

**FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN
AGED 0-59 MONTHS ACCOMPANYING INCARCERATED MOTHERS IN
SELECTED WOMEN'S PRISONS IN KENYA**

By

**MAKAU MARY NDANU
(B.ED H/ECONOMICS)
H60/10783/2008**

DEPARTMENT OF FOOD NUTRITION AND DIETETICS

**“A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER
OF SCIENCE (FOOD, NUTRITION AND DIETETICS) IN THE SCHOOL OF
APPLIED HUMAN SCIENCES OF KENYATTA UNIVERSITY”**

JUNE 2013

DECLARATION

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

Signature: _____

Date: _____

Name: Makau N Mary

Registration Number: H60/10783/2008

Supervisors:

We confirm that the work in this thesis was carried out by the candidate under our supervision.

Signature: _____

Date: _____

Sophie Ochola (PhD)

Department of Food Nutrition and Dietetics

Kenyatta University

Signature: _____

Date: _____

Dorcus Mbithe (PhD)

Department of Food Nutrition and Dietetics

Kenyatta University

DEDICATION

To my son Vincent Muuo, my parents Mr. and Mrs David Makau, my sisters, Ndunge, Mwikali and Nzilani and my brother Luke Makau and all my friends for their genuine support.

ACKNOWLEDGEMENT

First I thank God for giving me strength, grace and sustenance during my study. I sincerely thank my supervisors Dr. Sophie Ochola and Dr. Dorcus Mbithe both of Kenyatta University for their professional guidance and tireless efforts to assist me during the course of my study and Dr. Festus Kiplamai for his assistance with data analysis.

My appreciation goes to Ministry of Science and Technology and Commissioner of Prisons in Kenya for granting me permission to carry out research in various prisons. I am indeed grateful to Ministry of Public Health and Sanitation for granting me study leave to pursue my studies.

Sincere gratitude goes to officers in charge of prisons and all the staff and respondents in the prisons where I carried the research; without whom the research could not have succeeded. I am very grateful to my friends for their love, support and encouragement during my study. A lot of thanks to MSc students of the Department of Food Nutrition and Dietetics Kenyatta University, you have been my inspiration.

TABLE OF CONTENTS

DECLARATION.....	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF ABBREVIATIONS AND ACRONYMS	xiv
ABSTRACT.....	xvi
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background information	1
1.2 Statement of the problem	4
1.3 Purpose of the study.....	6
1.4 Objectives of the study.....	6
1.5 Hypotheses.....	7
1.6 Significance of the study.....	7
1.7 Delimitations of the study.....	8
1.8 Limitations of the study	8
1.9 Conceptual Framework.....	8
1.10: Operational Definition of terms.....	10
1.11: Standard Definition of terms.....	10

CHAPTER TWO: LITERATURE REVIEW.....	12
2.1 Introduction.....	12
2.2 Appropriate Feeding Practices Among Children 0-23 months.....	12
2.2.1 Breastfeeding Practices.....	13
2.2.1.1 The Status and Benefits of Exclusive Breastfeeding.....	13
2.2.1.2 The Status of Early Initiation of Breastfeeding.....	15
2.2.1.3 Status and Benefits of Continued Breastfeeding at One Year and Two years or beyond.....	16
2.3 The Status and Benefits of Complementary Feeding Practices.....	18
2.4 Nutritional Status of Children in Relation to Feeding Practices.....	19
2.5 Maternal Demographic and Socio economic Status Characteristics in relation to Child's Nutritional Status.....	21
2.6 Water and Environmental Sanitation in Prison.....	22
2.7 Childhood Morbidity and Maternal Health Seeking Behavior.....	22
2.8 Summary of the Literature.....	23
CHAPTER THREE: METHODOLOGY.....	24
3.1 Research Design.....	24
3.2 Study Location.....	24
3.3 Target Population.....	24
3.3.1 Inclusion Criteria.....	24
3.3.2 Exclusion Criteria.....	25
3.4 Sampling Techniques and Sample Size determination.....	25

3.4.1 Sample Size.....	25
3.4.2 Sampling Procedure	26
3.5 Research Instruments	27
3.6 Pre-testing of Data Collection Tools.....	27
3.6.1 Validity	27
3.6.2 Reliability.....	28
3.7 Data Collection Procedure	28
3.7.1 Researcher Administered Questionnaire.....	28
3.7.2 24 Hour Dietary Intake Recall	30
3.7.3 7-Day Food Frequency Questionnaire	30
3.7.4 Focus Group Discussion	31
3.7.5 Key Informant Interviews	31
3.7.6 Observation Checklists	32
3.8 Study Variables	32
3.9 Data Analysis and Presentation	33
3.10 Logistical and Ethical Considerations	33
CHAPTER FOUR: FINDINGS.....	35
4. 1 Socio- demographic characteristics of the mothers	35
4.1.1 Maternal age.....	35
4.1.2 Marital Status of the Respondents	35
4.1.3 Maternal Education Level.....	35

4.1.2 Duration and Nature of Confinement	36
4.1.2.1 Maternal duration of confinement	36
4.1.2.2 Nature of Confinement	37
4.1.3 Demographic Characteristics of the 0-59 Month's old Children Incarcerated with their Mothers.....	37
4.1.3.1 Children's age and sex	38
4.2 Infant and Young Child Feeding Practices	38
4.2.1 Breastfeeding Practices	38
4.2.1.1 Early Initiation of Breastfeeding.....	39
4.2.1.2 Exclusive Breastfeeding under Six Months.....	40
4.2.1.3 Continued Breastfeeding at 1 Year	40
4.2.2 Complementary Feeding Practices	40
4.2.2.1 Introduction of Solid, Semi-solid or Soft Food	41
4.2.2.2 Minimum dietary diversity	41
4.2.2.3 Minimum Meal Frequency	42
4.2.2.4 Minimum Acceptable Diet.....	42
4.2.2.5 Consumption of Iron Rich Foods.....	43
4.3 Amount of Nutrients and Kilocalories Consumed by Children 6-23 Months old	43
4.3.2 Frequency of Food Consumption by Children 6-23 Months old.....	45
4.4 Morbidity Patterns among Children 0-59 Months old.....	47
4.4.1 Morbidity Prevalence among Children 0-59 Months old	47

4.4.2 Common illnesses among the children	48
4.4.3 Maternal Health Seeking Behaviour	49
4.5 Immunization Coverage	50
Figure 4.1 : Children 12-23 fully immunized	51
4.5.1 Vitamin A Supplementation	51
4.5.2 Deworming	53
4.6 Water Accessibility and Hygiene Practices among Inmates.....	54
4.6.1 Sources of Water, Availability and Adequacy.....	54
4.6.2 Human waste disposal.....	54
4.6.3 Hand washing practices	55
4.7 Nutritional Status of the Children 6-59 Months old	56
4.7.1 Nutritional status of the under-fives by sex	57
4.8 Factors Associated with Nutritional Status of Children	57
4.8.1 Relationship between Meal Frequency and Nutritional Status.....	58
4.8.2 Relationship between Dietary Diversity and Nutritional Status.....	58
4.8.3 Relationship between minimum acceptable diet and nutritional status	59
4.8.4 Relationships between Morbidity and Nutritional Status	60
4.8.5 Relationships between Maternal Socio-Demographics and Nutritional Status	61
CHAPTER FIVE: DISCUSSION.....	63
5.1 Introduction.....	63
5.2 Socio-demographic characteristics of the mothers	63

5.3 Infant and Young Child Feeding Practices	65
5.3.1 Breastfeeding Practices	65
5.3.2 Complementary Feeding Practices	67
5.4 Morbidity and Health Care Practices	69
5.4.1 Morbidity prevalence among children 0-59 months	69
5.4.2 Immunization status	70
5.4.3 Health care practices in prisons in Kenya	70
5.5 Nutritional status of children 6-59 months old in prisons in Kenya	72
5.6 Relationship between nutritional status of children 6-59 months old and other study variables	73
5.6.1 Dietary Practices and nutritional status of the children	73
5.6.2 Morbidity prevalence and nutritional status of children	73
5.6.3 Maternal socio-economic characteristics and nutritional status of the children	74
CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	75
5.1 Introduction.....	75
5.2 Summary and conclusions of the findings	75
5.2.1 Demographic and socio-economic characteristics.....	75
5.2.2 Health status of the children 0-59 months old	76
5.2.3 Infant feeding practices for children 0-23 months old.....	77

5.2.4 The prevalence of malnutrition and associated factors among children 6-59 months of age.....	78
5.3 Recommendations.....	79
5.3.1 Recommendation for practice	79
5.3.2 Recommendations for policy	80
5.4 Suggestions for further research	81
REFERENCES.....	82
APPENDIX 1: INTRODUCTORY NOTE AND INFORMED CONSENT.....	88
APPENDIX 2: DATA COLLECTING TOOLS/INSTRUMENTS.....	89
INSTRUMENT 1: STRUCTURED QUESTIONNAIRE	89
INSTRUMENT 2: FOCUS GROUP DISCUSSION GUIDE.....	98
INSTRUMENT 3: KEY INFORMANT INTERVIEW SCHEDULE	101
INSTRUMENT 4: OBSERVATION CHECKLIST.....	103
APPENDIX 3: RESEARCH BUDGET	104
APPENDIX 4: WORK PLAN.....	105

LIST OF TABLES

Table 4.1: Maternal demographic characteristics in selected prisons.....	35
Table 4.2: Maternal socio-economic characteristics.....	36
Table 4.3: Duration and nature of confinement	37
Table 4.4: Characteristics of the study children.....	38
Table 4.5: Breastfeeding practices for children 0-23 months	39
Table 4.6: Complementary feeding practices for children 6-23 months	41
Table 4.7: Adequacy of kilocalories (Kcal) and consumption of selected nutrients by children 6-23 months old (N=45)	44
Table 4.8: Frequency of Food Consumption by children 6-23 months old based on a - 7 day recall.....	46
Table 4.9: Morbidity pattern among children 0-59 months old and maternal health seeking behaviour	48
Table 4.10: Maternal health seeking behaviour	50
Table 4.11: Distribution of water and sanitation facilities and mothers' hand washing practices	55
Table 4.12: Nutritional status by sex	57
Table 4.13: Meal frequency and nutritional status cross tabulation	58
Table 4.14: Dietary diversity and nutritional status cross tabulation.....	59
Table 4.15: Minimum acceptable and nutritional status relationships cross tabulation	60
Table 4.16: Relationship between morbidity and nutritional status (WFA).....	61
Table 4.17 : Relationship between maternal level of education and nutritional status	62

LIST OF FIGURES

Figure 1.1: Conceptual framework on the causes of malnutrition among children.....	8
Figure 4.1 : Children 12-23 fully immunized	51
Figure 4.2: Vitamin A supplementation coverage in the 6 months prior to the study.	52
Figure 4.3: Distribution (%) of Vitamin A supplementation among children 12-59 months 12 months prior to the study.....	53
Figure 4.4: Deworming coverage in children 24-59 months old.....	53
Figure 4.5: Distribution of under nutrition among children 6-59 months old.....	57

LIST OF ABBREVIATIONS AND ACRONYMS

AED	:	Academy for Educational Development
ARI	:	Acute Respiratory Infections
CAP	:	Chapter
DHS	:	Demographic and Health Survey
ENA	:	Emergency Nutrition Assessment
EBF	:	Exclusive Breast Feeding
FANTA	:	Food Nutrition Technical Assistance
HIV	:	Human Immunodeficiency Virus
HRC	:	Human Rights Commission
IFPRI	:	International Food Policy Research Institute
IBFAN	:	International Baby Food Action Network
IYCF	:	Infant and Young Child Feeding Practices
KDHS	:	Kenya Health Demographic Survey
KNBS	:	Kenya National Bureau of Statistics
MOH	:	Ministry of Health
MOPHS	:	Ministry of public health and sanitation
NASCOP	:	National AIDS/STI Control Programme
RTI	:	Respiratory Tract Infections
SMART	:	Standardized Monitoring & Assessment of Relief & Transitions
SPSS	:	Statistical Package for Social Sciences
SMR	:	Standard Minimum Rules
UNICEF	:	United Nations Children’s Education Fund
USAID	:	United States Agency for International Development
UN	:	United Nations

WHO : World Health Organization

ABSTRACT

Infant and young child feeding practices have substantial consequences for the growth, development, and survival of infants and children. Children should be exclusively breastfed for the first 6 months of life and thereafter continue to breastfeed for 2 years or longer. Children are vulnerable to malnutrition thus nutrition and health status of the confined children is of interest. The purpose of this study was to establish the feeding practices and the nutritional status of children aged 0-59 months incarcerated with their mothers in selected women's prisons in Kenya. A cross-sectional analytical study was conducted on an exhaustive sample of 202 children and 193 mothers, drawn from a sample of eight out of the 35 women prisons in Kenya. Data collection tools included: a structured researcher-administered questionnaire for mothers and children; key informant interview schedules, focus group discussion guides (FGDs) and observation checklist. The questionnaire was used to collect information on feeding practices, anthropometry, morbidity prevalence and health seeking behaviour for the children. The FGDs solicited information on mothers perceptions on the adequacy of health and nutrition services accorded to their children. Quantitative data was analyzed using SPSS for windows version 17.0. Nutritional status data was entered and analyzed in ENA for SMART (2008) software and interpreted using the WHO Standards (2006). Data on dietary intake was first entered and analyzed using Nutri-Survey software, after which it was exported to SPSS for cross-analysis with nutritional status. Exclusive breastfeeding rate was 69.4% and continued breastfeeding at 1 year (88.5%) and at 2 years (52.2 %). For complementary feeding practices, the mean Dietary Diversity Score (DDS) was 3.52 ± 1.04 foods groups out of 7 groups with 53.3% having attained the minimum DDS and 86.5% of breastfed children having attained the minimum frequency meal consumption. About half of the children (48.6%) attained the minimum acceptable diet. A large percentage (76.9%) of the children suffered from upper respiratory infection and 21.3% from diarrhoea. In terms of nutritional status, 21.4% of the children were stunted, 3.8% wasted and 7.5% were underweight. Dietary practices were associated with underweight; children who had attained the minimum meal frequency were more likely to be underweight ($p=0.030$); those who had not attained the minimum dietary diversity were more likely to be underweight ($p=0.012$); and those who did not attain the minimum acceptable diet were more likely to be underweight ($p=0.014$). Children who had been ill based on a two-week recall were also more likely to be underweight ($p=0.012$). The children of mothers with higher educational status tended to be more wasted ($p=0.019$) and also underweight ($p=0.020$). Educational level of the mother did not therefore positively influence the nutritional status of their children in such an environment. Feeding practices significantly influenced nutritional status among children accompanying incarcerated mothers in prisons in Kenya. The government and other stakeholders should formulate policies that govern the health care and feeding practices of children incarcerated with their mothers in prisons. Similar research should be replicated especially to determine the micro-nutrient status of the children.

CHAPTER ONE: INTRODUCTION

1.1 Background information

In many countries, in all regions, the female prison population has increased dramatically over the last ten years. Brazil has seen more than 100% increase in women prison population (Bastick & Townhead, 2008). In Kenya female prison population has increased by 100% compared to 24% male prison population. The vast majority of detained and imprisoned women are mothers, and often the sole or main caretaker of minor children (Bastick, 2005). Children of imprisoned women can be categorized into two: those who are separated from their mothers while she is imprisoned, and those who go into prison with their mothers (Alejos, 2005). Internationally it is not uncommon for a child to spend some of his or her childhood in prison during the parent's prison sentence (Poso *et al.*, 2010). In Kenya, 4,053 and 3,348 children under the age of 4 years spent some time in prisons in the year 2005 and 2009 respectively (Kenya Prisons Service, 2005; 2009).

Under Cambodian law for example, children are allowed to stay with their mothers in prison until the age of six. In cases where alternative care is not available, this age limit is nevertheless flexible and some children beyond the age of six do live with their detained mothers (Comité International de l'Ordre de Malte, 2008). In Cambodia, the daily budget per prisoner amounts to Riels 1,500 (about USD 0.35) and no budget is foreseen for accompanying children or for pregnant women whose child will be born in prison (CIOMAL, 2008). In Germany, where the prison system is more open and professionals stress the importance of mothers personally caring for their children for as long as possible, children up to three, four or six years old can live in prison with their mothers

(Robertson, 2008). In the UK, the upper limit for children living in prison is 18 months (Robertson, 2008).

The Kenya Prisons Act section 30(4) states; *The infant child of a female prisoner may be received into prison with its mother and may be supplied with clothing and necessaries at public expense: Provided that such child shall only be permitted to remain in prison until it attains the age of four years or until arrangements for its proper care outside prison are concluded, whichever shall be the earlier* (Republic of Kenya, 2009). This act does not give any special treatment to nursing mothers or any considerations regarding child feeding subjecting both the mother and child to various forms of malnutrition (Republic of Kenya, 2009).

Global attempts have been made to improve the plight of children living in prisons for example; The draft on United Nations minimum rules for the treatment of women prisoners and non-custodial measures for women offenders (2009) Rule 48 states: *Pregnant or nursing women prisoners shall receive advice on their diet under a programme to be drawn up and monitored by a qualified health practitioner. Appropriate food must be provided for babies, children and breast-feeding mothers, free of charge* (Republic of Kenya, 2009). The extent to which this rule applies in Kenya is of concern.

Children who accompany their mothers to prison have committed no crime and therefore should not suffer as if they had. Facilities in prison should always include good nutrition, decent playing areas and, where appropriate, kindergarten facilities. The best interests of the children should be the primary consideration at all times (Robertson, 2008). Studies on infant and child feeding have indicated that inappropriate feeding practices can have

profound consequences on growth, development and survival of infants and children, particularly in developing countries (Mamiro *et al.*, 2005; Bloss, Wainaina & Bailey, 2004). Children with poor growth have high rates of morbidity and mortality (Bryce *et al.*, 2005; Caulfield *et al.*, 2004) and can suffer motor and mental development delay (Gregor *et al.*, 2007; Walker *et al.*, 2007).

Globally, 26% of children under the age of five years are stunted, 16% underweight and 8% wasted while in Sub-Saharan Africa the prevalence of the three forms of malnutrition is stunting 40% underweight 21% and wasting is at 9% (UNICEF & WHO, 2011). High prevalence levels of stunting among children under five years of age in Africa (36% in 2011) and Asia (27% in 2011) remain a public health problem, one which often goes unrecognized (UNICEF & WHO, 2011). In sub-Saharan Africa, malnutrition in all its forms amounts to an intolerable burden not only on the health systems, but the entire socio-cultural and economic fabric of the society and is the greatest obstacle to the fulfillment of human potentials (Aliyu *et al.*, 2012). Although the prevalence of stunting and underweight among children under five years of age worldwide have decreased since 1990, overall progress is insufficient and millions of children remain at risk (UNICEF & WHO, 2011).

The Kenya National Bureau of Statistics and ICF Macro Survey (2010) reported that; 35% of children below the age of five years in Kenya are stunted, 7% wasted and 16% underweight based on WHO 2006 reference growth standards. A study by Omukhweso (2007) in the prisons in Kenya established the prevalence of wasting to be 8.9%, underweight 14.1% while stunting was 18.8% among children 0-59 months.

Nutrition has a great impact in a child's life and feeding practices have a direct impact on the nutritional status and the well-being of a child (Malla & Shrestha, 2004). Conditions in Kenyan prisons have been decried on various fronts. Food shortages, lack of access to clean safe drinking water, inadequate clothing for children, and overcrowding among others have been cited as some of the prevailing poor conditions (Amnesty International, 2005). This puts children living under such conditions vulnerable to malnutrition if appropriate feeding and healthcare practices are not put in place.

The World Health Organization (WHO) classifies children in prison among children in difficult circumstances. The statement on feeding children in exceptionally difficult circumstances states; *Families and children in difficult circumstances require special attention and practical support. Wherever possible, mothers and babies should remain together and be provided with the support they need to exercise the most appropriate feeding option available. Breastfeeding remains the preferred mode of infant feeding in almost all difficult situations* (WHO, 2010).

1.2 Statement of the problem

Kenya has on average about 300 children between 0-59 months old living with incarcerated mothers in the 35 women prison country world. Information on the status of feeding practices has not yet been established despite international agencies classifying these children as being under difficult circumstances (WHO, 2010). Adequate information regarding the nutritional status of children accompanying their mothers in prisons in Kenya is also scanty.

The Kenya prisons act section 30(4) does not give details on how children should be treated in regard to food, medical care, and maternal care among other needs (UN, 1957; 1977). Rule 49(1) Of the Act state; “*Subject to the provisions of section 35 of the Act, every Prisoner shall be entitled to a sufficient quantity of plain wholesome food, in accordance with prisoner’s diet in the First Schedule*” (Republic of Kenya, 2009). Section 35 of the Act stipulates how an inmate can access food during incarceration period. The Act does not cover infant and young children incarcerated with their mothers in regard to food, medical care, growth monitoring and other necessities. There is no food budget for children accompanying mothers to prison (Key informant interviews in prisons in Kenya, June/July 2011).

Reports released by various human rights lobby groups indicate that children accompanying a mother in prisons are hardly served with wholesome meals as stipulated in the *First Schedule* (Republic of Kenya, 2009). There are frequent reports of food shortage, congestion, lack of clean water, inadequate clothing, and poor sanitation across all the prisons in Kenya (Kenya Human Rights Commission, 1996). Under such circumstances, children are likely to be faced with high cases of malnutrition and morbidity compromising their growth and development (UNICEF, 1998).

Children accompanying a mother to prison have limited access to well-baby clinic services available to children for free living mothers. Failure to carry out regular growth monitoring could lead to delayed detection in growth failure and subsequent intervention. Accelerated feeding during illness is not practiced. It is therefore imperative to

investigate the feeding practices and nutritional status of children incarcerated with their in prisons.

1.3 Purpose of the study

This study sought to establish the feeding practices and nutritional status of children 0-59 months old, living with incarcerated mothers in women's prisons in Kenya.

1.4 Objectives of the study

The study was guided by the following specific objectives:

1. To establish the socio-demographic characteristics of mothers with children in women prisons in Kenya
2. To establish the breastfeeding practices for children 0-23 months of age in selected women's prisons in Kenya.
3. To determine the status of complementary feeding practices for children 6-23 months of age in the selected women's prisons in Kenya.
4. To establish the morbidity prevalence of children 0-59 months of age and the maternal health seeking behavior among women in selected women prisons in Kenya.
5. To determine the nutritional status of children 6-59 months of age of incarcerated mothers in selected women prisons in Kenya.
6. To establish the relationship between feeding practices and nutritional status of children accompanying incarcerated mothers in selected women prisons in Kenya.
7. To establish the relationship between morbidity prevalence and the nutritional status of children accompanying incarcerated mother in selected women prisons in Kenya.

8. To establish the relationship between maternal socio- economic and demographic characteristics and the nutritional status of their children among women in prisons in Kenya.

1.5 Hypotheses

H₀₁ There is no significant relationship between feeding practices and the nutritional status among children living with incarcerated mothers in selected women's prisons in Kenya.

H₀₂: There is no significant relationship between morbidity prevalence and nutritional status among children living with incarcerated mother in selected women's prisons in Kenya.

H₀₃: There is no significant relationship between maternal socio-demographic characteristics and nutritional status among children living with incarcerated mothers in selected women's prisons in Kenya.

1.6 Significance of the study

The findings of this study may be beneficial to stakeholders such as the Ministry of Home Affairs, The Kenya Human Rights docket, the Ministry of Public Health and Sanitation department of Nutrition and UNICEF. The results provide a basis for challenging the Prisons Act on neglecting the health and nutrition situation of children living with their incarcerated mothers in Kenya prisons. The findings are a useful tool for resource mobilization in support of children accompanying their mothers in prisons in Kenya. The results make a significant contribution to the existing knowledge and

research efforts on child feeding practices and nutritional status of children living in difficult circumstances.

1.7 Delimitations of the study

The study covered children whose mothers were incarcerated in eight out of the 35 women prisons in Kenya.

1.8 Limitations of the study

The results of this study can be generalized only to children of the same age living in similar conditions in Kenya or elsewhere in developing countries. The findings of the focus group discussions were affected by the presence of prison wardens during the discussions as the prisoners were guarded at all times.

1.9 Conceptual Framework

The interplay between the two most significant immediate causes of malnutrition, inadequate dietary intake and illness tends to create a vicious circle: A malnourished child, whose resistance to illness is compromised, is likely to fall ill worsening malnutrition. Prevailing conditions in Kenyan prisons predispose children to increased prevalence of malnutrition and infectious diseases like diarrhoea, coughs and colds. Infections cause loss of appetite, mal-absorption and metabolic and behavioral changes. These infections, in turn, increase the body's requirements for nutrients, which further affect young children's eating patterns and how they are cared for. Unavailability of safe and nutritious foods in prison set up and access to safe water are likely to lead to increase levels of malnutrition among children.

Maternal level of education, marital status, economic activity before incarceration, nature of stay while in prison and years incarcerated were assessed to evaluate their effect on nutritional status outcome as basic determinants of malnutrition in children. Also, access to safe drinking water, health care availability and environmental safety in prison set up were assessed to evaluate their impact on nutritional status of children 0-59 months incarcerated within selected prisons in Kenya. The framework's immediate, basic and underlying causes were tested to determine their influence on nutritional status of the study children.

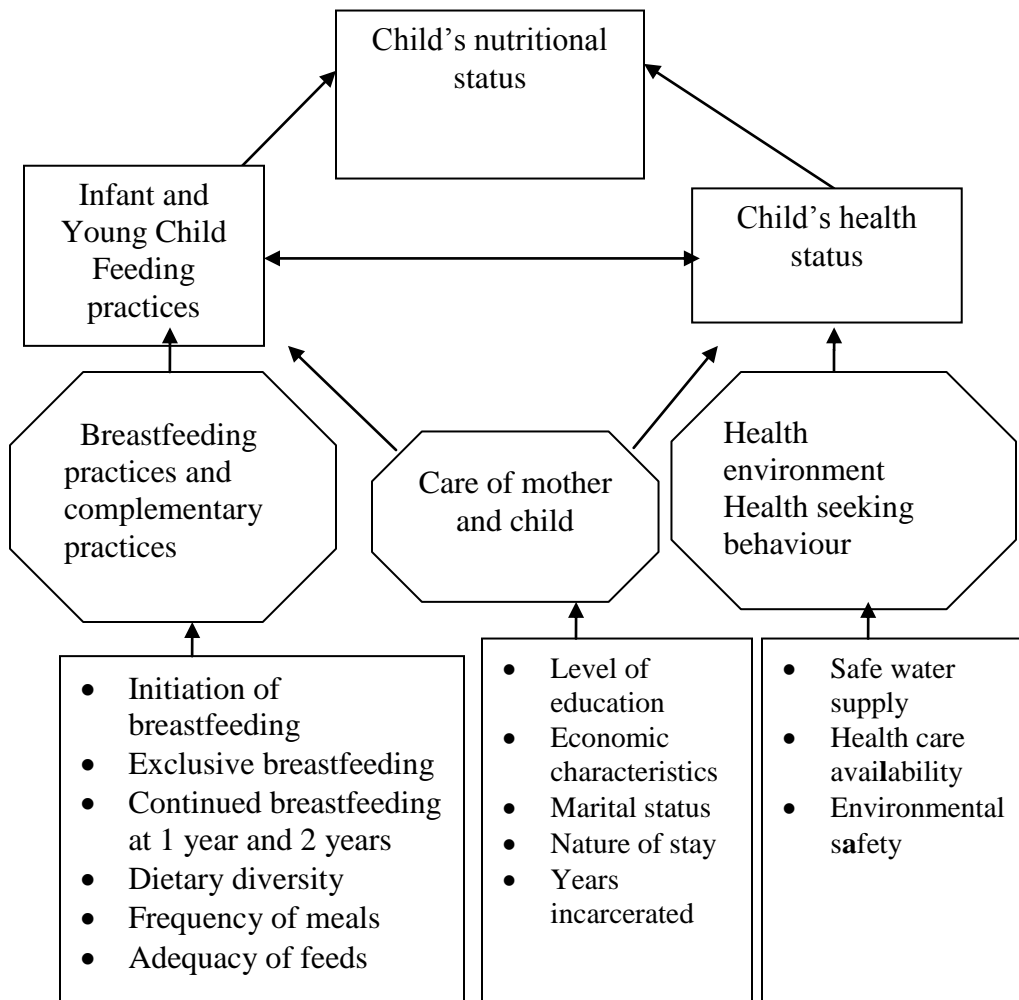


Figure 1.1: Adapted from: UNICEF & Engle *et al.*, (1990, 1998, and 1999). Conceptual framework on the causes of malnutrition among children

1.10: Operational Definition of terms

Complementary feeding: This refers to the provision of semi- solid and solid foods to children from 6 months of age in addition to breast milk to meet their daily nutrient requirements.

Incarcerated mothers: These refer to mothers who are confined in correctional institutions in Kenya whether convicted or awaiting trial or conviction.

Nutritional status: This refers to the anthropometric status for children, weight for age, weight for height and height for age indices.

1.11: Standard Definition of terms

Acceptable meal frequency: Refers to the proportion of children 6-23 months old who met the recommended meal frequency; 2 times for breastfed children 6-8 months old, 3 times for breastfed children 9-23 months old and 4 times for non-breastfed children 6-23 months old based on a 24 hour recall.

Exclusive breastfeeding: Refers to feeding a child below six months with breast milk only, be it directly from breast or expressed, with no addition of any liquid or solids apart from drops or syrups consisting of vitamins, mineral supplements or medicine, and nothing else 24 hours preceding the study (WHO/UNICEF, 2010).

Feeding practices: These refer to practices (both breastfeeding and complementary feeding) in feeding infants and young children based on WHO/UNICEF recommendations (WHO/UNICEF, 2011).

Minimum dietary diversity: Refers to the proportion of children 6-23 months old who received food from 4 or more food groups based on a 24 hours recall period.

Minimum acceptable diet: Refers to the proportions of children who met the recommended minimum dietary diversity and meal frequency of based on a 24 hours recall period (WHO/UNICEF, 2010).

Stunting: The relationship between observed height to the expected height for the specific age and sex of the child (H/A).

Underweight: The relationship between observed weight to the expected weight for the specific age and sex of the child (W/A).

Wasting: This phrase refers to the relationship between body mass and body stature of the child (W/H).

Z-scores: Measure of the degree of dispersion of the series of observations (H/A, W/A, W/H) with reference to the median of the series.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The first two years of life are critical stages for a child's growth and development. Any damage caused by nutritional deficiencies during this period could lead to impaired cognitive development, compromised educational achievement and low economic productivity (Victoria *et al*; 2008 & Grantham *et al*; 2007). Poor breastfeeding and complementary feeding practices, together with high rates of morbidity from infectious diseases are the prime proximate causes of malnutrition in the first two years of life (Murage *et al*, 2011).

2.2 Appropriate Feeding Practices Among Children 0-23 months

Child feeding practices are multidimensional and they change rapidly within short age-intervals in the first years of life. Unlike exclusive breastfeeding, which can be summarized in a single indicator, the measurement of feeding practices in children aged 6 months and older involves assessing various dimensions of feeding simultaneously. These dimensions include continued breastfeeding, appropriate timing of introduction of complementary foods, and optimum quantity and quality of the foods consumed (WHO/ UNICEF/ USAID, 2010).

Appropriate feeding practices are essential for the nutrition, growth, development and survival of infants and young children, (Kumar *et al.*, 2007.) Results of studies on infant and child feeding have indicated that inappropriate feeding practices can have profound consequences for the growth, development, and survival of infants and children, particularly in developing countries (Mamiro *et al.*, 2005; Bloss, Wainaina & Bailey,

2004). The most recent estimates of the global burden of malnutrition in under 5 children are that 178 million (one-third of all children) are stunted, 112 million are underweight, 55 million are wasted (19 million having severe acute malnutrition) and 13 million children are born each year with intrauterine growth retardation (Ramji, 2009).

2.2.1 Breastfeeding Practices

The WHO and the UNICEF recommend that all mothers should breastfeed their children exclusively for the first 6 months and thereafter they should continue to breastfeed for 2 years or longer (UNICEF, 2011). Breastfeeding alone with no water provides the ideal nourishment for infants for the first six months of life as it provides all the nutrients, antibodies, hormones, immune factors and antioxidants an infant needs to thrive. It protects babies from diarrhoea and acute respiratory infections and stimulates their immune systems (WHO/UNICEF, 2003).

The indicators of appropriate breastfeeding practices include: early initiation of breastfeeding, exclusive breastfeeding for children under six months and continued breastfeeding at 1 year and for 2 years or beyond (UNICEF, 2011).

2.2.1.1 The Status and Benefits of Exclusive Breastfeeding

For almost all infants, breastfeeding remains the simplest, healthiest and least expensive feeding method that fulfils the infants' nutrition needs (Oche, 2011). The numerous benefits of breast-feeding are of public health relevance for developing countries as well as for industrialized nations. Exclusive breastfeeding, which is giving breast milk only and no other liquids, except drops or syrups with vitamins, mineral supplements or

medicines, is superior to non-exclusive breastfeeding with a protective effect against both morbidity and mortality (Kramar & Kakuma, 2004).

Currently, exclusive breastfeeding for the first 6 months of life is recommended under Global Infant and Young Child Feeding Practices (Chudasama *et al.*, 2009). Worldwide, only 37% of children between birth and their sixth month are breastfed exclusively (UNICEF, 2010). In Kenya, 32% of infants 0-6 months are exclusively breastfed (KNBS & ICF Macro, 2010) compared to 13% in 2003 (KDHS, 2003). Scientific evidence indicates that infants not exclusively breastfed are at increased risk of death from diarrhoea, pneumonia and neonatal sepsis (Jones *et al.*, 2003).

A study carried out in Casa di reclusione di Roma Rebibbia, the main prison of Rome, on health status of 150 children in prison found that, 70% of mothers breastfed their children (Senanayake *et al.*, 2009). A prospective observational study carried out in Welikata prison, Colombia, Sri Lanka, established that 70% of children accompanying imprisoned mothers were breastfed (Senanayake *et al.*, 2009). However exclusive breastfeeding status was not established in these studies. Mothers serving prison sentences may not have adequate time to breastfeed their children on demand and exclusively owing to the fact that most of the time the mother is separated from the child (Bastick & Townhead, 2008).

Exclusive breast-feeding provides low cost and complete nutrition for the infant. It protects him/ her against infections including infant diarrhoea and prolongs lactation amenorrhoea, thereby increasing birth spacing (Oche, 2011). Exclusive breastfeeding status in prisons is therefore an issue of concern due to paucity of data.

2.2.1.2 The Status of Early Initiation of Breastfeeding

The (WHO) and UNICEF recommend initiation of breastfeeding within the first hour after birth (WHO/UNICEF, 2003). Early mother-infant bonding induces a series of changes in the brain cells with the release of chemical neurotransmitters triggering the hormones of lactation. The subsequent rise in prolactin hormone causes a state of tranquillity in the mother and enables her to sustain the stress of childcare and the additional burden of transition to parental role (Abdul *et al.*, 2005). This is an important factor to imprisoned mothers as a way of reducing mental stress associated with incarceration.

Early initiation of exclusive breastfeeding serves as the starting point for a continuum of care for mother and newborn that can have long-lasting effects on health and development (WHO, 2010). Despite these recommendations, only 39 percent of newborns in the developing world are put to the breast within one hour of birth (UNICEF, 2009).

In Kenya, according to the Kenya Demographic Health (KDHS) early initiation of breastfeeding is also practiced among the general population; 58 percent of children are breastfed within one hour of birth and 86 percent within one day after delivery (KNBS & ICF Macro, 2010). A study by Muchina and Waithaka (2010) among children 0-24 months in Nairobi, established that, 75% of mothers initiated breastfeeding within one hour of birth. Studies carried out in rural Ghana and Southern Nepal found out that, initiation of breastfeeding after the first 24 hours was associated with a 2.4-fold increased risk of mortality in Ghana and a 1.4-fold increased risk in Nepal when compared to

initiation before 24 hours (WHO *et al.*, 2010). There is scarcity of information on early initiation among children accompanying incarcerated mothers in prisons in Kenya.

With the poor conditions of sanitation cited in the Kenyan prisons, it is necessary to support mothers who deliver while incarcerated to be able to initiate breastfeeding within 1 hour to reduce chances of infant morbidity and possible mortality. Beginning breastfeeding immediately after birth ensures that the newborn receives the “first milk” (colostrum), the baby’s first “immunization”. Colostrum protects the newborn from illness by providing a number of immune factors, as well as anti-microbial and anti-inflammatory agents (WHO *et al.*, 2010).

The International Baby Food Action Network Geneva (2011) made a recommendation to address the plight of pregnant women in prison that: *Pregnant imprisoned women should be able to access assisted births like non incarcerated women, including immediate skin-to-skin and early initiation of breastfeeding (within one hour from birth)*. The WHO classifies children in prison as children in difficult circumstances where breastfeeding remains the preferred mode of infant feeding in almost all difficult situations (WHO, 2010).

2.2.1.3 Status and Benefits of Continued Breastfeeding at One Year and Two years or beyond

The first two years of life are critical stages for a child's growth and development. Any damage caused by nutritional deficiencies during this period could lead to impaired cognitive development, compromised educational achievement and low economic productivity (Victoria *et al.*, 2008; Mc-Gregor *et al.*, 2007). Poor breastfeeding and

complementary feeding practices, together with high rates of morbidity from infectious diseases are the prime proximate causes of malnutrition in the first two years of life. Breastfeeding confers both short-term and long-term benefits to the child. It reduces infections and mortality among infants, improves mental and motor development, and protects against obesity and metabolic diseases later in the life course (Murage *et al.*, 2011).

Based on the KNBS and ICF Macro (2010) findings, the median duration of breastfeeding among the general population in Kenya was 21 months. Continued breastfeeding at 1 year was 92% in (2003), while continued breastfeeding at 2 years or beyond was 57% (World Health Statistics, 2010). Breast milk supplies higher quality nutrients and protective factors than complementary foods. It is therefore recommended that breastfeeding on demand continues with adequate complementary feeding up to 2 years or beyond (WHO/UNICEF/USAID, 2008).

A study carried out in urban informal settlements in Nairobi on patterns and determinants of breastfeeding and complementary feeding established that, 85% of children are still breastfed at 1 year (Murage *et al.*, 2011). It is important for mothers in prison to be supported in order to continue breastfeeding their children to fill in the nutrients gaps. There is paucity of data on continued breastfeeding at 1 year and two years or beyond in prisons in Kenya.

Optimal duration of breastfeeding should be an important element in deciding on policies which stipulate how long the child should be living with their mother while in prison. Whenever the general environment in the prison would not result in the infringement of

the other child's rights, he/she should be allowed to stay with the mother to allow for 6 months exclusive and 24 months continued breastfeeding (IBFAN, 2011).

2.3 The Status and Benefits of Complementary Feeding Practices

The WHO recommends exclusive breastfeeding for the first six months of life with early initiation and continuation of breastfeeding for two years or more. It also recommends nutritionally-adequate, safe, age-appropriate complementary feeding starting at six months (WHO, 2003). From six months onwards, when breast milk alone is no longer sufficient to meet all nutritional requirements, infants enter a particularly vulnerable period of complementary feeding during which they make a gradual transition to eating family foods (Bhan, 2010).

Inappropriate timing of introduction of complementary foods deprives the infant of optimum nutrition, leading to under-nutrition, and increased mortality and morbidity (Hazir *et al.*, 2011). According to the new WHO indicators, the timeliness is assessed by whether infants aged 6 to 8 months are receiving solid, semi-solid or soft food irrespective of being breastfed or not (WHO *et al.*, 2010). The KNBS and ICF Macro (2010) show that 84.9% of infants 6-8 months are introduced to solids, semi-solids or soft foods in accordance with WHO recommendations compared to 81% in 2003 (KNBS & ICF Macro, 2003).

The WHO recommended meal frequency is, initially 2-3 times a day for infants between 6-8 months old, increasing to 3-4 times daily between 9-11 months old and 12-23 months old with additional nutritious snacks offered 1-2 times per day, as desired (WHO, 2010). Studies in Malawi have revealed that children who are given foods according to the

timing set by the WHO are well-nourished as compared with children who were introduced to solids too early (Matthew *et al.*, 2009). In Kenya, children 6-23 months old meeting the recommended minimum meal frequency was 58% in 2003 and 67% in 2008-09 (KNBS & ICF Macro 2010; 2003).

In achieving dietary diversity, meals should include adequate quantities of meat, poultry, fish or eggs, as well as vitamin A-rich fruits and vegetables every day. A minimum of 4 out of the seven food groups is viewed as sufficient to meet the child's nutritional requirements. In Kenya 58% of children 6-23 months old meet the recommended dietary diversity, (KNBS & ICF Macro, 2010) compared to 45% in 2003 (KDHS, 2003). Where this is not possible, the use of fortified complementary foods and vitamin mineral supplements may be necessary to ensure adequacy of particular nutrient intakes (Bhan, 2010). In order to guarantee satisfaction of the child's nutritional needs, complementary foods must be: timely, adequate and innocuous. The food must also be offered with a technique, with the frequency and consistency that are adequate for the age, and must attend to the child's feelings of hunger and satiety (Parada, Carvalhae & Jamas, 2007).

The minimum acceptable diet in Kenya for breastfed children is 44% (KNBS & ICF Macro, 2010) compared to 30% in 2003. The Infant and Young Child Feeding (IYCF) indicators in Kenya show an improvement in recent years. There is paucity of data on the status of complementary feeding in prisons in Kenya.

2.4 Nutritional Status of Children in Relation to Feeding Practices

Nutrition has a great impact in a child's life and feeding practices have a direct impact on the nutritional status and well-being of a child (Malla & Shrestha, 2004). In Sub-Saharan

Africa, the prevalence of malnutrition among the group of under-fives is estimated at 41% (WHO, 2010). In Kenya, an unacceptably high number of children, 1.8million are classified as chronically undernourished (Ministry of Public Health & Sanitation, 2010). Chronic and acute malnutrition are prevalent, particularly among the rural populations and the urban poor (MOPHS, 2010). In Kenya, trends over the past 15 years have shown no significant change in the nutritional status of children less than five years of age (MOPHS, 2010).

In 1998, 33% of children under-five years were stunted, 22% underweight and 6% were severely malnourished (KDHS, 1998). As per Kenya Demographic and Health Survey (2003) 30% were stunted, 20% underweight and 6% severely malnourished. In the current KNBS and ICF Macro (2010), 35% of children under -five years were stunted, 16% underweight and 7% wasted.

However, six sub-Saharan countries in Africa have shown reductions in stunting among children less than 3 years over the past two decades in Demographic and Health Surveys. The six countries are Senegal, Namibia, Togo, Uganda, Eritrea, and Tanzania. Senegal has had the most dramatic reduction in stunting, from 22 percent in 1993 to only 14 percent in 2005. Other three countries (Botswana, Gabon, and Gambia) do not have DHS trend data, but the WHO and UNICEF indicates they already have low or moderate levels of stunting (WHO, 2008).

A study by Anganwari (2007) on association between feeding practices and under-nutrition in areas of urban Allahabad established that; delayed initiation of breast-feeding, deprivation from colostrum, and improper complementary feeding are significant risk

factors for under-nutrition among under-fives, (Kumar *et al.*, 2007). Appropriate feeding is therefore an area of concern among children incarcerated within various prisons not only in Kenya but internationally. This is due to its significant impact on nutritional status. Nutritional status information available for incarcerated children in Kenya is; wasting 8.9%, underweight 14.1% with stunting being 18.8% (Omukhweso, 2007)

2.5 Maternal Demographic and Socio economic Status Characteristics in relation to Child's Nutritional Status

A study in Nigeria in Kaduna and Kano states among pre-school children inversely associated maternal level of education with nutritional status outcome (Ojiako *et al.*, 2009). Analysis of Cambodia Demographic and Health Survey for 2005, also found out that the prevalence of stunting and wasting decreased significantly with high levels of maternal education (Zhang *et al.*, 2010; Miller & Rodgers, 2009).

In the KNBS and ICF Macro (2010), stunting was least common among children of more educated mothers and those from wealthier families. Maternal nutrition knowledge and marital status contribute significantly to the nutritional status outcome in children. Women who receive minimal education are generally more aware than those who have no education on how to utilize available resources for the improvement of their own nutritional status and that of their families (Wamani *et al.*, 2005).

From the information available, it appears that women prisoners across the globe have one thing in common – *a background of social disadvantage*. Whatever the country or continent, the women found in prison are predominantly those at the most impoverished end of the social spectrum, who have led a life of social exclusion and abuse (Taylor,

2004). In Brazil, 8% of imprisoned women attended school only until age 14 (Howard, 2003). In Mexico, 6.11% of women prisoners are illiterate, compared to 2.37% of male prisoners (Maya, 2004). In the United States of America, the majority come from poor minority communities. They have few educational or vocational skills and are mostly young mothers with personal histories of substance abuse and unemployment (Owen, 2003). Children belonging to imprisoned mothers are therefore more likely to have compromised health status way before entering the prison making them more vulnerable to harsh prison conditions.

2.6 Water and Environmental Sanitation in Prison

Inadequate water and sanitation increase the risk of diarrhoea, which affects nearly 30% of children 6-11 months (KNBS & ICF Micro, 2010). According to Rules 12, 13 and 14 (Sanitation, hygiene and clothing) of SMR (UN, 1977) there should be adequate facilities to enable the prisoners to comply with the needs of nature in clean and decent manner. There should be also a provision of bathing or shower facilities. Many Kenyan prisons experience lack of running tap water for years (Bureau of Democracy, Human Rights and Labor, 2003). This is likely to negatively influence child feeding practices and consequently the nutritional status.

2.7 Childhood Morbidity and Maternal Health Seeking Behavior

Childhood diarrhoeal diseases and acute lower respiratory infections are two of the leading causes of the world's burden of disease (Manesh *et al.*, 2008). According to KNBS and ICF Macro (2010) based on a two-week recall, 8% of children under five had symptoms of acute respiratory infection (ARI). Of these, 56% received treatment at a

health facility or from a health provider. Twenty four percent of children had a fever in the two weeks before survey, of these children, about half received treatment. Nearly a twentieth (17%) of Kenyan children under five had diarrhoea. The rate was highest (30%) among children 6–11 months old. Almost half of children with diarrhea were taken to a health provider.

With the poor conditions in the prisons, children are at an increased risk of diarrhea and ARI. Overcrowding adversely affects the health of prisoners and the overall conditions of prisons including hygiene and the quality of food (Bastick, 2008). There is paucity of data on prevalence of morbidity and health care services available to incarcerated children.

2.8 Summary of the Literature

The conditions in Kenyan prisons such as overcrowding, poor sanitation, contaminated water, inadequate food and hygiene put children living with incarcerated mothers at an increased risk to malnutrition, morbidity and mortality. The paucity of data regarding the feeding practices and nutritional status of these children is a hindrance to advocacy of influence policy makers in coming up with policies that govern how the children should be treated regarding nutrition and health care. Improving infant and young child feeding practices for children aged 0–23 months is therefore, critical for improved nutrition, health and development of children (WHO/ UNICEF/ USAID, 2010).

CHAPTER THREE: METHODOLOGY

3.1 Research Design

A cross-sectional analytical study (Katzenellenbogen *et al.*, 2002) was undertaken in order to ascertain and describe the characteristics of the variables of interest in the study. This design was used because it provided a snapshot of the frequency and the characteristics of the status of study population at a particular point in time.

3.2 Study Location

The study was undertaken during the months of June and July 2011 in Lang'ata, Nakuru, Eldoret, Kakamega, Kisii, Kericho, Meru and Nyeri Kenyan women's prisons. Each of the prisons visited was headed by a Chief Officer I, Chief Officer II or a superintendent. The officers had served for long and were conversant with the operations in the prison service. The conditions in the prisons were similar in reference to child feeding practices, living conditions, water and sanitation.

3.3 Target Population

This study targeted children aged 0-59 months. The mothers of these children who were incarcerated at the time of study in the selected 8 women prisons in Kenya were the respondents. All the children 0-59 months who met the inclusion criteria were included in the study.

3.3.1 Inclusion Criteria

Children who were aged 0-59 months at the time of study and had stayed in prison for a period of one month or born to a mother who had been in prison for a similar period were included in the study. The child had to have no deformity that could interfere with

anthropometry assessment and the caretaker had to be present and in good mental health to give consent for inclusion.

3.3.2 Exclusion Criteria

Children with chronic illnesses or those with physical impairment were excluded. Thus one child admitted to hospital at the time of study was excluded from the study.

3.4 Sampling Techniques and Sample Size determination

Underweight does not distinguish between stunting and wasting and therefore it was used as the index for calculating the sample size for this study. Data available on the prevalence of underweight among children 0- 59 months old living in prisons in Kenya shows underweight to be (14.1%) (Omukhweso, 2007). So far this is the only study to investigate the nutritional status of children in prisons. It was therefore decided that the national prevalence of underweight 16% (KNBS & ICF Macro, 2010) be used to calculate the sample size.

3.4.1 Sample Size

The calculated sample size was 206. This was calculated based on Fisher *et al.*, 1998 formula ($n = Z^2 pq \div d^2$) Where:

- **n**= desired sample size,
- **Z** = standard normal deviation which is 1.96;
- **p** = proportion of the target population estimated to have characteristics being measured; (16% prevalence of underweight)
- **q** = population without the characteristics being measured (1-0.16)
- **d** = degree required for accuracy which is 0.05.

The formulae ($n = Z^2 pq \div d^2$) substituted as $n = 1.96^2 * 0.16(1-0.16) / 0.05^2 = 206$.

The calculated sample was not achievable in this study. At the time of the data collection, only 202 children between ages 0-59 months in prisons in Kenya met the inclusion criteria in the prisons included in the study. A total of 193 mothers were interviewed and included in the study.

3.4.2 Sampling Procedure

All the children aged 0-59 months meeting the inclusion criteria in the eight selected women prisons in Kenya were included in the study sample. The eight prisons were purposively sampled because they had the highest number of children aged 0-59 months. They were selected from a total of 35 women prisons in Kenya. Purposive sampling procedure was used in selecting the study location because the proportion of children in prisons is very minimal and there were chances of not finding the target group in some prisons in probability sampling methodology. Each study location had a mean holding capacity of 26 children in the year 2009 and 2010 thus sampled and included in the study (Kenya Prisons Service, 2009; 2010). At the time of the visits, 209 children were found in the sampled prisons, six children were excluded from the study since they had not stayed in prison for at least one month at the time of study, or born to a mother who had been incarceration for at least a month. Therefore, all the 202 children were recruited into the study. The number of mothers in the prisons who were interviewed was 193. Nine of the mothers had 2 children accompanying each of one of them.

3.5 Research Instruments

The main data collection instrument was an interviewer-administered structured questionnaire. It was used to collect socio- demographic information, feeding practices, morbidity and anthropometric data. Focus group discussion guide, key informant interview schedules and researcher observation checklist were used to gather information on experiences and challenges on feeding practices, medical care, water and sanitation and other relevant concerns attributable to this study about children in prisons. Data on feeding practices was collected using a 7 day food frequency questionnaire and 24 hour dietary recall.

In constructing the research instruments, the purpose, objectives and hypothesis of the proposed research were taken into consideration to ensure that the relevant information was collected. Questions were developed to ensure that information on the major study variables was collected. The questions were ordered in a logical sequence and were both closed and open-ended.

3.6 Pre-testing of Data Collection Tools

The questionnaire was pre-tested for accuracy and clarity prior to the main study on a selected sample of 10 children aged 0-59 months incarcerated with their mothers in Thika women's prison. This prison was not included in the main study.

3.6.1 Validity

To ascertain validity of the data collected, the questionnaires to be used were pre-tested. The clarity of information was ascertained to be containing only the information that was required for the purposes of the study on the 10 children from Thika prison. The

anthropometric data was collected using a salter scale and height board. Pre-tested to ascertain the degree of both the intra and inter observer error. Standardization was done on data collected. Content validity of the questionnaires was established through a panel of 3 judges competent in the field of IYCF and nutrition. These judges were drawn from Kenyatta University. The judges were requested to assess the relevance of the content used on the questionnaire. They examined the questionnaires individually and provided feedback to the researcher. Their recommendations were included in the final questionnaire.

3.6.2 Reliability

Test-retest method was used to test consistency in producing the same results. The participants of the pre-test comprised of 10 children aged 0-59 months that were randomly sampled from Thika women's prison. The same questionnaire was administered to the same group of participants after a period of one week. A comparison was then drawn between the responses obtained in the two occasions. The researcher allowed the pre-test subjects to make comments and give suggestions concerning the questionnaire. Correlation coefficient was determined using Cronbach correlation formula, (Kothari, 2004). The tools were accepted since the coefficient was 0.7.

3.7 Data Collection Procedure

3.7.1 Researcher Administered Questionnaire

The researcher visited each of selected eight women prisons in Kenya prior to the actual study in order to make the necessary arrangements. The visit was also meant to book appointment with the Officer-In-Charge of the prison in order to plan for the study. The

children's ages were verified by the Child Health Cards. Prison registers were used in the cases that did not have the health cards. In cases where there was no documentation of the birth dates, the mothers' self-reported information was used to establish the ages of their children.

Anthropometric data for the children (6-59 months of age) was collected using standard procedures as stipulated in the guidelines (Food Security Analysis Unit for Somalia, 2005). The weight was measured in Kilograms using Salter scale with accuracy of 0.1kgs. The children were weighed twice in the nude or with minimum clothing. The mean of the two weights was computed (so long as the difference between them was not more than 0.1 kg). Testing of the scale with known weight was also done before the exercise. During the exercise calibration was done by ensuring that the scale pointers were at zero before measurements were taken.

The height/Length of the children was measured in centimeters using height/length board with a headstand to the nearest 0.1 centimeter accuracy. Children below 2 years or those below 87cm were measured lying on their back while the rest were measured while standing. Children above 2 years or above 87cm who could not stand upright had (-0.7cm) adjustments done on the obtained length measurements to determine their height. This was done because in general, standing height is about 0.7 cm less than recumbent length. Before taking the reading, the researcher ensured that the child was barefooted and that the heels, buttocks, shoulders and the back of the head touched the board. The height/length readings were taken twice and a mean of the two was computed to get the child's length/height which was recorded in the questionnaire.

An assessment of bilateral oedema was done. The researcher gently applied pressure on the both feet of the children for three seconds using the thumbs. Children showing the print of the thumbs after three seconds were considered to have oedema.

3.7.2 24 Hour Dietary Intake Recall

A 24 hour dietary intake recall assessment on children aged 0- 23 months old was done. The mother or the caretaker was asked to state what they fed their child with previous 24 hours before the study. The dietary intake of all the foods, fluids taken and any other condiments added to the child's food were recorded. The recall period was from the time they woke up, until the time they went to bed. Respondents were provided with household measures used in the prison while feeding children like cups, metallic containers and spoons. Mothers were asked to measure water levels of the total amounts served and total amounts eaten. These amounts were measured and converted into weights measurements. The 5 step multiple pass method was used in the 24 hour dietary recall. First, the respondents were asked to list the foods and beverages the children consumed the previous day. Secondly probing was done for any foods forgotten during the quick list. Thirdly the time and eating occasion for each food item was recorded. Fourthly for each food item eaten a detailed description of ingredients, amounts eaten and any additions were collected. Finally probing was done for anything else the child may have consumed during the 24 hour dietary recall period.

3.7.3 7-Day Food Frequency Questionnaire

In order to assess usual food consumption, the 7 day food frequency was considered. The seven food groups which included grains, roots and tubers, legumes and nuts, eggs, flesh

meats, vitamin A rich fruits and vegetables, other fruits and vegetables and dairy products were considered. Respondents were asked how many times the child was fed on foods from the 7 food group in the previous 7 days.

3.7.4 Focus Group Discussion

FDGs were conducted on 8-12 mothers of children less than 5 years old randomly selected in each prison. This was done by first making an introduction and then explaining the purpose of the discussion. The FDGs discussions were facilitated by the investigator who led the participants on the topics for discussion one by one. Then a conclusion was made after the discussion. The facilitator thanked the participants after the session.

The areas covered were; the general concerns mothers have on the plight of children in prison, the challenges faced in feeding, water and sanitation and medical care.. The mothers were allowed to give their views on the various areas. The participants were guarded at all times and the investigator was not allowed to remain alone with the respondents. The presence of authorities made it challenging for respondents to speak freely hence affecting the outcome of the discussions. Audio recording was not permitted and therefore responses were recorded manually. The investigator guided and moderated the discussions. Each discussion lasted for approximately 30 minutes. One FGD was conducted per prison.

3.7.5 Key Informant Interviews

Key informant interviews were conducted. The prison Officers- In -Charge or any officer assigned by the office in each prison were the respondents. The areas covered included;

position of the officer and period of service, prison holding capacity and the challenges faced in feeding the children. The health care services offered, availability of health care staff, water and sanitation services and policies guiding feeding nursing mothers and children in prisons. The responses were recorded.

3.7.6 Observation Checklists

The researcher filled data on the observation checklist in each prison. Some of the areas observed were cleanliness of sleeping areas for the children, availability of beds and bedding for babies, adequacy of sleeping areas for both the mother and the child and availability of mosquito nets in the sleeping areas. The researcher also looked at the availability of hand washing facilities near the lavatory and the cleanliness of the surrounding area.

3.8 Study Variables

The dependent variable for this study was the nutrition status of children 6-59 months old. Nutritional status of children less than six months of age was not established in this study since it is not standard practice to measure nutritional status of this age of children since they are not at high risk of developing undernutrition because of the protection provided by breastfeeding. WHO growth Standards does not provide protocol for assessing anthropometric indices for this age category. The nutrition status was based on weight for height/length (wasting), weight for age (underweight), height/length for age indices (stunting), and presence/absence of oedema. The independent variables included the IYCF practices which were assessed using the WHO (2010) recommended 8 core indicators, health care practices (deworming, health seeking behavior, vitamin A

supplementation, immunization), morbidity prevalence among the children and socio-demographic status of the mother.

3.9 Data Analysis and Presentation

Anthropometry data was analyzed using ENA for SMART (2008). The indices of interest were W/H, H/A, W/A. Data on dietary intake was entered and analyzed using Nutri-Survey software, after which it was exported to SPSS. This was for cross analysis with variable like nutrition status, morbidity and other practices. Descriptive statistics (mean, maximum, minimum, standard deviation, frequencies and percentages) were used to describe data on nutritional status, feeding practices, maternal socio-demographic characteristics and morbidity prevalence. Pearson product moment correlation coefficient was used to show relationship between continuous variables such as the age of child with nutrition status. Chi-square tests were performed to establish the relationship between the socio- demographic, morbidity and dietary intake and the nutritional status of the children. Significance level was set at ≤ 0.05 . Qualitative data from FGDs was transcribed. The discussions were typed the common views were captured, coded and organized to themes before generalizations were made.

3.10 Logistical and Ethical Considerations

Authority to conduct the research was granted by Kenyatta University Graduate School. This was used to obtain a research permit from the Ministry of Education Science and Technology. The clearance to conduct the study was given by the Commissioner of Prisons. The participants were recruited into the study upon their informed consent. They were ensured on confidentiality. To secure the privacy of the r participants, name and

means of identity were not used during the research; instead identity numbers and pseudo names were used on the questionnaires. The researcher ensured that all the information obtained was kept in strict confidence and only for the purposes of the study.

CHAPTER FOUR: FINDINGS

4.1 Socio- demographic characteristics of the mothers

4.1.1 Maternal age

The youngest mother in this study was aged 17 years while the oldest was aged 55 years. The mean (SD) age was 27.7 \pm 6.33 years (Table 4.1). The majority of the mothers (97.4 %) were aged between 19-55 years (Table 4.1). The lowest proportions of mothers were in the category below 18 years (2.6%).

Table 4.1: Maternal demographic characteristics in selected prisons

Demographic characteristics		N = 193
Maternal age in years	N	%
>18	5	2.6
19-55	188	97.4
		Mean (SD) age: 27.7 \pm 6.33
Marital status		
Married	97	50.3
Single	52	26.9
Divorced	38	19.7
Widowed	6	3.1

4.1.2 Marital Status of the Respondents

In this study, half (50.3%) of the mothers were married (Table 4.1). Those who were single were less than a third (26.9%). Nearly a fifth (19.7%) of the mothers were divorced or separated at the time of confinement with only a small percentage (3.1%) widowed.

4.1.3 Maternal Education Level

The level of education is likely to influence feeding practices in prisons where resources are constrained. Findings of this study were that mothers had varied levels of education ranging from no schooling to university degree (Table 4.2).

Table 4.2: Maternal socio-economic characteristics

Socio economic characteristics	N= 193	
Maternal education level		
Primary	123	63.7
Secondary	52	26.9
College	4	2.1
University	2	1.0
No formal schooling	12	6.2
Occupation while out of prison		
Employed (salaried)	8	4.1
Waged labour (casual)	49	9.8
Business	4	2.1
Unemployed	33	17.1
Petty trade (included kiosks, small scale vegetable venders)	60	31.1
Domestic help	13	6.7
Other crime related occupations (Robbery with violence, drug trafficking, prostitution)	56	29

Close to two thirds (63.7%) of mothers had primary level education while slightly more than one-quarter (26.9%) had secondary education. The main occupation practiced by (31.1%) of the respondents while out of prison was petty trade. A United Nations report on human rights and refugee programme (Taylor 2004), observed that, across the globe women are more often imprisoned for drug related offences than any other capital offences. For this study, crime related forms of occupation constituted the 2nd highest (29%).

4.1.2 Duration and Nature of Confinement

4.1.2.1 Maternal duration of confinement

There is little information available regarding the effects prison may have on a child's early development. The majority (71%) of the mothers were in incarceration for a period

of between 1 to 12 months (Table 4.3) while those who had been incarcerated for 25 to 36 months were (12.4%) with a small percentage (1.6%) confined between 37 to 55 months. The mean (SD) duration of confinement was 11.7 ± 11.4 months.

Table 4. 3: Duration and nature of confinement

Other characteristics		N = 193
	N	%
Duration in confinement (months)		
1-12	137	71
13-24	29	15.0
25-36	24	12.4
37-55	3	1.6
		Mean (SD) duration: 11.7 ± 11.4
Nature of confinement		
Convicted	113	58.5
Pre-trial detention	80	41.5

4.1.2.2 Nature of Confinement

Globally, one out of every three detainees is awaiting trial and has not been found guilty of a crime (Walmsley, 2007). In this study, more than half (58.5%) of the mothers were convicted while (41.5%) were awaiting trial or sentences for various offences (Table 4.3).

4.1.3 Demographic Characteristics of the 0-59 Month's old Children Incarcerated with their Mothers

The demographic characteristics (age and sex) of the 0-59 month's old children are shown in Table 4.4

Table 4.4: Characteristics of the study children

Age categories (Months)	Female		Male		Total N=202	
	n	%	N	%	N	%
0-5	22	10.9	16	7.9	38	18.8
6-17	28	13.9	42	20.8	70	34.7
18-29	22	10.9	28	13.9	50	24.7
30-52	27	13.4	17	21.8	44	21.8
Total	99	49	103	51	202	100

Mean (SD) Age: 18.98±13.4

4.1.3.1 Children's age and sex

There was no significant difference in the number of male and female children. There was 51% male and 49% female (p-value 0.05); (Table 4.4). The findings in this study revealed slightly more than a third (34.7%) of the children were in the age group 6-17 months. Children in the age category 18-29 months were slightly more than one fifth (24.7%) while those below five months were less than one fifth (18.8%).

4.2 Infant and Young Child Feeding Practices

A child's first 2 years of life are considered a "critical window of opportunity" for prevention of growth faltering and under-nutrition (Victora et al., 2010). The WHO and UNICEF (2007) Infant and Young Child Feeding practices indicators were used to establish feeding practices for children 0-23 months of age in this study.

4.2.1 Breastfeeding Practices

Children between the ages of 0-23 months formed the basis of establishing breast feeding practices (WHO/UNICEF, 2010). The variables of interest, based on WHO (2007) indicators of breastfeeding practices were; early initiation of breastfeeding in children 0-

23 months; exclusive breastfeeding for infants under six months old, continued breastfeeding at 1 year (12-15 months of age) and continued breastfeeding at 2 years (20-23 months old) (UNICEF, 2011). The majority (85.5%) of the children were still breastfeeding at the time of study (Table 4.5).

Table 4.5: Breastfeeding practices for children 0-23 months

Breast feeding practices	N=130	
	n	%
Early initiation of breastfeeding (0-23mths) Within 1hour (N=130)	69	53.1
Exclusive breastfeeding under six months (N=36) Mean (SD) EBF age: 2.44 ± 1.63 months	25	69.4
Continued breast feeding at 1 year for children 12-15 months (N=26)	23	88.5
Continued breast feeding at 2 years children 20-23 months (N=23)	12	52.2

4.2.1.1 Early Initiation of Breastfeeding

The WHO and UNICEF recommend initiation of breastfeeding within the first hour of birth (WHO/UNICEF, 2003). Early initiation of breastfeeding serves as the starting point for the continuum of care for the mother and new born that can have long-lasting effects on health and development (WHO *et al.*, 2010).

In this study, more than half (53.1%) of children were initiated to the breast within one hour of birth with (43.8%) being initiated within 24 hours of birth (Table 4.5). A small proportion (0.8%) of respondents could not recall initiation time. The results do not differ

much from those of the general population in Kenya with 58% being initiated within one hour of birth (KNBS & ICF Macro, 2010). Beginning breastfeeding immediately after birth ensures that the new born receives the “first milk” (colostrum), the baby’s first immunization (WHO et al., 2010).

4.2.1.2 Exclusive Breastfeeding under Six Months

The WHO recommends exclusive breastfeeding for the first six months of life to achieve optimal growth, development and health (WHO, 2011). Based on a 24 hour recall (69.4%) of infants less than 6 months; were exclusively breastfed. About one third (30.6%) of infants had been provided with other fluids besides breast milk. Nearly a fifth (19.4%), were given other forms of milk and thin porridge (16.7%) respectively. Those who had received thin porridge in addition to other milks were (13.9%).

4.2.1.3 Continued Breastfeeding at 1 Year

The prevalence of continued breastfeeding at 1 year was 88.5%. Continued breastfeeding for two years or beyond among children 18-23 months old was prevalent among slightly more than half (52.2%) of the children.

4.2.2 Complementary Feeding Practices

Appropriate infant and young child feeding is a combination of how, when, and what children 0-23 months old should be fed (Pelto, Levitt, & Thairu, 2003). The WHO and UNICEF recommend that children be exclusively breastfed for 6 months, after which nutritiously appropriate, adequate, and safe complementary foods should be introduced along with continued breastfeeding up to 2 years and beyond (WHO/UNICEF, 2011).

4.2.2.1 Introduction of Solid, Semi-solid or Soft Food

According to the new WHO indicators (Daelmans *et al.* 2009; WHO *et al.* 2010) the timeliness is assessed by whether infants aged 6 to 8 months are receiving solid, semi-solid or soft food, irrespective of being breastfed or not (Daelmans *et al.* 2009; WHO *et al.* 2010). The findings of this study showed that most of the children between 6-8 months old, (92.3%) had been introduced to solids, semi-solids or soft foods in this study (Table 4.6). The main food to which children had been introduced was porridge.

Table 4.6: Complementary feeding practices for children 6-23 months

Complementary feeding practices among children 6-23 months old	N	N= 92 %
Introduction of solid, semi-solid or soft food for children 6-8 months old (n=13)	12	92.3
Minimum dietary diversity for children 6-23 months old (N=92): Minimum dietary diversity ≤ 4 food groups	49	53.3
Minimum meal frequency for children 6-23 months old:		
2 times for breastfed infants 6- 8 months old (N=12)	12	100
3 times for breastfed children 9-23 months old (N=62)	52	82.9
4 times for non-breastfed children 6-23 months old (N=18)	7	38.9
Minimum acceptable diet for children 6-23 months old		
Breastfed (N=74)	36	48.6
Non-breastfed (N=18)	6	33.3
Consumption of iron-rich foods for children 6-23 months (N=92)	28	30.4

4.2.2.2 Minimum dietary diversity

Minimum dietary diversity is defined by the proportion of children between 6-23 months who received food from 4 or more food groups in the past 24 hours. The food groups are; grains, roots and tubers, legumes and nuts, dairy products, flesh foods, eggs, vitamin A

rich fruits and vegetables and other fruits and vegetables (UNICEF, 2011). In this study slightly more than half (53.3%) of children 6-23 months were reported to have consumed foods from ≤ 4 food groups (Table 4.6). Those who did not meet the WHO recommendation were (46.7%). The mean (SD) dietary diversity score was 3.52 ± 1.04 .

4.2.2.3 Minimum Meal Frequency

The WHO recommends minimum meal frequency for children between 6-23 months old as; 2 times a day for breastfed children between 6-8 months old increasing to 3 times for breastfed children between 9-23 months old. Non-breastfed children between 6-23 months old should be fed on minimum 4 times a day. In all the cases additional 1-2 nutritious snacks should be included (UNICEF, 2011).

The findings of this study revealed that (100%) of breastfed children aged 6-8 months met the recommended minimum meal frequency (Table 4.6). Of the breastfed children aged 9-23 months old, 82.9% met the recommended meal frequency of three or more meals in a day. About two fifths (38.9%) of the non-breastfed children ages 6-23 months old met the recommended minimum meal frequency. This puts a larger percentage (61.1%) at an increased risk of malnutrition occasioned by inadequate dietary intake among other factors.

4.2.2.4 Minimum Acceptable Diet

The minimum acceptable diet is defined by the proportion of children 6-23 months of age who received minimum dietary diversity and minimum meal frequency 24 hours preceding the study.

In this study breastfed children who met minimum acceptable diet were close to half (48.6%). The findings compare closely with those in the KNBS and ICF Macro (2010) which reported a minimum acceptable diet of (44%) among children 6-59 months old. More than half (51.4%) of the breastfed children aged 6-23 months old in selected women prisons in Kenya may be at an increased risk of malnutrition arising from inadequate dietary intake.

4.2.2.5 Consumption of Iron Rich Foods

Healthy term infants with normal birth weight are born with a considerable endowment of iron and high haemoglobin levels. The two are usually sufficient to maintain the infants' needs for growth during the first 6 months of life (Anderson & MacLaren, 2012).

Consumption of iron-rich or iron fortified foods is therefore a recommended global infant and young child strategy to fight Iron Deficiency Anaemia (IDA) (WHO, 2010). The WHO recommended foods in this indicator are flesh foods (WHO/UNICEF 2010). One third (30.4%) of the children 6-23 months old had consumed foods rich in iron in the past 24 hours. Children below one year of age are not routinely given anthelmintic to control certain types of intestinal parasites that can cause anaemia unless on clinical diagnosis. Low consumption of iron-rich foods therefore puts children in prison set up at an increased risk of IDA.

4.3 Amount of Nutrients and Kilocalories Consumed by Children 6-23 Months old

The consumption of various nutrients and kilocalories by the children was established on a 24 hour dietary recall. The mother described the meal and the amounts of foods taken in each meal. In the prison set up, all the meals are prepared in one place and to establish the

quantities of ingredients used, the data was obtained from the kitchen personnel. The amount of nutrients in the ingredients was established through the Nutri-survey software (2008). These amounts were compared with the WHO Recommended Daily Allowance (WHO, 2008). The adequacy of kilocalories and selected nutrients consumed per day by the children is shown in (Table 4.7)

Table 4.7: Adequacy of kilocalories (Kcal) and consumption of selected nutrients by children 6-23 months old (N=45)

Nutrient	RDA	Mean (SD) consumption in 24 hours	Number meeting the RDA	% meeting the RDA
Kcal	2036 Kcal	2049 ± 772.5	23	51.1
Proteins	60.1gm	58.7 ± 22.5	20	44.4
Vitamin A	600 µg	1032.34 ± 388	41	91.1
Vitamin C	55 mg	24.36 ± 10.47	23	51.1
Iron	8.0 mg	14.99 ± 7.15	29	64.4
Zinc	2.0 mg	15.11 ± 7.0	45	100

WHO, 2008

Energy is required for basal metabolism rate and for physical activity. When children do not consume adequate kilocalories, their bodies do not get sufficient energy hence the body reserves are depleted to meet the deficiency resulting to poor nutritional status. In this study, about half (51.1%) of the children aged 6-23 months consumed adequate amounts of recommended (kcal) per day. The mean (SD) kilocalorie (kcal) intake was 2049.38 ± 772.5 against the recommended 2036.3 kilocalories (kcal) (WHO, 2008). All

the children were served same quantities. The difference in kilocalorie intake was as a result of poor appetite among some children as well as age.

For micro-nutrient intake, nearly all (91.1%) children consumed adequate amounts of vitamin A rich foods. The mean vitamin A intake was 1052.34 ± 388.19 μg against a recommendation of 600 μg . slightly more than two thirds (64.4%) consumed adequate amounts of iron with a mean intake of 14.99 ± 7.15 mg against the recommended 8.0 mg. All (100%) the children consumed adequate amounts of zinc with a mean intake of 15.11 ± 7.0 mg against the 2.0 mg recommendation. Vitamin C is required for iron absorption; children taking adequate amounts of iron may end up with Iron Deficiency Anaemia (IDA) arising from poor absorption. In this study the mean vitamin C intake was 24.36 ± 10.47 mg against the recommended intake of 55mg.

4.3.2 Frequency of Food Consumption by Children 6-23 Months old

The frequency consumption of foods in this study was based on a 7 day food frequency (Table 4.8).

Table 4.8: Frequency of Food Consumption by children 6-23 months old based on a -7 day recall

7- day food frequency consumption	
Food	N=50 Mean (sd)
Cereals and grains:	
<i>Ugali</i>	6.82 ± 0.8
Rice	6.42 ± 1.6
Potatoes/green bananas	3.2 ± 3.5
Legumes and nuts:	
Beans / green grams	5.36 ± 2.6
Green leafy vegetables:	
<i>Sukumawiki</i> /spinach/traditional vegetable	3.78 ± 3.5
Fruits:	
Ripe Banana/ avocados	1.48 ± 2.2
Oranges	0.66 ± 1.7
Meats:	
Beef	2.48 ± 1.1
Dairy Products:	
Fresh milk	6.94 ± 0.4
Sugars and Sweets:	
Sugar	6.94 ± 0.8
Oils and fats:	
Oils and fats	6.98 ± 0.1
Spices and condiments:	
Salt and spices	6.98 ± 0.1

All the prisons served *ugali* (stiff porridge) and rice as part of the daily meals for children 6-23 months of age (observation made during the study period by the author). The mean number of times these foods were consumed in a week was 6.82 ± 0.8 and 6.42±1.6 respectively (Table 4.8). Consumption of foods in this food group ensures that children

get adequate energy for growth and development. These findings support the high mean kilocalorie intake observed in the 24 hour recall meal analysis.

Consumption patterns in legumes and nuts food group, was high with the mean (SD) consumption being 5.36 ± 2.6 . No nuts were provided in either of the prisons visited, however beans constituted a daily menu in all the prisons surveyed. However, *mothers felt that legumes were not well cooked resulting to bouts of diarrhoea and bloating among children* (reported during the Key Informant Interview sessions and focus group discussions). Legumes are known to contain high amounts of phytates causing flatulence among some people. Therefore poor cooking methods may therefore affect the bioavailability of nutrients.

For flesh meats, the mean number of times beef was consumed was 2.48 ± 1.1 . Beef is served thrice per week. The mean for dairy products consumption was 6.94 ± 0.4 . Each child was provided with between 200mls-500mls of milk per day. Sugars and oils contribute significantly to daily kilo calorie intake. Close to hundred (98%) of children consumed both sugar and fats added to foods during the cooking process.

4.4 Morbidity Patterns among Children 0-59 Months old

4.4.1 Morbidity Prevalence among Children 0-59 Months old

In this study, slightly more than half (53.5%) of study children were reported ill based on a two-week recall. The duration of illness was between one to fourteen days. Many (43.7%) of the sick children had illnesses lasting for less than three days

4.4.2 Common illnesses among the children

Respiratory tract infection refers to any number of infectious diseases involving the respiratory tract. An infection of this type is normally further classified as an upper respiratory tract infection (URI or URTI) or a lower respiratory tract infection (LRI or LRTI). Lower respiratory infections, such as pneumonia, tend to be far more serious conditions than upper respiratory infections, such as the common cold. In this study, more than two thirds (76.9%) of reported illnesses were associated with upper respiratory tract infections. About two-fifths (39.8%) of the children's cases of illnesses were coughs and runny nose reported by 11.1% (Table 4.9).

Table 4.9: Morbidity pattern among children 0-59 months old and maternal health seeking behaviour

Morbidity prevalence	N = 202	
	N	%
Presence of illness two weeks prior the study		
Sick	108	53.5
Not sick	94	46.5
Duration of illness N= 108		
≤3days	47	43.5
< 3days - ≤6 days	21	19.4
< 6 days	40	37
Nature of illness*		
Upper Respiratory Tract Infections	83	76.9
Diarrhoea lasting more than 3 days	23	21.3
Skin infection	13	12
Clinical Malaria (no laboratory confirmation)	7	6.5
Vomiting and acute diarrhoea	15	13.9
Others	19	17.6

*Multiple responses expected

Malaria and other illnesses that cause fever contribute to high levels of malnutrition and mortality in children. In this study, symptoms associated with malaria were reported by (6.5%) of the sick children, however none of them had laboratory diagnosis to confirm the clinical symptoms. Fever is one indicator of immune system activation, which can suppress appetite and lead to re-allocation of nutrients away from growth (Dewey & Mayers, 2011).

Dehydration caused by severe diarrhoea and vomiting is a major cause of morbidity and mortality among young children. However the condition can easily be treated with oral rehydration therapy (ORS). The findings were; slightly more than one fifth (21.3%) had chronic diarrhoea lasting between 3-7 days. Chronic diarrhoea in this study refers to three or more loose stools in a day lasting between 3 – 7 days. Prevalence of vomiting accompanied by acute diarrhoea was reported by 13.9%. There was a strong positive correlation between prevalence of diarrhoea with vomiting $r = 7.0$ (p-value >0.002).

Skin infections and infestations are common in a prison environment. The prison is in dynamic equilibrium with the larger society. Therefore it serves as a reservoir of infections which can spread to the larger society (Oninla & Onayemi, 2012). In this study, skin infection prevalence was reported by slightly more than one tenth (12%) of respondents. The findings of this study show that 9.9% of the respondents had access to warm water for bathing babies.

4.4.3 Maternal Health Seeking Behaviour

More than two fifth (89.8%) of mothers, sought medical help for the sick children within 24 hours of illness. Slightly more than a third (36.4%) of those who did not seek medical

attention felt the illness was mild. The same proportion of mothers did not see the importance of seeking health services because in their view the treatment offered was blanket not based on proper diagnosis (Table 4.10). The majority (79.4%) of mothers who sought medical help for their sick children did so in the dispensaries within the prison grounds.

Table 4.10: Maternal health seeking behaviour

Maternal health seeking behavior	N=108	
	N	%
Sought medical help for sick child		
Sought help	97	89.8
Did not seek medical help	11	10.2
Reasons for not seeking medical help		
Illness considered mild	4	36.4
Negative staff attitude	3	27.2
Provision of blanket prescriptions	4	36.4
Time within which help was sought		
Within 24 hours	89	91.7
After 24 hours	8	8.3
Where medical assistance was sought		
Public hospitals outside the prison grounds	20	20.6
Dispensaries within the prison grounds	77	79.4

4.5 Immunization Coverage

Immunization is important because it enables the body of the child to fight against some illnesses. Universal immunization against the six vaccine-preventable diseases (namely, tuberculosis, diphtheria, whooping cough, tetanus, polio and measles) is crucial in reducing infant and child mortality. Child immunization services were offered in 4

prisons, Langata, Kericho, Nakuru and Eldoret. Children in Kisii, Meru, Nyeri and Kakamega were referred to the nearest government facility for immunization. During the government accelerated immunization campaigns, the prisons are included. The majority (99.5%) of mothers were allowed to take their children for immunization whenever the children were due for the immunization. More than two thirds (92.9%) of children 12 – 23 months old in this study were fully immunized (Figure 4.1), compared to 77% coverage in Kenya (KNBS & ICF Macro, 2010).

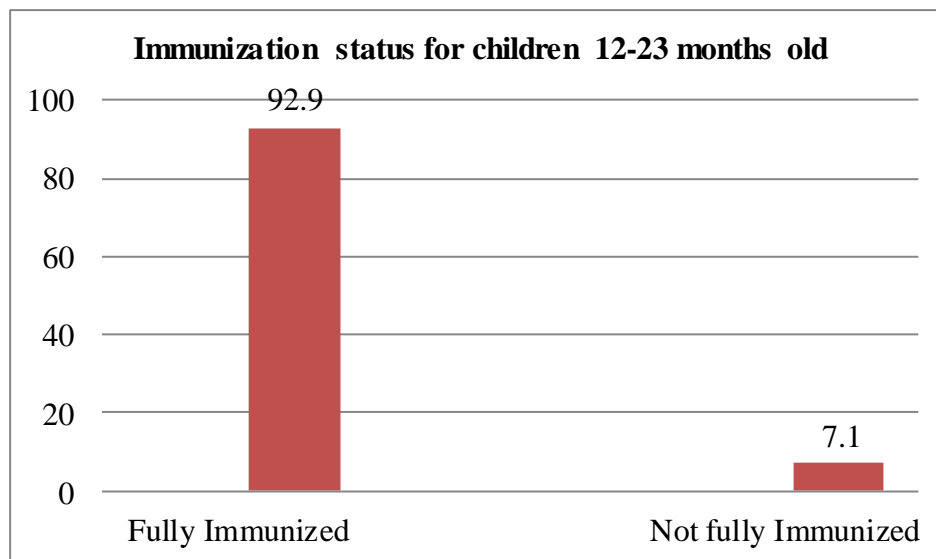


Figure 4.1 : Children 12-23 fully immunized

4.5.1 Vitamin A Supplementation

Vitamin A is an essential micronutrient for immune system; it plays an important role in maintaining health epithelial tissues in the body. Vitamin A deficiency increases severity of infections such as measles and diarrhoea diseases. Periodic dosing targeting infants and young children is one method of ensuring children at risk do not develop vitamin A Deficiency (VAD). Vitamin A supplementation is supposed to be given to children 6 -59

months old living in developing countries every 6 months according to WHO protocol (WHO, 2008).

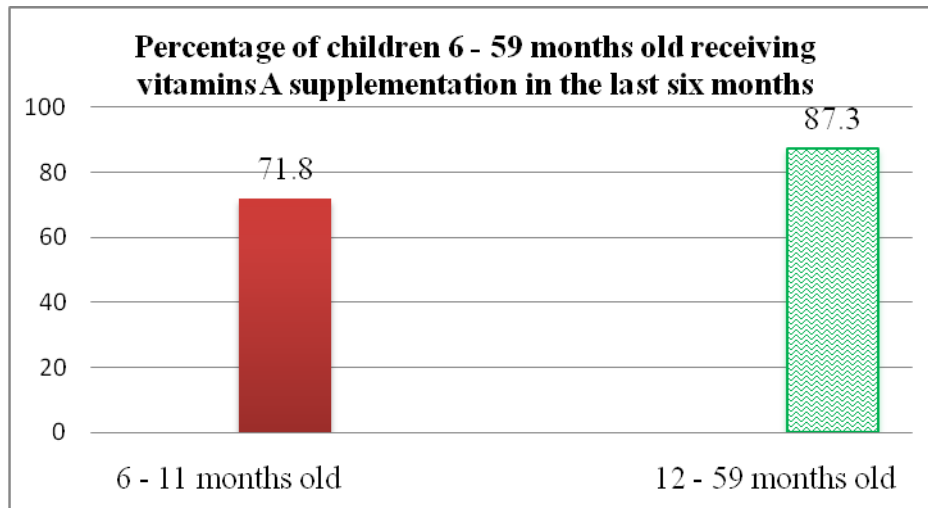


Figure 4.2 : Vitamin A supplementation coverage in the 6 months prior to the study

Vitamin A supplementation was determined by card or maternal recall. Maternal self-report was used in cases where child health cards were not available or where vitamin A supplementation was not recorded on the card. More than two thirds (71.8%) of the children 6-11 months old had received vitamin A supplement within six months prior to the study. Among the children 12-59 months old, the majority (87.3%) had received vitamin A within six months prior to the study. Children between 12-59 months old are supposed to receive vitamin A capsule twice in a year (MOPHS, 2010). In this study, 39.1% of the children received the supplement twice and 27.3% received the supplement more than twice (Figure 4.3).

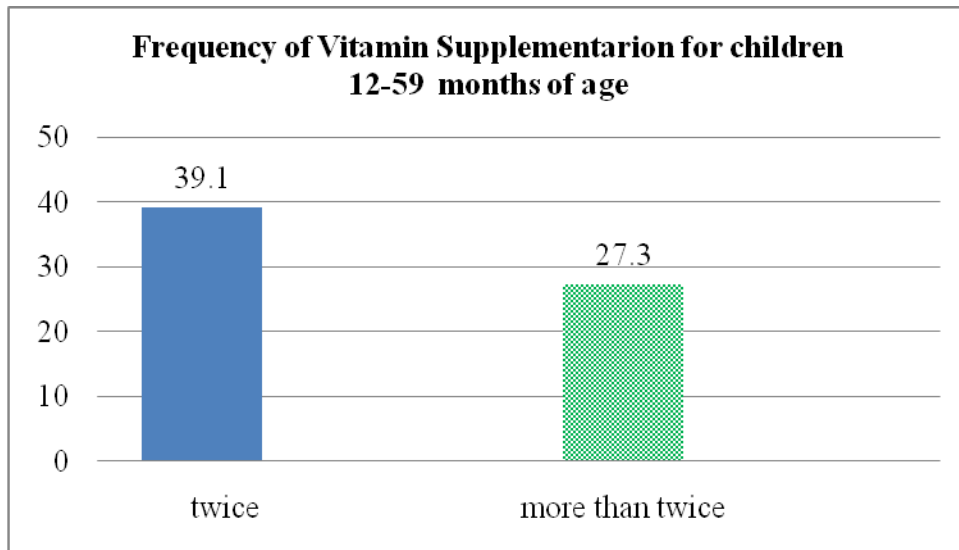


Figure 4.3 Distribution (%) of Vitamin A supplementation among children 12-59 months 12 months prior to the study

4.5.2 Deworming

Periodic deworming is carried out in intervals of six months targeting children 12-59 months of age a measure to improve micronutrient status especially iron (KNBS & ICF Macro, 2010). For this study slightly more than half (57.7%) of children 24-59 months had been dewormed six months prior to the study, (Figure 4.4).

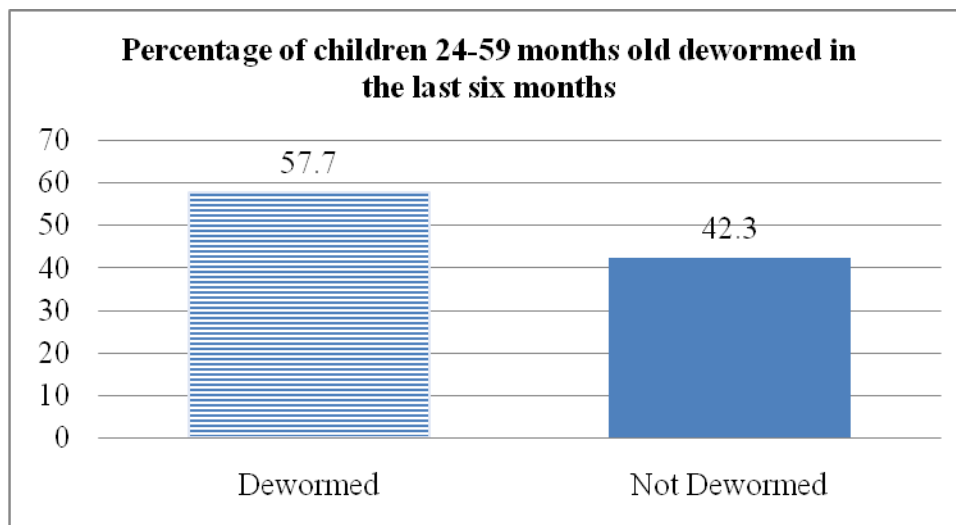


Figure 4.4: Deworming Coverage in children 24-59 months old

4.6 Water Accessibility and Hygiene Practices among Inmates

4.6.1 Sources of Water, Availability and Adequacy

The main source of water in all the prisons was tap water within the prison grounds. More than half (56.9%) reported water was always available and adequate while close to a third (29.7%) reported that it was not always available.

More than two thirds (70.3%) of the respondents reported that they were giving their children tap water available from stand taps within prison grounds and its safety could not be established. Less than a fifth (16.3%) of the respondents had access to treated/boiled water provided for the children by some institutions.

4.6.2 Human waste disposal

Excreta are the primary source of diarrhoeal disease agents which are further transmitted through foods and fluids. Containment of excreta is the best means to prevent diarrhoea disease agents from proliferating and being transmitted. In all the prisons excreta, was mainly disposed in flush latrines. Nearly all (96.9%) reported to have flush toilets within the cells while (3.1%) reported not to have access to toilets within the cells (Table 4.11). Despite this, many of the under-fives defecated on the floor at the day care centres hence creating an unhealthy environment. Based on the observation by the research team, *availability of potties within the day care centres for use by the children was evidently missing*. This occurrence could aggravate cases of diarrhoea among children due to cross contamination.

Table 4.11: Distribution of water and sanitation facilities and mothers' hand washing practices

Distribution of water and sanitation practices	N=193	
	N	%
Source of water for drinking and cooking		
Tap water	193	100
Treatment of drinking water for children		
Boiling and adding water guard	33	16.3
Tap water	142	70.3
Adequacy of water for use washing, bathing and cooking		
Always	115	56.9
Sometimes	60	29.7
Rarely	18	8.9
Type of toilet within the compound		
Flush toilet	193	100
Type of toilet within cell		
Flush toilet	187	96.9
No toilet available	6	3.1
Hand washing facility near toilet		
Yes	153	79.3
No	40	20.7
Availability of water at hand washing facility		
Yes	107	69.9
Sometimes	46	30.1
Availability of soap at hand washing facility		
Yes	1	0.7
Sometimes	2	1.3
Never	150	98

No multiple responses

4.6.3 Hand washing practices

Appropriate practice of hand washing is health behaviour crucial in attaining good health.

The findings (Table 4.11) showed that more than two thirds (75.6%) of mothers washed hands before eating and nearly half 43% used soap. Those who washed their hands after defecating were 80.8% whereas 71% used soap to wash their hands. Those who washed hands before feeding the baby were slightly more than one third (31.1%) with only 16% using soap to wash their hands.

Table 4.11: Distribution of water and sanitation facilities and mothers' hand washing practices

Mothers' hand washing practices		
Before eating	146	75.6
After defecating	156	80.8
Before feeding the baby	60	31.1
Before breastfeeding	36	18.6
After cleaning baby's bottom	18	9.3
Use of soap in hand washing practices		
Before eating	83	43
After defecating	137	71
Before feeding the baby	31	16
Before breastfeeding	13	6.7
After cleaning baby's bottom	14	7.3

4.7 Nutritional Status of the Children 6-59 Months old

A study by Omukhweso (2007) carried out in the prisons in Kenya targeting children 1-59 months of age, showed that stunting rate was 18.8%, underweight (14.1%) and wasting was 8.9%. In this study the wasting rate was 3.8% (95% CI: 1.4 – 9.6), underweight 7.5% (95% CI: 4.1 – 13.5), and stunting rates of 21.4% (95% CI: 12.4 – 34.2), (Figure 4.5). None of the children presented with oedema.

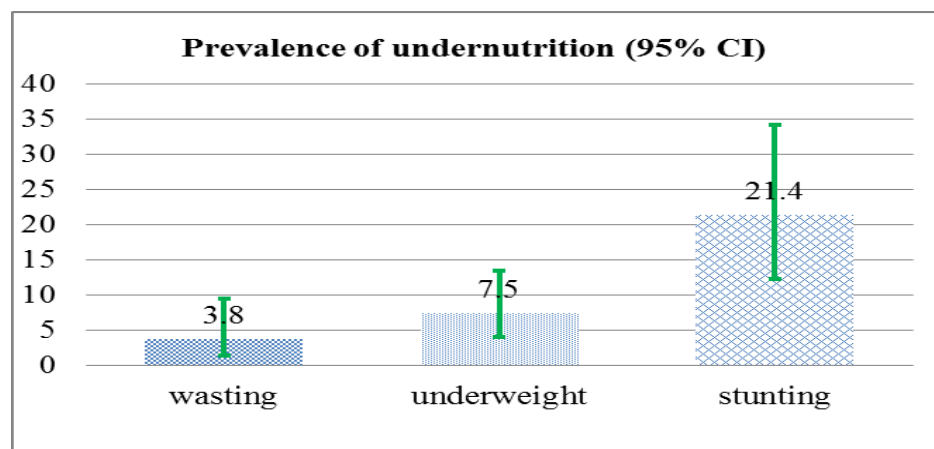


Figure 4.5: Distribution of under nutrition among children 6-59 months old

4.7.1 Nutritional status of the under-fives by sex

For boys the stunting, wasting and underweight levels of malnutrition were as follows; (24.1%, 4.8% and 9.6%) respectively. For the girls it was (18.4%, 2.6% and 5.3%) respectively. The results (Table 4.12), show that boys were more stunted, wasted and underweight compared to the girls

Table 4.12: Nutritional status by sex

Sex distribution	Boys N=87		Girls N=73	
	N	%	n	%
Forms of malnutrition:				
HAZ(Stunting)				
WHZ(Wasting)	20	24.1	14	18.4
WAZ(Underweight)	4	4.8	2	2.6
	8	9.6	4	5.3

Significant correlation existed within the forms of malnutrition, underweight was significantly associated with stunting at ($r = 0.316$ p-value < 0.000). On the other hand underweight was significantly associated with wasting at ($r = 0.443$ p-value < 0.000). This implies that the index child is likely to suffer more than one form of malnutrition, putting them at an increased risk of morbidity and subsequent mortality.

4.8 Factors Associated with Nutritional Status of Children

The anthropometric data was categorized into undernourished and well-nourished. The feeding practices were categorized as appropriate and inappropriate based on WHO (2007) guidelines for feeding practices for children 6-23 months old. The prevalence of morbidity was categorized into presence or absence of sickness based on a two-week recall period. The association between maternal socio-demographic characteristics and the nutritional status of the children were also investigated. Chi-square tests were

performed to assess the relationships of the variables at significance level of 0.05. Likelihood ratio correlation in chi-square was used for interpretation in variables where frequencies were less than five.

4.8.1 Relationship between Meal Frequency and Nutritional Status

In this study, nutritional status (underweight) showed a significant relationship with meal frequency (p- value 0.030). Based on this index, those children who had adequate meal frequency were more likely to be underweight. Three quarters (75%) of the children who were underweight, met the WHO recommendation for frequency of feeding (Table 4.13). Stunting and wasting did not show any significant relationship with this indicator.

Table 4.13: Meal frequency and nutritional status cross tabulation

Nutritional status	Meal Frequency Not adequate		Meal Frequency Adequate		Total N=85		Chi-square test p-value
	N	%	n	%	N	%	
Underweight	2	25	6	75	8	9.4	0.030*
Normal	2	2.6	75	97.4	77	90.6	
Wasted	1	16.7	5	83.3	6	7	0.246
Normal	3	3.8	76	96.2	79	93	
Stunted	0	0	8	100	8	9.4	0.368
Normal	4	5.2	73	94.8	77	90.6	

Likelihood ratio correlations used for cells with less than 5 counts.

4.8.2 Relationship between Dietary Diversity and Nutritional Status

The majority (87.5%) of the underweight children was those not consuming the recommended 4 or more food groups (Table 4.14). There was a significant relationship between dietary diversity and nutritional status based on underweight. Children who

were underweight were more likely to consume a diet not meeting the minimum acceptable dietary diversity score (chi-square test; $p = 0.012$). Stunting and wasting did not show any significant relationship with dietary diversity.

Table 4.14: Dietary diversity and nutritional status cross tabulation

Nutritional status	DDS not met n= 40		DDS met n= 45		Total N=85		Chi-square test p-value
	n	%	n	%	N	%	
Underweight	7	87.5	1	12.5	8	9.4	0.012*
Normal	33	42.9	44	57.1	77	90.6	
Wasted	4	66.3	2	33.3	6	7	0.316
Normal	36	45.6	43	54.4	79	93	
Stunted	4	50	4	50	8	9.4	0.861
Normal	36	46.8	41	53.2	77	90.6	

DDS – Dietary Diversity Score: Likelihood ratio correlations used for cell with less than 5 counts

4.8.3 Relationship between minimum acceptable diet and nutritional status

Children not meeting the recommended minimum acceptable diet in this study were more likely to be underweight. More (87.5%) of underweight children did not meet the recommended minimum acceptable diet. Underweight showed a significant relationship with this indicator at Chi-square test; $p= 0.014$) (Table 4.15). This IYCF indicator did not show any significant relationship with stunting and wasting. Table 4.15

Table 4.15: Minimum acceptable and nutritional status relationships cross tabulation

Nutritional status	Acceptable diet not met		Acceptable diet met		Total N=85		Chi-square test p-value
	N	%	N	%	N	%	
Underweight	7	87.5	1	12.5	8	9.4	0.014*
Normal	34	44.2	43	55.8	77	90.6	
Wasted	4	66.7	2	33.3	6	7	0.345
Normal	37	46.8	42	53.2	79	93	
Stunted	4	50	4	50	8	9.4	0.916
Normal	37	48.1	40	51.9	77	90.6	

Likelihood ratio correlations used for cells with less than 5 counts.

The hypothesis that there is no significant relationship between feeding practices and nutritional status of children 6-59 months was rejected. The findings compare with those by Dinesh et al (2007), that improper complementary feeding is a significant risk factor for under nutrition among under-fives. They also compare with those of Amegah (2009) in Kwale District Kenya, concluding feeding practices influence nutritional status in children. The findings further compare with the findings by Nti (2011) a study done in Ghana where DDS was significantly related to weight-for-age index.

4.8.4 Relationships between Morbidity and Nutritional Status

Weight-for-age index showed a significant relationship with the presence of illness ($p=0.012$). The majority (91.7%) of the children who were sick were also underweight. Wasting and stunting did not show any significant relationship with the episode of illness in this study.

Table 4.16: Relationship between morbidity and nutritional status (WFA)

Nutritional status	Childre n sick n=97		Children not sick n=63		Total N=160		Chi-square test p-value
	n	%	n	%	n	%	
Underweight	11	91.7	1	8.3	12	7.5	0.012*
Normal	86	58.1	62	41.9	148	92.5	
Wasted	5	83.3	1	8.3	6	3.8	0.219
Normal	92	59.7	62	41.9	154	96.2	
Stunted	20	58.8	14	41.2	34	21.4	0.809
Normal	77	61.1	49	38.9	126	78.6	

Likelihood ratio correlations used for cells with less than 5 counts.

The hypothesis that there is no significant relationship between morbidity and nutritional status of children 6-59 months was thus rejected. It is well known that the relationship between child nutrition and infection is bidirectional in that, frequent illness can impair nutritional status and poor nutrition can increase the risk of infection (Dewey & Mayers, 2011).

4.8.5 Relationships between Maternal Socio-Demographics and Nutritional Status

Maternal level of education categorized as formal schooling verses no formal schooling showed a significant relationship with underweight (Chi-square test: $p= 0.020$). Children whose mothers had some form of formal schooling were more likely to be underweight (Table 4.17). The findings demonstrated that wasting was significantly associated with maternal level of education (Chi-square test; $p= 0.019$). The findings imply that the beneficial effects of education may not be significant in the prison set up in Kenya. Table 4.17

Table 4.17 : Relationship between maternal level of education and nutritional status

Nutritional status	No formal schooling		Formal schooling		Total N=160		Chi-square test p-value
	N	%	n	%	n	%	
Underweight	1	8.3	11	91.7	12	7.5	0.020*
Normal	57	38.5	91	61.5	148	92.5	
Wasted	0	0	6	100	6	3.8	0.019*
Normal	58	37.7	96	62.3	154	96.2	
Stunted	10	29.4	24	70.6	34	21.4	0.344
Normal	48	38.1	78	61.9	126	78.6	

Likelihood ratio correlations used for cells with less than 5 counts.

Stunting in this study did not show any significant relationship with the maternal socio-demographic characteristics. The hypothesis stated that there is no significant relationship between socio-demographic characteristics and nutritional status was therefore rejected.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The Kenya prisons act section 30(4) does not give details on how children should be treated in regard to food, medical care and maternal care among other needs (UN, 1957; UN, 1977). With the majority of children accompanying incarcerated mothers being less than 23 months, feeding children while incarceration is an area of concern. The prison environment can be a health risk, particularly in situations of overcrowding or inadequate nutrition, (Robertson, 2011).

5.2 Socio-demographic characteristics of the mothers

In contrast to the Borstal Institution Act that states that a teenage mother be detained in Juvenile justice institutions (Bostal Institutions Act, CAP 92, 2009), the findings of this study showed that a few teenage mothers were confined in adult prisons. The findings of this study are in agreement with the observation that the number of girls in the juvenile justice system has increased dramatically in recent years despite the fact that the proportion of girls in prison within the women's prison population is low (Bastick & Townhead, 2007). In the United States of America, for instance, girls currently comprise about 25% of the total population in juvenile justice facilities (Kelly et al., 2007). Older women (older than 50 years) in prison represent a small proportion of the overall female prison population as well (WHO, 2009). Similar trends were observed in this study, women below 18 years of age and those above 50 years of age were the minority. Most of the mothers in this study were aged between 19 and 55 years. The findings of this study compare with those by Omukhweso (2007) conducted in selected women prisons in Kenya indicating that most mothers in prison are young.

The main occupation by a large number of the respondents was petty trade. A United Nations report on human rights and refugee programme (Taylor 2004), observed that, across the globe women are more often imprisoned for drug related offences than any other capital offences unlike in this study.

In many countries, the number of women held in pre-trial detention is equivalent to or even larger than the number of convicted female prisoners (United Nations Office on Drugs and Crime, 2008). However, in this study those convicted were the majority; this is likely to influence the nutritional status of children. In the Kenya prisons, most women awaiting trial spend more time with their children compared to those already sentenced (observations made by the research team during the visits).

Marital status is known to influence the quality of care given to the child because both the parents are able to contribute to the care of the child by providing the basic needs, psychological support and general welfare of the child (PAHO, 2003). Compared to the general population, women under criminal justice supervision are more likely to have never been married (Bloom & Owen, 2002). However, the findings in this study showed that half of the mothers were married. With reference to the KNBS and ICF Macro (2010) findings where (79.3%) of respondents were reported married, the findings in this study show a smaller percentage of the married population. The findings of this study compare with those by Omukhweso (2007) in selected women prisons in Kenya.

The findings of this study showed mothers had varied levels of education ranging from no schooling to university degrees. Most of the mothers had primary level education while slightly more than one-quarter had secondary education. A study by Omukhweso

(2007), showed similar findings. Education has influence on the kind of care a child receives although in prison set up where resources are constrained this may not have any impact (Robertson, 2008). Maternal level of education in this study had a significant relationship with nutritional status (underweight and wasting). More children whose mothers had formal schooling were underweight and wasted. Therefore the circumstances in prisons may have had a greater influence because women did not have much choice in terms of care and infant feeding practices.

5.3 Infant and Young Child Feeding Practices

5.3.1 Breastfeeding Practices

Breastfeeding can enable 'eye-to-eye contact, physical closeness and emotional bonding, essential for optimal child growth and development (WHO, 2010). Early initiation of breastfeeding serves as the starting point for the continuum of care for the mother and the new born that can have long-lasting effects on health and development (AED *et al.*, 2010). The findings in this study showed that more than half of the children were initiated to the breast within one hour of birth. The results do not differ much from those of general population in Kenya 58% (KNBS & ICF Macro, 2010). This is because most of the children are delivered in the same hospitals as the general population thus subjected to the same health services.

In low-resource settings where infection causes a large proportion of new-born deaths, exclusive breastfeeding can substantially reduce child mortality (WHO *et al.*, 2010). Prison set ups have been described as a low-resource setting with high cases of morbidity due to overcrowding and other aggravating factors (Roberson, 2008). Mothers, who

deliver while in incarceration, need support to initiate breastfeeding within the first hour of birth. As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health (UNICEF, 2011). Based on a 24 hour recall most of the infants less than 6 months of age in this study had been exclusively breastfed. This figure was below the WHO 90% acceptable rate (WHO, 2008).

Exclusive breastfeeding rate in this study was higher than the national rate for general population in Kenya at 32% (KNBS & ICF Macro, 2010). This is probably because of the relatively small sample size in this study. The higher prevalence of EBF in prison may also be attributed to the support given to mothers with infants 0-3 months. It was reported during the key informant interviews that;

“Mothers with infants below three months are not given routine duties in order to breastfeed and bond with their infants” (Key Informant Interviews with mothers in Prisons in Kenya, June/July 2011).

It is suggested that the same consideration should be extended to all the mothers with infants below six months. More so, they should not be allocated duties out of the prison grounds. This sentiment was echoed by the mothers as demonstrated in the following statement.

“Some of us are allocated duties away from prison grounds and we leave our children at 7 am in the morning, come back briefly for lunch and for roll call at around 12.30 pm, then go back to work for the afternoon until 4pm. We therefore have no option but to give

our children milk and porridge so that they do not cry and stay hungry” (Personal Interview with woman, Kakamega Women Prison, Kenya, July 2011). The findings of this study differ with those by Omukhweso (2007) where EBF was practiced by a minority. This may be as a result of reforms undertaken in prison in recent years after Omukhweso’s study. In Brazil, incarceration units for women are legally obliged to have nursery rooms where babies can be breastfed until 6 months of age, (Robertson, 2011).

Evidence of health benefits of continued breastfeeding from 6 to 23 months points to continued protection against illness such as diarrhoea and respiratory infection (UNICEF, 2011). Continued breastfeeding at 1 year for this study was high. The results of this study compare with those by Murage *et al.*, (2011) in urban informal settlement in Nairobi where continued breastfeeding at 1 year was (85%). They also compare with the KNBS & ICF Macro (2010) of (84%). This means that being in prison did not negatively influence maternal practice of breastfeeding at 1 year. Breastfeeding at 2 years was practiced by more than half of the respondents. This compares with 59% KNBS and ICF Macro, 2010).

5.3.2 Complementary Feeding Practices

Most of the children had been introduced to solid and semi-solids foods by the age of 6 months as per the recommendations by WHO and UNICEF (2010). Delaying the introduction of complementary feeds is likely to affect the nutrition status since breast-milk alone at six months is not adequate to maintain an infant in the right nutrition status (WHO, 2006). Studies in Kenya have shown porridge to be the main cereal introduced to children (Murage *et al.*, 2010 & Chelimo, 2008). In prisons in Kenya, children are served

with porridge as the main breakfast meal. These findings are in agreement with those by Omukhweso (2007) where a majority (85%) of the children 6 months of age had been appropriately introduced to solids, semi-solids and soft foods.

Slightly more than half of the children met the recommended minimum dietary diversity of four or more out of seven food groups (WHO, 2007). The diet served in the prisons comprised mostly of starchy/carbohydrate foods. Cabbage was served daily with some prisons serving kales once or twice a week. Meat was served thrice in a week; however, all the prisons served beans daily. In all the prisons, a cup of milk was offered to the children. A combination of these food groups contributed to half of the children meeting the recommended dietary diversity. The findings compare with the Kenya national rate of 58% of the children 6-23 months old having attained the minimum dietary diversity (KNBS and ICF Macro, 2010).

The frequency of feeding is an important indicator for the attainment of adequate dietary intake and therefore health and nutritional status. In all the prisons visited the children were served with 3 meals and at least 2 snacks per day. Therefore meeting the recommended meal frequency in prison set up among the breast-fed children was not an area of concern. Of concern is the frequency of meals served to non-breastfed children, who ate the same number of meals as their breast-fed counterparts despite the fact that they need to eat more times since they do not get additional nutrients from breastfeeding. No special consideration is given to these children. The finding compare closely with the Kenya national rate which reported minimum meal frequency of (44%) among children 6-59 months (KNBS and ICF Macro (2010). The meals were however served within very

short intervals in all the prisons; breakfast was served at 8 am, 10'oclock snack at 11am, lunch at 12.30 pm, dinner at 3.30 pm together with the evening snack (Observation made during the study period by Researcher). Meals served within such intervals may interfere with nutrient utilization in the body leading to malnutrition.

5.4 Morbidity and Health Care Practices

5.4.1 Morbidity prevalence among children 0-59 months

The most common childhood illnesses reported by the majority of mothers were those related to the acute respiratory tract infections (ARI). This could be associated to harsh prison conditions such as overcrowding and exposure to extreme temperatures especially at night. None of the prisons isolated a child when sick. Other aggravating factors cited during the focus group discussions were; *lack of beds within the cells for mothers with babies*. Langata women prison was the only facility with beds in the cells (Observation by the research team June 2011). *Children lacked warm clothing exposing them to excess cold weather at night and during cold seasons, dusty and cold floors within the cells; congestion in some facilities* (Reports from FGDs, June/July 2011). Similar observations were reported by Omukhweso (2007).

The prevalence of diarrhoeal diseases and vomiting was also common and could be associated with inappropriate sanitary habits according to the FGDs with the mothers. Only a small proportion of children had access to treated/boiled drinking water. Caretakers reported the failure to wash hands before feeding the children. The use of soap was found to be uncommon in the practice of washing of hands. These factors

increased the risks of contamination. These findings compare with those by Omukhweso (2007) in prisons in Kenya where the prevalence of diarrhoeal diseases was 32%.

Skin infections and infestations are common in a prison environment. The prison is in dynamic equilibrium with the larger society. Hence, it serves as a reservoir of infections which can spread to the larger society (Oninla & Onayemi, 2012). The occurrences were perceived to be associated with poor hygienic conditions arising from irregular bathing among the children. This was occasioned by lack of warm water for bathing babies among others as reported by respondents during the interviews.

5.4.2 Immunization status

The immunization coverage for the children in the prisons was good. There was a higher coverage for children fully immunized compared to the Kenya national rate. The higher coverage in prisons could be associated with the provision of services within the institutions and the referral systems where the services are not available.

5.4.3 Health care practices in prisons in Kenya

As a whole, the health care practices in the Kenya prisons are adequate. The study found that in the event of sickness, (91.7%) of the children was taken to the prison dispensaries for medical care. Every prison was found to have its own dispensary situated on the male (main) wing of the prison except in the case of Langata prison which is purely a women's prison. Through key informant interviews, it was established that the drug kits in the dispensaries were supplied by the Ministry of Public Health and Sanitation or Ministry of Medical Services which also seconded its technical staff to work in the prison dispensaries.

Whenever necessary, the women and their children were referred to the civilian/public health facilities where treatment was free. The drugs supplies were done by the government. In case where there were no drugs in the health facilities, the prison administration or the prisoners themselves or well -wishers purchased the drugs. However, all the administrators conceded that the money allocated by the government for pharmaceuticals and non-pharmaceuticals was not sufficient. More than half of the respondents concurred that prisons were faced with frequent essential drugs stock outs. Nevertheless the majority of mothers were satisfied with the quality of health care within the prison dispensaries and the civilian referral hospitals.

In all the prisons, mothers were provided with insect side treated mosquito nets. Despite this only Langata Women's Prison had beds. The other prisons reported difficulties in fixing the nets with some inmates opting to take the nets home. Based on the FGD findings, increased frequency of feeding during illness is not practiced thus putting the child at an increased risk of malnutrition.

Key informant interviews with the Officers-In-Charge of prisons revealed that there were a total of 7 clinical officers in all the 8 prisons and one Medical Officer working on part time basis at Langata women prison. There were a total of 25 nurses and 5 laboratory technicians and 10 VCT counsellors, Kisii prison had one prison officer trained and working as a clinical officer. Langata women prison had a nutritionist attached to the facility with the rest of prisons not having access to nutrition services.

5.5 Nutritional status of children 6-59 months old in prisons in Kenya

In Kenya, an unacceptably high number of children (1.8million) are classified as chronically undernourished. Chronic and acute malnutrition are prevalent, particularly among the rural populations and the urban poor (MOPHS, 2010). Currently, in Kenya 35% of children under-five years are stunted, (16%) underweight and (7%) wasted (KNBS & ICF Macro, 2010)

The prevalence of the three forms of malnutrition in this study was lower than the Kenya national levels (KNBS & ICF Macro, 2010). However, wasting was higher than the WHO acceptable level of 2% and stunting higher than the acceptable levels of 17%. Underweight was within the acceptable rates of 11% (WHO, 1995). Wasting and underweight were lower than the findings by Omukhweso (2007) in the prisons in Kenya. Chronic mal-nutrition was however higher in this study than that in the study by Omukhweso. The lower level in this study may be associated with the provision of regular meals served in prisons in Kenya. During Omukhwesos' study children were served with three meals only (Omukhweso, 2007). The lower levels of nutritional status in this study could also be attributed to the positive changes made in prisons in Kenya on provision of meals for children, health care practices among others (Ministry of Foreign Affairs, 2009). The lower levels in nutritional status in comparison with national figures may be attributed to the smaller sample size in this study.

The nutritional status of children is important as it determines their health, physical growth and development, academic performance and progress in life. All the children have the right to adequate nutrition, which is essential for attainment of the highest

standard of health (Ruwali, 2011). Even though the prevalence of all the three forms of malnutrition in this study was lower than the national levels, studies in prison have not yet established the effects of continued exposure to prison environment on children health and nutritional status outcome.

5.6 Relationship between nutritional status of children 6-59 months old and other study variables

5.6.1 Dietary Practices and nutritional status of the children

Achievement of the minimum dietary diversity, minimum meal frequency and minimum acceptable diet is associated with better nutritional status of children. Children who did not meet these recommendations were more likely to be undernourished. Underweight in this study showed a significant relationship with the three indices. Stunting and wasting did not show any relationship. A study in Ghana showed similar findings were weight-for-age was significantly associated with dietary practices (Nti, 2011). Studies in prisons have not yet established the link between nutritional status and these indicators.

5.6.2 Morbidity prevalence and nutritional status of children

In this study reports of illness during the past 14 days of study were similar to the prevalence rates among children in general population in Kenya (KNBS & ICF Macro, 2010). The synergistic cycle of illness and malnutrition is common thus a significant relationship with nutritional status (underweight). Children who were reported ill in the past 14 days before the study were more likely to be underweight. Increased frequency of feeding during illness is not practiced in prisons in Kenya and this could probably partly explain this occurrence. They hypothesis that there is no significant relationship between

morbidity and nutritional status of children living with incarcerated mothers in selected women prisons in Kenya was therefore rejected.

5.6.3 Maternal socio-economic characteristics and nutritional status of the children

Whereas have shown mother's education to be positively related to the nutritional status of children, not in difficult circumstances as prisons, (KNBS & ICF Macro, 2010; Ojiako *et al.*, 2009) in this study educational level of the mother was not associated with the nutritional status of her child. The converse was true; children belonging to mothers with higher education levels were more likely to be underweight. The lack of positive relationship between maternal education level and the nutritional status of their child was probably due to the low- resource set up in prisons and the limited choices for mothers to feed and take care of their children. All the other maternal socio-economic characteristics did not show any significant relationship with nutritional status of their children. The hypothesis that there is no significant relationship between maternal socio-demographic characteristics and nutritional status among children living with incarcerated mothers in selected women's prisons in Kenya was therefore rejected.

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The nutritional status of children under five years of age is affected by feeding practices, breastfeeding practices, infections, hygiene and sanitation and social-demographic and social-economic factors. This study aimed at assessing the feeding practices and the nutritional status of children aged 0-59 months old who accompany incarcerated mothers in selected prisons in Kenya. The information from this study could be useful to the government and NGOs involved in child survival activities for policy formulation. The information could also be useful for planning intervention programmes for children accompanying their mothers in prison.

5.2 Summary and conclusions of the findings

5.2.1 Demographic and socio-economic characteristics

The results of this study showed that most of the respondents were young married women of primary level of education. Most of the women had been in prison for less than 12 months. More than half of them were already convicted. The main occupation for the majority of the mothers while out of prison was petty trade. The majority of mothers in Kenya prisons could be classified as of low socio-economic backgrounds. The socio-economic backgrounds are based on the highest level of education attained before incarceration and economic status activities engaged in before confinement. The mean length of stay in prison for the majority of mothers was one year.

5.2.2 Health status of the children 0-59 months old

The morbidity burden was high among the children. More than half of them were reported ill two weeks prior to the study. The most prevalent illnesses were acute respiratory infections (ARIs) and diarrhoeal diseases. Even though the mean length of stay in prison for the majority of mothers was one year, continuous exposure of the children to the harsh prison conditions like: lack of beds and beddings; warm clothing; poor sanitary practices; and lack of mosquito nets could worsen the morbidity prevalence and subsequent health and nutrition of their children.

Mothers with children neither reside in separate rooms from the rest of the in-mates nor are they given any special considerations in terms of beds and bedding. Most of the mothers and their children sleep on cold floors putting the children at the risk of ARIs. Provision of warm clothing for the babies is highly depended on well-wishers. In cases where this is not forth-coming such children suffer a great deal.

Young children are not provided with napkins or diapers to use during the day while under the care of other in-mates in the nurseries. This predisposes the children to infections since most of them defecate on floors as potties are also not provided. . This is a risk factor for diarrhoeal diseases.

Health seeking behavior by mothers for their sick children was appropriate with the majority of them seeking assistance from health facilities within 24 hours of the child falling sick.

5.2.3 Infant feeding practices for children 0-23 months old

The majority of children 0-23 months old were still breastfeeding at the time of study. Early initiation of breastfeeding (within 1 hour) was prevalent among the children. About two thirds of the infants less than 6 months old were exclusively breastfed. The majority of the children above 1 year were still breastfeeding. Slightly more than half of the children who were 2 years old were still breastfeeding.

The majority of the children 6-8 months old had been introduced to solids, semi-solids and soft foods. Slightly more than half of the children 6-23 months old met the minimum dietary diversity score of ≤ 4 food groups of the recommended 7 food groups with the minimum meal frequency attained by all the breastfed children 6-8 months old. The majority of the breastfed children 9-23 months old met the recommended meal frequency. Slightly more than one third of the non-breastfed children 6-23 months old met the recommended meal frequency. Among the breastfed children 6-23 months old, less than half attained the WHO (2008) recommended minimum acceptable diet.

The majority of the women continued to breastfeed their children while in prison which is a good practice that should be enhanced. Even though the prevalence of exclusive breastfeeding was higher than the Kenya national level; it is below the WHO (2008) recommended level of 90%. More than half of the breastfed children 6-23 months old having met the WHO recommended minimum dietary diversity, however consumption of iron rich foods and fruits was very low thus exposing the children to the risk of micro-nutrient deficiencies that take long to manifest.

Despite the fact that the minimum frequency of meals was attained by more than half of the children; the meals are served within short intervals with the 1st meal served at 8am and the last meal served at 4 pm. This means that children go for more than 12 hours without any feed that is from evening up to morning. Non -breastfed children are disadvantaged in terms of feeding practices. This is so because no special attention is accorded to them in terms of meal frequency and dietary diversity to compensate for the extra nutrients required to make up for lack breastfeeding. .

5.2.4 The prevalence of malnutrition and associated factors among children 6-59 months of age

The prevalence of undernutrition among children 6-59 months old was as follows; wasting 3.8%, underweight 7.5% while stunting was 21.4%. The prevalence of under nutrition based on the three indices in this study was lower than the Kenya National rates for children 6-59 months old (KDHS & ICF Macro, 2010). Despite this, the rates are below the WHO (1995) recommended acceptable levels for the developing countries with the exception of underweight.

Nutritional status (underweight) showed a positive significant relationship with IYCF indicators; that is the minimum dietary diversity and the minimum acceptable diet. Children who attained the minimum dietary diversity and those who achieved the minimum acceptable diet were less likely to be underweight. Underweight showed a negative relationship with the minimum meal frequency, implying that children who attained the minimum meal frequency were more likely to be underweight. Those children reported ill in the two weeks prior to the study were more likely to be

underweight and wasted. Stunting did not show any significant relationship with any of the study variables.

5.3 Recommendations

The following recommendations are made based on the study findings.

5.3.1 Recommendation for practice

- The prisons authority should allocate duties to mothers with children below six months of age duties within the prison grounds to allow them to continue with exclusive breastfeeding for their children.
- The Ministry of Public Health and Sanitation should train the Kenya Prisons Officers-In-Charge of women prisons on IYCF; as a way of improving such practices in prisons. The Ministry should also solicit for and provide funding to facilitate the provision of appropriate health and nutrition services for children accompanying their mothers in prisons.
- The Prison Authority in conjunction with the Ministry of Health should carry out monthly growth monitoring to detect early onset of malnutrition among children 6-59 months of age for timely intervention to reduce on cases of malnutrition.
- The Prison authorities should provide children with safe, clean drinking water and toilet facilities to reduce cases of diarrheal and other related illnesses.
- Other stakeholders dealing with children issues such as UNICEF and Human Rights Commission should assist the government in lobbying and providing the appropriate services to women prisons holding children. These services include but not limited to,

beds and beddings, warm clothing, diapers or napkin, toiletries especially soap and oils, potties for young children and play equipment for the day care centers.

- The Ministry of Public Health and Sanitation should deploy nutrition officers to provide nutrition information to incarcerated mothers and their children. The nutrition officers should also facilitate the formulation of appropriate menus and to make in put to the budget allocation for provision of meals for the children. The nutritionist should ensure children are regularly growth monitored and dietary diversity and meal frequencies are improved.
- Ministry Of Health to ensure that the children and their mothers have access to Maternal and Child Health services.

5.3.2 Recommendations for policy

- The Ministry of Public Health and Sanitation to categorize children in prisons among children under difficult circumstances and accord them the necessary provisions provided for the children under such circumstances. The current IYCF document does not categorize such children as requiring special attention.
- The government should formulate policies that govern the stay of children in prisons in Kenya. Such policies should include provision of quality health care and nutrition.
- Women offenders with young children should be provided with free bond or sentences that involve community service where applicable. This is in a bid to reduce the increasing number of young children in prisons in Kenya.
- In the new Constitution, children have the right to a name and nationality, free and compulsory basic education, basic nutrition, shelter and health care. Furthermore, Kenya is a signatory of the International Human Rights Commission of which Kenya.

The Kenya government should therefore ensure the rights of children in prisons are not violated.

5.4 Suggestions for further research

- a) Intervention studies to test the efficacy of improving micronutrient content of the diets of children 6-23 months old accompanying their mothers in prisons.
- b) A comparative study on feeding practices and nutritional status of children 0-59 months old accompanying their mothers to prisons with those of free living mothers.

REFERENCES

- Amnesty International. (2005). The state of the world's human rights Kenya. *Harsh Prison Conditions and Deaths in Custody*,. 149-151.
- Abdul-Fadl, Azza A.M., Fahmy, Ehsan M., Kolkaliah, N., Narouz, N. (2005). The psychosocial benefits of continued breastfeeding into second year of mother and child. *Int. J. Ch. Neuropsychiatry*, 2(2): 143-153
- Alejos. M. (2005). Babies and Small Children Residing in Prisons. *Human rights and refugee publication*. 1-5.
- Anderson G.J & G. McLaren. (2012). Iron physiology and pathophysiology in humans. *Nutrition and Health*, 485-2-5.
- Aliyu A., O., Oguntunde, T., Dahiru and T., Raji. (2012). Prevalence and Determinants of Malnutrition among Pre-School Children in Northern Nigeria. *Pakistan Journal of Nutrition* 11 (11): 1092-1095.
- Amegah T Adeladza (2009). The influence of socio-economic and nutritional characteristics on child growth in Kwale District of Kenya. *African Journal of Food and Agriculture Nutrition*, 9, 7.
- Bastick M., & Townhead L. (2008). Women in Prison: A Commentary on the UN Minimum Rules on the Treatment of Prisoners. *Human Rights and Refugee Publication*, 8- 11
- Bastick. M. (2005) *Women in Prison: a commentary on the Standard Minimum Rules for the Treatment of Prisoners* (discussion draft – final version forthcoming)
- Bloss, E., Wainaina, F., & Bailey, B. C. (2004). Prevalence and predictors of underweight, stunting, and wasting among children aged 5 and under in Western Kenya. *Journal of Tropical Pediatrics*, 50, 260–70.
- Bloom B., & Owen B. (2002). Research, practice and guiding principles for women offenders. *National Institute of Corrections*.
- Bhan, R. (2010). Complementary Feeding. *Indian Journal for the Practicing Doctor*, 1(1), 2004-09 - 2004-10.
- Bryce, J., Boschi-Pinto, C., Shibuya, K., & Black, R. E. (2005). WHO estimates of the causes of death in children. *The Lancet*, 365(9465), 1147-1152.
- Borstal Institutions Act CAP 92 (2009). Laws of Kenya.

- Bureau of Democracy, Human Right, and Labour. (2003). Country Reports on Human Rights Practice. www.tate.gov/g/drl/rls/hrrpt.
- Caulfield, L. E., Onis, M., Blossner, M., & Black, R. E. (2004). Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles. *American Journal of Clinical Nutrition*, 80(1,) 193-198.
- Comité International de l'Ordre de Malte, (2008). Helping children living in prisons. Annual report, 1-4.
- Chelimo, F.L. (2008). Assessment of complementary feeding practices and nutritional status among children in Athi-river, Machakos District Kenya.
- Chudasama, R. K., Amin, C. D., & Parikh, Y. N. (2009). Prevalence of exclusive breastfeeding and its determinants in first 6 months of life: A prospective study. *Journal of Health Allied Sciences*, 8(1), 3.
- Grantham-McGregor, S., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L., & Strupp, B. (2007). Developmental potential in the first 5 years for children in developing countries. *The Lancet*, 369(9555), 60-70.
- Ghana Statistical Service & Macro International. (2004). Effect of community-based promotion of exclusive breastfeeding on diarrhoeal illness and growth: a cluster randomized controlled trial. *Ghana Demographic and Health Survey 2003. 2004. Statistical Review Number 6*, N.Y.
- Howard. C., (2003). Main Issues Facing Brazil's Women Prisoners. (*unpublished paper*)
- IBFAN. (2011). Children of incarcerated parents. Considerations on Infant and Young Child Feeding, 1-6.
- Julia G. S. & Jennifer F. (2011) "Iron Deficiency Anemia: Focus on Infectious Diseases in Lesser Developed Countries," *Anemia*, Article ID 260380. doi:10.1155/2011/260380
- Jones, G., Steketee, R. W., Black, R. E., Bhutta, Z. A., & Morris, S. S. (2003). How many child deaths can we prevent this year? *The Lancet*, 362, 65-71.
- Kenya National Bureau of Statistics. (2003). *Kenya Health and Demographic Survey*. KNBS, KE 9-11.
- Kenya National Bureau of Statistics & ICF Macro (2010). *Kenya Health and Demographic Survey*. Calvarton, Maryland: KNBS and ICF Macro.
- Kenya Human Rights Commission. (1996). Prisons Project: A Death Sentence; *Prison Conditions in Kenya; the Prison system now*, 25-89

- Kelly P et al. (2007). Health interventions with girls in the juvenile justice system. *Women's Health Issues*, 7:227–236.
- Kumar Dinesh., Goel, N. K., Mittal, P. C., & Misra, P. (2007). Influence of infant-feeding practices on nutritional status of under-five children. *Indian Journal Pediatrics*, 2(73), 417–21.
- Kramer M.S. & Kakuma R. (2004). The optimal duration of exclusive breastfeeding: a systematic review. *Advanced Experimental Medical Biology*, 554:63-77.
- Liz A., Kate P. & Marielle R. (2006) Children of Imprisoned Parents. *European Perspectives on Good Practice (EUROCHIPS)* 72.
- Maya., R., (2004). Discriminación en el sistema judicial afecta a mujeres. *CDHDF* (29/11/02) from www.cimac.com, Accessed on (4/3/2012).
- Mamiro, P. S., Kolesteren, P., Roberfroid, D., Tatala, S., Opsomer, A. S., & Van Camp, J. H., (2005). Feeding practices and factors contributing to wasting, stunting, and iron-deficiency anaemia among 3–23-month old children in Kilosa District, rural Tanzania. *Journal of Health Populations Nutrition*, 23, 222–30.
- Malla, S., & Shrestha, S. M. (2004). Complementary Feeding Practices and its Impact on Nutritional Status of under Two Old Children in Urban Areas of the Kathmandu, Nepal. *Journal of Nepal Health Research Council*, 2 (1).
- Manesh, A. O., Trevor, A. S., Pickett, K. E. & Carr-Hill, R. (2008). Accuracy of child morbidity data in demographic and health surveys. *International Journal of Epidemiology*, 37, 194-200
- Miller, J. E., & Rodgers, Y. V. (2009). Mother's Education and Children's Nutritional Status: *New Evidence from Cambodia Asian Development Review*, 26(1), 131–165.
- Ministry of Public Health and Sanitation. (2010). National Strategy on Infant and Young Child Feeding. 2007-2010.
- Murage E., Madise N.J. Jean-Christophe F., Catherine K., Martin M.K., Gitau T.G. & Nelly Y. (2011). Patterns and determinants of breastfeeding and complementary feeding practices in urban informal settlements, Nairobi Kenya *BMC Public Health*, 11:396 doi: 10.1186/1471-2458-11-396
- Muchina. E. N. & Waithaka. P.M. (2010). Relationship between Breastfeeding Practices and Nutritional Status of Children Aged 0-24 Months in Nairobi, Kenya.
- Nti C. Dietary diversity is associated with nutrient intakes and nutritional status of children in Ghana. (2011). *Asian Journal of Medical Sciences*, 2 (105-109).

- Oche M.O., Umar A.S. & Ahmed. (2011). Mothers, breastfeeding, knowledge & practice, Kware. *African Health Sciences*. 11(3) 518 – 523
- Oliver R. (2008). Children imprisoned by circumstance. Human rights and refugee publication
- Ojiako I., A., Manyong, V., & Ikpi, A. E. (2009). Determinants of Nutritional Status of Preschool Children from Rural Households in Kaduna and Kano States. *Nigeria Pakistan Journal of Nutrition* 8 (9), 1497-1505.
- Omukhweso S., O. (2007) The relationship between prison conditions and the nutritional status of the children accompanying their mothers in prisons in Kenya.(*unpublished thesis from University of Nairobi*)
- Oninla, O. A. and Onayemi, O. (2012). Skin infections and infestations in prison inmates. *International Journal of Dermatology*, 51: 178–181
- Owino, V. O., Amadi, B., Sinkala, M., Filteau, S., & Tomkins, A. (2008). Complementary feeding practices and nutrient intake from habitual complementary foods of infants and children aged 6-18 months old in Lusaka, Zambia. *African Journal of Food, Agriculture, Nutrition and Development*, 8(1), 28-47.
- Pelto, G. H., Levitt, E., & Thairu, L. (2003). Improving feeding practices: current patterns, common constraints, and the design of interventions. *Food and Nutrition Bulletin*, 24(1), 45-82.
- Parada, C. M.,Carvalhaes, M. A., & Milena, T. J. (2007). Complementary feeding practices to children during their first year of life. *Revista Latino-Americana Enfermagem*, 15(2), 282-289.
- Poso T., Rosi E & Tarja V. (2010). Children residing in prison: An example of institutional invisibility. *The Prison Journal*, 90(4) 516–533
- PAHO. (2003). Guiding principles for complementary feeding of the breastfed child. 8-26.
- Ramji, S. (2009). Impact of infant and young child feeding and caring practices on nutritional status and health. *Indian Journal Medical Research*, 130, 624-626.
- Ruwali D. (2011). Nutritional Status of Children under Five Years of Age and Factors Associated in Padampur VDC, Chitwan. *Research Article*.
- Quaker Council for European Affairs. (2007). Women in prison: a review of the conditions in Member States of the Council of Europe. *Brussels, Quaker Council for European Affairs*.
- Republic of Kenya. (2009). Kenya Gazette Legislative Supplement No 21: Legal Notice No. 540 of 2009, *First schedule A. Government printers, Nairobi*, 1282.

- Senanayake M., P., Kudalugoda JA. & Wckremasingh V.P (2009). Children of imprisoned mothers. *The Ceylon Medical Journal*, 46, 02.
- Taylor. R., (2004) *Women in Prison and Children of Imprisoned Mothers: Preliminary Research Paper*
- UNICEF, (2009). The State of the World's children. *New York Institute of Technology, N.Y*, 8-28).
- United Nations, (1977). *UN Standard Minimum Rules for Treatment of Prisoners*. ESC/RES/663 C (XXIV), 31.
- United Nations Office on Drugs and Crime (2008). UNODC handbook for prison managers and policymakers on women and imprisonment. *Vienna, United Nations Office on Drugs and Crime*.
- UNICEF. (2011) *Infant and Young Child Feeding. Program guide*. 1-10.
- USAID/ UNICEF/ WHO, (2010). Indicators for assessing infant and young child feeding practices. *Part 3, country profiles WHO press, Geneva*, 11-23.
- Victoria CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, Sachdev HS. (2008). Maternal and Child Undernutrition Study G: Maternal and child undernutrition: consequences for adult health and human capital. *Lancet*, 371:340357
- Victoria CG, de Onis M, Hallal PC, Blossner M, Shrimpton R. (2010). Worldwide timing of growth faltering: revisiting implications for interventions. *Paediatrics*, 125:3473-80.
- Walker, S. P., Wachs, T. D., Gardner, J. M., Lozoff, B., Wasserman, G. A., Pollitt, E., & Carter, J. A. (2007). Child development: risk factors for adverse outcomes in developing countries. *The Lancet*, 369 (9556), 145-157.
- Wamani, H., Astrom, A. N., Peterson, S., Thorkild T., T., & Tumwine, J. K. (2005). Infant and Young Child Feeding in Western Uganda: Knowledge, Practices and Socio-economic Correlates. *Journal of Tropical Pediatrics*, 51(6), 356-361.
- Walmsley. R., (2007). *World Prison Population List, Sixth Edition*, (London: *International Centre for Prison*).
- WHO. (2010). Impact of early Initiation of Exclusive breastfeeding on New Born Deaths. *A&T Technical Brief (1)*, 1-6.
- WHO. (2010). *Infant and Young Child Feeding. Fact Sheet N 342*.
- WHO/ UNICEF/ USAID, (2004). *National Guidelines on Infant and Young Child Feeding Practices*. WHO press, Geneva.

WHO/ UNICEF, (2003). Global Strategy for Infant and Young Child Feeding. *WHO press, Geneva.*

WHO, UNICEF, IFPRI, UC Davis, USAID, FANTA, Macro International. (2008). Indicators for assessing infant and young child feeding practices. *WHO press, Geneva.*

WHO, UNICEF, IFPRI, UC Davis, USAID, FANTA 2, AED. (2010). Macro International, (2010). Indicators for Assessing Infant and Young Child Feeding Practices Part 3 Country Profiles. *Geneva, World Health Organization press.* 6-59

Zhang S., J., Wang, Y., Caulfield, L. E., Guyer, B. (2010). Effectiveness of an educational intervention on complementary feeding practices and growth in rural China: a cluster randomized controlled trial. *Public Health Nutrition 13(4), 556-65.*

APPENDIX 1: INTRODUCTORY NOTE AND INFORMED CONSENT**FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN 0-59 MONTHS OF AGE ACCOMPANING INCARCERATED MOTHERS IN SELECTED WOMEN'S PRISONS IN KENYA**

How are you?

My names are Mary N Makau, I am a post-graduate student of Kenyatta University school of Applied Human Sciences. I am carrying out a study on infant and young child feeding practices and nutritional status of children 0-59 months incarcerated within the various women's prisons in Kenya. The purpose of this study is to determine the child feeding practices and the nutritional status; therefore all the children between 0-59 months will be included. Your child is among them, if you don't mind you will be interviewed and weight and height for your child taken. Your responses will be taken with a lot of confidentiality and will only be used for the sole purpose of this study. The results of the entire study will however be availed to any interested respondents.

I would like to know if you agree to participate. 1=Yes 2= No. If yes I kindly sign below.

Signature:_____

APPENDIX 2: DATA COLLECTING TOOLS/INSTRUMENTS**INSTRUMENT1: STRUCTURED QUESTIONNAIRE****FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN 0-59
MONTHS OF AGE ACCOMPANING INCARCERATED MOTHERS IN
SELECTED WOMEN'S PRISONS IN KENYA**

SECTION 1: IDENTIFICATION INFORMATION	
1.1 District Name:	_____
1.2 Prisons Name:	_____
1.3 Questionnaire number	<input type="checkbox"/>
1.4 Respondent ID	<input type="checkbox"/>
1.5 Interview results:	<input type="checkbox"/>
1=Completed 2=Partially Done 3=Not done	
1.6 Enumerator Names: 1.	_____
	2. _____
Date of Interview:	_____
1.8 Date reviewed:	_____
1.9 Name of reviewer:	_____

SECTION 2: DEMOGRAPHIC AND SOCIAL ECONOMIC CHARACTERISTICS

I would like to ask you a few questions about yourself.

Person ID	Person's Name	Age in years	Sex:	Marital status 1=Married 2=Divorced 3=Single	Years incarcerated	Nature of stay: 1= serving sentence 2= Remand	Main occupation before incarceration: See codes below	Highest Level of education attained. 1=Primary 2=Secondary 3=College 4=University 5=Others:.....	Sources of income while incarcerated. Name only 2 main See codes
2.1	2.2	2.3	2.4	2.5	2.6		2.7	2.8	2.9

Codes for 2.7

- 1=Employed (salaried)
- 2= Waged labor (casual)
- 3=Business Person
- 4=Housewife
- 5=Petty trade
- 6=Domestic help
- 7=Unemployed
- 8=Others(Specify).....

Codes for 2.9

- 1=Own savings
- 2=Family contributions
- 3=Petty trade within
- 4=Support from the government
- 5=None
- 6=Others (specify).....

SECTION 3.0: WATER CONSUMPTION AND SANITATION

3.1 What is your main current water source for consumption?

House hold use?

1= River 2= Water tap 3= unprotected well 4=protected well 5=Borehole 6=others

specify.....

3.2 What do you do to the water before giving it to the baby?

1=Boiling 2=Use water treatment 3= Nothing

3.3 Is the water adequate for all the household use? 1=always

2=sometimes 3=rarely

3.4 What type of toilet does the facility have?

1=Bucket 2=Traditional pit latrine 3=Flush toilet

3.5 Is there hand washing facility near the toilet? 1=Yes 2= No

If yes is the water always available 1=Yes 2 =sometimes 3= Never

3.6 On what occasions do you usually wash your hands, (tick all that apply)

1= Before eating 2=After defecating

3=Before feeding the baby 4=Before breastfeeding

5=After cleaning baby's bottom 6=others (specify)

3.7 On what occasions you usually use soap when washing hands?

1= Before eating 2=After defecating

3=Before feeding the baby 4=Before breastfeeding

5=After cleaning baby's bottom 6=others (specify)

SECTION 5: FEEDING PATTERN: for children 0-23 months

Child ID	Child Name	Age in months	Did you ever breastfeed(Name) 1= Yes(go to 3.5) 2= No 3=Don't know	If No why (see codes)	If yes how soon after birth.(see codes)	During the 1 st three days after delivery did you give (name) the fluid that came out of your breast. 1=Yes, 2= No, 3= Don't know	In the 1 st days after delivery, was (Name) given anything to drink other than breastmilk? See codes below	Are you still breastfeeding (Name) 1= Yes 2= No	
5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	
		5.5 codes 1= No milk 2= Did not want to breastfeed 3=Traditional beliefs 4=Had to go back to work 5= Mother with chronic illness 6= Child separated from mother			Codes for 5.6 1= within one hour 2=less than 24 hours 3= less than 3 days 4= more than 3 days 5= does not know		Codes for 5.8 1=plain water 2= sugar water or glucose water 3= powdered milk or fresh milk 4= infant formula 5= gripe water 6= nothing given 7 = others specify		

SECTION 6: HEALTH AND CARE PRACTICES

Child ID	Child name	Age in months	During the past 2 weeks did (Name) suffer from any illness or injury? 1=Yes 2=No (go to the next child)	For how many days did (Name) suffer due to illness or injury during the past 2 weeks? No. of days (1-14)	Can you describe the symptoms that primarily suffered from the major illness or injury during the past 2 weeks? Main symptoms		Was anyone consulted for the major illness or injury during the past 2 weeks? 1=Yes (go to 2.8 2=No (go to 2.7	Why was no one consulted for the major illness? See codes below	How soon did you seek assistance? 1= within 24hrs 2=After 24 hrs.	Where did you go for the first consultation during the past 2 weeks? 1=Public clinic 2=Private clinic 3=Send for medicine 4=Friend/Relative 5=others (specify)
6.1	6.2	6.3	6.4	6.5	6.6		6.7	6.8	6.9	6.10
					6.6a	6.6b				

Code for question 6.6

- 1=Diarrhea (acute)
- 2=Fever (acute)
- 3=Difficult breathing
- 4=Diarrhea (chronic)
- 5=Skin infection

- 6= Measles
- 7= Malaria
- 8= Vomiting

- 9=Coughing
- 10=Others (Specify).....

Codes for question 6.7

- 1= mild illness
- 2= Staff attitude
- 3= No medicine
- 4= Others (Specify).....

INSTRUMENT 2: FOCUS GROUP DISCUSSION GUIDE

FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN 0-59 MONTHS OF AGE ACCOMPANING INCARCERATED MOTHERS IN SELECTED WOMEN'S PRISONS IN KENYA

All information obtained from participants will be treated in confidence and shall not be diverted to any other interest group or individual other than for the purposes of this study. Where anonymity is requested, such shall be guaranteed. The interview will be tape-recorded. Information obtained from the participant(s) will be treated with confidence and only used for the purposes of this study. Anonymity will be guaranteed.

A group of 8-12 imprisoned mothers will form the FDG in each prison. The purpose for the FGD will be to guide the women to discuss freely and in-depth about their personal experiences and challenges as prisoners accompanied by their babies. The discussion will be guided by the principle researcher who will tape-record the views. Pseudo-names will be used by discussants for purposes of ensuring privacy.

THEMES	ISSUES TO BE DELEBARATED
1. Concerns	What are the general concerns about children in prisons?
2. Feeding practices	<p>What are the:</p> <p>a) Challenges facing breastfeeding in prison?</p> <p>b) Challenges facing continued breastfeeding?</p> <p>c) Challenges facing complementary feeding?</p>

	<ul style="list-style-type: none"> d) Types of foods offered to children? e) Frequency of feeds? f) Consistency and diversity of meals?
3. Medical care	<ul style="list-style-type: none"> a) Common health problems facing children and possible causes? b) Health care seeking behavior? c) How is the quality of care: Drugs availability, staffing norm, equipment, supplies, referrals, procedure for accessing health care, cleanliness, staff attitude, and client satisfaction? d) Are there any of mortality? What are the possible causes in your view?
4. Water and Sanitation	<ul style="list-style-type: none"> a) What is the source of water? b) How is the availability and safety? c) What is the condition of sanitation in the sleeping areas, kitchen, bathroom, toilet, laundry area and the surrounding environment? d) Do you have waste disposal facilities?

	<p>e) What can you say about toilet facilities?</p> <p>f) What is done to the drinking water in terms of making it safe for consumption?</p>
--	--

INSTRUMENT 3: KEY INFORMANT INTERVIEW SCHEDULE**FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN 0-59 MONTHS OF AGE ACCOMPANING INCARCERATED MOTHERS IN SELECTED WOMEN'S PRISONS IN KENYA**

The interview will be tape-recorded. Information obtained from the participant(s) will be treated with confidence and only used for the purposes of this study. Anonymity will be guaranteed.

1. What is your position in the organization?
2. How long have you worked in Kenya prisons? What about in this facility?
3. How many prisoners are in the facility currently?
4. What is the recommended capacity?
5. What is the average number monthly of children 0-59 months accompanying their mothers in prison?
6. What particular problems do these children and their mothers face in prison?
7. Does the prison have health care staff? What are the number and cadre? What is their role? Do you consider them adequate?
8. Feeding practices:
 - a) How does the facility support mothers who are breastfeeding? PROBE for diet of mothers, mothers sleeping with children to facilitate breastfeeding, mothers being with babies all the time to facilitate feeding on demand etc

- b) What considerations does the facility put in place as far as feeding the children is concerned? Need to probe for; type of food, frequency of feeding, feeding of sick children etc?
9. What health services are available to the children? How does the facility ensure quality of care for any sick children? PROBE for; health services availability at the prison,
10. Water and sanitation: how accessible and available is water to prisoners?(*probe for source, supply safety and quantity per head*)
- How does the facility ensure safe disposal of waste (*probe for incinerators, disposal pits, and waste baskets*’). RELATE THIS specifically to child care issues
11. In your view should children stay with imprisoned mothers?
12. Do you feel that the services available in terms of feeding, health and general welfare of the children are adequate? What else could be done to improve on the welfare of the children? PLEASE PROBE ON THE ROLE OF THE GOVT.
13. Does the institution face any challenges in the care of children staying with their imprisoned mothers? Are there institution policies on child feeding, nutrition and health services for children?

INSTRUMENT 4: OBSERVATION CHECKLIST

Tick appropriately.

OBSERVATION	YES	NO
Are the sleeping rooms clean?		
Are there beds for babies?		
Are the beddings clean?		
Is the room where babies sleep adequately ventilated?		
Is the sleeping area adequate for mothers and babies?		
Are there mosquito nets provided for mothers with babies		
Is there hand washing facility next to the lavatory area?		
If yes do they have water?		
Is the surrounding area clean?		

APPENDIX 3: RESEARCH BUDGET**FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN 0-59 MONTHS OF AGE ACCOMPANING INCARCERATED MOTHERS IN SELECTED WOMEN'S PRISONS IN KENYA**

Activity	Quantity	Unit Cost	Total
Concept Paper binding	10 copies of 10 pages	30/=	300/=
Proposal Writing binding	4 copies of 30 pages	40/=	400/=
Summary copies binding	10 copies of 30 pages	40/=	400/=
Black Cartridge	5 cartridges	1800/=	9,000/=
Photocopying papers	10 Reams	500/=	5,000/=
Instruments for pre-testing			2,000/=
Transport during pre-testing	3 days, 3 persons	500/=	4,500/=
Data collection Instruments			3,000/=
Training assistants	2 assistants for 3 days	500 per day	3,000/=
Transport and accommodation during data collection	2 assistants for 30 days	500/= per day	30,000/=
Transport and accommodation during data collection	30 days	2000/=per day	60,000/=
Data coding, entry and analysis	70 copies	200 per page	14,000/=
Statistical services			30,000/=
Binding thesis	4 copies	250/=	2,000/=
Data collection equipment			15,000/=
Miscellaneous			25,000/=
			217,000/=

