort towards discouraging early complementary feeding of infants less than six months. This information is also expected to help

them develop appropriate interventions that will address the constraints and determinants of complementary feeding of infants 0-6 months.

1.9 BENEFITS

It is hoped that this study will benefit mothers and caregivers of infants 0-6 months old in that it will highlight constraints to their timely complementary feeding and in this way enable formulation of appropriate interventions to help them feed their children in the proper way. This will in turn ensure optimal health for their infants.

Health managers and stakeholders will also benefit from the findings of this study, which they can use to formulate appropriate interventions that will ensure better compliance by mothers and caregivers to the recommended infant feeding practices. This will reduce the malnutrition associated with poor complementary feeding of children and hence benefit the children too by improving their nutrition and health.

CHAPTER 2: LITERATURE REVIEW

2.1. CURRENT TRENDS IN COMPLEMENTARY FEEDING

2.1.1. TIMING OF COMPLEMENTARY FEEDING IN AFRICA

Many countries still recommend complementary feeding from 4-6 months even though WHO, after the 54th World Health Assembly in 2001 recommended the introduction of complementary foods around the sixth month of life instead of between the fourth and sixth month as previously recommended, and even incorporated this change in its recommendation for global public health. In 2003, WHO approached governments of member states to determine whether a formal recommendation on the optimal duration of exclusive breastfeeding had been adopted. Of the 131 governments that replied, 13 had no official policy, 65 recommended four to six months and 53 recommended six or about six months (Saadeh, 2003).

It is important at this point to note that exclusive breastfeeding and complementary feeding are two sides of the same coin in that the end of the period of exclusive breastfeeding marks the beginning of complementary feeding. Hence the recommended period of exclusive breastfeeding is critical since it has a strong bearing on the appropriate time to begin complementary feeding.

Statistics show that most countries in Sub Saharan Africa still have extremely low exclusive breastfeeding rates for infants less than 4 months, with the exception of Ethiopia (55%), Rwanda (84%) and Burundi (62%) (UNICEF, 2005). The proportion of infants prematurely given complementary foods in addition to breastfeeding remains high, ranging approximately between 25% and 75% in three quarters of the 33 countries studied. Out of 30 countries, only 7 have a timely complementary feeding rate of over 80% i.e. wean from 6-9 months. Thus improvement

is necessary in this area too. It appears that before the age of four months, the major problem in all countries is not the cessation of breastfeeding but the early introduction of solid foods (Dop and Delpeuch, 1999). Delpeuch (1999) goes on to show that after the age of 6 months, the problem becomes that of late complementary feeding.

In Africa, 65% of 6-9 month-old infants are receiving complementary foods in addition to breast milk. In five out of the ten West African countries surveyed, less than half of the infants receive complementary foods at 6-9 months. In Guinea, Mali and Ghana, only approximately a third of infants are fed according to recommendations. In Mali for instance, only 31% of infants are fed complementary foods, while 68% receive only water or other liquids in addition to breast milk. In North African countries rates are also low, ranging from 30-70% (Dop and Benbouzid, 1999).

From these statistics, it is clear that the problem of early and late complementary feeding is of a bigger magnitude than that of early cessation of breastfeeding since the rate of continued breastfeeding is quite high in most African countries (more than 70% in 24 out of 30 countries) (Delpeuch, 1999).

2.1.2. TIMING OF COMPLEMENTARY FEEDING IN KENYA

Kenya has adopted the recommendations to exclusively breastfeed infants for at least six months through the ministry of health and is reflected in the country's national policy on infant and young child feeding. However, the Kenya Demographic and Health Survey 2003 shows a trend similar to that described above, with high rates of continued breastfeeding duration and early complementary feeding of infants 0-6months old. Only 29% of children under two months and

9% of those under four months of age are exclusively breastfed. By six months, 90 percent of Kenyan infants have been introduced to complementary foods. These are, however, introduced sometimes even before the baby is one month old as opposed to the recommended period of six months. Fifteen percent of babies under two months and 45% of those aged 2-3 months are given complementary foods. This indicates that supplementation of breast milk starts early in Kenya. Most of the supplements given are plain water, water based liquids or juice or other milk. On the other hand, 96% of children aged between 10 and 11 months are still being breastfed, implying a long duration of continued breastfeeding for infants (KDHS, 2003).

The problem of early complementary feeding appears to be more pronounced in urban areas compared to the rural areas in that rural mothers are four times (30%) more likely to fully breastfeed up to four months than the urban mother (8%) (UNICEF, 1998). According to the UNICEF report on the state of the world's children 2004, Kenya is among the six countries with the lowest proportion of children under six months that are exclusively breastfed (5%) (UNICEF, 2003).

From these statistics, it is clear that much more needs to be done nationally and internationally to encourage appropriate feeding practices for infants and young children. Frequently, other foods are introduced too early, infants are weaned too early or other foods are introduced later than desirable. Consequently, WHO is taking the lead in developing a global strategy for infant and young child feeding. This strategy should reaffirm the fundamental importance of appropriate feeding practices for infants and young children everywhere (Saadeh, 2003).

2.1.3. TYPES OF COMPLEMENTARY FOODS

Complementary foods are usually referred to as special transitional foods since they are specially prepared and designed to meet the particular nutritional and physiological needs of the infant and young child (Dop and Benbouzid, 1999). These are as varied as the countries where they are used, but generally most of them can fit in one of three categories:

1. Foods prepared traditionally
2. Processed complementary foods and
3. Nutritionally improved home based preparations.

Majority of those used in Africa fall under the first category. For most African infants, the first complementary food is thin cereal porridge, usually made from a single cereal e g. maize, millet or sorghum, depending on the region. Other ingredients such as sugar, fresh or fermented cow's milk, groundnut paste/flour or other legume pastes are normally added. The porridge is gradually thickened as the infant grows older.

Apart from porridge, in some countries mashed foods are given. In Tanzania, mashed potatoes and bananas are given to infants and in Nigeria, fruit juice, vegetable soup and mashed vegetables with palm oil (Dop and Benbouzid, 1999).

The processed complementary foods category is mostly a mixture of a staple cereal and legume flour for example groundnut, Soya bean, cowpea or chickpea flour. They are usually commercially produced. Improved household preparations are very important in interventions to improve the quality of the traditional complementary foods, which have a problem of being

bulky and hence have a low energy density. Germination of cereal grains, also called malting is a technique used at the household level to improve the energy density of traditional gruels. Another technique used is fermentation, which is traditionally practised in many African countries. It also has important advantages such as good acceptability and reduction of the risk of microbial contamination. Moreover, fermentation can reduce the viscosity of gruel of low or medium dry matter content (Dijkhuizen and Wuidermann, 1999)

A major constraint to the home-based preparation of improved complementary foods is the limited time mothers can devote to it. Where it is not a custom it might be difficult for mothers to find the extra time to do it especially in rural areas where women's workload is heavy (Dop and Benbouzid, 1999).

2.2. CONTROVERSIES IN COMPLEMENTARY FEEDING

2.2.1. WHAT IS THE RIGHT AGE TO INTRODUCE COMPLEMENTARY FOODS?

The optimal age of introduction of complementary foods remains controversial. The appropriate time may represent a compromise between two competing health issues. On one hand, if complementary foods are introduced too late when breast milk alone no longer meets all the infant's energy and nutrient needs, nutrient deficiencies and growth faltering may occur. On the other hand, because these foods are often contaminated with microbial pathogens, premature introduction carries an unnecessary risk of transmission of infection (Brown, 2000).

Opinions on this question have varied widely from as far back as the 20th Century and up to date. controversy still persists despite WHO's attempt to give some form of guidance with its recommendation in 2001 that introduction of complementary foods begin around the 6th month

of life. Demographic health surveys show that many countries still hold to the previously recommended four to six months.

At the beginning of the 20th Century, paediatricians were recommending that the milk diet of infants be supplemented with a food such as meat or cereal, only after 1 year of age. By 1917, Dr. Emmet Holt cautiously suggested that a meat broth could safely be introduced at 8 or 9 months of age, but that solid foods should be withheld until 1 year. By 1956,the pendulum had swung so far in the opposite direction that some paediatricians were recommending that an infant be put on solid foods and be expected to adhere to three meals a day by two or 3 weeks of age! (Guthrie, 1989).

To add to the confusion. Saadeh. speaking at the 17th International congress on nutrition in August 2003 says that: ... "The notion of optimal infant feeding cannot be defined in absolute terms in the abstract. Thus when applying WHO's current infant feeding recommendation as a guide for feeding practices-whether for an entire population in a given country or for an individual child, public health authorities need to take into account prevailing environmental, cultural and other risk factors, e.g., the availability, safety and quality of complementary foods, the possibility of environmental contamination, morbidity and mortality patterns for infants and young children..."

His statement sounds like a disclaimer and can be interpreted to mean that so long as the availability, safety and quality of complementary foods is assured, then health authorities don't have to apply WHO's infant feeding recommendations. This may well be so for developed

countries where there is good access by majority of the population to basic services like water and health care. In developing countries however, majority of the populations live in environments where basic food stuffs are not easily available (too costly or unobtainable),health services are few and far in between, hygiene is poor, mother's nutrition education is inadequate not to mention the high infant mortality rate compared to that of developed countries. It is for this reason that breastfeeding remains a vital safety net for children in developing countries.

UNICEF on the other hand maintains that exclusive breastfeeding should go on for about 6 months. According to them, the terminology of "4-6" months is outdated and so is recommending complementary foods from 4 months. But they too again concede that some infants 4 months but not yet 6 months may need early complementation and even go ahead to give 3 indicators for such infants as follows:

1. Child shows interest in semisolid foods e.g. reaching for them and shouting
2. Appears hungry after breastfeeding on demand without any limits or
3. Is not gaining weight adequately (UNICEF, 2004).

These varied views confuse the mother, who also has to contend with pressure and conflicting information from colleagues, relatives, friends and even health workers who all have varying opinions as to when she should begin complementary feeding. There's also the issue of insufficient breast milk as perceived by the mother, especially when the baby is constantly crying. The mother tends to think that the child is not getting enough breast milk, and so the temptation to introduce complementary foods before the baby is six months old. Having two sets of recommendations creates confusion and policy harmonization is urgently needed in this area.

2.2.2. HIV POSITIVE MOTHERS: TO BREASTFEED OR NOT TO BREASTFEED?

Since the beginning of the AIDS pandemic, an estimated 3 million children under 15 years worldwide have been infected with HIV. Mother to child transmission of HIV is responsible for more than 90% of cases (WHO, 1998). Transmission of HIV from an infected mother to her infant can occur during pregnancy, delivery or after delivery. The risk of transmission from breast milk is about 15% for infants who are breastfed up to six months, and about 20% for children breastfed to their second year (MoH and GOK, 2006). There's continued concern that 10% to 20% of infants born to HIV positive mothers may acquire HIV through breastfeeding and recent studies indicate a heightened risk of transmission during the early months (Saadeh, 2003).

On the other hand, findings from a prospective cohort study by Coutsoudis and others in South Africa show that infants exclusively breastfed by HIV positive mothers were 48% less likely to become infected with the virus than a partially breastfed group who had also received other fluids or foods (Coutsoudis, 1999).

In light of these seemingly controversial scenarios, The Global Strategy on infant and young child feeding lays down that the optimal feeding pattern for survival in the general population is exclusive breastfeeding for the first six months of life, with adequate and safe complementary feeding from age six months and continued breastfeeding for up to two years and beyond. It also recognizes that there are exceptionally difficult circumstances that call for specific approaches to infant feeding, such as the birth of infants to HIV-positive mothers. Consequently, recommendations on preventing transmission of HIV through breastfeeding depend on a woman being tested for HIV, requesting and being given the result, and accepting the implications of that result (UNAIDS, UNFPA, UNICEF, WHO, 2003).

Given the need to minimize the risk of HIV transmission to infants while at the same time not increasing their risk of other causes of morbidity and mortality, UN (WHO/UNICEF/UNAIDS) recommendations state that "when replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS), avoidance of all breastfeeding by HIV-infected mothers is recommended". However, counselling of HIV-positive mothers should include information about the risks and benefits of various infant-feeding options and guidance in selecting the most suitable option in their circumstances. Following are the recommended infant feeding options for HIV positive mothers who choose not to breast feed and meet the AFASS conditions.

1. **Commercial infant formula:** specially formulated milk made specifically for infants and sold in shops or provided through programmes designed to prevent HIV transmission to infants
2. **Home-modified animal milk:** fresh or processed animal milk that is modified by adding water, sugar and micronutrient supplements
3. **Exclusive breastfeeding:** giving only breast milk and prescribed medicine but no water, other liquids, or food to the infants for the first months of life
4. **Wet-nursing:** having another woman breastfeed an infant; in this case, ensuring that the woman is HIV-negative
5. **Expressing and heat-treating breast milk:** removing the milk from the breasts manually or with a pump, then heating it to kill HIV
6. **Breast-milk banks:** centres where donor milk is pasteurized and made available for infants

When replacement feeding is not AFASS, HIV infected mothers should practice exclusive breastfeeding the first months of the baby's life and discontinue as soon as AFASS replacement feeding becomes practical. The recommendations further state that "when HIV-infected mothers choose not to breast-feed from birth or stop breastfeeding later, they should be provided with specific guidance and support for at least the first two years of the child's life to ensure adequate replacement feeding" (UNAIDS, UNFPA, UNICEF, WHO, 2003).

The dilemma then for mothers who are HIV positive comes in when the AFASS conditions are not met as is the case in many resource poor settings. In such a case, the mothers face a difficult decision of whether to breastfeed their babies and risk transmitting the virus to them, or not breastfeed at all and have their babies exposed to the dangers of replacement feeding or early complementary feeding.

2.3. CHALLENGES OF COMPLEMENTARY FEEDING

2.3.1. EARLY COMPLEMENTARY FEEDING

A sizeable number of observational studies and randomised trials have failed to identify any benefit of complementary foods for infant growth before 6 months of age, even in low birth weight term infants. By contrast, several studies have documented a twofold or greater risk of enteric and other infections when these foods are provided before 6 months (Brown, 2000).

The national infant feeding policy in Kenya requires that children are exclusively breast fed for six months. This aims at protecting the children from getting exposed to infection before they build up their immune mechanisms, since early introduction of complementary foods in an infant's diet exposes the child to disease causing conditions and is likely to result in infections

and increased risk of diarrhoea. However, the status on feeding practices in Kenya shows that a large proportion of children are introduced to complementary foods as early as two weeks after birth, 44% are given other milk, 19% are given porridge and 12% are fed on water and sugar solution (UNICEF and GOK 1998).

Onayade in a comparative prospective study in Nigeria to compare the growth and illness pattern of infants who were exclusively breast fed for six months with those of infants commenced on complementary feeding before the age of six months found that early introduction of complementary foods did not provide any advantages in terms of weight gain but rather was frequently associated with illness episodes and growth faltering (Onayade, 2004).

Several studies carried out in developing countries show that the early introduction of complementary foods increases infant morbidity and mortality, as a result of the reduced ingestion of protective factors present in breast milk, in addition to the fact that complementary foods are an important source of contamination for infants. From the nutritional view point, the early introduction of complementary foods can bring some disadvantages since these foods in addition to replacing part of breast milk; often have a lower nutritional value than breast milk, e.g. foods that are bulky or extremely diluted (Monte and Giugliani, 2004)

More over, the early introduction of complementary foods shortens the duration of breastfeeding, inhibits the uptake of important nutrients found in breast milk such as iron and zinc and reduces the efficiency of lactation in preventing new pregnancies. More recently the early introduction of complementary foods has been associated with the development of atopic diseases. Although

findings are not consistent, many studies report an increased incidence of food allergy among infants who are introduced to a variety of foods at an early age. This is an especially important consideration among infants with a family history of allergy (Guthrie, 1989; Monte and Giugliani, 2004).

Another danger of early complementary feeding is related to the fact that the young infant has low levels of many cellular enzymes due to an immature secretion of digestive enzymes. Hence a diet high in protein in the neonatal period will tax the infant's ability to utilize the amino acid phenylalamine (Guthrie, 1989).

2.3.2. LATE COMPLEMENTARY FEEDING

Delayed introduction of complementary foods is a serious problem in some countries especially in Asia. Less than one third of infants receive complementary foods by six to nine months in Bangladesh, India and Pakistan (ACC/SCN, 2000).

Nevertheless, late complementary feeding is not a serious problem in sub-Saharan Africa. Statistics show that 23 out of 29 countries have more than 60% complementary feeding of children 6-9months. Of these, 14 (50%) have more than 80% rate of timely complementary feeding of infants 6-9 months (WHO, 2002).

All the same, it is important to note that initiating complementary feeding too late could malnourish an infant. At about six months, infants need solid or semi solid foods to supplement nutrients in breast milk (Population reports, 2003).The late introduction of complementary foods

is also disadvantageous because infant growth stops or slows down and the risk of malnutrition and micronutrient deficiency increases (Monte and Giugliani , 2004).

If a mother does not start to give food until after the age of 6 months, the baby may stop gaining weight at a healthy rate and may become underweight. It also becomes more difficult to persuade the baby to start eating solid foods at a later age. They may want nothing but breast milk or other milk or liquid foods after the age of 1 year and this can cause malnutrition (Burgess ,1992).

2.3.3. INADEQUATE QUANTITY AND QUALITY OF COMPLEMENTARY FOODS

Providing safe and adequate amounts of foods appropriate for infants and young children is not simple. Complementary foods must be adequately dense in energy and micronutrients to meet the requirements of this age group. They must also be prepared, stored and fed in hygienic conditions to reduce the risk of diarrhoea (SCN, 2000).

Food poisoning and nutritional deficiencies are both possible results of poor quality and quantity of complementary foods. Hence these foods should not only be available in sufficient quantities, but also have to be of satisfactory nutritional quality. This is of particular importance in the case of food for young children, for whom food poisoning can have very serious effects and is an important cause of infant mortality. In addition, nutritional deficiencies seriously harm the health and development of children (Doyram, 1999).

Many of the complementary foods in Africa are based on staples with low protein content such as sweet potatoes or cassava; hence the protein density of these foods is likely to be a limiting

factor. The biggest challenge though is meeting micronutrient needs from complementary foods especially key nutrients like iron, zinc and calcium (Burgess, 1992).

Another problem of the starchy staples is bulkiness, but this can be overcome by enriching them with oil or fat, protein rich foods such as fish, eggs, beans, peas or lentils and also by adding foods that are rich in micronutrients such as dark green vegetables, pumpkins, etc. Bulk can also be reduced by fermentation or using germinated cereal flour and by toasting the cereals and legumes before making them into flour (Burgess, 1992).

2.3.4. SAFETY OF COMPLEMENTARY FOODS

The complementary feeding period is characterised by an increase in cases of diarrhoea and other infections among infants, which has to do with contamination of the foods. Weaning foods prepared under unhygienic conditions are frequently contaminated with pathogens and thus are a major factor causing diarrhoea and associated malnutrition (Tontisirin, 1995).

The main sources of food contamination are microorganisms, which are carried by hands, flies, cockroaches, and other insects, rats, mice and other animals, dirty containers and dishes. Some foods contain toxins for example moulds can grow on cereals and legumes that are not properly dried. One kind of mould (Aspergillus Flavons) makes a toxin called aflatoxin, which often contaminates maize, groundnuts and other starchy foods and legumes (Burgess , 1992).

2.3.5. EARLY CESSATION OF BREASTFEEDING

This is not a major problem in Africa, especially for the first 12 months of the infant's life. Statistics show high rates of continued breastfeeding. For example, two thirds of children are breastfed beyond the 1st year in the Eastern Mediterranean region on average, while the mean percentage is 90% in the African region. In Africa, only 2 countries have rates below 80%, that is, Namibia and Botswana (Benbouzid and Dop, 1999).

The median duration of breastfeeding in Kenya is 20 months (KDHS, 2003). About 97% of the infants born in Kenya are breastfed at birth and 90 percent of these are still breastfeeding at one year and 49% at two years.

2.4. FACTORS ATTRIBUTED TO EARLY COMPLEMENTARY FEEDING

Whether or not the recommended infant feeding practices are adopted is a result of the interaction of many factors. The closest determinants relate to a woman's choice and her ability to act on that choice. For optimal breastfeeding and complementary feeding behaviours to occur, a woman must both wish to use them and be able to choose them. The two factors are influenced most immediately by the infant feeding information a woman receives as well as the physical and social support provided to her during pregnancy, childbirth and postpartum, (ACC/SCN, 2000).

Because of this, the reasons for early complementary feeding vary widely with regions. For example, a research carried out by Oguta (2002) on infant feeding practices by mothers in Homabay District attributes early complementary feeding to perceived insufficient breast milk to satisfy the baby, straightening the intestines in readiness for other foods, prevention of stomach

upsets, accustom the baby early for other foods in case the mother goes away, to make the baby stronger, onset of another pregnancy and sickness of the mother.

In another study by Dudas and Krugman (2004) to ascertain parental beliefs and practices regarding early introduction of solid foods to their children, 80% of the caregivers stated that the child was not satisfied with formula or breast milk alone and 53% stated that solids helped the child sleep better at night. 76% of the caregivers who started solids at less than 4 months were aware of guidelines regarding proper infant feeding practices.

One of the reasons that cut across many regions is that of insufficient milk. Mothers frequently cite infant crying as a sign that their babies are not getting enough milk and then decide to supplement with other liquids or solids or they give water because they think their baby is thirsty. The other reason cited is the mother's work. Mothers may introduce fluids and foods too early because thy need to work, either in formal settings or during harvesting and sowing (WHO/UNICEF, 1999).

What is clear from the few studies done in this area is that lack of knowledge on the appropriate complementary feeding times is not the problem. However, there is little data to help give insight as to why the mothers for example feel that the milk is not enough, or why they do not use the alternative of expressing milk in the case of working mothers.

2.5. GAPS IN KNOWLEDGE

In Kenya, no studies have been done specifically to address the issue of timeliness of complementary feeding. It is only the Kenya Demographic Health Survey 2003 that has a little

information on this, but it is general to the whole country and not specific to particular provinces or towns. Many of the studies done are on general infant feeding practices in relation to knowledge of the mothers.

Those closest to the problem of early complementary feeding seek to find out the differences in weight gain, illness and growth patterns between those children exclusively breastfed for 6 months and those commenced on complementary feeding before the age of six months. One such study is that by Onayade et al (2004) in Nigeria, which sought to compare growth, and illness patterns of infants who were exclusively breastfed for 6 months and those commenced on complementary foods before the age of six months and between 4 and 6 months. The findings of this study showed that the mean weight of the babies exclusively breastfed for six months was above that of babies who started complementary foods before 6 months. They also reported fewer symptoms and fewer illness episodes compared to those who started complementary feeding before 6 months.

A cross sectional survey by Krugman et al (2004) on parental beliefs and practices regarding early introduction of solid foods to their children showed that despite knowledge of infant feeding guidelines, female caregivers frequently introduce solids at less than 4 months. The authors agreed that targeted anticipatory guidance was needed to address the most common reasons caregivers begin solid foods before the recommended age.

But then, this targeted guidance can only be effective if underlying reasons such as familial, medical, cultural attitudes and norms, demographic and economic conditions are researched in

depth. In this way, interventions will be appropriately targeted not only to individual women but also to changing the context in which infant and child feeding choices are made (ACC/SCN, 2000).

Statistics on the extent of early complementary feeding are not available except in very few instances, mostly because the WHO indicators measure only the proportion of infants fed according to current recommendations, say exclusive breastfeeding, but there are no indicators for the proportion of infants not fed according to current WHO recommendations. Thus any data on prevalence of early complementary feeding is by inference from the data on exclusive breastfeeding, which results in anomalies. To avoid this, there is a need for data or indicators not just for those following WHO recommendations but also for those not following the recommendations.

The period of complementary feeding carries a high risk of nutritional deficiency for infants, yet where it has been studied; timeliness has been ignored with most studies focusing on adequacy (quality and quantity) and safety of the weaning foods. Most of the time, timeliness has been looked at under the broad umbrella of childcare and feeding practices and hence it gets swallowed under the other issues and is just mentioned in passing.

A lot of research has been done to compare growth and illness patterns of infants exclusively breastfed for 6 months versus those given complementary foods before 6 months, hence the benefits of exclusive breastfeeding are well known and researched. Consequently, education and mobilization programmes are mostly aimed at promoting exclusive breastfeeding and very few if

any specifically target discouragement of early complementary feeding. On the other hand, little is done to raise awareness of mothers or health workers for that matter about the dangers of early complementary feeding.

There are no studies done to compare prevalence of early complementary feeding in urban versus rural areas, low versus high-income households. Data from such studies would help in identifying the most vulnerable groups to enable targeted interventions.

There's considerable concern about the effect of early complementary feeding practices on later development for example whether they may predispose the child to later degenerative diseases, obesity, high blood cholesterol levels and the deposition of lipid in the wall of the artery. The last two are known to be risk factors in arteriosclerosis. More research needs to be done to dispel or substantiate these concerns.

CHAPTER 3: STUDY AREA AND METHODOLOGY

3.1. STUDY SETTING

The city of Nairobi is the capital of Kenya and the largest city in the Eastern Africa region. It lies at an altitude of 1,670m, latitude 36° 50' East and longitude 1° 17' South, about 140 kilometres south of the equator. The mean annual temperature is 17° C with annual rainfall 800-1500mm. Nairobi now spans 680km^2, has an estimated population of just over 3 million people and is thought to be growing at 5% per annum. It is divided into 8 administrative Divisions namely: Central, Westlands, Pumwani, Kibera, Kasarani, Embakasi, Makadara and Dagoretti.

The area lying at about 1600m and flanking the industrial area on the north is generally known as Eastlands and has seen progressive expansion in high-density housing estates such as Buruburu, Umoja and Kayole. Eastlands area spans three of the eight Divisions that is; Pumwani, Makadara and Embakasi and has a population of 834,529, which is over a third of the entire Nairobi population.

Trends suggest that chances of survival of children below five years have worsened over the past twenty years, with the highest risks observed in Embakasi, where under five mortality rates are 254 per 1000 (PHRC, 2002). Surprisingly, the lowest infant and under five mortality rates are observed among children born to mothers with no education or incomplete primary education, while the highest mortality risks occur when mothers have achieved at least a primary level of education. It is possible that this is due to breastfeeding duration differentials as most mothers

with some education go to work outside the home in both formal and informal employment, leaving their infants in the care of others.

3.2 RESEARCH METHODOLOGY

3.2.1 STUDY DESIGN

This study sought to establish what is going on and why, in terms of early complementary feeding practices; hence a descriptive case study was employed. This design was appropriate because it involved systematic collection and presentation of data, which helped give a clear picture of the situation. In this way, it also provided useful insight into the problem of premature complementary feeding of infants in Nairobi.

The design involved a cross sectional survey of mothers during their children's visits to the city council run health facilities in the East lands area of Nairobi.

3.2.2 SAMPLE SIZE DETERMINATION

According to the KDHS 2003, about 70% of infants in Kenya are started on complementary foods before the age of six months. This proportion was used in determination of the sample size using the fisher statistical formula (Fisher et al, 1991): -

$$N=\frac{z^2pq}{d^2}$$

Where N=the desired sample size

z=the standard normal deviate which is 1.96 for the 95% confidence interval

p= the proportion of mothers estimated to begin complementary feeding of their infants before 6 months of age. For this study, p was estimated to be 70% (KDHS, 2003).

q=1.0-p=1.0-0.70=0.30

d=risk of sampling error=5% (0.05)

Sample size $n = \frac{z^2 * p * q}{d^2} = \frac{1.96^2 * 0.7 * 0.3}{0.05^2}$ =322.7 rounded to 323 as the sample size

3.2.3 SAMPLING PROCEDURE

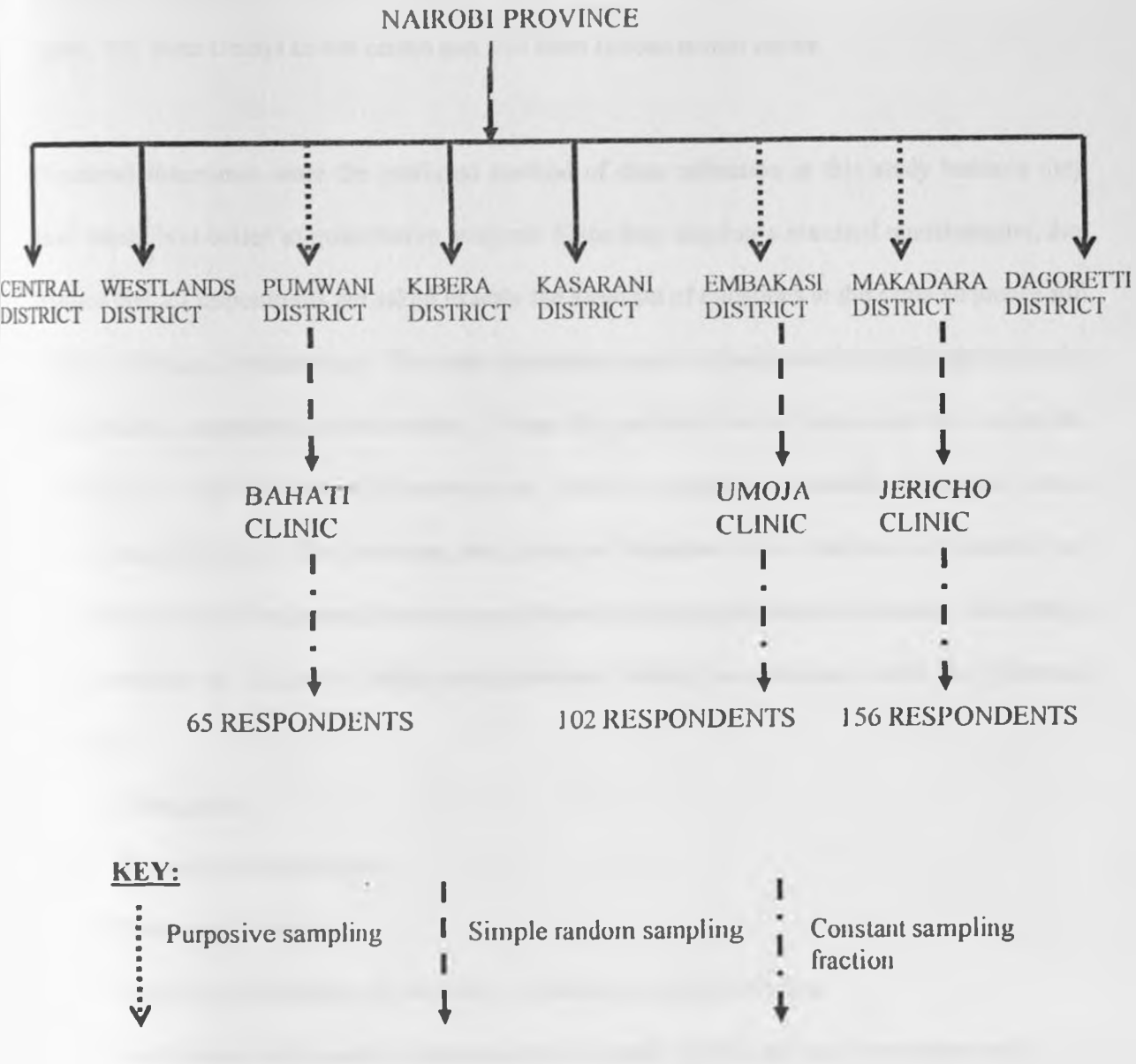
Multistage sampling was used, based on the distribution of NCC run health facilities in the province. Probability sampling methods were employed to ensure equal chance of selection for all members of the target population. This also helped to minimize bias.

In the first stage, Pumwani, Embakasi and Makadara Districts were purposively selected because these are the Districts found in the Eastlands area of Nairobi, which was the study area.

At the second stage, one health facility was selected from each district by simple random sampling whereby, the names of all health centres in each District were written on small pieces of paper, the papers folded and put in a container, after which one health facility was drawn from the container. The process was repeated for all the three Districts to end up with 3 health facilities in total.

Once the 3 health facilities had been selected, the third stage involved constant sampling fraction to determine the number of respondents to be interviewed from each clinic. This was to ensure that the number of respondents from each clinic was the same proportion of the total number of clinic attendees in all the three clinics. Lastly, all mothers who gave consent were interviewed from each clinic until the required sample size was attained.

Fig 3.1 Sampling Procedure Scheme



3.2.4 DATA COLLECTION

3.2.4.1 METHODS AND INSTRUMENTS

Structured interviews of 323 mothers were the sole method of data collection. The interviews took place at the health centres where 65 respondents were interviewed from Bahati health centre, 102 from Umoja health centre and 160 from Jericho health centre.

Structured interviews were the preferred method of data collection in this study because they lend themselves better to quantitative analysis. Since they employ a standard questionnaire, this ensures that all respondents are asked exactly the same set of questions in the same sequence and in this way bias is minimised. The main instrument used to facilitate data collection was the questionnaire, supported by observation. It was the preferred tool of data collection due to the relatively low cost and ease of administration. This was designed, pretested and refined a week before data collection. The pretesting took place at Makadara clinic that is a city council run clinic found in East lands area, but not one of those where data collection took place. Knowledge of the mothers on dangers of early complementary feeding was assessed using the following checklist.

1. Constipation
2. Stomach pain/discomfort
3. Overweight/obesity
4. Risk of atopic diseases in later life e.g. asthma, diabetes, allergies
5. Interference with uptake of essential nutrients such as iron and zinc from breast milk
6. Increased risk of morbidity and mortality e.g. from diarrhoea

If a mother mentioned any one of the above dangers, her level of knowledge was graded as low, if she mentioned two, it was graded as fair, if she named three, it was graded as good and one who named more than three of the above dangers was graded as having a very good level of knowledge.

3.2.4.2 ETHICAL AND HUMAN RIGHTS CONSIDERATIONS

Although this study did not involve any invasive procedures, informed consent was obtained from each respondent before interviewing them. No coercion was used to elicit information from respondents who declined to be interviewed. Neither were they threatened with negative consequences. Confidentiality of the information received was assured and to this end, respondents were not obliged to give their names.

Consent to carry out the research was obtained from the government of Kenya (GOK) in form of a research permit. Further consent was obtained from the Nairobi medical officer of health for use of the city council health facilities to interview the mothers.

3.2.4.3 RECRUITMENT AND TRAINING OF FIELD ASSISTANTS

Due to financial constraints, no field assistants were recruited or trained. The data was collected solely by the principal investigator.

3.2.5 DATA QUALITY CONTROL

Several measures were put in place to ensure that the data collected was as accurate as possible. For one, at the end of each day the principal investigator checked the questionnaires for omissions to ensure there was an answer to every question, each questionnaire was dated and

names of the clinics included. In addition, the data was carefully entered into the computer and then cleaned.

Statistical checks for errors were done by examining the frequency distribution on all variables for items that were improbable or not logical. High quality of the data collected was also helped by the fact that the principal investigator was the sole interviewer, thus minimising errors from interviewer variation in phrasing questions or probing skills.

3.2.6 DATA MANAGEMENT AND ANALYSIS

For ease of analysis, the data was edited and converted to numerical codes before entry into the computer. Any errors found were checked by reference to the original data forms (questionnaires) and the necessary corrections made.

The data was managed and analysed using the Statistical Package for Social Sciences (SPSS) software. Microsoft Excel, a spreadsheet package was used for creating tables and graphs/charts. Descriptive, inferential and confirmatory analysis was carried out. This involved various statistical tests that sought to establish measures of central tendency and spread, levels of significance, confidence intervals, relationships and differences in variables.

Significance of the association and differences between groups of variables was evaluated using chi square tests for nominal data and Spearman's rho for ordinal level data. The strength and relationship between row and column variables of cross tabulations was measured using Pearson's R and Spearman's rho. The F test (ANOVA) was used to test the significance of the

differences in timing of complementary feeding in the three clinics. In addition, two tests of hypotheses (one sample t test) were done as outlined below:

Tests of Hypotheses/ Tests of Significance at 5%:

1st Hypothesis: Early complementary feeding is widespread in Eastlands area of Nairobi

H_0: P=70%

H_1: P>70%

2nd Hypothesis: Early complementary feeding is due to lack of adequate knowledge by mothers on dangers it poses to their children

The mean age at which mothers would begin complementary feeding after being advised on dangers of early complementary feeding was compared with that at which they had begun prior to the counsel.

H_0: μ=3.4

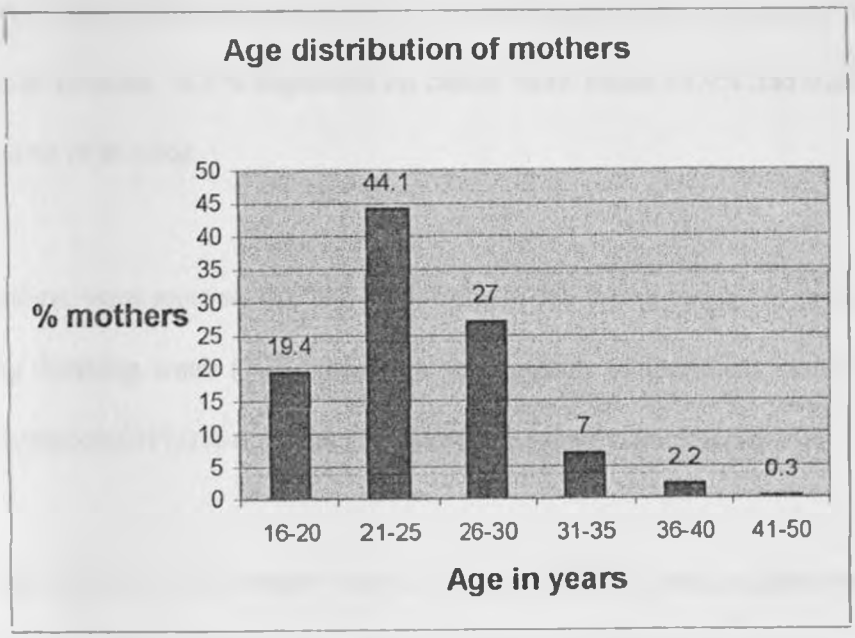
H_1: μ>3.4

CHAPTER 4: RESULTS

4.1 PROFILE OF THE CHILDREN AND MOTHERS

The respondents in this study were mothers attending MCH clinics. Their mean age was 24.61years (S.D 4.58, S.E 0.26) with 23 years being the modal age. Most of them (44.1%) were between 21 and 25 years old with the youngest aged 16 and the oldest aged 43. Figure 4.1 below shows the grouped age of the mothers.

Fig. 4.1 Grouped age distribution of respondents



A good number of the mothers had attained formal education with 48% having gone up to secondary school level while 38% had primary level education. Only 13% had attained college level education while 2 were university graduates. Out of all the 315 respondents, only one mother had not attained formal education.

Household size averaged 4.2 (S.D 1.5) with the smallest household having 2 people and the largest having 10. The most common household sizes were 3 (39.4%) and 4 (31.4%). More than half the respondents were not engaged in any income earning activity, formal or informal as 49.2% were housewives while 9.8% were single and reported not having any occupation. The rest were mostly self employed and involved in small businesses such as selling vegetables, fruits, fish and second hand clothes, hawking, tailoring, hair dressing and running small shops.

A very small number (2.2%) were students and only 7.3% were in formal employment. Nevertheless, more than half the households (51.7%) were dependent on salaried employment as the main source of income. 12.1% depended on casual work while 35.9% had trade or business as their main source of income.

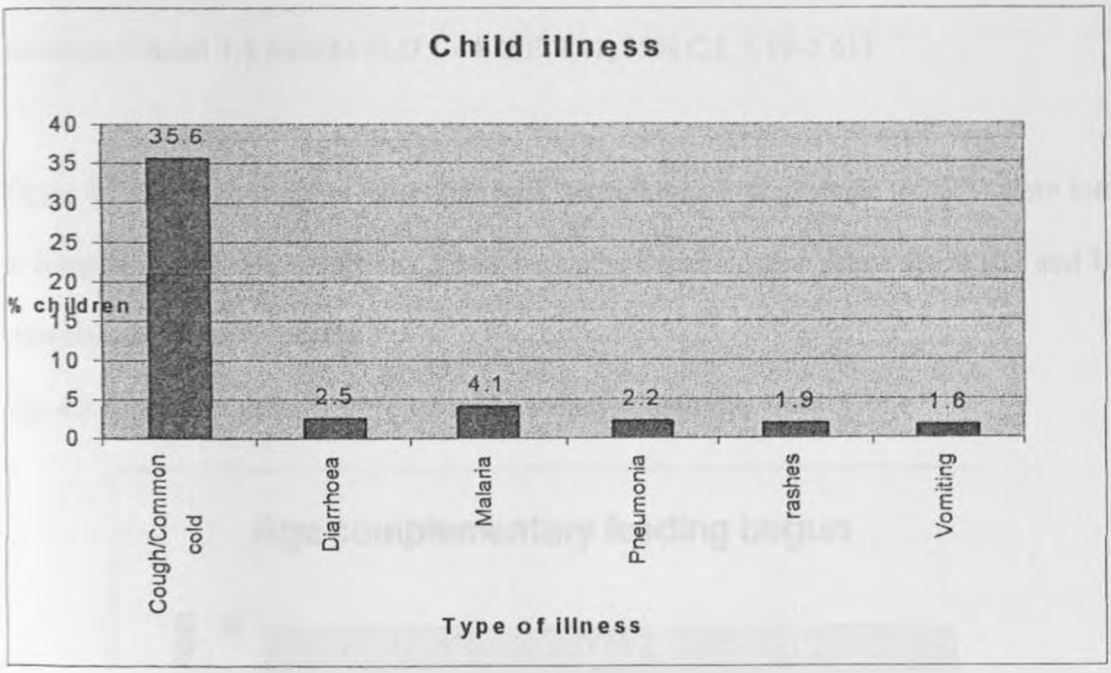
Most of the mothers were married (82.5%) with only 17.1% being single. A good number also reported treating drinking water (79%) although the methods of treatment varied with boiling being the most common (61%) and chemical treatment the least common (18.1%).

The mean age of children in the sample was 8.5 months (S.E 0.3) with majority being in the 3 months (11.4%), 4 months (10.8%), 6 months (11.1%) and 1.5 months (10.8%) categories. The proportion of males was just slightly more than that of females, 50.3% and 49.7% respectively.

On the question of child illness in the month preceding the time of interviewing, it emerged that 45.4% of the children had not been sick while 54.6% had been ill with the common cold and cough being the most frequent illness (35.6%). Other common illnesses reported included

malaria (4.1%), diarrhoea (2.5%) and pneumonia (2.2%) among others. Figure 4.2 below summarizes the types of illnesses reported.

Fig. 4.2 Child illness in the month before the interview



4.2 COMPLEMENTARY FEEDING PRACTICES

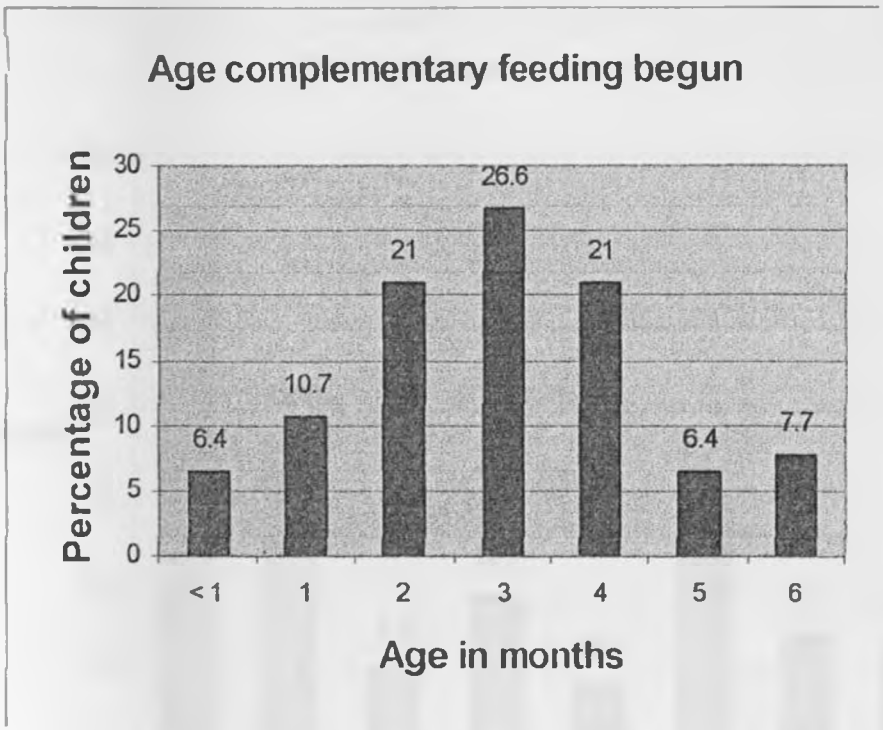
Although the proportion of children exclusively breastfed was very small (7.7%), all the mothers had breastfed or were still breastfeeding (95.2%) at the time of the interview. Only 15 mothers (4.8%) had stopped breastfeeding at the time of the interview. Even so, 66.7% of these had stopped after the child was one year old either because the child refused to breastfeed (53.3%), the mother conceived (13.3%) or the child refused to eat (20%).

For purposes of this study, complementary foods were defined as non-liquid, solid and semi solid foods given to infants in addition to breast milk. As part of the interview, mothers were asked

whether they were giving their breastfed children anything else in addition to breast milk. From the answer to this question, it emerged that 74% of the respondents had already introduced complementary food to their children. Complementary foods were introduced quite early with about a third of the mothers (31.8%) introducing foods at 2 months and below. The mode was 3 months and mean 3.4 months (S.D 1.64, S.E 0.11, 95% C.I: 3.19-3.61).

Figure 4.3 below shows that more than half the children in the sample (68.6%) were introduced to complementary foods between 2 and 4 months which is way below the WHO and UNICEF recommendation of 6 months.

Fig. 4.3 Age when infants were started on complementary food



Fifteen mothers (6.4%) begun complementary feeding before the child was even one month, as early as 2 weeks! Of those who had introduced complementary foods to the children (N=233),

only 7.7% had done so at the recommended six months. The rest (92.3%) introduced the foods before six months.

Among the different types of solid, semi solid and liquid foods the child was first introduced to, the most popular was pawpaw (28.8%), possibly because of the belief that it helps to soothe the child's stomach and prevents constipation. It was followed by milk (18.8%) and millet porridge (14.8%). Infant formula was used by few mothers (4.4%), probably because of its relatively high cost in relation to the other first complementary foods. Other types of first foods and fluids that were given are shown in figure 4.4 below.

Fig. 4.4 First complementary foods introduced to children

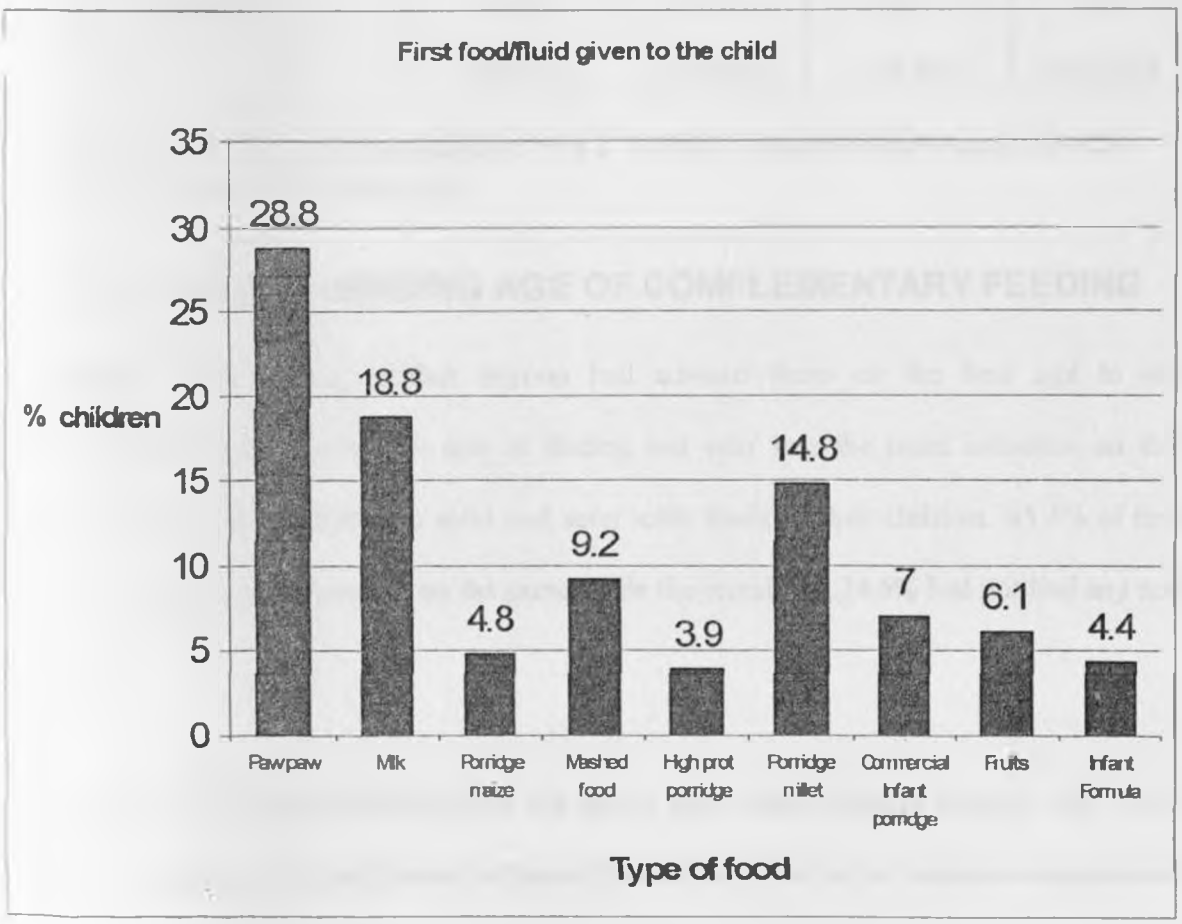


Table 4.1. Pattern of introduction of complementary foods by clinic

N=233	Name of clinic			
***Time of introduction	Jericho	Bahati	Umoja	Total
Premature (Before 6 months)	114 (97.4%)	38 (80.9%)	63 (91.3%)	215 (92.3%)
Timely (6 months)	3 (2.6%)	9 (19.1%)	6 (8.7%)	18 (7.7%)
Total	117 (100.0%)	47 (100.0%)	69 (100.0%)	233 (100.0%)

*** *One-way ANOVA Age of introduction, $F=6.8$, $p<0.001$, significant difference with more Jericho respondents introducing early*

4.3 FACTORS INFLUENCING AGE OF COMPLEMENTARY FEEDING

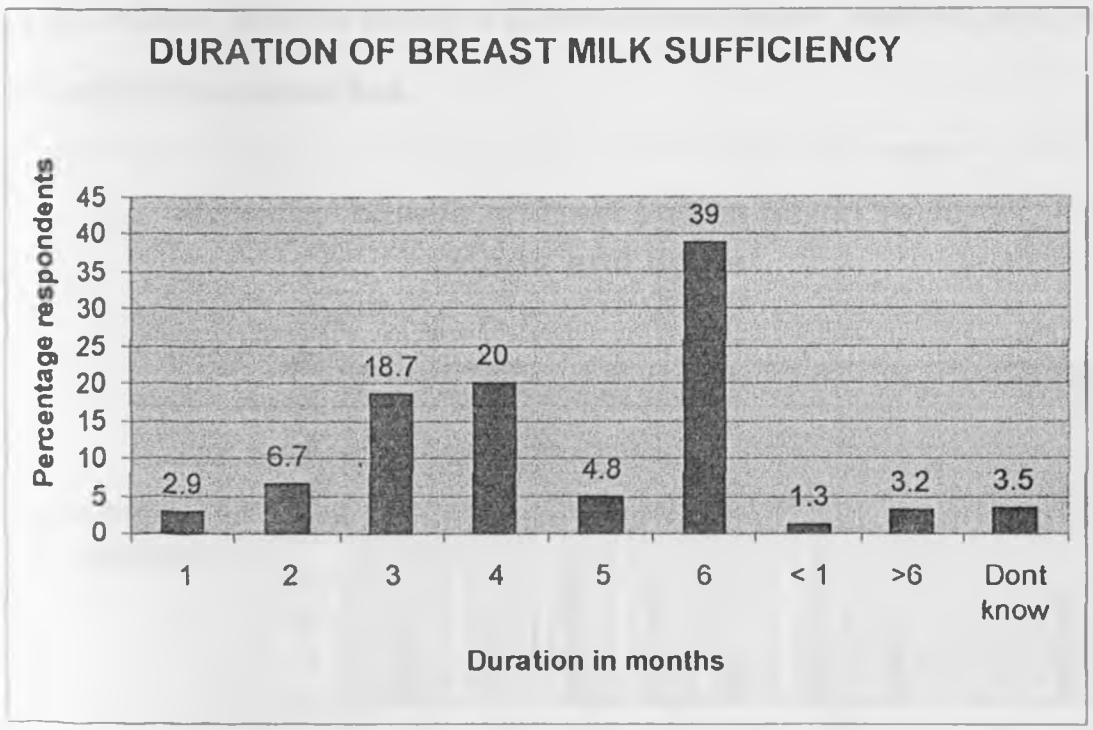
The mothers were asked whether anyone had advised them on the best age to start complementary feeding, with the aim of finding out who was the main influence on their decision about when to introduce solid and semi solid foods to their children. 65.4% of them reported having had a discussion on the same while the remaining 34.6% had not had any such discussion.

Among those who had been advised on the age to start complementary feeding, only 30.6% followed the advice they were given. It appears the decision about when to begin complementary

feeding was largely the mother's. Never the less, nearly half the advice (45.1%) was from neighbours, friends and workmates followed by mothers (16.5%). The other significant advisers were health workers (11.7%), mothers in law (11.2%) and sisters of the respondents (10.2%). More than half the neighbours, friends and workmates (57%) advised the mothers to start giving foods at 3 months or earlier, a cause for concern given that they formed the largest bloc of advisers for the mothers on the issue of timing of complementary feeding.

In trying to establish other possible influences on the mothers' decisions about when to begin complementary feeding, they were asked how long they thought breast milk alone would be sufficient for the baby. Their responses are reflected in figure 4.5 below.

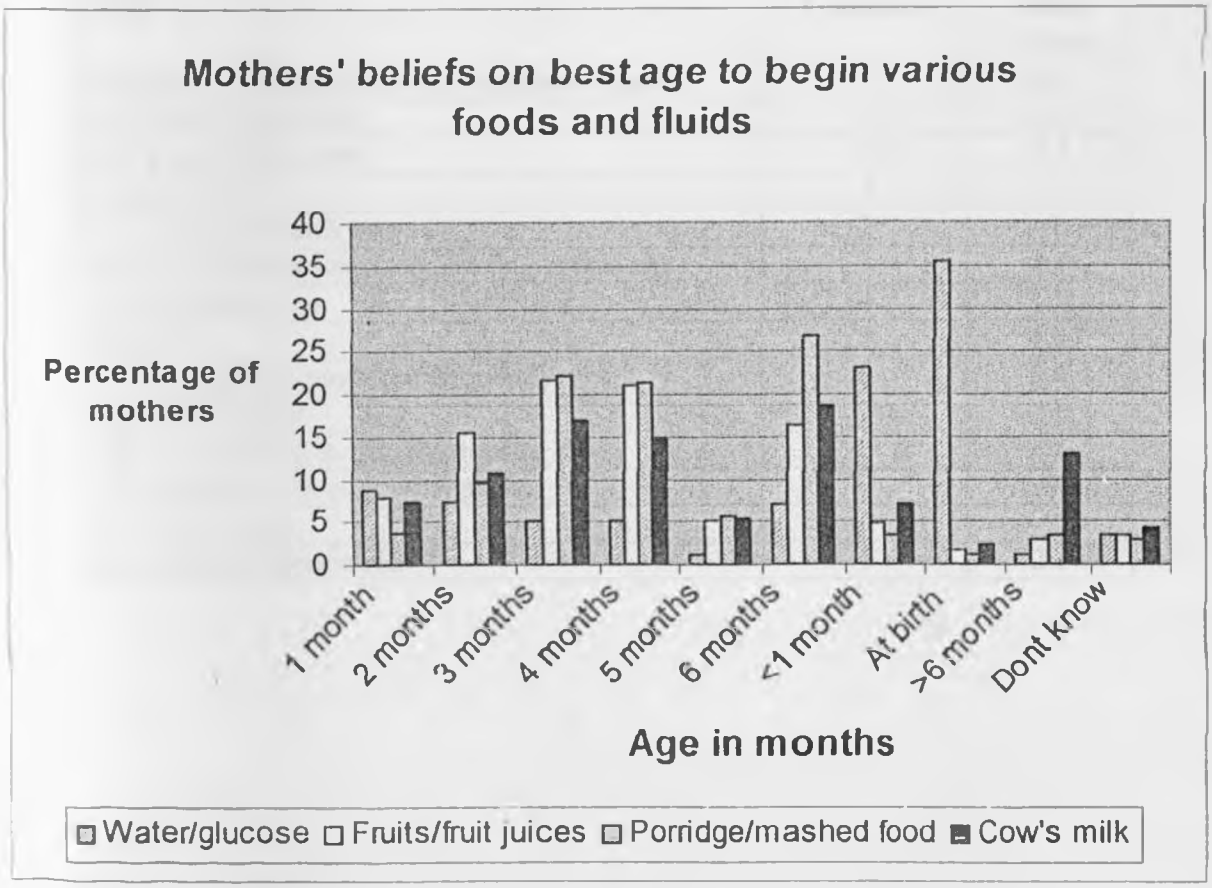
Fig. 4.5 Mothers' beliefs on how long breast milk alone is sufficient for the baby



39% of the mothers believed breast milk alone is sufficient for the child for the first six months of life with the mean age given as 4.76 ($P<0.01$, S.E 0.1, S.D 1.8). This finding was interesting given that in practice, only 7.7% of the mothers begun complementary feeding at 6 months. However, there was a significant positive linear relationship between the mothers' beliefs and the time they begin complementary feeding (Linear regression: $P<0.01$). There was also a significant positive correlation for the same though the relationship was weak, given the small value of the correlation coefficient ($P<0.01$, Pearson's $R=0.246$).

The mothers were also asked about the age they felt was appropriate to introduce to the baby water/glucose, fruits/fruit juice, cow's milk and porridge/mashed food. Figure 4.6 below summarises their responses.

Fig. 4.6. Mothers' beliefs on best age to introduce water/glucose, fruits/fruit juice, cow's milk and porridge/mashed food.



On the issue of water or glucose, most mothers (58.8%) believed that the child should be given these at birth (35.6%) and before the child attained the age of 1 month (23.2%). A good number believed porridge and mashed foods were best introduced when the child was 6 months (26.7%), 4 months (21.3%) and 3 months (22.2%). In the category of foods they believed should be introduced to the child after 6 months, cows' milk was mentioned by nearly twice (13%) the combined proportion for the other foods and fluids (7.4%). Fruits and fruit juices were favoured at 4 months and earlier unlike porridge/ mashed food and cows' milk which had high percentages for six months (26.7% and 18.7% respectively) compared to fruits/fruit juices (16.2%).

The mothers gave various reasons for beginning complementary feeding earlier than recommended. These are summarized in table 4.2 below.

Table 4.2. Reasons for beginning complementary feeding before the recommended age

N=215	Frequency	Valid Percent
Child hungry/not satisfied/ i.e. crying/not sleeping	117	50.2
Insufficient breast milk	27	11.6
Need to go back to work	17	7.3
Accustom child	2	.9
To stop child stomach pain	2	.9
Children start complementary feeding at this age	3	1.3
No particular reason	4	1.7
Mother ill	3	1.3
Child suckling too much/too frequently	8	3.4
Advised by mother	2	.9
Child was reaching for food/wanted to eat	2	.9
Child constipated/to ease constipation	2	.9
Advised by friend	2	.9
Child refused to breastfeed	5	2.1

The most common reason given for beginning complementary feeding before six months was that the child was hungry or not satisfied by breast milk alone. Over half the mothers (50.2%) cited this as the reason why they then decided to start feeding the child other foods. According to the mothers, child crying and failure to sleep at night was the indicator for them that the child was hungry/not satisfied by breast milk alone. Eleven point six percent of the mothers cited insufficient breast milk as the reason for early complementary feeding. Again the cue for this was given as child crying and not sleeping, which gave the mother the impression that her milk was not enough for the child. The need to go back to work was given by only 7.3% of the respondents.

More than half the mothers (66.7%) would not consider expressing breast milk. Only 33.3% said they would consider this option if they had to be away from the baby for long hours. There was no significant relationship at the 5% level of significance between age the mothers begun complementary feeding and whether they would consider expressing breast milk or not ($p>0.05$).

Of the reasons given for not expressing breast milk (table 4.3 below), majority (52.9%) believed that expressed breast milk would not be safe for the child as it could get contaminated or spoilt. 12.4% felt the process of expressing breast milk is too much work and time consuming. Only 3.3% said they were not aware of such an option while a mere 1% said they didn't know how to.

Correlations between the age of beginning complementary feeding and occupation, education level and marital status of the mothers were not significant. However, the chi square test for education level of the mothers and the age they begun complementary feeding was significant at the 10% level of significance ($p=0.08$).

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Of the reasons given for not expressing breast milk (table 4.3 below), majority (52.9%) believed that expressed breast milk would not be safe for the child as it could get contaminated or spoilt. 12.4% felt the process of expressing breast milk is too much work and time consuming. Only 3.3% said they were not aware of such an option while a mere 1% said they didn't know how to.

Correlations between the age of beginning complementary feeding and occupation, education level and marital status of the mothers were not significant. However, the chi square test for education level of the mothers and the age they begun complementary feeding was significant at the 10% level of significance ($p=0.08$).

There was a significant positive correlation between the age of beginning complementary feeding and beliefs of the mothers on the best age to introduce fruits (p=0.02), cow's milk (p=0.05) and porridge (p=0.002). However, the relationships were weak given that the Pearson coefficient was 0.15, 0.18 and 0.2 respectively.

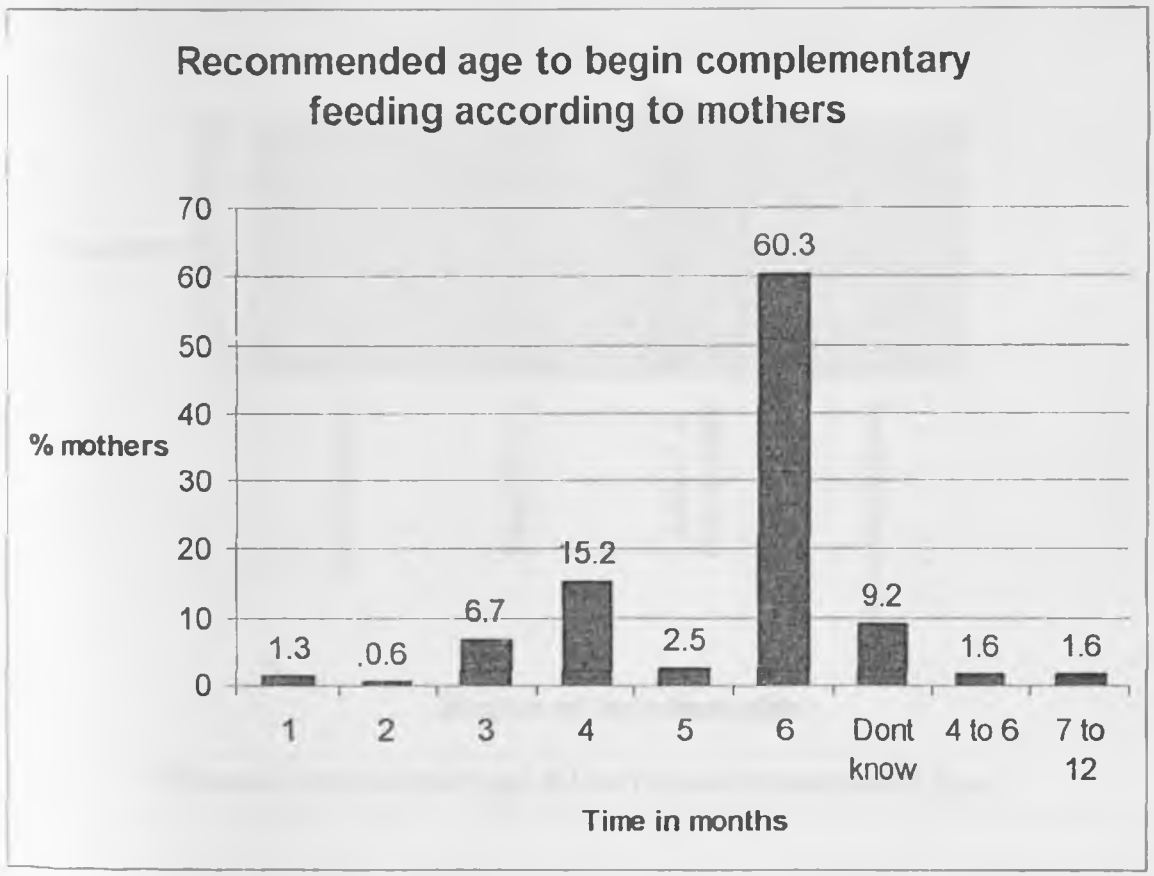
Table 4.3. Reasons for not considering option of expressing breast milk

N=210	Frequency	Valid Percent
Milk can spoil/get contaminated/not hygienic	111	52.9
Difficult to express/too much work	26	12.4
It's taboo/it's not good	14	6.7
Messy/looks bad	12	5.7
Milk not enough/wont be enough	12	5.7
Didn't know there's such an option	7	3.3
It will get cold	7	3.3
Not good for the child-will be retarded	4	1.9
It's painful	3	1.4
Its time consuming	2	1.0
Don't know how to	2	1.0
Milk will lose its nutritive value	1	.5

4. 4. LEVEL OF MOTHERS' KNOWLEDGE

The study sought to find out if the mothers knew what the recommended age to begin complementary feeding is. Figure 4.7 below summarizes their responses. The mean age given by the mothers was 5.64 months (S.D 1.53: 95% C.I: 5.47-5.81). More than half the respondents (60.3%) gave six months as the recommended age to begin complementary feeding. Only 9.2% said they didn't know while 15.2% gave the recommended age as 4 months.

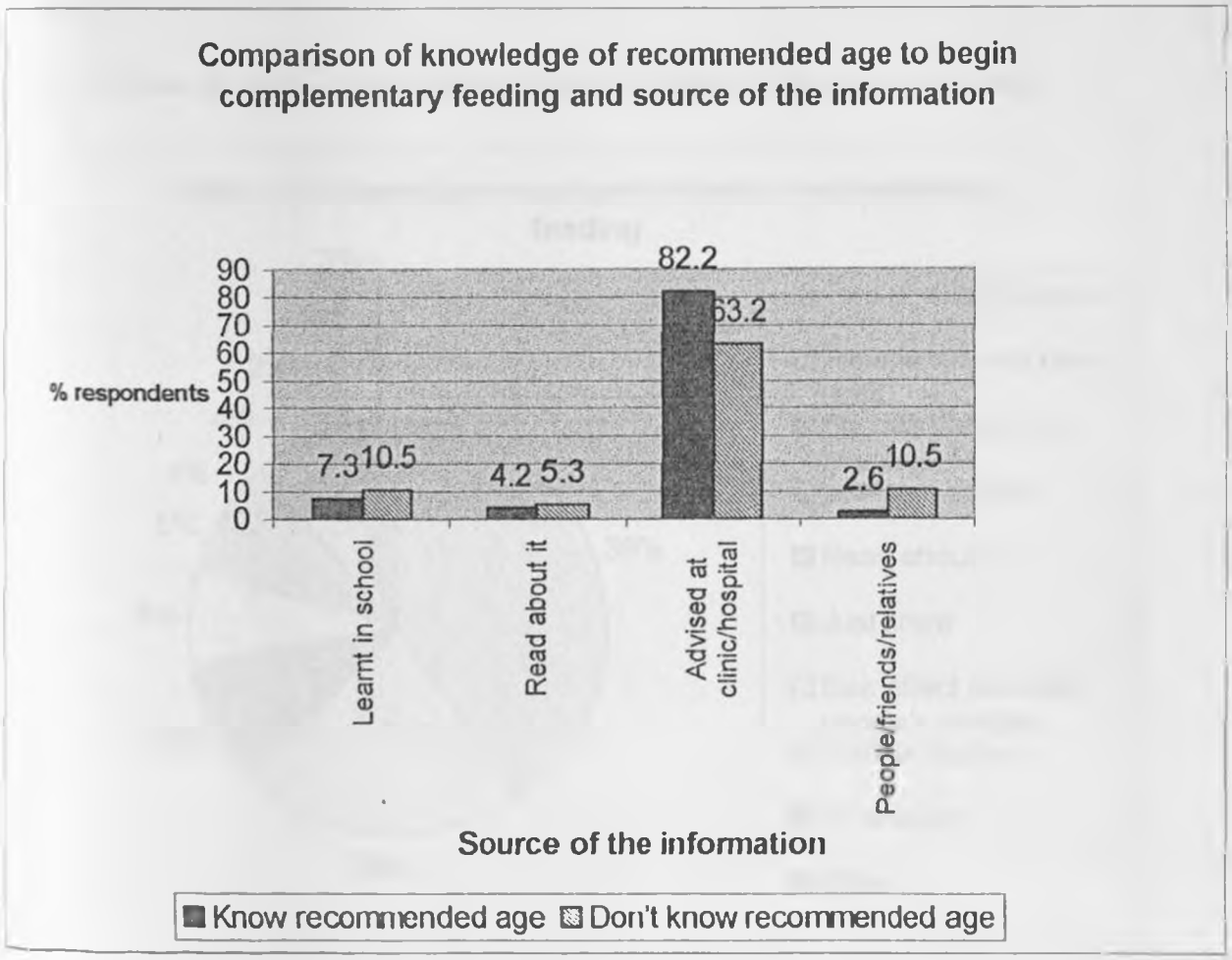
Fig. 4.7 Mothers' knowledge of recommended age for complementary feeding



A consolidation of their answers showed that 39.7% of the respondents don't know the recommended age to begin complementary feeding while 60.3% are aware of it. Asked how they

knew about this age, 82.1% said they were advised during visits to the clinics or hospitals, 7.4% had learnt about it in school, 4.2% had read about it and 2.6% heard about if from friends and relatives. The following figure 4.8 compares the knowledge of the mothers on the recommended age to begin complementary feeding with the sources of the information on the same.

Fig 4.8 Comparison of recommended age to begin complementary feeding according to the mothers and how they knew about this age

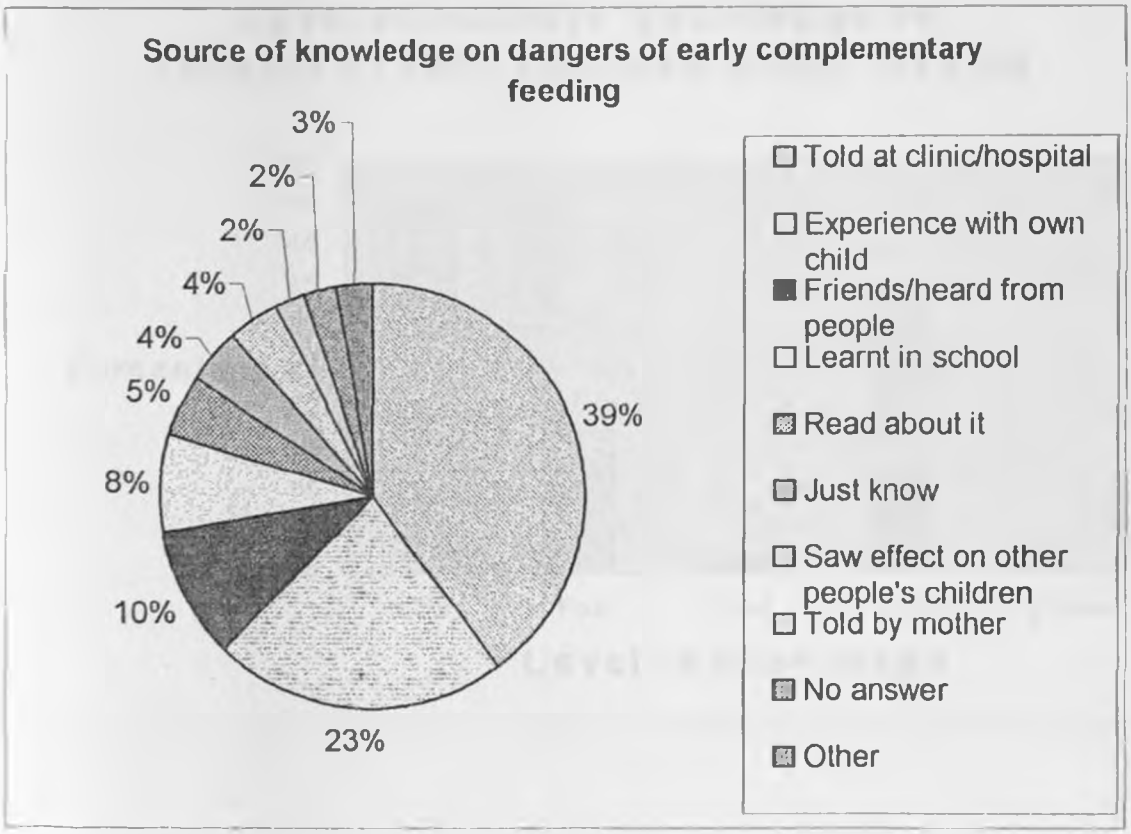


The highest proportion of mothers who knew the recommended age of complementary feeding got this information from the clinics and hospitals. It is interesting though to note that majority (63.2%) of those who gave an age other than 6 months (don't know recommended age) also had

their source of information as the clinics and hospitals. A good fraction of those that got their information from people/friends/relatives did not know (10.2% compared to 2.6% that knew) the recommended age of complementary feeding.

More than one third of the mothers (39%) learnt about the dangers of early complementary feeding from health facilities. Other sources of information on this are summarized in figure 4.9 below.

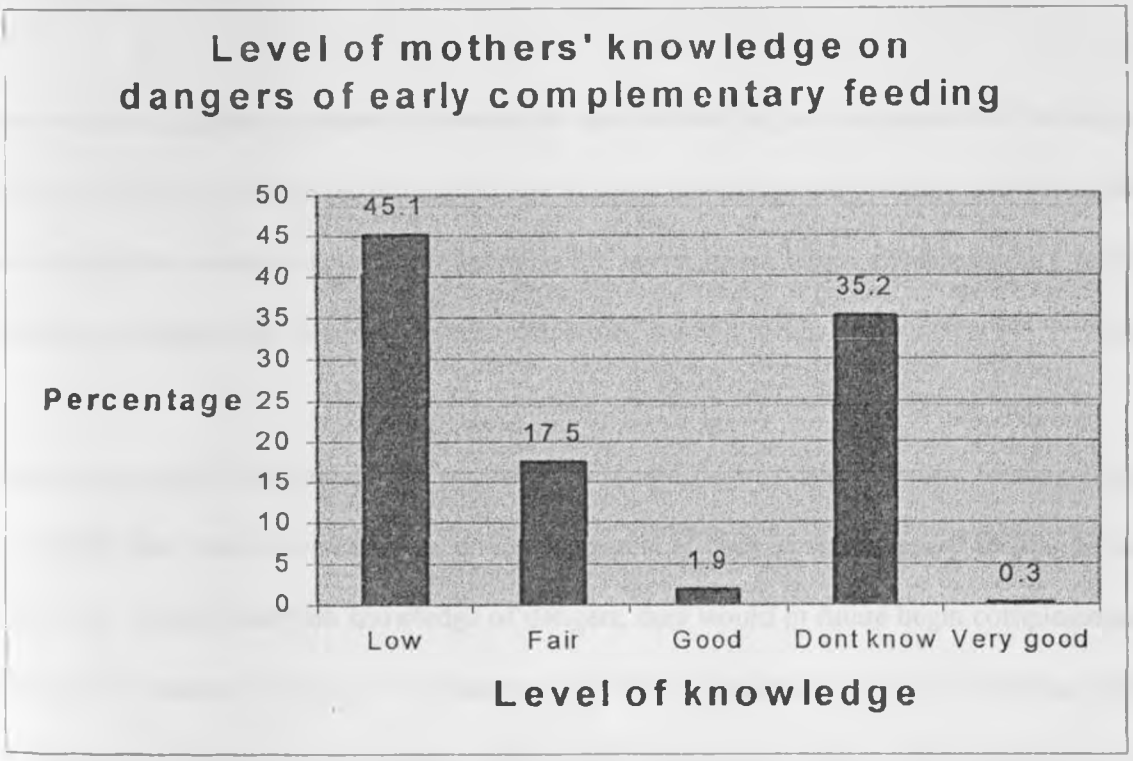
Fig. 4.9 How the mothers knew about dangers of early complementary feeding



On the question of whether they knew the dangers early complementary feeding posed to the child, 67.3% of the mothers answered in the affirmative while the remaining 32.7% said they were not aware of any dangers to the child. Among those who claimed to be aware of dangers to

the child, 39.6% cited the clinics and hospitals as the source of information about these dangers. 22.6% said they leamt about the dangers to the child through experience with their own children while 9.9% said they had been told by friends/heard from people. To verify the respondents' claims to know the dangers and to help determine the level of this knowledge, the mothers were asked to mention these risks. Their responses were compared to the documented dangers and the level of knowledge determined as summarised in figure 4.10 below.

Fig. 4.10 Level of mothers' knowledge on dangers of early complementary feeding



Out of the 67.3% who claimed to know the dangers of early complementary feeding, only 2.2% could be classified as having very good (0.3%) and good (1.9%) understanding of the dangers of early complementary feeding. Nearly half (45.1%) displayed a low understanding of the dangers of early complementary feeding while 35.2% did not know at all. This figure is slightly higher

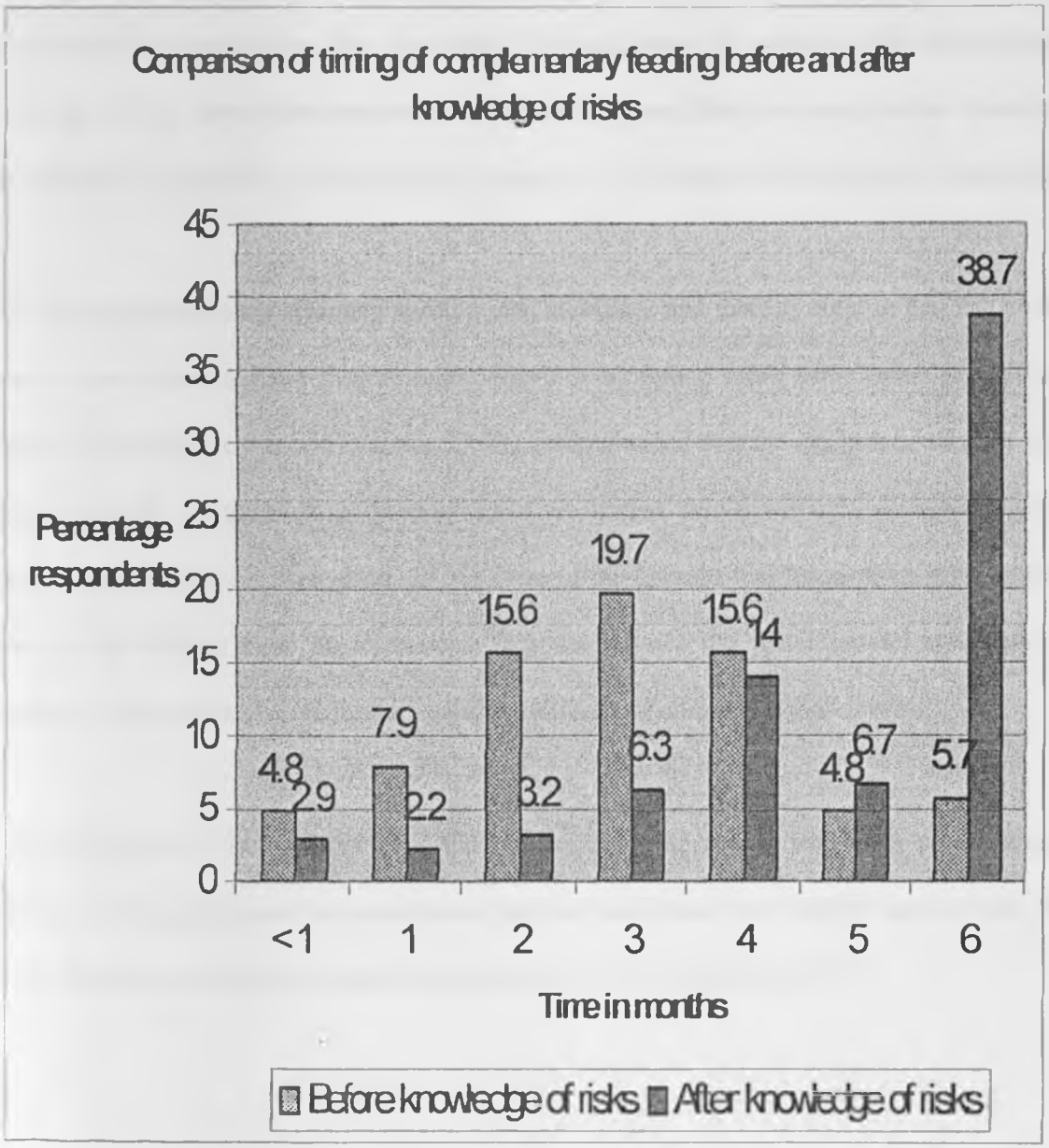
than the initial 32.7% because some of those who had claimed to know dangers to the child were not able to name any or gave wrong answers such as the child will have worms and red eyes.

The two chief ways by which mothers learnt of the dangers of complementary feeding were through advice at clinics and hospitals (39.6%) and from their own children's experiences (22.6%). Other sources of information were lessons learnt in schools (7.5%), read about it (4.7%), heard from people (9.9%), saw effect on other people's children (3.8%) and lastly told by their mother (2.4%).

There was no significant correlation between the age mothers begun complementary feeding and what they believed to be the recommended age to begin complementary feeding. However, there was a significant correlation ($p<0.01$) between the age mothers begun complementary feeding and the age at which they would begin complementary feeding if they knew dangers to the child.

There was a marked increase in the age mothers would begin complementary feeding (figure 4.11 below) after being advised on the possible dangers of early complementary feeding to their children. 38.7% said that with knowledge of dangers, they would in future begin complementary feeding at six months. This is an increase of over 30% compared to the 5.7% that had begun complementary feeding at six months before the dangers or risks to their children were explained. The mean age of beginning complementary feeding also increased significantly to 4.9 months from the previous 3.4 months ($p<0.01$) with the modal age also increasing to 6 months from the previous 3 months.

Fig. 4.11 Comparison of timing of complementary feeding before and after knowledge of dangers



4.5. SUGGESTIONS TO REDUCE EARLY COMPLEMENTARY FEEDING

In a bid to establish what action can be taken to help the mothers begin complementary feeding at six months and not earlier, they were asked for suggestions on what they felt can be done to encourage them to desist from early introduction of foods and fluids to their children. Nearly all the mothers had something to say about this except for 10.2% who said they had no suggestions.

5.1% felt that early complementary feeding was inevitable and there is nothing that can be done about it since mothers have their reasons why they introduce foods early and it is a personal decision that every mother has to make. 23.2% recommended that the mothers be advised on the dangers of early complementary feeding since no mother would willingly do something they knew was dangerous for their child. 17.5% were of the opinion that the mothers who introduce foods to the children early do so because they don't know the recommended age, hence the suggestion that mothers be taught the recommended age of complementary feeding.

A small fraction of the mothers (1%) did not see anything wrong with early complementary feeding so long as hygiene was maintained and the food made very light in consistency. More recommendations from the mothers are summarised in the following table 4.4.

Table 4.4 Mothers' suggestions on what can be done to help them introduce complementary foods at the recommended six month

N=315	Frequency	Valid Percent
Advise them on dangers/risks of early complementary feeding	73	23.2
Teach them the recommended age of complementary feeding	55	17.5
It's hard because it depends if mother available/has enough milk	38	12.1
Advise them to eat well to have enough milk	37	11.7
Don't know	32	10.2
Teach/advise them how to feed children	13	4.1
Advise them not to give foods early-before 6 months	12	3.8
Its unavoidable/inevitable-mothers have their reasons	9	2.9
Its hard since every one has to make their own decision	7	2.2
Advise them to breastfeed for six months	6	1.9
Give formula to those without enough milk	5	1.6
Give longer maternity leave	5	1.6
Express breast milk if need to go back to work	5	1.6
Its okay to wean early-make the food well, light, clean	3	1.0
Tell them not to listen to other people's advice	3	1.0
Give milk instead of porridge for those with insufficient milk	2	.6
Teach them importance/advantages of breastfeeding	2	.6
Teach other family members too, not just mothers	1	.3
Give them something to stop the baby from crying	1	.3
Tell them mother's milk is the best & has all nutrients	1	.3
Advise them to start with light foods like porridge	1	.3
Should learn when they see child having problems	1	.3
Explain why 6 months is best time to start complementary foods	1	.3
Have talks in other gatherings too, not just clinics	1	.3
Tell them child crying not necessarily sign of hunger	1	.3

CHAPTER 5: DISCUSSION

5.1. PREVALENCE OF EARLY COMPLEMENTARY FEEDING

The results of this study show that there is a very high prevalence of early complementary feeding in Eastlands area of Nairobi with 92.3% introducing complementary foods before the six months recommended by WHO and UNICEF. This proportion was found to be highly significant ($P<0.01$) when subjected to the one sample T test. Thus the null hypothesis $\mathbf{H_0: P=70\%}$ was rejected at the 1% level of significance and the hypothesis that early complementary feeding is widespread in Nairobi's Eastlands area ($\mathbf{H_1: P>70\%}$) accepted at the 1% level of significance.

These results are fairly consistent with the UNICEF report on the state of the world's children 2004, which gives the rate of exclusive breastfeeding in Kenya as 5% implying that the remaining 95% are receiving other foods and fluids in addition to breast milk. The situation seems to be deteriorating given that more mothers (17.1%) are introducing foods before the child is 2 months compared to 15% in the Kenya Demographic survey 2003. There has also been an increase in the percentage of mothers introducing food to children between 2 and 3 months (47.6%) compared to 45% in 2003.

5.2. FACTORS ATTRIBUTED TO EARLY COMPLEMENTARY FEEDING

There really should be no valid reason for early complementary feeding, even in the case where a HIV positive mother chooses not to breastfeed. In such a case, rather than give complementary foods, it is preferable to replace breast milk with a suitable substitute such as commercial infant formula or home prepared formula with micronutrient supplements. Even then, the risk of replacement feeding should be less than the potential risk of HIV transmission through infected

breast milk, so that infant illness and death from other causes like diarrhoea do not increase; otherwise there's no advantage in replacement feeding.

The main question is why there is continued increase in the number of children being introduced to complementary foods early. Most of the respondents in this study were housewives (49.2%), stay home mothers (9.8%) or self employed in running small businesses (31.4%) so the issue of having to go back to work does not really arise as a major reason for early complementary feeding. In any case, only 7.3% of the respondents cited this as the reason why they introduced complementary foods to the children earlier than recommended. Lack of knowledge on the recommended age to begin complementary foods is also not a likely reason for early complementary feeding since more than half the mothers (60.3%-**fig. 4.7**) gave 6 months as the recommended age to begin complementary feeding.

Considering that 39% of the mothers believe breast milk alone is sufficient for the baby for six months, one would expect that a similar proportion would not introduce complementary foods before the child attained the age of six months. A possible explanation for this contradiction between belief and practice is that there are other influences on the mother that make it difficult for her to practice what she seems to believe is the right thing. The strongest influence seems to be the cues the mother gets from the child particularly child crying and failure to sleep at night. The most common reason given for early complementary feeding (50.2% of the respondents) was that the child was hungry or not satisfied by breast milk alone. It is worth noting that this explanation was not confirmed by poor weight gain but rather by child crying and failure to sleep which are not necessarily good indicators of hunger.

The mothers also associated constant or frequent breast-feeding with hunger and as a sign that the breast milk was not satisfying the child. 3.4% of the mothers cited child suckling too much or too frequently as the reason why they begun supplementing breast milk before the child attained the age of six months. They seem not to know that the more the child suckles, the more milk is produced.

Not surprisingly, the second most common reason given for early complementary feeding was insufficient breast milk (11.6%), which is closely related to the first reason but which is a cue from the mother herself. A study by Crocetti, Dudas and Krugman (2004) on parental beliefs and practices regarding early introduction of solid foods to their children also came up with similar findings. According to their results, 80% of the caregivers stated that the child was not satisfied with breast milk alone while 53% stated that solids helped the child sleep better at night. Gussler and Briesemeister (1980) call this the "insufficient milk syndrome".

It would appear that mothers gauge sufficiency of their breast milk on child behavioural cues rather than on child's weight gain or growth. If the child cries and does not sleep well at night, they conclude that the child is not satisfied by their breast milk alone and hence the temptation to supplement it rather than seek ways to increase their milk output. A possible explanation for this course of action is that the mothers believe there is something wrong with their milk or ability to lactate. These mothers are both right and wrong. They are probably correct in interpreting the behaviour of their fussy infants as caused by hunger but wrong in thinking there is nothing they can do about increasing their milk output. There are many possible causes of insufficient breast milk such as not eating enough foods that enhance milk production, poor breast feeding patterns,

sucking difficulties, maternal stress and anxiety, insufficient sucking and emptying of the breast to name a few.

In 1980, Gussler and Briesemeister published an article arguing that the feeding patterns dictated by life in urban, industrial societies (infrequent feedings, lasting for long periods of time) actually caused women to produce less milk. In response, Greiner, Van Esterik, and Latham (1981) argued several hypotheses to account for the insufficient milk syndrome. These focused on the introduction of other feeds and, therefore, less nipple stimulation, as the real cause of insufficient milk. Thus the interpretation of "insufficient milk" and consequent supplementation with other foods and fluids by mothers actually turns out to be a biologically self-fulfilling prophecy.

The need to go back to work should not really be an excuse for early complementary feeding since there is the option of expressing breast milk. Only 3.3% of the respondents did not know about such an option. The reasons why many working mothers have not adopted this option seem to arise more from misconceptions and lack of proper knowledge about breast milk expression.

This is clearly reflected by the most common reason given for not expressing breast milk. In this study, 66.7% of the respondents would not even consider expressing breast milk with 52.9% believing that the milk would get spoiled or contaminated if expressed. This implies ignorance on the part of the mothers since it has been shown that breast milk will stay fresh and safe for the baby for up to 8 hours without refrigeration. With refrigeration, it will stay fresh for the next day too. The anti infective properties in the milk that protect the child against infections also prevent

bacteria from growing in it (Burgess 1992). The mothers did not seem to be aware of these facts hence the belief that breast milk would get spoilt or contaminated if expressed.

The information the respondents received from various sources would appear to also influence the age they begin complementary feeding since more than half of them (65.4%) were involved in discussions about which age to introduce complementary foods to their children. Most of the advice received was from neighbours, friends, workmates and mothers whose knowledge of the recommended age for complementary feeding is hard to gauge and who therefore may exert pressure on the respondents to begin complementary feeding early. It often turns out that the one who is concerned about the breastfeeding is not really the mother, but a relative or friend who argues "If that baby was getting enough to eat he wouldn't be doing all that crying."

When women or health workers in close geographical proximity share the belief for example, that insufficient milk is a common phenomenon, they may become acutely watchful for signs of it. Thus they may interpret normal physiological events in the mother (e.g., cessation of milk dripping from the breasts) or non-hunger-related crying as signs of insufficient milk.

From what was observed during the five weeks of data collection, information about complementary feeding from the health workers was little and inadequate. Much as there was an element of teaching before the mothers were attended to, very little was about complementary feeding, least of all the dangers of early complementary feeding or why 6 months and not earlier is the recommended age for introducing other foods and fluids to children. A lot of the teaching

was on immunization, recommended age to begin complementary feeding; benefits of exclusive breast feeding, the importance of growth monitoring and the usefulness of the child's clinic card.

One possible explanation for this was that the nurses were overwhelmed by the number of mothers and so they cut short the teaching time so that they could attend to all the mothers before 1 pm when the clinic closed. Out of the three clinics visited, only one (Bahati) had a nutritionist teaching the mothers. Interestingly, this is the clinic that had the highest proportion of mothers who introduced complementary foods at six months and not earlier. This implies that availing nutritionists and hence nutritional counselling to mothers could help reduce the prevalence of early complementary feeding.

5.3. KNOWLEDGE OF THE MOTHERS ON RECOMMENDED AGE TO BEGIN COMPLEMENTARY FEEDING

At least two thirds of the mothers (60.3%) gave six months as the recommended age for beginning complementary feeding. Clearly lack of knowledge on this is not the reason for early complementary feeding. The health care workers seem to be doing a good job of sharing this information since 82.1% of the respondents said they learnt about this during visits to the clinics and hospitals where they learnt that six months is the recommended age to begin giving children foods and fluids in addition to breast milk.

A similarly high proportion (63.2%) who gave an age other than six months as the recommended one claimed to have got their information during visits to the clinics and hospitals. This disparity implies that some health workers may be advising the mothers differently from WHO and UNICEF recommendations.

5.4. KNOWLEDGE OF THE MOTHERS ABOUT DANGERS OF EARLY COMPLEMENTARY FEEDING

The level of knowledge on the dangers early complementary feeding poses to their children is quite basic. It is quite telling that 35.2% had no idea that early complementary feeding has potential threats to the health of their children. It is important that the mothers be advised on other dangers to the child apart from diarrhoea, constipation and stomach pain/upsets which were the most common examples cited. From discussions held with some of the mothers, it emerged that they don't treat these dangers as seriously as they should because they believe there is a way round them.

Some of the respondents said that children get constipated because of poor food preparation, not because the food is given prematurely. According to them, so long as the food is made very light in consistency, the problem of constipation will be overcome. As for diarrhoea, they believe it can be avoided by maintaining hygiene, so to them, it is not sufficient reason to desist from early complementary feeding since they believe there are ways to go around these problems. These narrow views about the dangers of early complementary feeding need to be corrected.

The mothers need to know that the potential dangers to the children are more complex than this. For example, the problem of anti nutrients (which inhibit absorption of key micronutrients such as zinc and iron from breast milk) in the complementary foods such as millet and sorghum porridge (which are popular first foods) cannot be solved by hygiene alone or making the food thin in consistency. They also seem not to know that early complementary feeding is frequently associated with illness episodes and growth faltering because of reduced ingestion of protective

factors present in breast milk and because most of these foods often have a lower nutritional value than breast milk-more so when they are extremely diluted to make the consistency light enough to prevent constipation.

It is quite telling that the mean age of beginning complementary feeding increased significantly to 4.9 months from the previous 3.4 months ($p<0.01$) after the mothers were informed of the dangers of early complementary feeding to the health of their children. Thus H_0: $\mu=3.4$ was rejected and the hypothesis that early complementary feeding is due to lack of adequate knowledge by the mothers on the dangers it poses to their children was accepted at the 1% level of significance.

According to Monte and Giugliani (2004), unmodified cow's milk (which is also a popular first food) is responsible for 20% of food allergies. They also state that early exposure to cow's milk (before the fourth month) can be an important determinant factor for type 1 diabetes and it can increase the risk for diabetes by 50%. This is a worrying fact given that nearly half the respondents (49.5%) believed that the child could be safely given cow's milk at 4 months or earlier.

5.5. SUGGESTIONS FROM THE MOTHERS ON CURBING EARLY COMPLEMENTARY FEEDING

This study sought to find out what the mothers felt can be done to help them introduce complementary foods to their children at the recommended six months and not earlier. If implemented, their suggestions are likely to be effective since they are not imposed but rather came from the proverbial horse's mouth-the mothers themselves.

Only a small fraction of the respondents (5.1%) felt that nothing can be done, and early complementary feeding is here to stay. The larger majority (23.2%) suggested that the mothers should be advised on the dangers or risks of early complementary feeding to their children. This solution is based on the premise that no mother would willingly do something she knows could harm her child.

There is a marked increase (33%) in the proportion of mothers that would begin complementary feeding at six months with knowledge of dangers to the children of early complementary feeding. This figure would probably be higher if verified by an experimental study. It is also encouraging to note that whereas 63.6% of the respondents had introduced complementary foods at four months and earlier, this number dropped by 36% with only 27.6% of the respondents saying that even with knowledge of dangers, they would still introduce complementary foods at four months or earlier.

Although 17.5% of the respondents recommended that the mothers be taught the recommended age to begin complementary feeding as a solution to the problem of early complementary feeding, results of the study showed that lack of knowledge on the recommended age to begin complementary feeding is not really the problem since more than half the respondents (60.3%) gave six months as the recommended age yet only 7.7% introduced complementary foods at six months.

The issue of insufficient breast milk and breast milk expression comes up again with 12.1% of the respondents saying that timing of complementary feeding depends on how much milk the

mother has and whether she is available to breast feed. If these two issues are addressed, then the problem of early complementary feeding can be reduced significantly. Some of the recommendations from the respondents are targeted at the issue of insufficient breast milk with 11.7% suggesting that mothers be advised to eat well so as to have enough milk.

What came out of the recommendations is that a lot more needs to be incorporated in the kind of information the mothers receive during their prenatal and postnatal visits to the clinics regarding infant feeding. The timing of this information is critical because it is likely to affect a mother's decision making, her motivation to overcome problems should they arise and her persistence in maintaining a recommended behaviour despite negative influences. Therefore education on infant feeding needs to be delivered as close as possible to the time of the desired behavior, in this case during the prenatal period, soon after delivery and within the first month post partum.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The age of beginning complementary feeding in Eastlands area Nairobi as in the rest of the country, generally does not follow international recommendations. In low income homes where nutritious foods are scarce and hygiene is poor, early complementary feeding is critical and may lead to early under nutrition. Worse still, in the light of HIV/AIDS, it is critical that the issue of early complementary feeding be addressed. When a mother does not know her status, it is safer to exclusively breastfeed the child for six months because mixed feeding or early complementary feeding would increases the chance of the child being infected with HIV in case the mother is infected.

The problem of early complementary feeding seems to be an educational one with mothers not receiving the information they need to help them make beneficial infant feeding decisions. This practice could however be minimized over time through a widespread information system. The health care workers are the best source of infant feeding information for the mothers thus they need to be trained or re-trained on what to include in their teaching. For example, they need to advise women to continue and even increase breast-feeding if their milk appears to be insufficient because milk production is related to the frequency and intensity of infant suckling. Since the problem of insufficient breast milk features prominently as a major reason for early complementary feeding, there's a need for the mothers to be advised on how to increase their milk output for example through dietary advise on what foods improve lactation.

For the mothers who need to leave the child to go to work, they should be given more information on breast milk expression, not just how to do it, but also reassure them on safety of expressed milk even in the absence of refrigeration facilities.

Another component that needs to be included in the education mothers are given regarding infant feeding are the dangers to the child of early complementary feeding. It is not enough just to tell the mothers to begin complementary feeding at six months. It is equally important to tell them why this is the recommended age and possible dangers to the child if introduced to foods and fluids earlier than this.

In this regard, there's also need to use the term 'food' with care, or better still, define what exactly it means; whether it includes fluids or only solids. Some mothers do not consider fruits and porridge as food, and so when asked when they begun complementary feeding, they will cite six months, yet when asked the first food they gave the baby and at what age they did so, they mention fruits or porridge given at one or two months.

Another issue that mothers grapple with is child crying. They need to be taught the causes of colic, when to expect it and how to prevent it so that they do not interpret this as an indicator of insufficient milk or resort to giving foods like paw paw which is believed to help soothe the child's stomach pain. It would also help if the mothers were advised on other ways to gauge milk sufficiency or insufficiency other than child crying which is not a good indicator of poor breast milk supply. For example, the best indicator that milk supply is adequate is if infants are passing urine at least six times during a 24-hour period, something that can be easily assessed by any

mother whether literate or illiterate. They should also be advised that so long as the child is gaining weight normally there is no need to give them complementary foods early.

Last but not least, information on child feeding needs to be targeted to other family members and not just the mother so that they can support her in making the right infant feeding decisions rather than put undue pressure on her based on beliefs and practices that may be harmful to the child.

In summary, I would recommend the following actions in an effort to address the factors attributed to early complementary feeding.

1. Address the 'insufficient milk syndrome' by advising mothers how to increase milk output and on other ways of gauging milk sufficiency other than infant crying.
2. Teach mothers the dangers of early complementary feeding and why six months and not earlier is the recommended age to introduce complementary foods.
3. Target the teaching not just to the mothers but other family members and the general public since friends and neighbours also influence the mothers' decision on age to begin complementary feeding.

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QUESTIONNAIRE

SURVEY ON THE TIMING OF COMPLEMENTARY FEEDING OF INFANTS IN EASTLANDS AREA NAIROBI

INTERVIEW DATE: _____/_____/ 2005

NAME OF INTERVIEWER: _____

NAME OF HEALTH CENTER/CLINIC _____

SOCIOECONOMIC AND DEMOGRAPHIC DATA

1. a) Name of respondent _____

b) Place of residence_____

c) Age in years_____ d) Sex **Male=1** **Female=2**

e) Occupation _____

f) Religion _____

g) Level of education **Primary=1** **Secondary=2** **College=3** **Other=5**_____

No formal education=4

h) Ethnicity _____

i) Marital Status **Married =1** **Single=2** **Widowed=3** **Other=4**_____

2. How many people are in your household including you? _____

3. What fuel do you use most for cooking? **Paraffin=1** **Gas=2** **Charcoal=3**

Firewood=4 **Electricity=6** **Other=7**_____

4. What is the main source of income for the family? **Salaried employment=1**

Farming=2 **Casual labourer=3** **Business/trader=4** **Other=5**_____

5. What is the: a) Sex of the index child? **Male=1** **Female= 2**

b) Birth order? _____ c) Age in months? _____

MORBIDITY, SANITATION AND HYGIENE

6.a) When is the last time the child was sick? **This week=1** **2 weeks ago=2** **1 month ago=3**

Child hasn't been sick=4 **Other=5**_____

b) What was the illness? **Cough/common cold=1** **Diarrhoea=2** **Malaria=3**

Fever=4 **Other=5**_____

7. Where was the child delivered? **Health facility=1** **Under TBA=2** **At home=3**

Other=4_____

8.a) Do you treat drinking water? **Yes=1** **No=2**

b) If yes, how do you treat it? **Boil=1** **Other=2**_____

9.Do you wash your hands a) Before preparing food for the child? **Yes=1** **No=2** **Sometimes=3**

b) Before feeding the child? **Yes=1** **No=2** **Sometimes=3**

10. When do you prepare food for the child? **Morning=1** **Before feeding=2**

When cooking for the family=3 **Other=4**_____

CHILD FEEDING PRACTICES

11.a) Is the child breastfeeding? **YES=1** **NO=2** **[If NO, skip to question 13]**

b) If YES, how often do you breastfeed? **On demand=1** **1-2 times a day=2**

>3times a day=3 **Other=4**_____

c) Are you giving the child anything else in addition to breast milk? **YES=1** **NO=2**

[If NO, skip to question 12]

d) How often were you breastfeeding before you begun giving other foods/fluids?

On demand=1 **1-2 times a day=2** **>3times a day=3** **Other=4**_____

e) At what age did you begin giving other foods/fluids to the baby? _____

f) Why this age? _____

g) What was the first food/fluid you gave the baby? _____

h) How do you feed the baby fluids? **Cup=1 Spoon=2 Bottle=3 Other=4**_____

12. a) At what age will you begin feeding the child other foods/fluids_____

b) Why this age? _____

13. a) At what age did you stop breastfeeding? _____

b) Why this age? _____

MATERNAL BELIEFS AND KNOWLEDGE

14. In your opinion, up to what age will a baby remain healthy with breast milk only? _____

15. At what age do you think a baby should be started on: a) Water/glucose? _____

b) Fruits/fruit juice_____ c) Cow's milk _____

d) Porridge/mashed foods_____

16. a) If you had to be away from the child for several hours a day, would you express breast milk and leave it to be given to the child by someone else? **Yes=1 No=2**

b) If NO, why not? _____

17. a) Has anyone told you/discussed with you about when to start giving the child other foods?

Yes=1 No=2 [If No, skip to question 18]

b) If Yes, who was it? _____

c) What did they suggest? _____

d) Did you follow their suggestion? **Yes=1 No=2**

18.a) What is the recommended age for starting the child on other foods/fluids in addition to breast milk? _____

b) How did you know about this age? _____

c) Did you follow the recommendation? **Yes=1** **No=2**

19.a) Are you aware of the risks/dangers of starting the child on other foods/fluids before the recommended age? **Yes=1** **No=2** **[If No, skip to question 20]**

b) If Yes, please tell me some of these risks/dangers_____

_____

c) How did you know about these dangers/risks? _____

20. If you knew the risks/dangers of starting the child on other foods/fluids before the recommended age, at what age would you start the child on other fluids/foods? _____

21. How can mothers be helped to follow the recommended age of starting the child on other foods/ fluids and not earlier? _____

_____

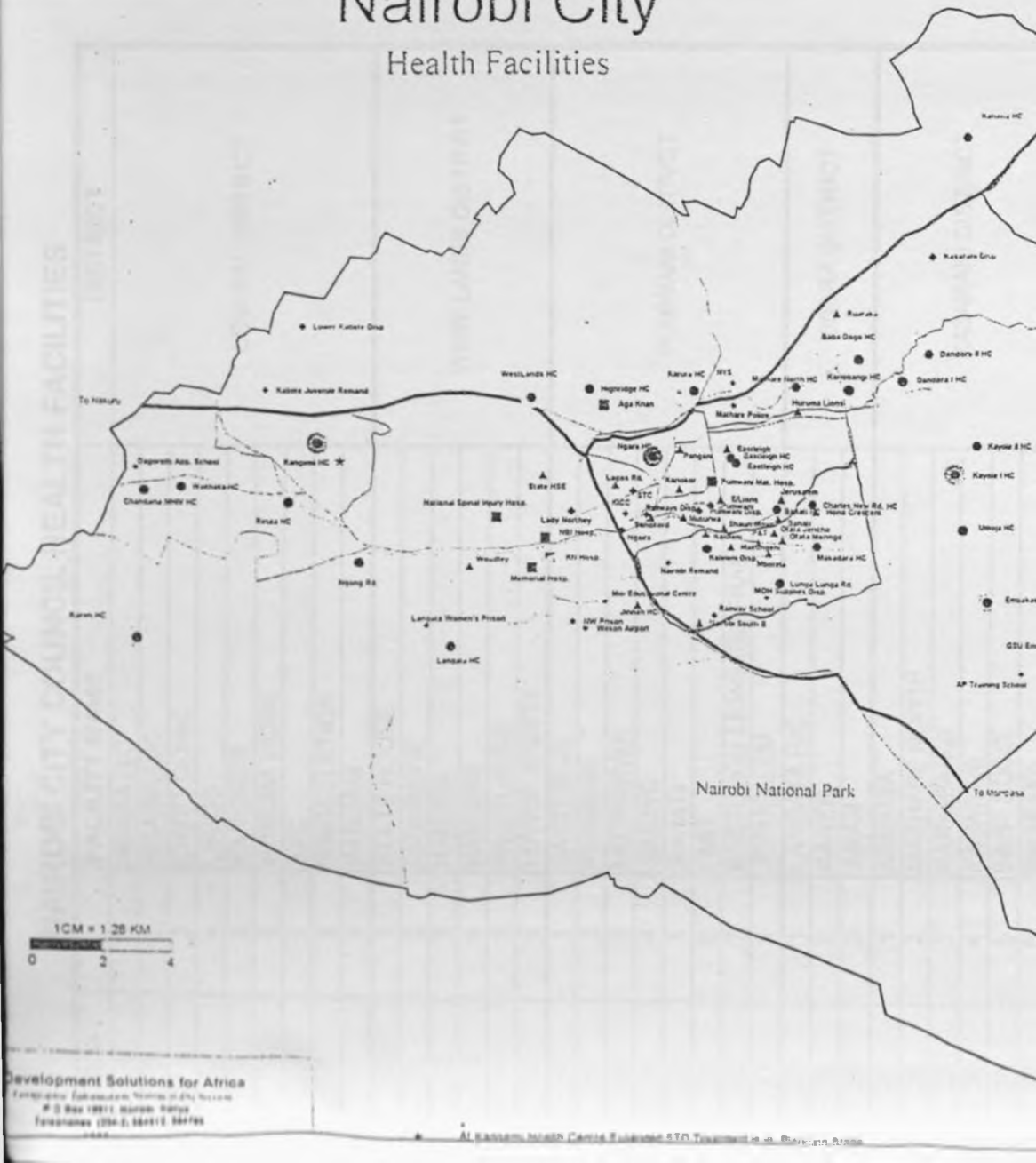
NAIROBI CITY COUNCIL HEALTH FACILITIES
WORKLOAD BY HEALTH FACILITY AND BY MONTHS FOR YEAR 2004

	FACILITY NAME	DISTRICT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1	NGARA H/C	CENTRAL DISTRICT	2,579	2,231	1,474	1,569	2,145	2,433	2,376	2,456	1,752				19,015
2	NGAIRA H/C		3,586	4,458	3,879	3,155	3,950	4,158	4,520	4,266	5,463				37,435
3	CHEST CLINIC		1,216	1,036	1,152	1,157	2,122	1,969	1,921	2,608	2,072	1,851			17,104
4	LAGOS		532	610	542	521	761	526	835	654	432				5,413
5	KARIOKOR		1,051	1,035	991	1,256	1,235	1,325	1,244	1,423	1,256				10,816
6	HURUMA LIONS									102		362			
7	STC		3,307	2,125	3,304	3,060	2,955	3,225	3,630	2,468					24,074
8	INNOCULATION		879	351	558	905	873	1,129	1,499	1,493	1,504	1,215			10,406
9	PANGANI		1,742	1,523	2,105	2,145	1,789	2,745	2,431	2,340	2,724				19,544
10	STATE HOUSE	WEST LANDS DISTRICT	235	250	123	432	324	422	400	398	374				2,958
11	HIGHRIDGE		1,568	1,921	2,036	2,113	2,045	2,998	3,225	2,456	1,866				20,228
12	KARURA		1,263	1,120	1,789	1,489	1,899	2,113	1,766	2,561	1,365				15,365
13	KANGEMI		5,663	6,489	7,562	7,335	6,664	8,900	9,034	8,665	7,855				68,167
14	WEST LANDS		2,045	2,312	2,674	3,215	5,512	4,632	3,889	3,421	2,456				30,156
15	LOWER KABETE		156	356	93	213	222	456	234	186	288				2,204
16	EASTLEIGH	PUMWANI DISTRICT	2,247	2,560	4,112	4,213	3,752	3,522	4,180	3,155	3,645				31,386
17	PUMWANI		3,658	3,265	5,148	4,256	4,322	5,324	5,273	2,893	3,357				37,496
18	MUTHURWA		246	512	648	963	766	625	890	671	721				6,042
19	S/MOYO		312	311	311	561	325	401	464	386	354				3,425
20	BAHATI		2,133	2,254	3,156	2,580	2,612	3,700	1,364	1,632	1,354				20,785
21	PMH														
22	EASTLEIGH LIONS (BIAF														
23	JERUSALEM		1,200	703	1,025	1,524	1,110	1,632	1,267	1,355	1,450				11,266
24	LANGATA H/C	KIBERA DISTRICT	3,512	4,562	5,302	5,244	3,544	3,350	6,427	5,246	4,789				41,976
25	KAREN		4,223	3,562	4,231	4,015	3,489	3,987	4,738	4,661	3,540				36,446
26	JINAH		563	411	452	533	512	423	548	502	487				4,431
27	KAHAWA	KASARANI DISTRICT	5,233	4,231	4,325	4,512	6,231	6,112	6,575	4,236	5,521				46,976
28	MATHARE NORTH		8,334	7,335	7,863	8,552	9,666	7,963	8,756	8,631	7,882				74,982
29	KARIOBANGI		8,635	8,456	9,501	7,888	8,772	8,562	7,120	7,888	8,012				74,834
30	KASARANI		4,221	3,655	5,321	4,231	5,325	4,500	5,762	4,150	4,005				41,170
31	BABA DOGO		3,554	5,200	6,452	6,221	5,003	6,696	6,542	4,115	5,133				48,916
32	RUARAKA		1,722	1,844	2,311	2,103	2,135	1,954	1,478	1,450	2,041				17,038

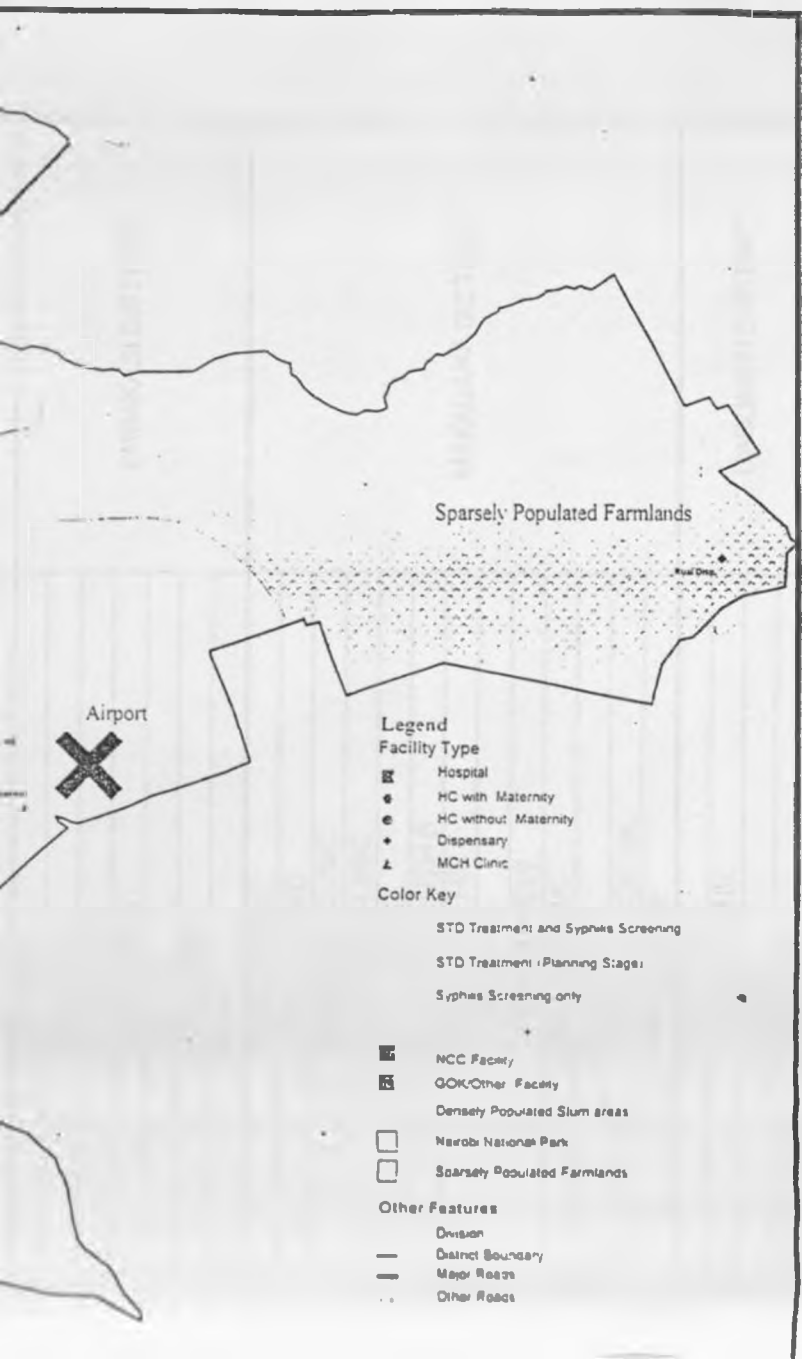
	FACILITY NAME	DISTRICT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
33	KAYOLE I	EMBAKASI DISTRICT	2,566	2,236	2,547	2,456	2,700	2,145	3,331	3,122	3,457				24,560
34	KAYOLE II		423	3,120	3,520	3,891	4,132	2,887	3,987	2,225	5,736				29,921
35	DANDORA I		963	2,785	3,210	2,827	3,155	3,266	4,143	3,705	4,725				28,779
36	DANDORA II		5,661	5,003	6,331	4,560	7,210	4,113	9,787	6,546	6,921				56,132
37	UMOJA		3,556	4,102	3,347	3,125	3,345	3,608	4,061	4,994	2,846				32,984
38	EMBAKASI		2,156	24,602	2,136	2,875	2,894	2,562	3,224	2,954	3,315				46,718
39	RUAI		1,520	936	789	844	999	1,544	1,818	1,412	1,958				11,820
40	HONO CLINIC	MAKADARA DISTRICT	635	720	2,245	1,356	1,563	1,233	783	1,056	1,423				11,014
41	OFAFA CLINIC		321	315	326	569	308	433	563	623	541				3,999
42	MARINGO CLINIC		256	327	766	1,154	296	466	673	721	560				5,219
43	MBOTELA CLINIC		869	3,155	3,001	2,567	1,436	1,274	986	1,487	2,135				16,910
44	P& T CLINIC		251	612	467	266	415	531	653	563	845				4,603
45	NAIROBI SOUTH B		3,221	3,422	3,561	2,987	2,311	3,658	2,980	2,460	3,200				27,800
46	MAKADARA H/C		3,554	3,436	3,555	3,456	2,845	4,138	3,494	5,214	4,489				34,181
47	JERICO H/C		7,654	5,412	4,556	3,115	3,466	5,410	6,743	7,230	6,544				50,130
48	CHARLES NEW														
49	KALOLENI H/C		2,336	2,331	3,421	1,756	1,971	2,553	3,245	3,566	2,435				23,614
50	SANDFORD		1,003	615	546	647	500	617	894	730	786				6,338
51	LUNGA LUNGA H/C		3,564	4,123	4,213	733	2,643	5,079	4,678	4,123	3,556				32,712
52	MAKONGENI		700	456	563	722	662	705	904	725	1,233				6,670
53	WAITHAKA	DAGORETI DISTRICT	2,004	3,975	5,013	3,566	4,566	5,889	6,893	5,036	3,215				40,157
54	NGONG CLINIC		1,869	2,578	1,589	2,456	3,452	452	3,567	2,567	2,436				20,966
55	RIRUTA		3,645	3,589	4,657	6,745	3,115	5,563	4,678	6,678	4,773				43,443
56	WOODLY		1,720	2,349	1,354	1,569	1,755	1,889	1,900	1,780	2,311				16,627
	TOTAL														1,355,351

Nairobi City

Health Facilities



Development Solutions for Africa


Sparsely Populated Farmlands
Airport
Legend
Facility Type
Hospital
HC with Maternity
HC without Maternity
Dispensary
MCH Clinic
Color Key
STD Treatment and Syphilis Screening
STD Treatment (Planning Stage)
Syphilis Screening only
NCC Facility
GOK/Other Facility
Densely Populated Slum areas
Nairobi National Park
Sparsely Populated Farmlands
Other Features
Division
District Boundary
Major Roads
Other Roads

NAIROBI CITY COUNCIL HEALTH FACILITIES

S/N		FACILITY NAME	DISTRICT
1	1	NGARA H/C	CENTRAL DISTRICT
2	2	NGAIRA H/C	
3	3	CHEST CLINIC	
4	4	LAGOS	
5	5	KARIOKOR	
6	6	HURUMA LIONS	
7	7	STC	
8	8	INNOCULATION	
9	9	PANGANI	
10	1	STATE HOUSE	WEST LANDS DISTRICT
11	2	HIGHRIDGE	
12	3	KARURA	
13	4	KANGEMI	
14	5	WESTLANDS	
15	6	LOWER KABETE	
16	1	EASTLEIGH	PUMWANI DISTRICT
17	2	PUMWANI	
18	3	MUTHURWA	
19	4	S/MOYO	
20	5	BAHATI	
21	6	PMH	
22	7	EASTLEIGH LIONS (BIAFRA)	
23	8	JERUSALEM	
24	1	LANGATA H/C	KIBERA DISTRICT
25	2	KAREN	
26	3	JINAH	
27	1	KAHAWA	KASARANI DISTRICT
28	2	MATHARE NORTH	
29	3	KARIOBANGI	
30	4	KASARANI	
31	5	BABA DOGO	
32	6	RUARAKA	
33	1	KAYOLE I	EMBAKASI DISTRICT
34	2	KAYOLE II	
35	3	DANDORA I	
36	4	DANDORA II	
37	5	UMOJA	
38	6	EMBAKASI	
39	7	RUAI	
40	1	HONO CLINIC	MAKADARA DISTRICT
41	2	OFAFA CLINIC	
42	3	MARINGO CLINIC	
43	4	MBOTELA CLINIC	
44	5	P& T CLINIC	
45	6	NAIROBI SOUTH B	
46	7	MAKADARA H/C	
47	8	JERICO H/C	
48	9	CHARLES NEW	
49	10	KALOLENI H/C	
50	11	SANDFORD	
51	12	LUNGA LUNGA H/C	
52	13	MAKONGENI	
53	1	WAITHAKA	DAGORETI DISTRICT
54	2	NGONG CLINIC	
55	3	RIRUTA	
56	4	WOODLY	

CITY COUNCIL OF NAIROBI

MEDICAL OFFICER OF HEALTH
TELEGRAMS: "MUNICIPALITY" NAIROBI
TELEPHONE: 224281 EXT.....

CITY HALL
P.O.BOX 30108
NAIROBI

PUBLIC HEALTH DEPARTMENT

EXT:

M E M O

FROM : MEDICAL OFFICER OF HEALTH

TO : **CATHERINE K. ASHENE**
P.O. BOX 227
BUTERE

REF : PHD/MOH/R.1VOL I/15

DATE : 29th June 2005

RE: PERMISSION TO DO RESEARCH IN NAIROBI CITY COUNCIL HEALTH FACILITIES

I acknowledge receipt of your letter dated 22nd June 2005 on the above issue. Permission is hereby granted for you to carry out your research at Nairobi City Council Health facilities, (Eastlands area). This is upon payment of Ksh. 1200 research fee.

By a copy of this letter, the District Medical officer is requested to accord you the necessary assistance.

DR. D.M. NGUKU
MEDICAL OFFICER OF HEALTH