Evaluation of two counseling strategies promoting exclusivebreastfeeding among HIV-negative mothers in Kibera slum, Nairobi, Kenya: A randomized controlled trial

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Declaration

By submitting this dissertation electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

Objectives: To determine the impact of facility-based semi-intensive and home-based intensive counseling strategies to improve exclusive breastfeeding rates and to identify factors associated with exclusive breastfeeding.

Methods: This was a randomized trial in which villages in the Kibera slum, Nairobi Kenya were assigned to two intervention groups and a control group. Study participants from among 34-36 week pregnant, HIV-negative women, attending antenatal clinic at Lang'ata health centre, were assigned to study groups and followed up in their homes until 6 months postpartum. Experimental group 1, the Home-Based Intensive Counseling Group (HBICG)] received 7 counseling sessions; 1 prenatally and 6 postnatally. Experimental group 2, the Facility-Based Semi-Intensive Counseling Group (FBSICG) received 1 counseling session prenatally. The control group (Control Group) received irregularly provided health education by health personnel. Information on infant feeding practices, using a validated 24-hour recall questionnaire was collected monthly at participant homes; observations were conducted on a random 10% sub-sample to verify the reported information. Qualitative data from focus group discussions provided information on the rationale for feeding choices. Information on infant morbidity and weight measurements were taken on a monthly basis.

Results: At six months, exclusive breastfeeding rate was 23.6% in HBICG; 9.2% in FBSICG; and 5.6% in CG. Mothers from HBICG had a 4.2 increased likelihood to exclusively breastfeed compared to those in the CG (RR=4.20; 95% CI; 1.66-10.64; p=0.002). Cumulative exclusive breastfeeding rate for 6 months was 3.2% in the CG; and 6.9% and 15.6% in the FBSICG and HBICG respectively (p<0.00001). Mothers from HBICG had a 3.4 increased likelihood to practice exclusive breastfeeding for 6 months compared to those in CG (RR=3.4; 95% CI: 1-34-8.80; p=0.010). Exclusive breastfeeding rates in FBSICG were insignificantly higher than those in the CG. The median duration of exclusive breastfeeding was one month in both the CG and FBSICG and three months in the HBICG. The predictors of exclusive breastfeeding were non-giving of post-lacteal feeds; planned long breastfeeding duration; living in smaller households; non-ownership of telephones and televisions; absence of breast health problems; and correct knowledge of breastfeeding duration. The major hindrances to exclusive breastfeeding were: inadequate knowledge of exclusive breastfeeding; cultural perceptions about infant feeding; and absence of mother from home for long periods. The prevalence of acute respiratory infections and diarrhoea were significantly lower among exclusively breastfed infants than those non-exclusively breastfed. The prevalence of underweight was

significantly lower among the exclusively breastfed infants than those non-exclusively breastfed at one month (p=0.006) and three months (p=0.005).

Conclusions: It is feasible to promote and sustain exclusive breastfeeding for six months in low socio-economic conditions, using the home-based intensive counseling strategy. Breastfeeding promotion programmes should adopt strategies to allow for wider dissemination of information, targeting both mothers and the community at large, as this study showed family members were major decision-makers in the choice of infant feeding practices. Hospital-based breastfeeding education should offer detailed information on a consistent basis. Breastfeeding promotion messages should be re-packaged to address cultural perceptions in infant feeding practices.

ABSTRAK

Doelwitte: Om die impak van fasiliteit-gebaseerde semi-intensiewe en tuis-gebaseerde intensiewe onderrig strategieë op die verbetering van eksklusiewe borsvoeding koers te bepaal en om die faktore te identifiseer wat met eksklusiewe borsvoeding geassosieer word.

Metode: Hierdie was ‘n ewekansige studie waar dorpies in die Kibera krotbuurt, Nairobi Kenia, in twee intervensie groepe en ‘n kontrole groep ingedeel is. Deelnemers was HIV negatiewe vrouens wat 34 – 36 weke swanger was en wat die voorgeboorte kliniek te Lang’ata gesondheid sentrum besoek het. Hulle is ingedeel in die studie groepe en is tuis opgevolg tot 6 maande postpartum. Eksperimentele groep 1, die Tuis-Gebaseerde Intensiewe Onderrig Groep (TGIOG), het 7 onderrig sessies ontvang; 1 voor geboorte en 6 na geboorte. Eksperimentele groep 2, die Fasiliteit-Gebaseerde Semi-Intensiewe Onderrig Groep (FGSIOG) het 1 onderrig sessie voor geboorte ontvang. Die kontrole groep (Kontrole Groep) het gesondheids onderrig deur gesondheidspersoneel op ’n ongereëlde basis ontvang. Inligting omtrent babavoeding praktyke is maandeliks met behulp van ’n gevalideerde 24-uur herroep vraelys by die deelnemers aan huis versamel. Observasies is op ’n ewekansige sub-steekproef van 10% bepaal om die gerapporteerde inligting te verifieer. Kwalitatiewe data is met behulp van fokusgroep besprekings ingesamel om die rasionaal vir keuse van voeding te bepaal. Inligting omtrent kindersterfte en gewig metings is op ’n maandelikse basis bepaal.

Resultate: Op ses maande was die eksklusiewe borsvoeding koers 23.6% in TGIOG; 9.2% in FGSIOG; en 5.6% in KG. Moeders van TGIOG het ‘n 4.2 hoër kans tot eksklusiewe borsvoeding gehad in vergelyking met die KG (RR=4.20; 95% CI; 1.66-10.64; p=0.002). Die kumulatiewe eksklusiewe borsvoeding koers vir 6 maande was 3.2% in die KG; en 6.9% en 15.6% in die FGSIOG en TGIOG respektiewelik (p<0.00001). Moeders van TGIOG het ‘n 3.4 hoër kans gehad om eksklusiewe borsvoeding vir 6 maande te beoefen in vergelyking met die KG (RR=3.4; 95% CI: 1-34-8.80; p=0.010). Die eksklusiewe borsvoeding koers in FGSIOG was nie betekenisvol hoër as in KG nie. Die mediaan duurte van eksklusiewe borsvoeding was 1 maand in beide die KG en FGSIOG en drie maande in die TGIOG. Die voorspellers van eksklusiewe borsvoeding was die gebrek aan post-lakteale voedings; beplande lang borsvoeding duurte; woonagtig in kleiner huishoudings; nie in besit van telefone en televisie; afwesigheid van probleme met borsgesondheid; en korrekte kennis van borsvoeding duurte. Die belangrikste struikelblokke tot eksklusiewe borsvoeding was ontoereikende kennis van eksklusiewe borsvoeding; kulturele persepsies omtrent babavoeding; en uitstedigheid van die moeder van die huis vir lang periodes. Die prevalensie van akute respiratoriese infeksies en diaree was betekenisvol laer onder babas wat eksklusiewe borsvoeding ontvang het in

vergelyking met die wat nie eksklusief geborsvoed is nie. Die prevalensie van ondergewig was betekenisvol laer onder die babas wat eksklusiewe borsvoeding ontvang het in vergelyking met die wat nie eksklusief geborsvoed is nie op 1 maand (p=0.006) en op 3 maande (p=0.005).

Gevolgtrekkings: Dit is moontlik om eksklusiewe borsvoeding vir ses maande te bevorder en onderhou in lae sosio-ekonomiese toestande deur gebruik te maak van die tuis-gebaseerde intensiewe onderrig strategie. Programme ter bevordering van borsvoeding behoort strategieë te gebruik om wyer verspreiding van inligting moontlik te maak en beide moeders en die gemeenskap in die breë behoort geteiken te word aangesien hierdie studie getoon het dat gesinslede belangrike besluitnemers in die keuse van borsvoeding praktyke is. Hospitaal-gebaseerde borsvoeding onderrig behoort volledige inligting op ’n deurlopende basis te verskaf. Boodskappe ter bevordering van borsvoeding behoort herverpak te word ten einde kulturele persepsies rondom babavoeding praktyke aan te spreek.

LIST OF ACRONYMS

AFASS	Acceptable, Feasible, Affordable, Sustainable, and Safe
ANC	Ante Natal Clinic
ANOVA	Analysis of Variance
AOR	Adjusted Odds Ratio
ARIs	Acute Respiratory Infections
BFHI	Baby-Friendly Hospital Initiative
CG	Control Group
CI	Confidence Intervals
EBF	Exclusive breastfeeding
FBSICG	Facility-Based Semi-Intensive Counseling Group
FGDs	Focus Group Discussions
HBICG	Home-Based Intensive Counseling Group
HR	Hazard Ratio
KDHS	Kenya Demographic and Health Statistics
MCH	Maternal and Child Health
NCHS	National Center for Health Statistics
NGOs	Non Governmental Organizations
OR	Odds Ratio
PMTCT	Prevention of mother to child transmission
PRa	Prevalence Ratio Adjusted
RAs	Research Assistants
RR	Relative Risk
SD	Standard Deviation
SPSS	Statistical Programme for Social Sciences
TB	Tuberculosis
TBAs	Traditional Birth Attendants
VCT	Voluntary Counseling and Testing
WABA	World Alliance for Breastfeeding
WHA	World Health Assembly

DEFINITION OF TERMS

Breastfeeding Counseling: A two-way communication between educators and recipients aimed at changing behaviour from inappropriate to appropriate breastfeeding practices.[1]

Home-based breastfeeding counseling: This is breastfeeding counseling done at home, as opposed to facility-based counseling. The mother's individual concerns and problems are addressed; and counseling and support is given continuously.

One-on-one breastfeeding counseling: A two-way counselor-mother communication aims to give the mother information to enable her practice appropriate breastfeeding practices. In this type of counseling, the mother is given individual attention.

Exclusive breastfeeding: Giving a child no other food, including no water, in addition to breastfeeding with the exception of medicines, vitamin drops or syrups, and mineral supplements (WHO definition).[2]

Predominantly breastfed: Breastfeeding a child, but also giving small amounts of water or water-based drinks. Neither food-based fluids, nor solid food, nor non-human milk is allowed under this definition (WHO definition).[2]

Mixed feeding: Breastfeeding a child while giving non-human milk, or food-based fluids or solid foods (WHO definition).[2]

Not breastfed: Not fed on breastmilk (WHO definition).[2]

Infant Feeding: Exclusively breastfed, predominantly breastfed, mixed fed or is not breastfed.

Colostrum: Thick yellowish secretion from the breast within the first three days of the infant's life.

Pre-lacteal foods: Any fluid or food given before colostrum.

Post-lacteal: Fluid or food given after breastfeeding has started, within three days of birth.

Complementary food: Any food, whether manufactured or locally prepared, suitable as a complement to breastmilk, to infant formula, when either becomes insufficient to satisfy the nutritional requirements of the infant.[2]

LIST OF TABLES

Table 1.1	Percentage of children ever breastfed and the median duration of any breastfeeding in African countries (2006)	5
Table 1.2	Percentage of children exclusively breastfed (<6 months) 2000-2006 from selected African Countries	8
Table 1.3	The median duration of exclusive breastfeeding in African countries (2006)	8
Table 1.4	Cultural perceptions about infant feeding practices by place of study	17
Table 2.1	Infant feeding practices at 5-10 days postpartum by study groups	69
Table 2.2	Infant feeding practices at 3 weeks postpartum by study groups	69
Table 3.1	Demographic and socio-economic characteristics of the study population	75
Table 3.2	Maternal knowledge about breastfeeding practices at baseline	77
Table 3.3	Past maternal infant feeding practices and intended infant feeding choice	77
Table 3.4	Baseline comparisons of key demographic, socio-economic and perinatal characteristics for the study groups	79
Table 3.5	Comparison of mothers lost to follow up and those who completed the study on key demographic and socio-economic characteristics	81
Table 3.6	Differences in reported maternal and observed infant feedings practices at one month	83
Table 3.7	Differences in reported maternal and observed infant feeding practices at five months	83
Table 3.8	The place of delivery, rooming in and counseling opportunities for study population	85
Table 3.9	The impact of counseling strategies on infant feeding practices during the first week after birth by study groups	87
Table 3.10	Infant feeding practices in the first week after birth by study groups and delivery site	89
Table 3.11	Infant feeding practices in the first week after birth by delivery site	90
Table 3.12	Changes in infant feeding practices by time and study groups	92
Table 3.13	The impact of counseling strategies on infant feeding practices by time and study groups	98

Table 3.14	Maternal demographic and socio-economic characteristics and exclusive breastfeeding status	104
Table 3.15	Maternal knowledge about infant feeding practices and intended feeding choices (at baseline) and exclusive breastfeeding practices	106
Table 3.16	Maternal infant feeding practices during the first week after birth and exclusive breastfeeding practices	108
Table 3.17	Maternal morbidity and breastfeeding complications and exclusive breastfeeding practices	109
Table 3.18	The findings of logistic regression analysis of factors associated with exclusive breastfeeding from one to six months	111
Table 3.19:	Maternal breastfeeding practices either exclusively or non-exclusively over time by study groups	112
Table 3.20:	Differences in maternal practice of giving non-breastmilk liquids by infant age and study groups	116
Table 3.21:	Reasons for giving of non-breastmilk liquids by study groups	120
Table 3.22:	Differences in maternal practice of giving semi-solid and/or solid foods by infant age and study groups	121
Table 3.23:	Reasons for giving semi-solid and solid foods by infant age and study groups	123
Table 3.24:	Maternal knowledge about breastfeeding after counseling by the research team by study groups	125
Table 3.25:	Maternal attitudes towards breastfeeding counseling strategies after the intervention by the study	127
Table 3.26:	The association between the study breastfeeding counseling and maternal infant feeding practices by study groups	131
Table 3.27:	A summary of the main and common agreements about exclusive breastfeeding issues by mothers from the FBSICG and HBICG study groups	151
Table 3.28:	Gender and birth weight of infants by study groups	152
Table 3:29:	Mean monthly weight of infants by study groups	153
Table 3.30:	Mean monthly weight of infants by exclusive breastfeeding status	154
Table 3:31:	Weight gains of infants by time and study groups	155
Table 3.32	Mean weight gains of infants by time and breastfeeding status	156

Table 3.33:	Prevalence of morbidity among infants by time and study groups	158
Table 3.34:	Differences in morbidity prevalence between exclusively and non- exclusively breastfed infants	159
Table 3.35:	Prevalence of infant underweight by time and study groups based on the NCHS growth reference and the WHO growth standards	163
Table 3.36:	Prevalence of infant underweight by time and breastfeeding status based on the NCHS growth reference and the WHO growth standards	168

LIST OF FIGURES

Figure 1.1	A schematic illustration of factors associated with exclusive breastfeeding	9
Figure 1.2	Adapted conceptual framework on determinants of infant feeding practices	33
Figure 2.1	Map of Kibera Slum, Nairobi, Kenya	37
Figure 2.2	Pictures of Gatwikera and Soweto Villages in Kibera Slum, Nairobi, Kenya	38
Figure 2.3	Description of the health care organogram of the study site	40
Figure 2.4	Study Design and Treatments for the three study groups	45
Figure 2.5	Schedule of counseling sessions for the HBICG	46
Figure 2.6	Schedule for interviews, observations and focus group discussions for the study groups	49
Figure 2.7	Study design, interventions and determination of infant feeding practices in the three study groups	64
Figure 2.8	Schematic representation of the recruitment for participants included in the pilot study	68
Figure 3.1	Schematic representation of the recruitment process for participants included in the study	74
Figure 3.2	Schedule of observations for maternal infant feeding practices in the three study groups	82
Figure 3.3	Data collection schedule on infant feeding practices in the three study groups	91
Figure 3.4	Cumulative proportion of exclusive breastfeeding rates by time and study groups	93
Figure 3.5	Trends in exclusive breastfeeding practice in the three study groups by infant age	95
Figure 3.6	Relative risk of exclusive breastfeeding in the FBSICG and HBICG	96
Figure 3.7	Trends in the practice of predominant breastfeeding in the three study groups by infant age	97
Figure 3.8	Relative risk of predominant breastfeeding in the FBSICG and HBICG	97
Figure 3.9	Trends in the practice of exclusive and predominant breastfeeding in the three study groups by infant age	100
Figure 3.10	Relative risk of exclusive and predominant breastfeeding in the FBSICG and HBICG	100
Figure 3.11	Trends in the practice of mixed feeding in the three study groups by infant age	101

Figure 3.12	Relative risk of mixed feeding in the FBSICG and HBICG	102
Figure 3.13	Schedule for determination of factors associated with exclusive breastfeeding in all study groups	102
Figure 3.14	Schedule for determination of factors associated with exclusive breastfeeding in the HBICG	103
Figure 3.15	Trends in giving non-breastmilk liquids by infant age and study groups	115
Figure 3.16:	Trends in maternal practices in the giving of semi-solid and solid foods by infant age and study groups	121
Figure 3.17:	Maternal attitudes on how the breastfeeding counseling was conducted and how it should be conducted in the future	129
Figure 3.18:	Maternal beliefs about the usefulness of the breastfeeding counseling strategies by study groups	130
Figure 3.19:	Monthly trends in weights of exclusively and non-exclusively breastfed infants	154

LIST OF APPENDICES

Appendix 1	Breastfeeding Counseling Content	194
Appendix 2	Baseline Questionnaire	196
Appendix 3	Questionnaire for second interview	202
Appendix 4	Questionnaire for third to seventh interviews	209
Appendix 5	Observation Guidelines	215
Appendix 6	Focus Group Discussion Guidelines	216
Appendix 7	Training of Breastfeeding Counselors	219
Appendix 8	Ethical Review Committees Approval	221
Appendix 9	Informed Consent Form	222
Appendix 10	Pilot Study Report	229
Appendix 11	Maternal demographic and socio-economic characteristics not associated with exclusive breastfeeding	237
Appendix 12	Maternal knowledge and planned feeding practices not associated with exclusive breastfeeding	239
Appendix 13	Maternal perinatal-related factors (at baseline) not associated with exclusive breastfeeding	241
Appendix 14	Maternal infant feeding practices in the first week after birth not associated with exclusive breastfeeding	242
Appendix 15	Maternal Morbidity and breastfeeding complications not associated with exclusive breastfeeding practices	243
Appendix 16	Contextual issues not associated with exclusive breastfeeding	244
Appendix 17	Infant morbidity not associated with exclusive breastfeeding	246

TABLE OF CONTENTS

		Page
Declaration		ii
Acknowledgements		iii
Abstract		iv
Abstrak		vi
List of Acronyms		viii
Definition of Terms		ix
List of Tables		x
List of Figures		xiii
List of Appendices		xv
CHAPTER 1:	**INTRODUCTION, REVIEW OF THE LITERATURE AND MOTIVATION OF THE RESEARCH PROGRAMME**	**1**
1.	**INTRODUCTION**	**2**
1.1	Health and Nutrition Benefits of Breastfeeding to Children	2
1.1.1	Benefits of exclusive breastfeeding	3
1.2	Breastfeeding Practices	5
1.2.1	Initiation and duration of breastfeeding	5
1.2.2	Exclusive breastfeeding practices	6
1.3	Factors Associated with Exclusive Breastfeeding Practices	7
1.3.1	Maternal factors	9
1.3.1.1	*Employment status*	9
13.1.2	*Education*	10
1.3.1.3	*Parity*	11
1.3.1.4	*Age*	12
1.3.1.5	*Knowledge about breastfeeding*	12
1.3.1.6	*Workload*	13
1.3.2	Socio-economic and demographic factors	13
1.3.3	Contextual issues associated with exclusive breastfeeding	15

1.3.3.1	*Place of delivery*	15
1.3.3.2	*Type of delivery: normal/vaginal vs caesarian deliveries*	15
1.3.3.3	*Presence of breastfeeding support programmes in maternal residential area*	16
1.3.4	Cultural factors	16
1.3.5	Infant characteristics	18
1.3.6	Maternal psychological factors	19
1.3.6.1	*Attitudes towards breastfeeding*	19
1.3.6.2	*Maternal moral support*	19
1.3.7	Maternal physiological factors	20
1.4	Interventions to Promote Breastfeeding	21
1.4.1	The Baby-Friendly Hospital Initiative and its impact on breastfeeding practices	22
1.4.2	Community-based strategies and their impact in promoting exclusive breastfeeding	24
1.5	Motivation for the Research Programme	29
1.6	Statement of the Research Question	30
1.7	Significance of the Study	31
1.8	Conceptualizing Infant Feeding Practices	31
CHAPTER 2:	**METHODOLOGY**	**34**
2.1	Research Aim	35
2.1.1	Objectives	35
2.1.2	Hypotheses	35
2.2	Description of the Study Site	36
2.3	Study Design	40
2.3.1	Randomization	41
2.3.2	Target population	42
2.3.3	Inclusion and exclusion criteria	42
2.3.4	Sampling methods	42
2.3.5	Sample size	43
2.4	Description of the Interventions	43
2.4.1	Control group (CG)	43

2.4.2	Facility-Based Semi-Intensive Counseling Group (FBSICG)	44
2.4.3	Home-Based Intensive Counseling Group (HBICG)	46
2.5	Determination of Breastfeeding Practices	47
2.5.1	Types of data collected	47
2.5.2	Methods for collection of quantitative data	47
2.5.2.1	*Interviews*	47
2.5.2.2	*Observations*	49
2.5.3	Collection of qualitative data	50
2.5.3.1	*Focus Group Discussions (FGDs)*	50
2.6	Data Collection Tools and the Information Collected	52
2.6.1	Questionnaires for the interviews	52
2.6.2	Observation guidelines	53
2.6.3	Focus group discussion (FGDs) guidelines	53
2.7	Anthropometry	54
2.8	Methods of Data Collection	54
2.8.1	Logistics of data collection	54
2.8.2	Data collection procedure	55
2.8.3	Maternal follow-up	56
2.9	Training of Research Assistants and Breastfeeding Counselors	56
2.9.1	Breastfeeding counselors	56
2.9.2	Research assistants	57
2.10	Data Quality Control	58
2.11	Measurements of Variables	58
2.11.1	Dependent variables	58
2.11.2	Independent variables	59
2.12	Data Analysis	59
2.12.1	Quantitative data analysis	59
2.12.2	Qualitative data analysis	60
2.13	Ethics Approval	61
2.13.1	Ethical review committees	61
2.13.2	Informed consent	61

2.13.3	Participant confidentiality	61
2.14	Pilot Study	61
2.14.1	Purpose of the pilot study	62
2.14.2	Methodology	62
2.14.2.1	*Study design*	62
2.14.2.2	*Village randomization*	62
2.14.2.3	*Sampling frame and selection criteria for study participants*	62
2.14.2.4	*Recruitment and placement of women into study groups*	62
2.14.3	Description of the intervention	63
2.14.4	Follow-up of mothers	63
2.14.5	Determination of infant feeding practices	63
2.14.6	Implementation of the pilot study	65
2.14.7	Testing of study procedures	65
2.14.8	Data analysis	66
2.14.9	Results of pilot study	66
2.14.9.1	*Subject enrolment into the study*	66
2.14.9.2	*Baseline comparisons of the study* groups	67
2.14.9.3	*Key findings*	67
2.14.9.4	*Suggested changes to the study*	70
CHAPTER 3:	**RESULTS**	**72**
3.1	Enrolment of Subjects into the Study	73
3.1.1	Recruitment process and trial profile for the study subjects	73
3.2	Characteristics of the Study Population	73
3.2.1	Demographic and socio-economic characteristics of the study population	73
A.	**FINDINGS AT BASELINE**	**76**
3.2.2	Maternal perinatal characteristics at baseline	76
3.2.3	Maternal knowledge about breastfeeding practices at baseline	76
3.2.4	Past and intended maternal infant feeding choice for the unborn baby at baseline	76
3.3	Baseline Comparison of Key Demographic and Socio-Economic Characteristics for the Study Groups	78

B.	**FINDINGS FOLLOWING THE INTERVENTION**	**78**
3.4	Completeness of Data Collection	78
3.5	Data Quality	82
3.6	Infant Feeding Practices during the First Week after Birth	84
3.6.1	The place of delivery, rooming in and counseling opportunities for the study population	84
3.6.2	Infant feeding practices during the first week after birth by place of delivery and study groups	85
3.6.2.1	*Infant feeding practices during the first week after birth by study groups*	85
3.6.2.2	*Infant feeding practices in the first week after birth by delivery site and study groups*	88
3.6.2.3	*Infant feeding practices during the first week after birth by delivery site*	89
3.7	The Impact of Breastfeeding Counseling Strategies on Infant Feeding Practices	90
3.7.1	Infant feeding practices from one month to six months of age	92
3.7.1.1	*Exclusive breastfeeding*	93
3.7.1.2	*Predominant breastfeeding*	96
3.7.1.3	*Combined exclusive breastfeeding and predominant breastfeeding rates*	99
3.7.1.4	*Mixed feeding practices*	100
3.8	Factors Associated with Exclusive Breastfeeding	102
3.8.1	Maternal demographic and socio-economic characteristics and exclusive breastfeeding practices	104
3.8.2	Maternal knowledge on infant feeding practices and feeding choices for the unborn baby at baseline and exclusive breastfeeding practices	105
3.8.3	Maternal perinatal-related factors at baseline and exclusive breastfeeding practices	105
3.8.4	Maternal infant feeding practices in the first week after birth and exclusive breastfeeding practices	106
3.8.5	Maternal morbidity and breastfeeding complications and the impact on maternal exclusive breastfeeding practices	107
3.8.6	Contextual issues: place of delivery, type of delivery and type of facility where delivery took place and their relationship with exclusive breastfeeding	107

3.8.7	Multiple regression analyses of factors associated with exclusive breastfeeding from one to six months	110
3.9	Trends in Infant Feeding Practices from one month to six months of age	112
3.9.1	Trends in breastfeeding practices from one month to six months of age	114
3.9.2	Trends in non breastmilk liquid feeding	115
3.9.3	Reasons for giving of liquids other than breastmilk	118
3.10	Trends in feeding Semi-Solid and Solid Foods to the Infants by Study Groups	119
3.10.1	Reasons for giving semi-solid and solid foods	122
3.11	Maternal Perceptions about the Breastfeeding Counseling Strategies Conducted during the Study	124
3.11.1	Maternal knowledge about breastfeeding after counseling provided by the research team	124
3.11.2	Maternal attitudes towards breastfeeding counseling strategies conducted during the study	125
3.11.3	Maternal attitudes towards how the breastfeeding counseling was conducted by study groups	128
3.11.4	Maternal beliefs about the usefulness of the breastfeeding counseling strategies	129
3.11.5	The association between the breastfeeding counseling and maternal infant feeding practices by study groups	130
3.12	Focus Group Discussions (FGDS)	131
3.12.1	Focus group discussions with mothers from the CG practising exclusive breastfeeding for six months	132
3.12.1.1	*Understanding of the exclusive breastfeeding concept*	132
3.12.1.2	*Sources of breastfeeding information in the Kibera community*	132
3.12.1.3	*Exclusive breastfeeding benefits*	132
3.12.1.4	*Exclusive breastfeeding practices in the Kibera community*	133
3.12.1.5	*Challenges experienced by mothers in exclusive breastfeeding practices*	133
3.12.1.6	*Factors promoting the "exclusive breastfeeding for six months" practice*	134
3.12.1.7	*Suggestions on how to encourage the "exclusive breastfeeding" practice in the community*	134

3.12.2	Results of the discussions with CG mothers not practising exclusive breastfeeding for six months	134
3.12.2.1	*Breastfeeding benefits*	135
3.12.2.2	*Breastfeeding practices in the Kibera community*	135
3.12.2.3	*Participant understanding of exclusive breastfeeding*	135
3.12.2.4	*Participant perceptions about dissemination of exclusive breastfeeding information to target large numbers of women*	136
3.12.3	Results of the discussions with FBSICG mothers practising exclusive breastfeeding for six months	136
3.12.3.1	*Sources of breastfeeding information in the Kibera community*	136
3.12.3.2	*Exclusive breastfeeding practices in the Kibera community*	137
3.12.3.3	*Maternal perceptions about exclusive breastfeeding benefits*	138
3.12.3.4	*Challenges experienced in exclusive breastfeeding practice*	138
3.12.3.5	*Factors providing motivation for mothers to practice exclusive breastfeeding for six months*	139
3.12.3.6	*Maternal perceptions about the facility-based semi-intensive breastfeeding counseling strategy*	139
3.12.3.7	*Recommendations for the improvement of the facility-based semi-intensive counseling strategy*	140
3.12.4	Results of the discussions with FBSICG mothers not practising exclusive breastfeeding for six months	141
3.12.4.1	*Sources of information on infant feeding in the Kibera community*	141
3.12.4.2	*Exclusive breastfeeding practices in Kibera community*	141
3.12.4.3	*Reasons why mothers do not practice exclusive breastfeeding*	141
3.12.4.4	*Maternal perceptions about exclusive breastfeeding benefits*	142
3.12.4.5	*Maternal perceptions about the facility-based semi-intensive breastfeeding counseling strategy*	142
3.12.4.6	*Suggestions for the improvement of the facility-based semi-intensive counseling strategy*	142
3.12.5	Results of the focus group discussions with HBICG mothers practising exclusive breastfeeding for six months	143

3.12.5.1	*Sources of breastfeeding information in the Kibera community*	143
3.12.5.2	*Exclusive breastfeeding practices in the Kibera community*	143
3.12.5.3	*Maternal perceptions about exclusive breastfeeding benefits*	144
3.12.5.4	*Challenges experienced in exclusive breastfeeding practice for six months*	145
3.12.5.5	*Factors motivating mothers to practice exclusive breastfeeding for six month*s	146
3.12.5.6	*Maternal perceptions about the home-based intensive breastfeeding counseling strategy*	146
3.12.5.7	*Recommendations for the improvement of the home-based intensive breastfeeding counseling strategy*	147
3.12.6	Discussions with HBICG mothers not practising exclusive breastfeeding for six months	147
3.12.6.1	*Sources of infant feeding information in the Kibera community*	147
3.12.6.2	*Exclusive breastfeeding practices in the Kibera community*	148
3.12.6.3	*Reasons for low exclusive breastfeeding practice*	148
3.12.6.4	*Maternal perceptions about exclusive* breastfeeding benefits	148
3.12.6.5	*Challenges experienced in exclusive breastfeeding practice*	149
3.12.6.6	*Maternal perceptions about home-based intensive breastfeeding counseling strategy*	149
3.12.6.7	*Recommendations for improvement of the home-based counseling strategy*	150
3.12.7	Summary of the main findings and common participant agreements among all the study groups	150
3.13	Infant Outcomes	152
3.13.1	Gender and birth weight of infants by study groups	152
3.13.2	Trends in monthly weight of infants	153
3.13.2.1	*Monthly trends in infant weight by study groups*	153
3.13.2.2	*Monthly trends in infant weight by exclusive breastfeeding status*	153
3.13.3	Trends in weight gain of infants	155
3.13.3.1	*Infant weight gain trends by time and study* groups	155
3.13.3.2	*Infant weight gain trends by time and breastfeeding status*	155
3.13.4	Prevalence of morbidity among infants	156
3.13.4.1	*Prevalence of morbidity among infants by time and study groups*	156

3.13.4.2	*Prevalence of morbidity among infants by time and exclusive breastfeeding* status	159
3.13.4	Anthropometric status of the infants	160
3.13.4.1	*Anthropometric status of infants by time and study* groups	160
3.13.4.2	*Anthropometric status of infants by time and breastfeeding status*	165
CHAPTER 4:	**DISCUSSION**	**170**
4.1	Introduction	171
4.2	The Impact of Breastfeeding Counseling on Exclusive Breastfeeding from One to Six months	172
4.3	The Impact of Breastfeeding Counseling on Predominant Breastfeeding from One to Six months	174
4.4	The Impact of Breastfeeding Counseling on Mixed Feeding from One to Six months	175
4.5	Hindrances to the Practice of Exclusive Breastfeeding	175
4.6	Factors Encouraging Mothers to Practice Exclusive Breastfeeding	177
4.7	Factors Associated with Exclusive Breastfeeding	178
4.8	Exclusive Breastfeeding and Infant Outcomes	180
4.8.1	Trends in monthly weight of infants	180
4.8.2	Anthropometric status	181
4.8.3	Comparison of the anthropometric status by NCHS growth reference and WHO child growth standards	181
4.8.4	Prevalence of morbidity among infants	182
CHAPTER 5:	**CONCLUSIONS AND RECOMMENDATIONS**	**183**
5.1	**Limitations of the study**	**184**
5.2	Conclusions	184
5.3	Recommendations	185
REFERENCES		**188**
APPENDICES		**195**

CHAPTER 1: INTRODUCTION, REVIEW OF THE LITERATURE AND MOTIVATION OF THE RESEARCH PROGRAMME

1. INTRODUCTION

The promotion and support of breastfeeding is a global priority.[3-5] Vast amounts of scientific literature demonstrate substantial health, social and economic benefits associated with appropriate breastfeeding, including lower infant morbidity and mortality from diarrhoea and other infectious diseases. [4, 6-9] The 2002 Global Strategy on Infant and Young Child Feeding adopted by the World Health Assembly (WHA) and by the 2002 UNICEF Executive Board recognizes that *"Inappropriate feeding practices and their consequences is a major obstacle to sustainable socio-economic development and poverty reduction. Governments will be unsuccessful in efforts to accelerate economic development in any significant long-term sense until optimal child growth and development, especially through appropriate feeding practices, is ensured."*

1.1 Health and Nutrition Benefits of Breastfeeding to Children

Breastfeeding presents clear short-term benefits for the child, mainly protection against morbidity and mortality from infectious diseases.[4, 6-9] Available evidence suggests breastfeeding may also have long-term benefits in the prevention of chronic adult diseases. The findings of systematic reviews and meta-analyses suggest there is a protective effect against overweight and obesity from breastfeeding; this effect is more important against obesity than against overweight.[10] Studies have also demonstrated a dose-response relationship between the duration of breastfeeding and a decrease in the risk of overweight.[11] Initial breastfeeding protects against obesity in later life [12]; although a more detailed review, including large unpublished studies exploring the effect of non-confounding factors was recommended.[12] In addition, studies have shown that breastfed subjects experience lower mean blood pressure and total cholesterol.[11] Even though breastfed subjects are less likely to present with type-2 diabetes, this finding needs further investigation to rule out the possibility of self-selection or residual confounding, because the studies included in the analyses were observational. Furthermore, few studies were available from low and middle-income countries, where the effect of breastfeeding may be modified by social and cultural conditions.[10]

Breastfeeding is an unequalled way of providing ideal food for the growth and development of infants. Breastfeeding contributes to infant nutrition and health through a number of important mechanisms. It provides a complete source of nutrition for the first six months of life, half of all the requirements in the second six months of life and one-third of the requirements in the second year of life.[13] Nevertheless,

concerns are being raised over the adequacy of breastmilk as a complete source of nutrition for infants for six months (see section 1.1.1 Benefits of Exclusive Breastfeeding).

Furthermore, breastfeeding provides immunity through the antibodies and immunoglobulins it contains; and stimulates children's immune systems and response to vaccinations.[14] Studies have consistently shown the role breastmilk plays in protecting infants from diarrhoea and respiratory infections, the two leading causes of infant death. Children not breastfed have a six-fold greater risk of dying from infectious diseases in the first two months of life, than breastfed children.[15] Breastfeeding has been ranked first in child mortality reduction, with the potential to prevent an estimated 13% of deaths of all children under five years of age.[15] Moreover, breastfeeding is a key priority in addressing the double burden of malnutrition; reducing the risk of undernutrition and overweight in late childhood.[16] Promotion of appropriate infant feeding practices has therefore, been identified as one of the key actions at the individual and family levels to reduce malnutrition, particularly during the key window of opportunity from birth to two years. This is important especially in developing countries, where most children are born well-nourished but become malnourished within the first few months of life, with the damage done during this early period being essentially irreversible.[16-17]

1.1.1 Benefits of exclusive breastfeeding

Exclusive breastfeeding means giving a child no other food, including no water, in addition to breastfeeding with the exception of medicines, vitamin drops or syrups, and mineral supplements.[2] Before 2001, the World Health Organization (WHO) recommended that infants be exclusively breastfed for four to six months, with the introduction of complementary foods such as any fluid or food other than breastmilk thereafter. There is very extensive and mostly confirmatory evidence of no benefits of giving complementary foods to infants before 6 months of age. Most of the findings of such studies have been recently meta-analyzed and consequently in 2001, after a systematic review and expert consultation, this advice was changed; exclusive breastfeeding is now recommended for the first six months of life, after which breastfeeding should be continued up to, or longer than, two years but complemented with other sources of nutrition.[5] This policy change was based on reviews providing evidence of the health benefits of exclusive breastfeeding for three to four months versus six months. The researches demonstrated that infants exclusively breastfed for six months experienced less morbidity from gastrointestinal infection and showed no deficits in growth. This is despite the fact that large randomized trials are required to rule out small adverse effects on susceptible infants.[18-20]

Evidence is, however, insufficient to confidently recommend exclusive breastfeeding for six months for infants in developed countries; breastmilk may not meet the full energy requirements of the average infant at six months.[18] Furthermore, concerns have been raised over the optimal duration of exclusive breastfeeding, centered on the so-called "weanling's dilemma" in developing countries. The choice is between the known protective effect of exclusive breastfeeding against infectious morbidity versus the theoretical insufficiency of breastmilk to satisfy the infant's energy and micronutrient requirements beyond four months of age. There is no evidence of "weanling's dilemma" in infants exclusively breastfed for six months; these infants experience less morbidity and gastrointestinal infection and show no deficits in growth. As based on scientific evidence, a policy of exclusive breastfeeding for six months appears eminently sensible for countries without clean water, and scarce nutritious first solid foods,[18] circumstances very similar to those of the present study.

Early supplementation reduces breastmilk output since the production and release of milk is modulated by the frequency and intensity of sucking. Exclusive breastfeeding has substantial health benefits. If every infant was exclusively breastfed from birth, an estimated 1.5 million lives would be saved each year, and not just saved, but also enhanced, because breastmilk is the perfect food for a baby's first six months of life and no manufactured product can equal it.[21] Moreover, exclusive breastfeeding reduces the risk of illness through the use of contaminated foodstuffs and utensils, especially in areas of scarce clean water. Recent research has revealed the benefits of breastfeeding increase with increased exclusiveness of breastfeeding during the first six months of life, and thereafter with increased duration of breastfeeding with complementary foods. [21]

Although breastfeeding has been consistently reported to increase the risk of HIV mother-to-child transmission, exclusive breastfeeding is becoming increasingly important in the prevention of mother-to-child transmission of HIV. Scientific evidence shows exclusive breastfeeding carries less risk of HIV virus transmission, whereas mixed feeding carries a higher risk of HIV transmission.[2,22-24] Exclusive breastfeeding during the early months of life significantly reduces the risk of HIV transmission compared to early mixed feeding. In South Africa, Zimbabwe and Cote d'Ivore, for example, exclusive breastfeeding for up to six months was associated with a three- to four-fold decrease in HIV transmission compared to non-exclusive breastfeeding.[24] The WHO recommends HIV-positive mothers breastfeed exclusively for six

months, unless replacement-feeding is acceptable, feasible, affordable, sustainable, and safe (AFASS). The WHO also recommends continued breastfeeding after six months, until it is AFASS to stop.[2]

1.2 BREASTFEEDING PRACTICES

1.2.1 Initiation and duration of breastfeeding

Available data indicate that breastfeeding initiation rates are very high in developing countries. The incidence of breastfeeding initiation exceeds 90% in almost every country and exceeds 95% in more than half of the countries. Furthermore, breastfeeding initiation is universal in sub-Saharan Africa. Few infants under twelve months of age are not breastfed. The median duration of breastfeeding is between eighteen to twenty five months for most African countries. In Kenya, the proportion of children who are breastfed is 96.8% and the median duration of breastfeeding is 20.1 months (Table 1.1).[25]

Overall, between 1975 and 2002, in developing countries, data for median duration of breastfeeding trends show positive changes.[25] The high median duration of breastfeeding has been maintained in many countries and increased in some. In Kenya, however, the median duration of breastfeeding 27 is insignificant. From 20.0 months in 1989 [26] to 21 months in 2003.[27]

Table 1.1: Percentage of children ever breastfed and the median duration of any breastfeeding in African countries (2006)

Countries	% of children ever breastfed *	Median duration of any breastfeeding (Months)	Countries	% of children ever breastfed *	Median duration of any breastfeeding (Months)
Benin	97.1	21.8	Mali	96.9	21.7
Burkina Faso	98.4	24.5	Mauritania	95.2	20.6
Cameroon	93.6	17.4	Mozambique	98.3	22.6
Chad	98.4	21.3	Namibia	95.1	18.6
Cote d'Ivoire	96.6	20.5	Niger	97.9	20.6
Eritrea	98.0	21.8	Nigeria	97.4	18.6
Ethiopia	96.3	25.5	Rwanda	97.1	22.1
Gabon	86.2	12.1	Tanzania	95.3	20.9
Ghana	97.0	22.5	Togo	97.4	24.4
Guinea	92.3	22.4	Uganda	98.3	19.9
Kenya	96.8	20.1	Zambia	98.4	21.4
Madagascar	98.3	21.6	Zimbabwe	97.7	19.6
Malawi	98.3	23.3			

Source: Mukuria A.G. Kothari M.T. Abderrahim N. Infant and Young Child Feeding Practices Updates. Calverton. Maryland, USA: ORC Macro. 2006.
Data source: Demographic Health Surveys (DHS) Surveys 1998-2004
*** The percentage (%) of all children born in the five years preceding the survey**

1.2.2 Exclusive breastfeeding practices

Despite the high breastfeeding initiation rates, exclusive breastfeeding practices are poor for the majority of the developing countries. Only about one third of all infants less than six months in the developing countries are exclusively breastfed. Considerable variation exists across regions. The highest rates of exclusive breastfeeding are currently found in East Asia/Pacific at 43% and Eastern/Southern Africa at 41%; the lowest is in West/Central Africa at 20% and CEE/CIS at 22%.[28]

Although percentages of exclusive breastfeeding continue to be low across the developing world, trend data indicate that exclusive breastfeeding rates have improved: between 1990 and 2004, exclusive breastfeeding rose from 34% to 41%. Available data indicate that in sub-Saharan Africa, the rate over the same period doubled, from 15% to 32%. West/Central Africa made noteworthy progress as the exclusive breastfeeding rate rose more than five-fold. African countries making major strides in exclusive breastfeeding since 1990 include Burkina Faso, Cameroon, Ghana, Madagascar, Mali, Nigeria, Senegal, the United Republic of Tanzania, Zambia and Zimbabwe.[28]

The most current data on exclusive breastfeeding rates for children less than six months of age [29] show that overall, the percentage of exclusive breastfeeding rates for children less than six months of age in sub-Saharan Africa is 30%. The highest percentage is 39% in Eastern and Southern Africa; followed by the Middle East and North Africa at 28%; and West and Central Africa at 21% (Table 1.2). Analysis of the exclusive breastfeeding rates by countries show Rwanda to have the highest rate of exclusive breastfeeding at 88%, Benin at 70%, Uganda at 60%, Malawi at 56% and Ghana at 54%. The countries with the lowest exclusive breastfeeding rates are South Africa at 7%, both Angola and Cameron at 11.0% and Kenya at 13% (Table 1.2). In Kenya, the percentage of children six months old and exclusively breastfed is 2.3%.[27]

The major limitation of the data on exclusive breastfeeding rates in infants less than six months of age (Table 1.2) is that the information was collected using different methods in various countries and should therefore be interpreted with caution. The data was compiled from Demographic and Health Surveys (DHS), Multi Indicator Cluster Surveys (MICS) and UNICEF surveys conducted in various countries. The surveys were conducted at varying times between 2000 and 2006. The information on exclusive breastfeeding was collected in cross-sectional surveys on children less than five years of age and thus there is a likelihood of recall bias, leading most probably to inflated rates. Despite the fact the most current

information was solicited; for some of the countries, the data refers to exclusive breastfeeding for less than four months and for the majority, the data refers to exclusive breastfeeding for 6 months. For some, the data refers to only parts of the country and yet these rates were used for calculating country and regional averages.

Nevertheless, data on the median duration of exclusive breastfeeding indicates in the majority of the countries in Africa, the duration of exclusive breastfeeding is much shorter than the recommended six months. In 2006 in Rwanda, the longest median duration of exclusive breastfeeding was recorded at 4.9 months; followed by Madagascar at 3.6 months; Uganda 3.4 months; and Ghana and Eritrea at 2.6 months, with most other countries recording median duration of less than one month (Table 1.3). The low exclusive breastfeeding rates in the majority of the countries in sub-Saharan Africa, coupled with the low duration of exclusive breastfeeding point to the need for more concerted efforts to improve, not only the rates of exclusive breastfeeding, but its duration to reach the recommended six month period.

1.3 Factors associated with Exclusive Breastfeeding Practices

Breastfeeding is a complex process governed by psychological and physiological factors, in turn these are conditioned by a wide spectrum of environmental, socio-economic and cultural factors.[30] The schematic illustration (Figure 1.1) gives an overview of factors influencing exclusive breastfeeding practices. These factors affect breastfeeding and exclusive breastfeeding rates in different directions and to varying degrees depending on culture.[31] Very few studies, especially in Africa, have investigated the factors associated with exclusive breastfeeding.[31-32] A search through the available literature did not reveal any study designed to investigate factors in Kenya associated with exclusive breastfeeding. There are important differences between duration of any breastfeeding and that of exclusive breastfeeding. Factors associated with these practices should be analysed separately, as breastfeeding promotion strategies can only be effective if they capture and incorporate the socio-cultural realities of the target populations into intervention programmes.[33]

Table 1.2: Percentage of children exclusively breastfed (<6 months) between 2000- 2006 from selected countries in Africa

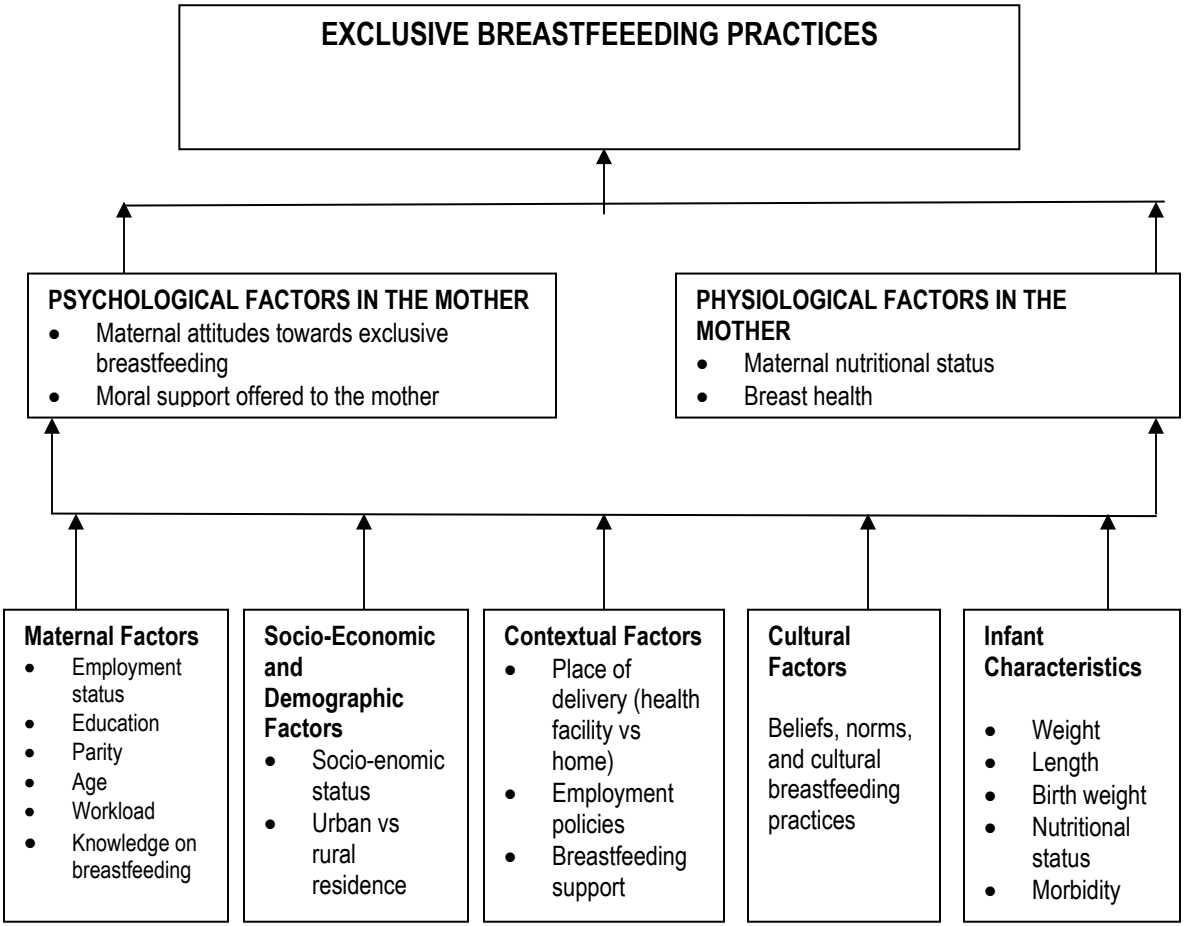
Countries	% of children <6 months exclusively breastfed	Countries	% of children <6 months exclusively breastfed
Angola	11	Malawi	56
Benin	70	Mali	25
Botswana	34	Mauritania	20
Cameroon	11	Morocco	31
Chad	2	Mozambique	30
Egypt	38	Namibia	19
Cote d'Ivoire	4	Niger	14
Eritrea	52	Nigeria	17
Ethiopia	20	Rwanda	88
Gabon	6	Senegal	34
Gambia	41	South Africa	7[y]
Ghana	54	Tanzania	41
Guinea	27	Togo	28
Guinea-Bissau	16	Tunisia	47
Kenya	13	Uganda	60
Lesotho	36	Zambia	40
Liberia	35	Zimbabwe	22
Madagascar	67		
Sub-Saharan Africa	30	Industrialized countries	7
Eastern and Southern Africa	39	Developing countries	16
West and Central Africa	21	Least developing countries	17
Middle East and North Africa	28	World	15

[y] Data refers to years or periods other than those specified in the table heading, differing from the standard definition or referring to only part of the country. Such data are included in the calculation of regional or global averages.
Source: UNICEF State of the World's Children 2008.[29]

Table 1.3: The median duration of exclusive breastfeeding in African countries (2006)

Countries	Median duration of exclusive breastfeeding (Months)	Countries	Median duration of exclusive breastfeeding (Months)
Benin	1.1	Mali	0.6
Burkina Faso	0.5	Mauritania	0.7
Cameroon	0.6	Mozambique	0.7
Chad	0.4	Namibia	0.6
Cote d'Ivoire	0.4	Niger	0.4
Eritrea	2.6	Nigeria	0.5
Ethiopia	2.5	Rwanda	4.9
Gabon	0.4	Tanzania	1.1
Ghana	2.6	Togo	0.5
Guinea	0.4	Uganda	3.4
Kenya	0.5	Zambia	1.8
Madagascar	3.6	Zimbabwe	1.3
Malawi	2.0		

Source: Mukuria A.G. Kothari M.T. Abderrahim N. Infant and Young Child Feeding Practices Updates. Calverton. Maryland, USA: ORC Macro. 2006. [25]
Data source: Demographic Health Surveys (DHS) Surveys 1998-2004
The percentage (%) of all children born in the five years preceding the survey



Source: Author; S. Ochola (Compiled from [30-51, 69])
Figure 1.1: A schematic illustration of factors associated with exclusive breastfeeding practices

1.3.1 Maternal factors

1.3.1.1 Employment status

The findings of a prospective cohort study of 291 new-born babies and their mothers during the first six months of life showed that mothers working outside the home were 2.8 times, using a 2-stage PROBIT model, significantly less likely to practice exclusive breastfeeding, compared to those not working outside the home. The study was conducted in three rural localities in Mexico and the prevalence of exclusive breastfeeding at five days was 50%, at four months 14%, and at six months 2%, with an average duration of exclusive breastfeeding of 2.18 months.[34] In another study conducted to identify the factors related to exclusive breastfeeding among mothers in peri-urban Guatemala City, the most important factor associated with exclusive breastfeeding was whether the mother worked outside the home or not. After controlling for maternal age, gender and ethnicity, mothers not working outside the home were 3.2 times more likely

[Odds ratio (OR) = 3.2: 95% CI: 1.6 – 6.4] to practice exclusive breastfeeding when compared to women who worked outside the home, The study was conducted on mothers with infants less than six months of age; 332 were residing in communities with breastfeeding promotion programmes; and 445 mothers were living in areas with no such programmes. [35] The findings of a longitudinal cohort study conducted in three Latin American Countries revealed that in Brazil and Honduras, mothers in employment were less likely ($p=0.03$ and $p<0.0001$) to practice exclusive breastfeeding, respectively.[36] In contrast, a cross-sectional study on 157 rural and 192 semi-urban Malawian mother infant-pairs documented no association between maternal occupation and the practice of exclusive breastfeeding [37].

1.3.1.2 Education

Studies have demonstrated positive, negative or no influence on exclusive breastfeeding practices from maternal formal education. In a prospective Swedish study of 10 205 children from birth to one year, the prevalence of short duration of exclusive breastfeeding, for less than four months, was 21.6%. Maternal low education was identified as one of the risk factors for short duration of exclusive breastfeeding [95% confidence Interval for adjusted Odds Ratio (95% CI AOR) 1.45 – 2.19). [38] The findings of an Accra Ghana cross-sectional study on 376 women with infants less than six months, also showed a positive impact for maternal education on the practice of exclusive breastfeeding practice. Mothers with a secondary level of education were about twice (OR= 1.79 95% CI: 1.11 - 2.86) more likely to practice exclusive breastfeeding than those with a primary level education. The exclusive breastfeeding rate for the infants in this study was 70.2%, based on a 24-hour recall; and 51.6% based on since-birth reports.[31] Similarly, a study to investigate individual and contextual determinants of exclusive breastfeeding in Sao Paulo, Brazil on 34,435 children under six months, living in 11 municipalities, also demonstrated that mothers with tertiary education were about twice as likely (OR =1.91 95% CI: 1.33 – 1.49) to practice exclusive breastfeeding, compared to those with lower education.[39] Likewise, a Bangladeshi cross-sectional study, using secondary data from a National Survey for children, was conducted on 2, 781 children from birth to twenty four months. It was found mothers with secondary education were more likely (Chi-square test $p<0.001$) to practice exclusive breastfeeding than those with a primary level education. The rate of exclusive breastfeeding for children less than six months of age in this study was 16%.[40]

Another study conducted in Sao Paulo, Brazil investigated the practice of early introduction of liquids other than maternal milk to infants. Factors associated with this practice evaluated secondary data from

Breastfeeding and Municipalities Project (AMAMU-NIC) for 26,474 children less than six months of age. The exclusive breastfeeding rate was 26.8% for children less than six months of age and 35.4% for those less than four months of age. Mothers with less than eight years of education were more likely, [Prevalence Ratio adjusted (PRa) 1.54; 95% CI: 1.19 – 1.97] to give water or tea to infants on the first day after hospital discharge, after delivery when compared to those with more than eight years of education.[41] A positive association between maternal education and exclusive breastfeeding was also documented in a cross-sectional study of 597 women with their infants less than six months of age in Buenos Aires, Argentina. Mothers with secondary or college-level education significantly practised exclusive breastfeeding for a longer duration, median 4.0 months versus 2.5 months respectively, ($p<0.01$) than those with primary education. [42]

On the contrary, the findings of a cross-sectional study in India on 501 mothers with infants from birth to six months and an exclusive breastfeeding rate of 61.3% at six months revealed that low education was a predictor of exclusive breastfeeding (OR= 1.09 and 1.23). [43]

The findings of a cross-sectional rural and urban Morogoro Tanzania study was conducted on 320 mothers with infants below seven months of age, about half of the one month infants are exclusively breastfed, showing no association between maternal formal education and the practice of exclusive breastfeeding.[32] Similarly, the findings of a cross-sectional rural Jamaican study on 599 mother-child pairs showed that maternal education was not associated with the practice of exclusive breastfeeding. The prevalence of exclusive breastfeeding for infants below six months in rural Jamaica was 22.2%.[33]

1.3.1.3 Parity

Emerging scientific evidence shows a relationship between maternal parity and exclusive breastfeeding, although there is no consensus on the findings. The results of the study conducted in Sao Paulo, Brazil [39] showed that women with more than one child were more likely (OR 1.42; 95% CI: 1.3 - 1.5) to practice exclusive breastfeeding than those who had one child. The findings of yet another Sao Paulo, Brazil study documented similar findings. Mothers with one child were more likely, (PRa 1.32; 95% CI: 1.12 – 1.54) to give other types of milk rather than breastmilk to infants on the first day after hospital discharge, after delivery. [41]

On the contrary, in a longitudinal Lusaka, Zambia cohort study on 177 HIV-infected and 177 HIV-uninfected women [44] investigated the reasons for cessation of exclusive breastfeeding before the recommended six months. Mothers, both HIV-infected and HIV-uninfected, with one child, were more likely to exclusively breastfeed their infants at sixteen weeks postpartum compared to their counterparts with more than one child. The rate of exclusive breastfeeding at sixteen weeks in this study was 37%. The findings of the studies conducted in Accra Ghana [31], Jamaica [33] and Argentina [42] documented no influence of parity on maternal exclusive breastfeeding practice.

1.3.1.4 Age

The findings of a study conducted in Sao Paulo, Brazil [39] revealed that maternal age was associated with exclusive breastfeeding practices; twenty-five to twenty-nine year old mothers were more likely, (OR =1.5; 95% CI 1.4 -1.6) to practice exclusive breastfeeding compared to younger mothers. In the Swedish [38] study, mothers less than, or twenty-nine years of age were less likely (95% CI: AOR 1.45 – 2.19) to practice exclusive breastfeeding compared to their older counterparts. The findings of a longitudinal cohort study in three Latin America countries documented older Brazilian mothers more than or equal to eighteen years of age, were more likely (p=0.006) than those less than eighteen years to practice exclusive breastfeeding.[36]

In contrast, the findings of a study conducted in three rural Mexican localities showed infants of older women, twenty-one to thirty years of age, were significantly, 1.4 times, less likely to receive exclusive breastfeeding than those of younger mothers fourteen to twenty years.[34] On the other hand, the studies conducted in Morogoro, Tanzania [32], rural Jamaica [33], Bangladesh [40] and Sao Paulo, Brazil [41]showed insignificant associations between maternal age and the practice of exclusive breastfeeding.

1.3.1.5 Knowledge about breastfeeding

Maternal knowledge, particularly about certain aspects of breastfeeding, has been found to influence exclusive breastfeeding practices. In the study conducted in rural and urban Morogoro, Tanzania [32] it was found that maternal knowledge was positively associated with the practice of exclusive breastfeeding. Urban Morogoro mothers with satisfactory knowledge about prelacteal feeds not being given to babies were likely to practice exclusive breastfeeding for forty two compared to nineteen days by those with unsatisfactory knowledge (T-test; p<0.001). In rural Morogoro, mothers with satisfactory knowledge about

this aspect of breastfeeding practised exclusive breastfeeding for a mean duration of thirty four days; those with unsatisfactory knowledge for a mean duration of eight days (T-test; p<0.001).

Those mothers in rural Morogoro with satisfactory knowledge about the importance of colostrum for the baby practised exclusive breastfeeding for a mean of sixteen days; those with unsatisfactory knowledge practised exclusive breastfeeding for a mean of eight days (T-test; p<0.001). Urban Morogoro mothers with satisfactory knowledge about the ideal duration of exclusive breastfeeding practised exclusive breastfeeding for a mean of 44 days, while those with unsatisfactory knowledge practised exclusive breastfeeding for a mean of 17 days (T-test; p<0.001). In rural Morogoro, knowledge about the ideal duration of exclusive breastfeeding was not associated with the duration of exclusive breastfeeding.[32]

On the contrary, the study conducted in rural Jamaica [33] showed an insignificant association between maternal knowledge about: the mechanisms of breastfeeding, appropriate positioning and attachment to the breast during feeding; exclusive breastfeeding; and the practice of exclusive breastfeeding. Similarly, in the study conducted in Accra Ghana[31] there was no association between maternal knowledge about the WHO recommendations on breastfeeding and the practice of exclusive breastfeeding.

1.3.1.6 Workload

There is little information on the association between maternal workload and the practice of exclusive breastfeeding. A qualitative Bangladeshi study investigated the reasons for maternal failure to practice exclusive breastfeeding; mothers reported that too much housework was a hindrance to exclusive breastfeeding.[45] Similarly, the findings of a qualitative rural Cameroonian study[46] revealed that one of the reasons mothers practice mixed feeding was physical work exhaustion, both in the field and at home. Furthermore, the mothers reported that they received no help from the family with daily chores, such as fetching water, wood and food.

1.3.2 Socio-economic and demographic factors

The findings of the Ghana study [31] showed that mothers living in their own houses were about 4 times more likely (OR= 3.96; 95% CI; 1.02 – 15.49) to practice exclusive breastfeeding in the first six months compared to those who lived in rented houses. In Morogoro Tanzania, radio ownership was associated with a longer duration, actual duration was not specified, of exclusive breastfeeding in the rural area, (T-test; p< 0.01),

but not in the urban area.[32] In the Jamaican study [33] mothers whose male partner was the main source of income for the family were twice as likely (OR= 2.0; 95% CI: 1.4 to 3.0) to practice exclusive breastfeeding compared with those who were the main source of income for the family. The findings in Bangladesh showed mothers from families with higher incomes were more likely to practice exclusive breastfeeding compared to those families with lower incomes (Chi-square test; $p<0.01$).[40]

In contrast, in the study conducted in three Latin American countries, those mothers from higher income families in Honduras were less likely ($p=0.006$) to practice exclusive breastfeeding compared to those from lower socio-economic families.[36] A non-randomized intervention cohort was selected in a high HIV prevalent KwaZulu Natal, South Africa area. [47] The purpose was to increase exclusive breastfeeding among 1219 HIV-positive and 1217 HIV-negative mothers. It was shown that HIV-negative mothers using electricity were more likely, [Adjusted Hazard Ratio (HR) =1.52; 95% CI: 1.18 – 1.97; $p<0.001$] to stop exclusive breastfeeding before six months compared to those using wood and other types of fuel, Similarly, HIV-positive mothers using electricity were more likely (Adjusted HR = 1.64; 95% CI: 1.24 – 2.17; $p=0.001$) to stop exclusive breastfeeding before six months compared to those who used wood and other types of fuel. HIV-negative mothers owning a refrigerator were also more likely (Adjusted HR=1.64: 95% CI: 1.24 – 2.17; $p=0.016$) to stop exclusive breastfeeding before six months. There was however, no difference in the duration of exclusive breastfeeding among HIV-positive mothers who did or did not own a refrigerator. In this study, the cumulative breastfeeding rate at six months was 45% among the HIV-negative mothers; and 40% among the HIV-positive mothers.

The residential area, that is urban or rural, may also affect exclusive breastfeeding practices. In the Morogoro, Tanzania study of 320 women and their infants below seven months of age, the mean duration of exclusive breastfeeding in the urban area was 23 days [Standard Deviation (SD) 5]; whereas in the rural area, the mean duration of exclusive breastfeeding was nineteen days (19) (T-test; $p=0.001$). This indicated mothers residing in the urban areas practised exclusive breastfeeding for a significantly longer time than those from the rural areas.[32] In the Malawian [37] study, among 157 women from a rural area and 192 from a semi-urban area with infants less than six months of age were studied; the rate of exclusive breastfeeding at four months was significantly higher, 45.8%, in the semi-urban area compared to 4.7% in the rural area. Living in the rural areas in Mangochi Malawi was a risk factor (OR=1.87; 95% CI: 1.25 – 2.76) for stopping exclusive breastfeeding before six months. In the KwaZulu Natal, South Africa study[47], mothers living in

urban areas were less likely (Adjusted HR=0.65; 95% CI: 0.44-0.97) than those living in the rural or semi-urban areas to stop exclusive breastfeeding before six months.

On the other hand, the Bangladesh [40] findings showed an insignificant difference in exclusive breastfeeding rates between those mothers living in urban and rural areas.

1.3.3 Contextual issues associated with exclusive breastfeeding

A limited number of studies have investigated the association between contextual issues such as place of delivery, type of delivery and the presence of breastfeeding support programmes and exclusive breastfeeding practices.

1.3.3.1 Place of delivery

In Accra Ghana [31] delivery in a hospital or polyclinic was associated with a 2 times higher likelihood (OR=1.96; 95% CI: 1.08 – 3.54) of exclusive breastfeeding compared to home deliveries. The Malawian findings documented that not giving birth in a health facility was a risk factor (OR = 1.36; 95% CI: 1.00 – 1.85) for stopping exclusive breastfeeding before six months.[37]

The findings of a study conducted in Sao Paulo, Brazil showed that whether a delivery facility was baby-friendly or not was not associated with exclusive breastfeeding.[39]

1.3.3.2 Type of delivery: normal/vaginal deliveries vs caesarian deliveries

In a study conducted in India to determine contextual determinants of exclusive breastfeeding, the findings showed that mothers having normal, vaginal deliveries were more likely to exclusively breastfeed their babies than those delivered through caesarian section.[43] In Sao Paulo Brazil, mothers delivering through caesarian section were more likely (PRa=1.50; 95% CI: 1.27 – 1.76) to give infants water or tea on the first day after hospital discharge after delivery .[41] In contrast, the findings of another study conducted in Sao Paulo, Brazil on 34 435 children did not document any association between mode of delivery, vaginal versus caesarian and exclusive breastfeeding.[39]

1.3.3.3 Presence of breastfeeding support programmes in maternal residential area

In a study to investigate the reasons for failure of breastfeeding counseling in Bangladesh, a group of 125 mothers of breastfed infants aged one to twelve weeks, admitted with acute diarrhoea to a health facility, received individual counseling to start exclusive breastfeeding; the counseling was repeated one week later at home. The infant feeding practices were evaluated two weeks after hospital discharge. The findings showed 25% of the mothers failed to practice exclusive breastfeeding because of domineering grandmothers; lack of spousal support; excessive housework and disinterest in the mothers.[45] Similar findings were documented in the Accra Ghana study; prenatal and postnatal advice about infant feeding was not associated with the practice of exclusive breastfeeding.[31].

In contrast, a study was conducted in India [43] on 501 mothers of infants less than 6 months of age. A programme, in the maternal residential area, promoting breastfeeding was a predictor of exclusive breastfeeding practice. Those residing where there was no breastfeeding promotion were less likely, (OR= 1.34) to breastfeed, compared with those residing where breastfeeding programmes promoted the practice (OR=2.99). Likewise, the findings of a study conducted in Sao Paulo Brazil to assess the factors associated with exclusive breastfeeding documented that mothers residing in municipalities with four or five breastfeeding promotion programmes were over two times more likely (OR=2.4: 95 % CI: 2.19 – 2.88) to practice exclusive breastfeeding, than those residing in municipalities with less than four such programmes.[39]

1.3.4 Cultural Factors

Culture exerts both positive and negative influences on breastfeeding practices. In most of sub-Saharan Africa, breastfeeding is the cultural norm; initiation of breastfeeding is universal and the majority of the women breastfeed babies for two or more years.[25] On the other hand, culture may hinder the adoption of some of the WHO recommended infant feeding practices, because of the perceptions and norms associated with these practices (Table 1: 4). In a qualitative, rural Cameroonian study, mothers reported practising mixed feeding because of family and community pressure. Non-compliance with cultural practices leads to quarrels with husbands, mother-in-laws or female village elders, with the threat of curses. [46] In rural Gambia, the findings of a qualitative study showed that delayed initiation of breastfeeding, prelacteal feeding and failure to practice exclusive breastfeeding were widespread. This was because of traditional beliefs and practices (Table 1:4) strongly influencing infant feeding practices. These traditional

beliefs and practices were maintained by elderly females, males and husbands.[48] A study of both quantitative and qualitative components conducted in poor rural Yoruba communities in Nigeria documented the negative impact of culture on exclusive breastfeeding practices.[49] The findings from ten Focus Group Discussions (FGDs) among homogenous groups of grandmothers, pregnant women, lactating mothers, husbands and community health workers showed exclusive breastfeeding to be a rare practice because of the cultural beliefs and practices around infant feeding (Table 1.4).

The most serious conflict between negative culturally-determined infant feeding practices and the WHO[5] recommendations, is the lack of credibility of exclusive breastfeeding. According to traditional knowledge, the early introduction of water, other pre-lacteals and complementary foods is designed to enhance child survival. By exposing the infant to contaminants early, thereby increasing diarrhoeal morbidity and mortality, these instead achieve the exact opposite of the WHO rationale. [49]

Table 1.4: Cultural perceptions about infant feeding practices according to place of study

Cultural perceptions on infant feeding practices	Area of study and Reference
• Breastfeeding is universally accepted as the ideal mode of feeding babies but should be supplemented with other feeds before a baby is 6 months old	Cameroon [46]; Gambia [48]; Nigeria [49]
• Breastmilk is an incomplete source of food for the baby	Cameroon [46]; Gambia [48]; Nigeria [49]
• Breastmilk only quenches thirst, but does not increase the baby's weight	Cameroon [46]
• Exclusive breastfeeding as a concept was neither known or practised	Cameroon[46]; Gambia[48]; Nigeria [49]
• Exclusive breastfeeding is dangerous to the baby. The baby has an obligatory requirement for supplementary water to quench its thirst and promote normal development	Cameroon[46]; Gambia [48]; Nigeria [49]
• Colostrum is discarded because it is dirty "like pus" and is therefore potentially harmful to the baby	Nigeria [49]; Gambia [48]
• Expressed breastmilk is suspect as it can get contaminated, poisoned or bewitched	Nigeria [49]
• Water together with herbs will purge the baby and clean its stomach	Nigeria [49]
• Prelacteals of water herbal infusions, food, medicine and ritual fluids are the norm	Nigeria [49]
• Mixed feeding is an old practice encouraged by village elders. Changes to this practice are introduced by the Western Culture, those responsible for many modern diseases	Gambia [48]
• Mixed feeding makes the baby grow in size and increase weight	Gambia [48]

1.3.5 Infant characteristics

Few studies have investigated the association between infant characteristics, such as weight, length, birth weight, morbidity status and exclusive breastfeeding practices. A study in India evaluated predictors of exclusive breastfeeding among 501 mothers and infants less than six months of age. It was shown younger babies were more likely (OR= 1.02 lower age and OR= 1.05 older age) to be exclusively breastfed than the older ones. In addition, heavier babies were more likely than lower weight babies to be exclusively breastfed (lower weight babies OR=1.45 and heavier babies OR= 9.64).[43] A Lusaka, Zambia prospective study was conducted on 354 mothers and infants less than six months of age. It was shown that at six weeks, infants whose mothers had stopped exclusive breastfeeding were significantly shorter and weighed less than the infants whose mothers continued to exclusively breastfeed for sixteen weeks. [44]

In a Sao Paulo, Brazil study, mothers of infants of birth weight (≥3000g) were more likely (OR = 1.73; 95% CI; 1.49 – 1.97) to practice exclusive breastfeeding. [39] Another Sao Paulo, Brazil study showed mothers of infants of low birth weight (< 2500g) were more likely (PRa 1.64; 95% CI: 1.25 – 2.15) to introduce liquids other than breastmilk to their babies on the first day after hospital discharge after delivery.[41] Lower exclusive breastfeeding among infants of low birth weight may be consistent with the hypothesis that babies with low birth weight, due to their weaker sucking capability would fail to stimulate the establishment of an appropriate production of breastmilk.[50]

The Sao Paulo Brazil study researched the link between infant gender and exclusive breastfeeding.[39] It was revealed that female infants were more likely (OR 1.1; 95% CI 1.05-1.2) to be exclusively breastfed than male infants. Similar findings were documented in the study of three Latin American countries. In Brazil, boys were significantly less likely (p=0.04) than girls to be breastfed exclusively and the same findings were documented in Honduras (p=0.001). The authors attributed these findings to the possibility of a belief among health workers and the community that boys have greater nutritional needs than girls; thus they require complementary feeding at an earlier age.[36] Contrary to these findings, in the studies conducted in Accra Ghana [31] and in Malawi [37], the infant gender was not associated with exclusive breastfeeding.

1.3.6 Maternal psychological factors

1.3.1.6 Attitudes towards breastfeeding

Studies indicate that maternal attitudes towards breastfeeding are either positively associated with exclusive breastfeeding practices, or have no influence on exclusive breastfeeding practices. The Accra, Ghana study demonstrated a positive association between maternal attitudes towards exclusive breastfeeding and the practice of exclusive breastfeeding. Mothers with a positive attitude towards exclusive breastfeeding, a score of less than four out of six, were more likely (OR=2.0; 95% CI: 1.1-3.6) to exclusively breastfeed their babies than their counter parts with negative attitudes, a score of more than four out of six. Furthermore, those mothers planning to exclusively breastfeed before the delivery of their babies, had a higher likelihood (OR=2.6; 95% CI: 1.1-6.2) of exclusive breastfeeding than those who did not. [31] A study in Argentina on 597 mothers with infants of less than six months documented an exclusive breastfeeding rate of 19.6%. Positive maternal attitudes towards breastfeeding were significantly associated with a longer duration of exclusive breastfeeding. Mothers with good, or very good attitudes, regarding breastfeeding infants practised exclusive breastfeeding for a significantly longer duration (p value for linear trend <0.001) than those with poor attitudes towards breastfeeding infants [42]

On the contrary, a Jamaican study revealed no association between positive maternal attitudes towards exclusive breastfeeding, a score greater than the median on attitudinal questions, and the practice of exclusive breastfeeding. Those with a negative attitude towards exclusive breastfeeding, a score less than the median on attitudinal questions (Chi-square test; p=0.2).[33]

1.3.6.2 Maternal moral support

There is little scientific information about the effect of moral support offered to the mother and its impact on exclusive breastfeeding practices. A randomized clinical trial in a Mexican hospital evaluated the effects of psychosocial support during labour, delivery and the immediate postpartum period. It was shown the frequency of exclusive breastfeeding was significantly higher, 12%, in the intervention group compared to 7% in the control group.[51] The mothers in the intervention group were about one and a half times more likely [Relative Risk (RR) 1.64: 95% CI: 1.01-2.64] to practice exclusive breastfeeding than those in the control group. This signifies the important role played by companions during child birth. The study was conducted on 724 females and the support provided by a trained female companion. The intervention followed a standardized protocol; this was the basis for the training course for the female companions

participating in the study. The trained female companions provided: emotional and physical support; information on the benefits of breastfeeding; communication to prevent loneliness and encouraged contact between mother and infant. Similarly, in Argentina, duration of exclusive breastfeeding was significantly higher, ($p<0.05$) in women with good family support to breastfeeding than among those who did not have support.[42] In the Accra Ghana study, friend and relative support for or against the current infant feeding did not influence the maternal infant feeding practices.[31]

1.3.7 Maternal physiological factors

There is little scientific information linking maternal physiological factors and exclusive breastfeeding practices. The Argentinian study [42], showed that the duration of breastfeeding and the frequency of exclusive breastfeeding were significantly higher ($p<0.001$) in mothers with very good nipple conditions, such as no soreness or cracks compared to those who suffered from sore or cracked nipples (p value for linear trend <0.001). The KwaZulu Natal, South Africa study [47] also showed that mothers with breast health problems were about three times more likely (adjusted HR = 2.64: 95% CI: 1.61 – 4.2; $p<0.0001$) to stop exclusive breastfeeding compared to those with no breast health problems. The same study documented that among the HIV-negative mothers, those experiencing feeding challenges, such as perceived insufficient breast-milk or infant hunger were more likely (Adjusted HR=2.64; 95% CI: 2.13 – 3.28: $p<0.0001$) to stop exclusive breastfeeding than those without breastfeeding challenges.

In summary, despite the fact that breastfeeding is common in developing countries, exclusive breastfeeding is unusual in most cultures, therefore there is need for research on determinants of exclusive breastfeeding. Socio-economic, demographic, psychosocial, cultural and contextual factors have been found to influence exclusive breastfeeding in studies conducted in a number of communities and settings. These factors have been found to influence exclusive breastfeeding in different ways and varying degrees, hence the results cannot be generalised.[31] To achieve the WHO exclusive breastfeeding goal, it is important to understand the factors influencing exclusive breastfeeding and how best to promote this practice. Interventions to promote exclusive breastfeeding should be tailored to the needs of each population. In Kenya no studies have been undertaken to investigate the factors associated with the low exclusive breastfeeding rate.

1.4 Interventions to Promote Breastfeeding

The 1974 Twenty-Seventh World Health Assembly (WHA) noted the general decline in breastfeeding in many parts of the world. This decline was related to socio-cultural and other factors, including the promotion of manufactured breastmilk substitutes. It urged member states to review sales promotion activities for infant foods and to introduce appropriate remedial measures, including where necessary advertisement codes and legislation.[52]

Following subsequent meetings and deliberations of the WHA, a number of initiatives have been introduced to facilitate appropriate duration of breastfeeding and exclusive breastfeeding. In 1981, the World Health Assembly (WHA) adopted the International Code of Marketing Breastmilk Substitutes to protect breastfeeding and to regulate the advertising and promotional techniques used to encourage artificial feeding.[53] In 1990, the Innocenti Declaration called for the creation of an environment enabling all women to practice exclusive breastfeeding from birth to four to six months. In 1991, the World Alliance for Breastfeeding (WABA), a global network of individuals and organizations concerned with the protection, promotion and support of breastfeeding worldwide was created. WABA action is based on the Innocenti Declarations of 1990 and 2005 and the Global Strategy for Infant and Young Child Feeding. [54] This was achieved through networking, facilitating collaborative efforts in social mobilization, advocacy and capacity building.[55] A second Innocenti Declaration in 2005 [56] noted while remarkable progress has been made in breastfeeding practices, much more needs to be done. Among the actions recommended for governmental implementation by all concerned parties are the: revitalization of the Baby-Friendly Hospital Initiative (BFHI); implementation of the International Code of Marketing of Breast-Milk Substitutes; assurance that all mothers are aware of their rights and have access to support, information and counseling in breastfeeding and complementary feeding from health workers and peer groups.[56]

UNICEF and the WHO are collaborating on a global effort to rehabilitate the breastfeeding environment. The International Code of Marketing of Breast-milk Substitutes, the Innocenti Declarations and the BFHI are the most significant actions supported by UNICEF and the WHO to promote and protect breastfeeding.[57] In 1989, the WHO/UNICEF formulated guidelines on “Protecting, promoting and supporting breastfeeding: the special role of maternity services”. [9] According to these guidelines, every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff

2. Train all health care staff in skills necessary to implement this policy
3. Inform all pregnant women about the benefits and management of breastfeeding
4. Help mothers initiate breastfeeding within a half-hour of birth
5. Show mothers how to breast-feed, and maintain lactation even if they separated from the infant
6. Give newborn infants no food or drink other than breastmilk, unless *medically* indicated.
7. Practice rooming-in, allow mothers and infants to remain together for the entire day and night
8. Encourage breastfeeding on demand
9. Give no artificial teats or pacifiers, dummies or soothers to breastfeeding infants
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

The guidelines are known as the ”Ten Steps to Successful Breastfeeding” and form the basis for the BFHI.

1.4.1 The Baby-Friendly Hospital Initiative and its impact on breastfeeding practices

In 1989, UNICEF and WHO combined forces to promote and lead the establishment of BFHI. BFHI is the most widely promoted international programme to increase exclusive breastfeeding rates and extend breastfeeding duration. To become baby-friendly, it was mandatory for hospitals and maternity centres to practice the ten steps to successful breastfeeding. [9] In September 1991, the Ministry of Health and UNICEF launched the Baby-Friendly Hospital Initiative in Kenya (Personal Communication, Nutrition Officer, Division of Family Health, Ministry of Health, May 2004).

The BFHI has demonstrated some success. Over the last fifteen years, 20,000 designated facilities in 152 countries around the world have been established and continue to be established.[58] In Kenya, according to a 2003 national assessment, five out of eighty maternity hospitals qualified for the designation ‘Baby-friendly Hospital’ (Personal Communication, Nutrition Officer, Division of Family Health, Ministry of Health, May 2008). Information on the impact of BFHI on the duration and extent of breastfeeding, especially during the first six months of life, is limited; trends over the past two decades strongly suggest that BFHI has had a global impact on breastfeeding outcomes.[59] Recent studies have shown a significant increase in breastfeeding, and exclusive breastfeeding rates after implementation of BFHI or similar principle [45, 59-63]. It is estimated that there is nearly a 17% increase in exclusive breastfeeding globally.[55]

The level of BFHI successes vary across countries and regions. The first well-controlled study addressing the impact of the BFHI initiative compared the duration of exclusive breastfeeding of women from Santos, Brazil delivering either at a hospital with an active implementation of BFHI, or in a hospital where mothers roomed-in with their babies and infant formula was not allowed, but where there was no lactation counseling support or breastfeeding promotion programme. The findings of this study showed a 3.4-fold increase, ($p<0.0001$), in the median duration associated with the full BFHI package; 75 days versus 22 days respectively.[60] Despite the significant improvement in the duration of exclusive breastfeeding, it was still far below the WHO recommended six months of exclusive breastfeeding.[5] In Belarus [61] a controlled randomised trial revealed that implementing the BFHI increased the duration and exclusivity of breastfeeding 7-fold at three months, 43.3% versus 6.4% ($p<0.001$) and 12-fold at six months, 7.9% versus 0.6% ($p=0.01$). Despite the major impact of BFHI on improving exclusive breastfeeding rates, the percentage of infants exclusively breastfed at six months was less than 10%. This is far below the WHO recommendation that all infants should be exclusively breastfed for six months.[5]

The findings of a before- and after-study prospective observation study in which two cohorts of babies born at a hospital in Brazil [62] showed that the median duration of exclusive breastfeeding among the mothers exposed to the BFHI was two months compared to one month for those not exposed to the BFHI. The Hazard ratio was 1.66; 95% CI: 1.40 – 1.98 for not breastfeeding exclusively at one month and 1.55; 95% CI: 1.16 – 2.07 for discontinuing of any breastfeeding at four months among children born before the implementation of the BFHI compared to children born after the BFHI intervention. Despite the occurrence of an increase in exclusive breastfeeding rates in the first six months after BFHI implementation, the rates were still low. The authors concluded that the BFHI was insufficient to have a sustained positive impact on the duration of exclusive breastfeeding on a long-term basis.

A more recent Brazilian [63] study, using a randomized clinical design, compared the effects of two systems to promote breastfeeding on exclusive breastfeeding rates. A hospital-based system was founded on BFHI guidelines, this was the control group. A hospital-based system founded on BHFI guidelines combined with home visits, this was the experimental group. A comparison of the groups showed the hospital-training intervention to be associated with a significant increase in the proportion of infants exclusively breastfed at hospital, 70% from both study groups on day one after birth, compared to the 21% previously reported. This practice was not sustained; at ten days only 30% of the infants in the control group were exclusively

breastfed and this decreased to 15% at thirty days. When the patterns of exclusive breastfeeding in the two trial groups were compared for days 10 – 180, they differed significantly ($p<0.0001$), with a mean aggregated prevalence of 45% among the group assigned home visits compared to 13% for the group assigned no home visits. The findings demonstrate the high rates of exclusive breastfeeding achieved in hospital by BFHI not sustained at home, but home visits improve the situation.

The significant effect of BFHI on rates of exclusive breastfeeding in hospital is well documented; interventions concentrating on hospital policies and practices have shown significant positive impacts on early exclusive breastfeeding, but these efforts are not sustained.[45, 60-63] Most of the studies designed to test the impact of BFHI beyond the hospital have been conducted in Latin America and a search through the available literature revealed no such studies conducted in sub-Saharan Africa. Furthermore, in spite of the significant improvements, exclusive breastfeeding rates achieved in the first six months by BFHI fall short of meeting the WHO goal of exclusive breastfeeding for 6 months. The BHFI in itself appears to be insufficient to maintain high rates of exclusive breastfeeding up to 6 months. Hospital interventions made only at one moment may increase the rates of exclusive breastfeeding, but will have short-term effects unless complementary strategies are incorporated.[63] Within the BFHI itself, it is possible to obtain more sustainable results through the strengthening of step ten, the establishment of support groups for mothers breastfeeding after discharge from the maternity ward.[62]

The greatest challenge to BFHI therefore, is the implementation of the tenth step related to community-based breastfeeding promotion. In sub-Saharan Africa, exclusive breastfeeding rates remain low [29] despite the high rates of initiation and long duration of breastfeeding.[25] Moreover, approximately 80% of births occur outside hospitals and the highest level of maternal and infant mortality occurs in communities.[28] The BFHI may not reach many mothers in developing countries not attending ante-natal care clinics, nor delivering infants in hospitals. There is an urgent need therefore, to develop alternative or additional complementary strategies to BFHI to reach more mothers and have a greater impact on exclusive breastfeeding practices.

1.4.2 Community-based strategies and their impact in promoting exclusive breastfeeding

A randomised clinical trial in peri-urban Mexico [64] demonstrated the efficacy of home-based peer counseling to increase the rate of exclusive breastfeeding among mothers. In this study, mothers were

treated to varying intensity of counseling sessions. One intervention group received three sessions, and the second group, six counseling sessions. In the three-visit group, the first home visit took place in late pregnancy and the second and third visits during the first and second week postpartum, respectively. In the six-week visit, home visits took place in mid and late pregnancy, first, second, fourth and eighth weeks postpartum. The control group received no counseling sessions. The mothers were followed until the baby was three months. There was a strong impact of the intervention on exclusive breastfeeding rates at two weeks and three months postpartum, following a dose-response relationship. At two weeks the rate of exclusive breastfeeding in the six-visit group was 80%, whereas in the three-visit group it was 62%; and 24% in the control group ($p<0.001$). At three months, the exclusive breastfeeding rate in the six-visit group was 67%; 50% in the three-visit group and 12% in the control group ($p<0.001$). The results of this study suggest that early and repeated counseling contacts with mothers promote successful breastfeeding outcomes. Due to the fact that this study was conducted before the WHO recommendation of six months of exclusive breastfeeding, the effect of the intervention was not evaluated at six months. Thus the outcome of the intervention for a period longer than three months in this and similar populations, would need to be tested. Furthermore, infant feeding practices were determined on a 24-hour recall; the accuracy of the reported information was not verified by observation. Additionally, there was no qualitative information collected to give an in-depth understanding of the maternal rationale for choice of feeding methods.

A randomized controlled Bangladeshi [65] trial, demonstrated peer counseling is a highly effective strategy in improving exclusive breastfeeding rates. In this study women with breastfeeding experience and at least four years of schooling were used as the breastfeeding peer counselors. A total of fifteen counseling session visits, two in the last trimester of pregnancy; and thirteen post-partum visits up to five months were conducted. The visits were more frequent during the first two months after delivery and then reduced to fortnightly visits thereafter. The control group received no counseling sessions. Infant feeding practices were determined on 24-hour recall; in addition 4-hour observations took place twice, at different times of the day, on a sub-sample of twenty intervention and twenty control mother-infant pairs of different ages. Focus group discussions were held separately with mothers and peer counselors after the exit interviews at five months postpartum to solicit maternal and the counselors' views on the peer counseling strategy to promote exclusive breastfeeding. The proportion of mothers who breast-fed exclusively remained significantly higher in the intervention than in the control group throughout follow-up. This proportion was 70% by the end of the 5 months compared to 6% in the control group; an absolute difference of 64% (95%

CI: 57% - 71%; p<0.0001). Over half, 51%, of the babies in the intervention group were classified as exclusively breastfeeding throughout the five months. The results of the observation were similar to those obtained by interviews. Like the Mexican study [64], this trial was conducted before the WHO recommendation of exclusive breastfeeding for six months. The high rate of exclusive breastfeeding in the intervention group was attributed to the high frequency of home-visits, however these may be difficult to achieve in most of the developing world.

Another randomised clinical trial [66] in Brazil was conducted on low-income mothers with babies of birth weight less than 3000g. This trial demonstrated frequent postnatal counseling by peer counselors increased breastfeeding at four months from 19.4% in the control group, to 24.7% in the intervention group (p=0.044). Mothers in the intervention group were visited at home six times after discharge from the maternity ward on the: fifth, thirtieth, sixtieth, ninetieth, and one hundred and twentieth day, whereas those from the control group received no visits. The findings of this study have great application potential. This is because most cities in north eastern Brazil County, where the study was conducted, rely on community health workers, who could do the counseling. Even though peer counseling demonstrated a significant effect in improving exclusive breastfeeding rates, the rates achieved were modest and fall below the WHO recommended goal.[5] Furthermore, the evaluation was not conducted up to six months, thus the effect of the peer counseling on exclusive breastfeeding beyond four months in this population would need further investigation.

A randomized trial in a predominantly low-income Latin community-living in Hartford, Connecticut, the United States of America [67] demonstrated the efficacy of peer counseling in improving exclusive breastfeeding rates. Women were randomly assigned at the only hospital certified Baby-Friendly to either the intervention or control group. Those in the intervention group received an intensive protocol of: three, prenatal home-visits; daily, postpartum in-hospital visits; and nine home-visits after hospital discharge. The control group received the routine lactation education support given to mothers attending pre-natal clinic and delivering at hospital. The hospital also provided a breastfeeding, counseling hot-line nursing mothers could call twenty-four hours a day, after hospital discharge; nurses provided support for lactation crises. At three months, the exclusive breastfeeding rate in the intervention group was 20.6% compared to 1.4% in the control group (p<0.001). This implies community-based peer counseling interventions are efficacious in increasing exclusive breastfeeding rates even in developed countries. Nevertheless, the rate of exclusive

breastfeeding achieved in this trial is modest and falls short of the WHO recommendations.[5] Further investigations are necessary to test the impact of peer counseling on improving exclusive breastfeeding rates up to 6 months of age in this or similar populations.

A cluster randomised trial in India [6] demonstrated the positive impact of health workers to promote exclusive breastfeeding at community level. Eight communities were pair matched on their baseline characteristics; they were randomly paired so one received intervention and the other had no specific intervention. The following opportunities were used for breastfeeding counseling in the intervention communities: Traditional Birth Attendants (TBAs) at birth; local village-based health workers who weighed the infants once every three months until two years of age; health workers who visited newborn infants once a month at home until the age of one year; auxiliary nurses or midwives who ran immunization clinics; and other heath-care providers including doctors and at community meetings. Infant feeding status was determined at three and six months. At three months, 79% of the infants in the intervention communities and 48% in the control communities were exclusively breastfed. The infants in the intervention communities were four times more likely (OR=4.02; 95% CI: 3.01 – 5.38; p<0.0001) to receive exclusive breastfeeding than those from the control communities. At six months of age, 42% versus 16% were exclusively breastfed (p<0.0001). These findings indicate promotion of exclusive breastfeeding, in developing countries, through existing primary health care services, is feasible. The findings are, however, especially important since behavioural change was achieved with an approach, feasible and sustainable, on a large scale, because it was implemented through the routine health and nutrition services. The increase in exclusive breastfeeding was due to the many channels facilitating contact with the target groups soon after birth and throughout the six months of follow up. Nonetheless, the improved exclusive breastfeeding rates fall short of the WHO recommendation as less than half, 42%, of the infants were exclusively breastfed at six months.

A randomised clinical urban Ghanaian trial [68] controlled for the Hawthorne effect; in this study analogous to the placebo effect, while also varying the time of intervention. The trial revealed that at six months postpartum, 90% of the mothers in the group receiving pre, peri and postnatal counseling and 74.4% of those in the group receiving peri and postnatal counseling had exclusively breastfed their infants. This was significantly difference to the 47.7% of those not receiving breastfeeding health educational support (p=0.008). Similarly, the differences in the rate of exclusive breastfeeding, among the two treatment

groups, was statistically significant (p=0.02). All three trial groups received the same number of counseling sessions, but the control group received education on immunization and family planning, but not on exclusive breastfeeding. There was no evidence that the pre-natal counseling sessions added benefits; the exclusive breastfeeding rates throughout the six months was 40% in each of the intervention groups versus 20% in the control group (p<0.05). The researchers argued that the lack of influence of prenatal counseling was most likely due to the strong prenatal exclusive breastfeeding education, routinely received in the health facilities attended by the study participants. Furthermore, the study mothers delivered in the hospitals most likely to provide breastfeeding education.[68] The findings indicate populations with a strong culture of breastfeeding; and well-structured, professional, community lactation-counseling can have substantial and positive effect on exclusive breastfeeding rates. The high rates of exclusive breastfeeding attained in this study should be interpreted against a background of a relatively high exclusive breastfeeding rate in Ghana, 54% infants less than six months of age, compared to the other countries in Africa [29] (Table 1.2); and the high BFHI activity in the health facilities where the study was conducted.

The findings in a high HIV/AIDS prevalence KwaZulu Natal, South Africa area [47] of a non-randomized intervention cohort study, to increase exclusive breastfeeding rates to six months, demonstrated the efficacy of using trained lay-counselors to improve exclusive breastfeeding rates. The study was conducted among 1 217 HIV-positive and 1 219 HIV-negative mothers opting to breastfeed. Mothers received four prenatal, breastfeeding counseling sessions at home. These were followed by four sessions in the first two postpartum weeks; and thereafter, fortnightly, up to six months. The median duration of exclusive breastfeeding was 177 days, Range (R) 1 – 180 in HIV-negative females; and 175 days, R = 1 – 180, in HIV-positive women. Using a 24-hour hour recall, exclusive breastfeeding rates at three months were 83.1% and 76.5% among HIV- negative and HIV-positive women, respectively. At five months, the exclusive breastfeeding rate among HIV-negative females was 72.5%; and 66.7% among HIV-positive women. Fewer females, 45% of the HIV-negative, adhered to exclusive breastfeeding for six months; and 40% of the HIV-positive adhered to exclusive breastfeeding for six months. Counseling visits were strongly associated with adherence to cumulative exclusive breastfeeding at four months. HIV-negative females (adjusted OR= 2.07, 95% CI: 1.56 – 2.74; p<0.0001) and HIV- positive females (adjusted OR= 2.86, 95% CI: 2.13 – 3.83; p<0.0001) receiving the scheduled number of visits were more than twice as likely to exclusively breast feed than those not visited. The study was conducted in a high HIV prevalent and BFHI activity area. Despite lay counseling significantly increasing exclusive breastfeeding in this study; the

exclusive breastfeeding rates fall short of the WHO goal; less than half the mothers exclusively breastfed up to six months. Nevertheless, the results are striking, given the low rate, 7% of infants less than six 6 months of age of exclusive breastfeeding in South Africa.[29] This may be attributed to the high frequency of visits to the mothers, a practice with limited feasibility in the developing countries.

Overall, community-based strategies, involving peer counseling or Primary Health Care services, designed to promote exclusive breastfeeding have been shown to be effective in improving exclusive breastfeeding rates. However, the rates achieved in most of the studies are inadequate because they fall short of meeting the WHO exclusive breastfeeding goal. Although hospital-based policies and practices have had significant impact in increasing exclusive breastfeeding rates, community-based support of breastfeeding is also needed for continuous support and sustainability.

1.5 Motivation for the Research Programme

Exclusive breastfeeding plays a critical role in child survival and health.[14-15] Nevertheless, most mothers in Africa do not reach the WHO goal of exclusive breastfeeding for six months.[29] Whilst the, BFHI is the most widely promoted international programme to initiate and extend exclusive breastfeeding duration to six months, it may not reach many women in the developing countries. This is because a large proportion of infant deliveries are home-births.[28] Most studies demonstrating the critical role of community-based strategies, in increasing and sustaining exclusive breastfeeding rates among women in low-resource settings, have been conducted outside Africa. A search through the available literature revealed only two studies conducted in Africa, one in Accra Ghana [68] and another in KwaZulu Natal, South Africa. [47] and therefore there is need to investigate the impact of community-based strategies in improving exclusive breastfeeding rates in different settings in Africa.

In the Ghanaian study [68], the main objective was to test the effect of starting breastfeeding counseling prenatally or perinatally against exclusive breastfeeding rates for infants below six months of age. The study also controlled for the Hawthorne effect, analogous to the placebo in this study, by offering education sessions to the control group at the same frequency as the intervention groups. However, the content for the control group was immunization and family planning, not breastfeeding. The counseling was conducted by nurses and nutritionists who received training in lactation management prior to the intervention. Infant feeding practices were determined on; a 24-hour recall, over the previous month and over the entire six-

month period after, birth. The reported infant feeding practices were not verified by observation neither was qualitative information collected to give an in-depth understanding of maternal choice of breastfeeding practices. The study was conducted during an ongoing, exclusive breastfeeding promotion period in Ghanaian hospitals and clinics. A previous exploratory Ghanaian [31] study showed 98.1% of females attending child welfare clinics had heard about exclusive breastfeeding. Furthermore, the majority of the study participants delivered in hospitals. The present study was conducted in a low BFHI activity area; despite most of the females attending antenatal clinics, over half of the deliveries are at-home births. Additionally, the present study verified maternal reports of infant feeding practices, through observation. Qualitative data gave an in-depth understanding of maternal rationale for feeding practice choices, as well as their perception about the counseling strategies.

In the Kwazulu Natal, South Africa study [47], the purpose was to increase exclusive breastfeeding rates for six months after delivery, among HIV-negative and HIV-positive females opting to breastfeed using trained lay counselors. The study was conducted in a high HIV prevalent and BFHI activity area; unlike the area of the present study. In addition, unlike in the present study, infant feeding practices were determined on reported information and not verified by observation; neither was qualitative information collected to solicit reasons for maternal choice of infant feeding practices.

It is important to test the impact of community-based strategies in improving exclusive breastfeeding in different settings in Africa. This is because of varying: socioeconomic circumstances; provision of quality health services; accessibility to health services; and cultural infant feeding norms and practices. Furthermore, there is need to investigate the impact of community-based breastfeeding support in areas of low BFHI activity as well as in areas where most of the deliveries are at home-births. Maternal reports on infant feeding practices need to be verified through observation and qualitative data collected to give an in-depth understanding of the maternal rationale for choice of feeding practices.

1.6 Statement of the Research Question

The challenge from a public health perspective is to translate the vast literature on breastfeeding and recommendations into effective interventions understood and accepted by the population at large. In Kenya, only 13% of the infants less than six months of age are exclusively breastfed; and 2.3% of those six months of age, receive exclusive breastfeeding. The median duration of exclusive breastfeeding is 0.5

months. [27] In Kenya, interventions to promote exclusive breastfeeding focus on health facilities, yet only five out of eighty maternity wards are designated Baby-Friendly (Personal Communication, Nutrition Officer, Division of Family Health, Ministry of Health, May 2008). Despite the fact that 88% of pregnant women attend ante-natal clinics, only 40% of deliveries take place in health facilities.[27] Therefore most females do not have access to hospital-based breastfeeding promotion programmes. Breastfeeding education in hospital-based programmes is often conducted on an irregular basis, amidst many other activities; thus, it may not be afforded the necessary attention it deserves. It is mainly conducted in "group sessions"; there is no individualized attention afforded to the mothers. There is need therefore, to accelerate the implementation of the tenth step, related to community-based breastfeeding promotion, to improve exclusive breastfeeding rates. Currently, in Kenya, efforts are in place to initiate community-based breastfeeding promotion programmes, but the majority of these initiatives are in the formulation, or implementation stage (Personal Communication, Nutrition Officer, Division of Family Health, Ministry of Health, May 2008), thus their feasibility and impact are yet to be tested.

The proposed study therefore, was intended to test the impact of a modified version of the community-based concept; and of one-on-one facility-based counseling strategies to improve exclusive breastfeeding rates in a low socio-economic setting in Nairobi, Kenya.

1.7 Significance of the Study

The research has provided information on home-based intensive counseling and one-on-one facility-based breastfeeding-counseling models to improve exclusive breastfeeding rates in a low socio-economic setting. The findings will be useful, particularly to the Ministry of Health and NGOs in Kenya dealing with child survival programmes. The research findings will also help to improve and re-orientate the current breastfeeding counseling strategies. The findings will also be useful in policymaking; and as a contribution to the on-going research efforts to promote exclusive breastfeeding practices.

1.8 Conceptualizing Infant Feeding Practices

The conceptual framework for this study was adapted from Lutter's framework on the Determinants of Infant Feeding Behaviours.[69] This framework states that whether or not optimal behaviours are adopted is a result of the interaction of many factors. The closest or proximate determinants relate to female choice and the ability to act upon this choice. For example, a woman in formal employment may not be able to practice

exclusive breastfeeding, even if she has knowledge of its benefits. The proximate factors are influenced most immediately by the infant feeding information a woman receives. The factors are also influenced by the physical and social support provided to the mother during pregnancy, childbirth and the postpartum period; these factors are classified as intermediate determinants. Familial, medical and economic conditions; commercial pressures; and national and international policies and norms are considered to be underlying factors influencing breastfeeding practices.

For this study, Infant Feeding Information was separated from the Intermediate Determinants of infant feeding practices and placed between the intermediate and proximate determinants (Figure 1.2). This was because the study hypothesized that infant feeding information plays a major role in influencing the choices females make. In addition, other intermediate factors for example, infants' and mothers' health and nutrition status were added in order to adapt Lutter's model for this study.

The adapted model was used to test the impact of home-based intensive breastfeeding and one-on-one, facility-based, semi-intensive counseling approaches to improve exclusive breastfeeding rates. The model was also used to analyze factors influencing maternal choice to exclusively breastfeed.

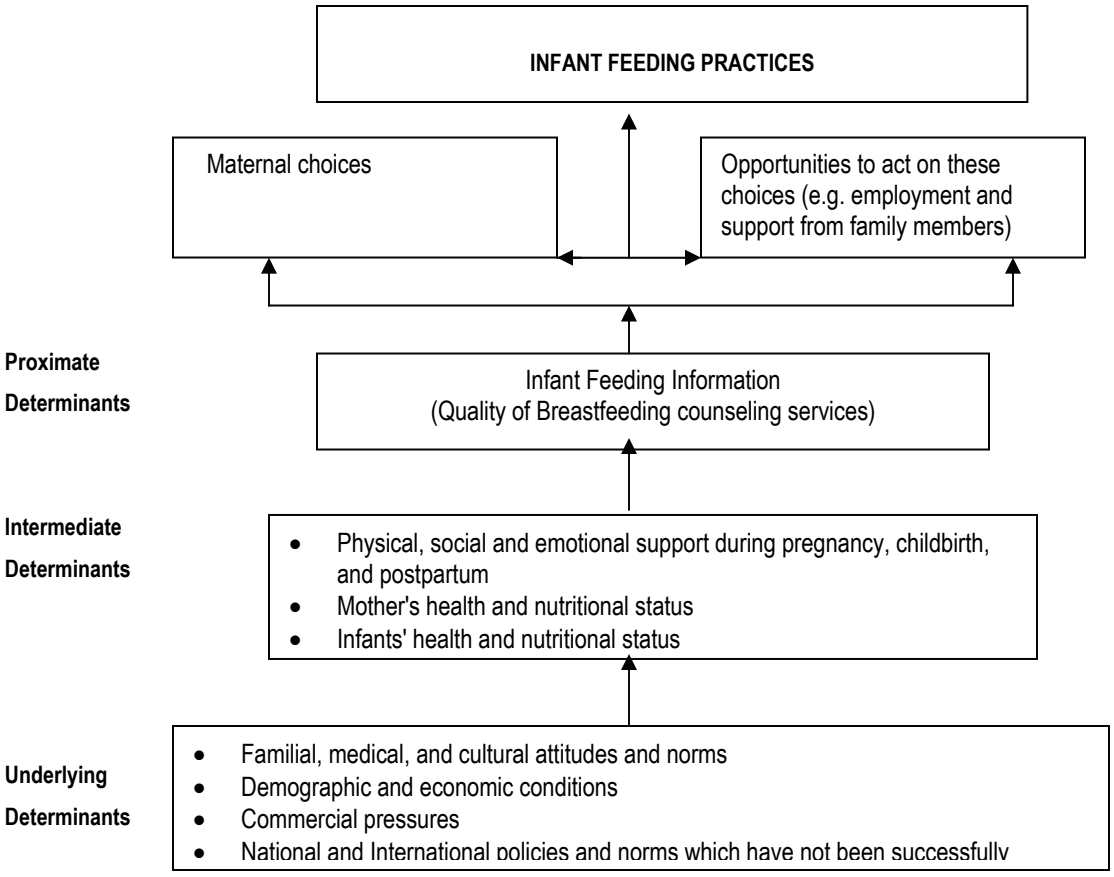


Figure 1.2: Adapted Conceptual Frame work on Determinants of Infant Feeding Practices

Source: Adapted from Lutter 2000 [69]

CHAPTER 2: METHODOLOGY

2.1 Research Aim

The aim was to assess the impact of community-based and one-on-one facility-based counseling strategies, in improving exclusive breastfeeding rates among HIV-negative females, in the Kibera slum of Nairobi, Kenya; and to investigate factors related to exclusive breastfeeding.

2.1.1 Objectives

Primary objective

This was to determine the impact of community-based and one-on-one facility-based counseling strategies in improving exclusive breastfeeding rates.

Secondary objectives

These were to determine:

- The prevalence of exclusive breastfeeding among mothers in the Kibera slum, Nairobi.
- The median duration of exclusive breastfeeding among the mothers in the Kibera slum, Nairobi.
- The factors influencing mothers to exclusively breastfeed, or not, as determined by socio-economic, maternal and infant characteristics.
- Maternal attitudes to, and acceptance of, community-based and one-on-one facility based counseling strategies, for the promotion of exclusive breastfeeding.

2.1.2 Hypotheses

Ho: Community-based and one-on-one facility-based counseling do not improve the rates of exclusive breastfeeding.

Ho: There is no difference in the rate of change in exclusive breastfeeding associated with community-based and one-on-one facility-based counseling strategies.

Ho: Mothers have no preference over the different breastfeeding counseling strategies; the three strategies were: standard counseling offered at the health facility; one-on-one facility-based counseling; and community-based counseling.

Ho: Maternal socio-economic characteristics, such as, age, education and income levels, do not influence mothers to exclusively breastfeed, or not.

Ho: There is no relationship between exclusive breastfeeding and infant health and nutrition status.

Ho: There is no relationship between exclusive breastfeeding and infant health and nutrition.

2.2 Description of the Study Site

The study was conducted in Kibera district, Nairobi province, Kenya. Kibera district is divided into seven divisions namely Kibera, Lan'gata, Karen, Mugomoini, Nairobi West, Laini Saba and Sera Ngombe.[70] The study site is in Kibera division; this has a total population of approximately, 286 739 and a population density of 49 228 per square kilometre. Kibera is sub-divided into ten official villages; each unit with its own village elder, reporting to the division chief. The division is not well served with either public or private health facilities. The Kibera residents rely on a privately organized, water supply. There are too few water points for the population; and sanitation services are minimal, with an average of one pit latrine for every fifty to one hundred people. The houses are mainly temporary, or semi-permanent, in structure; few have electricity. The transport system is poor and vehicles can hardly access the area. The average house size is three metres by three metres, with an average household size of four to five people per household (Figure 2.1 and Figure 2.2).

In Kibera division, there are two government health facilities: Kenyatta National Hospital, a teaching and a national referral hospital; and the Makina Ministry of Health Maternal and Child Clinic. There are two Nairobi City Council health facilities: Joseph Kang'ethe Health Centre; and Lang'ata Health Centre (Figure 2.3).The Nairobi City Council is the local authority responsible for the provision of essential services such as water, sanitation, health and education in the City of Nairobi. In addition, there are many private health clinics, particularly in the Kibera slum. Most provide minimal facilities; and generally have a lower standard of trained health personnel compared to the public health centres.

The study population was accessed through the Langa'ta Health Centre, whose main catchment area is the Kibera division (Figure 2.3). Lang'ata is the largest Nairobi City Council health centre in the division. From January 2003, the centre has offered free medical services. Administratively, the health centre is under the supervision of the Medical Officer of Health in-charge of Kibera District; he is assisted by the Deputy Medical Officer of Health in charge of Kibera Division. At the health centre level, the nursing officer in-charge is responsible for the administration and daily running of the centre; she is assisted by the deputy nursing officer and the administration officer. The health care centre had three medical doctors; three clinical officers; twenty-four nurses; and a nutritionist (Personal Communication, Nursing Officer in-charge, August 2004). The nutritionist left during the course of the study and there was no replacement by the end of the study.

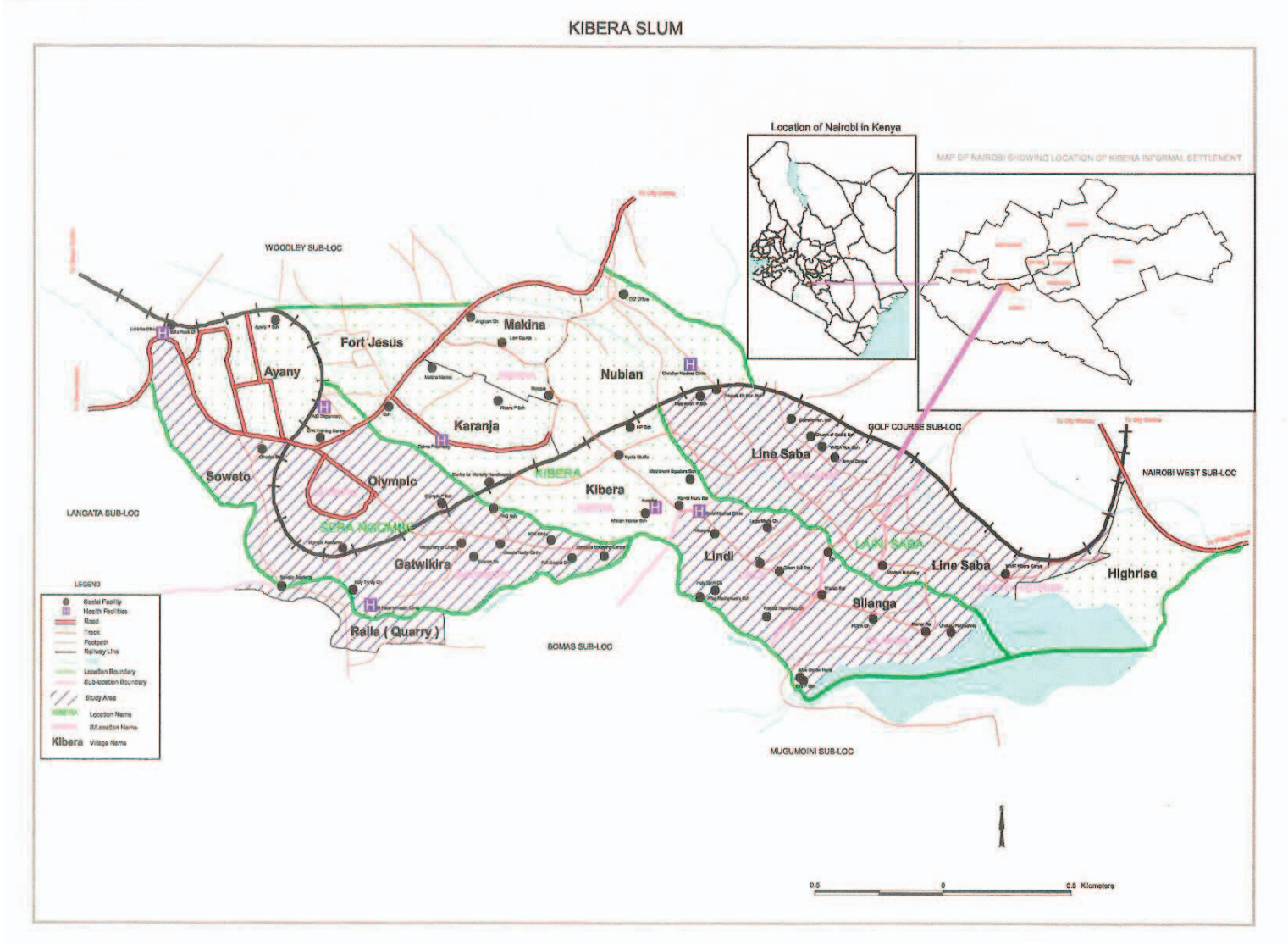


Figure 2.1: Map of Kibera Slum, Nairobi, Kenya

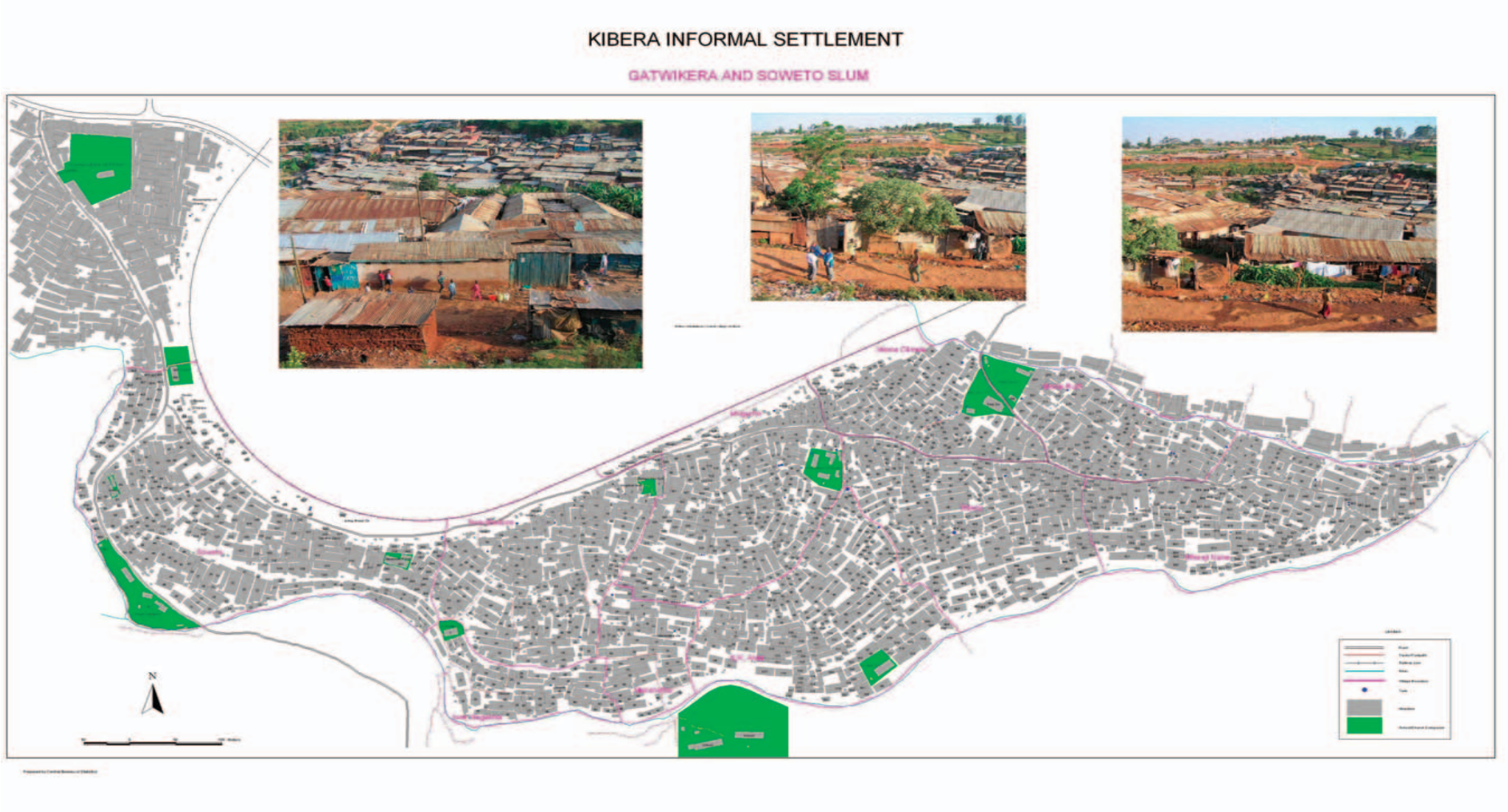


Figure 2.2: Pictures of Gatwikera and Soweto Villages in Kibera Slum, Nairobi, Kenya

At the time of the study, Lang'ata health centre offered both curative and preventive health services. The curative services included the treatment of minor ailments, such as acute respiratory infections (ARIs), malaria, skin diseases and tuberculosis (TB). Major ailments and conditions needing hospital admission were referred to Mbagathi District Hospital or Pumwani Health Centre. Preventive health services included Maternal Child and Health (MCH) and family planning services; Antenatal Care Clinic (ANC); adolescent reproductive health services; health and nutrition education; Prevention of Mother to Child Transmission (PMTCT); and Voluntary Counseling and Testing (VCT) for HIV/AIDS. Almost all females attending the ANC were tested for their HIV status during their first visit to the clinic. Lang'ata is the only Nairobi City health centre in Kibera division with a maternity ward. The health education sessions were conducted infrequently as the first, 08.15 – 08.30 am activity, before the provision of curative and preventive services began. On average, these sessions lasted about thirty minutes; and only early clients attended these sessions. During the time of the study, most of the education sessions focused on the prevention and management of HIV/AIDS. Nutrition education included appropriate infant and young child feeding; it was provided, in group sessions, to females attending ANC and MCH. The educations sessions were given infrequently by the nutritionist. Education session frequency depended on the availability of the nutritionist. Furthermore, nutrition education was scheduled for one or two days a week; and the rest of the days were allocated to education on general health issues. During the study period, the focus of the nutrition education was the importance of a balanced diet for children; and the importance of breastfeeding, although there was no emphasis on exclusive breastfeeding for six months. No such sessions were held once the nutritionist left the health centre.

The health centre had a laboratory offering basic diagnostic tests for ailments such as malaria, TB and HIV/AIDS. The centre however, did not offer X-ray services; patients requiring X-ray diagnosis were referred to either Mbagathi District Hospital, or Pumwani Health Centre.

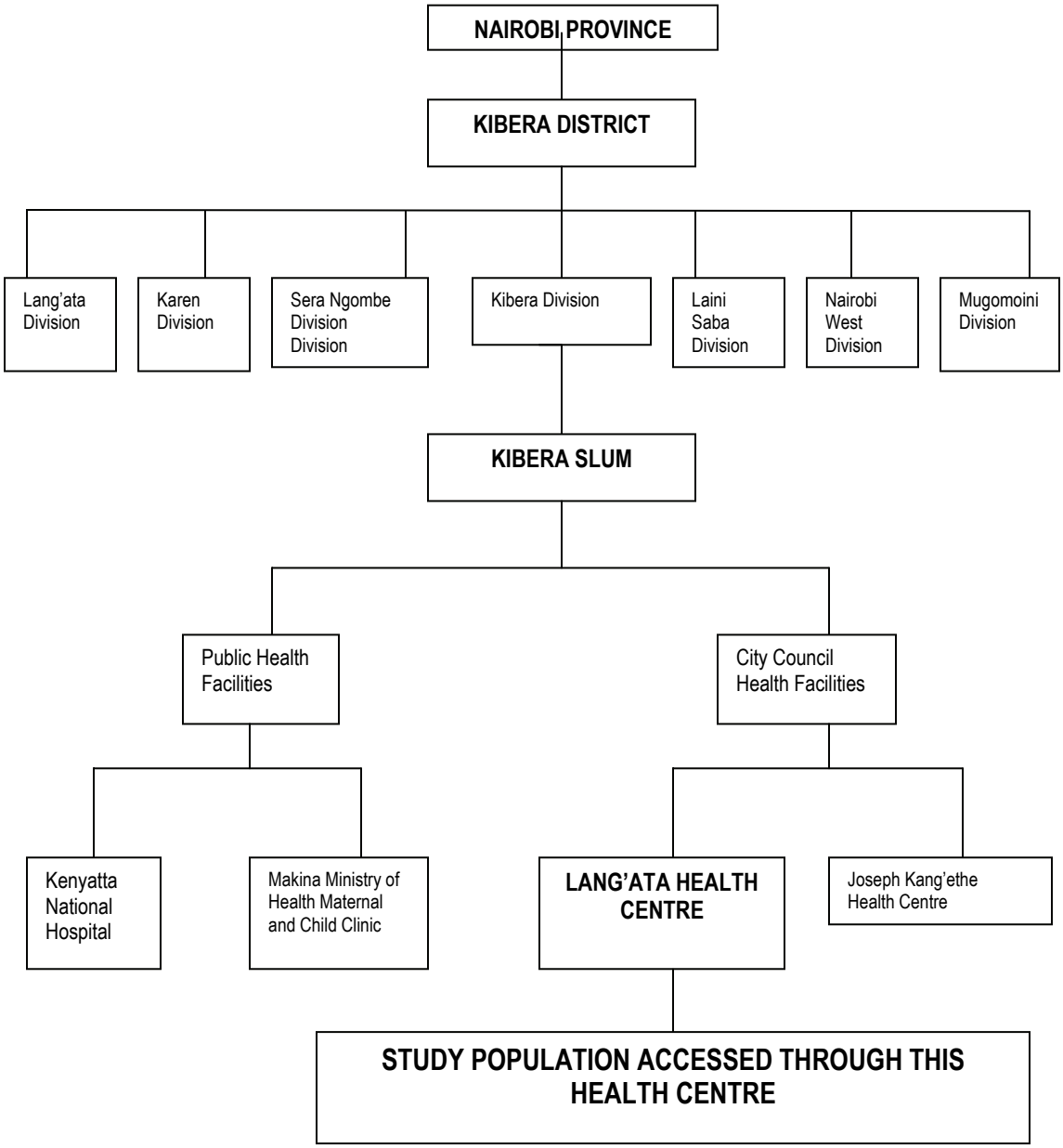


Figure 2.3: Description of the health care organogram of the study site

2.3 Study Design

The study was a randomized trial [71] designed to test the impact of two counseling strategies to increase exclusive breastfeeding rates. The study subjects were randomly assigned to three study groups: a control group, referred to as CG; an experimental group one, referred to as the Facility-based, Semi-Intensive Counseling Group (FBSICG); and an experimental group two, referred to as the Home-Based Intensive Counseling Group (HBICG). The FBSICG received one session of one-on-one, health facility-based, semi-

intensive counseling. The HBICG received seven sessions of intensive home-based counseling. The CG received no counseling from the research group.

2.3.1 Randomization

Nine villages in Kibera were randomly assigned to the three study groups. Villages, rather than women, were randomized. This was done to prevent cross contamination of expected influences if close neighbours were assigned to different study groups. The randomization was computer-generated using an Excel software package (Microsoft Office Excel 2003). Village randomization was done by the investigator, with the assistance of a statistician from the University of Stellenbosch. The investigator provided the statistician with a list of names of the nine villages included in the study. The statistician is not resident in Kenya and therefore had no information on the villages submitted to him.

The identification and placement of the subjects in the three study groups was conducted by the investigator, assisted by the sister-in-charge of the ANC at Lang'ata Health Centre. The assisting sister identified and placed eligible women into their respective study groups. This sister did not have knowledge of the treatment given to the three groups, nor did she have knowledge of the study hypotheses. This was to enhance the reliability of the study findings. Weekly, from Monday to Friday, eligible women for inclusion in the study were identified by the nurse in charge of the ANC, together with the investigator. The purpose of the study was explained to the eligible mothers, without revealing the study hypotheses. Women were told the aim of the research was to: determine infant feeding practices in the Kibera slum; identify appropriate practices needing to be encouraged; and inappropriate practices needing to be targeted, in the promotion of appropriate infant feeding practices. The randomization was done during the first contact with the mother, by either the investigator, or the nurse-in-charge of the ANC.

Only the investigator and the peer breastfeeding counselors, those providing counseling to mothers in the FBSICG and HBICG, were aware of the treatment given to these experimental groups. The hypotheses of the study could not be concealed from the peer breastfeeding counselors, since they were offering breastfeeding education to mothers and encouraging the practice of exclusive breastfeeding. The research assistants conducting the interviews to determine breastfeeding practices were unaware of the different treatments given to the study groups. They were blinded to the study hypotheses to avoid any likelihood of bias in the way they asked questions, even though they were trained to ask questions in a standard way.

The purpose of the study was explained to the research assistants, without revealing the study hypotheses or information about the study groups. The research assistants were told that the purpose of the study was to determine feeding practices of infants, from birth to six months, in the Kibera slum.

2.3.2 Target population

The target population was Kibera slum, Nairobi, Kenya females, reporting to the Lang'ata health centre for ANC services; and in the thirty-four to thirty-six week, third trimester of pregnancy. The proportion of the population of pregnant females attending Lang'ata health centre for ANC was estimated to be 75%; although the actual coverage was unknown (Personal Communication, Nursing Officer in-charge, August 2004).

2.3.3 Inclusion and exclusion criteria

Inclusion criteria

- Women in the third trimester of pregnancy, that is, 34-36 weeks
- Women tested at the Lang'ata Health Centre and diagnosed as HIV-negative
- Women intending to stay in the study site for at least six months after delivery
- Women willing to be visited at home
- Women fulfilling the above four conditions
- Women willing to be included in the study (Figure 2.4).

Exclusion criteria

- Women with documented chronic diseases such as: diabetes mellitus; renal disease; heart disease or any other chronic disease; and eclampsia in a previous pregnancy.
- Women tested HIV-positive were excluded from the study. Involving them would have had practical and financial implications, such as extending the duration of the study; and having a larger sample to distinguish between HIV-positive and HIV-negative maternal infant feeding practices.

2.3.4 Sampling methods

The sampling frame consisted of women visiting the ANC at Lang'ata Health Centre from Monday to Friday. The research team went to the health centre daily. The investigator and the nurse-in-charge

checked all the cards for women attending the ANC; and identified women in the 34 to 36 week gestation period. This ensured screening of all eligible subjects to enhance the representation of the study sample. Women meeting the inclusion criteria (Figure 2.4) and willing to participate in the study, were enrolled. They were given an oral description of the study procedure for their respective groups. After enrolment, for subsequent follow-ups, the women were accompanied home by the research team members to establish the location of their homes.

2.3.5 Sample size

The calculated sample size was 360, that is, 120 per study group. This was calculated based on the following considerations: [72]

- 90% power of the test
- 10% non-intervention prevalence rate
- 30% post--Intervention prevalence rate
- 5% level of significance

The sample size was derived, based on an assumption of a 10% pre-intervention exclusive breastfeeding rate for children from birth to six months, based on the 2003 Kenyan national exclusive breastfeeding rate [27]; and a post-intervention rate of 30%, indicating an improvement of 20%. This formula gave a sample size of 98, inflated by 20% to make it 120. The sample size was inflated for attrition due to the possible mobility of study subjects living in informal settlements.

2.4 Description of the Interventions

2.4.1 Control group (CG)

Mothers in the control group received only the usual standard health and nutrition education offered at the ANC and MCH, by the health staff of Lang'ata Health Centre. The standard nutrition education, at the health centre, was offered to women in group sessions, not on a frequency basis. It depended on time constraints and staff availability to conduct such sessions. Nutrition education was allocated about one third of the time allowed for health education. Breastfeeding promotion was just one of the many topics covered during such sessions; thus it was not accorded the necessary attention. The main focus was on the benefits of breastfeeding, without much attention to the duration and health benefits of exclusive breastfeeding. It was possible for a mother, during all her visits to the ANC, to miss out entirely on

breastfeeding information, because of the infrequency of the education sessions. No additional counseling on breastfeeding, by the research team, was provided to the study subjects in this group (Figure 2.4).

2.4.2 Facility-based semi-intensive counseling group (FBSICG)

The mothers in FBSICG received one session of counseling at the Lang'ata health centre conducted by the investigator and the breastfeeding counselors (Figure 2.4). An appointment for the counseling session was made with the mother at recruitment into the study. During the first week after enrolment into the study, the counseling session was conducted on a day, and at a time, convenient to the mother. The counseling was one-on-one; it took place in a quiet, private room at the health facility. The counseling was conducted in Kiswahili, the Kenyan national language, as most of the study participants preferred this language to English. Most study participants showed interest and demonstrated an understanding of the breastfeeding information communicated to them, as confirmed by their questions and the discussions during the counseling sessions. A few mothers were in a hurry because they needed to attend to the younger children left at home with relatives or neighbours. The counseling sessions lasted thirty to forty minutes.

The counseling content was based on the WHO/UNICEF guidelines [73] and a book, *Helping Mothers to Breastfeed.*[74] It was also structured around the benefits of exclusive breastfeeding; preparation for breastfeeding; initiation and sustainability of breastfeeding; it also included appropriate complementary feeding practices. The counseling content introduced the concepts of: complementary foods; frequency of feeding; and importance of varied diet. On breastfeeding, emphasis was on the: definition and importance of exclusive breastfeeding; dangers of breastmilk substitutes; importance of early initiation of breastfeeding, of colostrum and breastfeeding on demand; dangers of prelacteal feeds; correct breastfeeding techniques, that is, positioning and attachment of baby to the breast during feeding; prevention and management of breastfeeding challenges (Appendix 1). During these sessions, mothers were encouraged to ask questions and raise concerns, so these could be addressed as additional topics. Such concerns included: expression of breastmilk; stool patterns of breastfed babies; prevention and management of breast health problems.

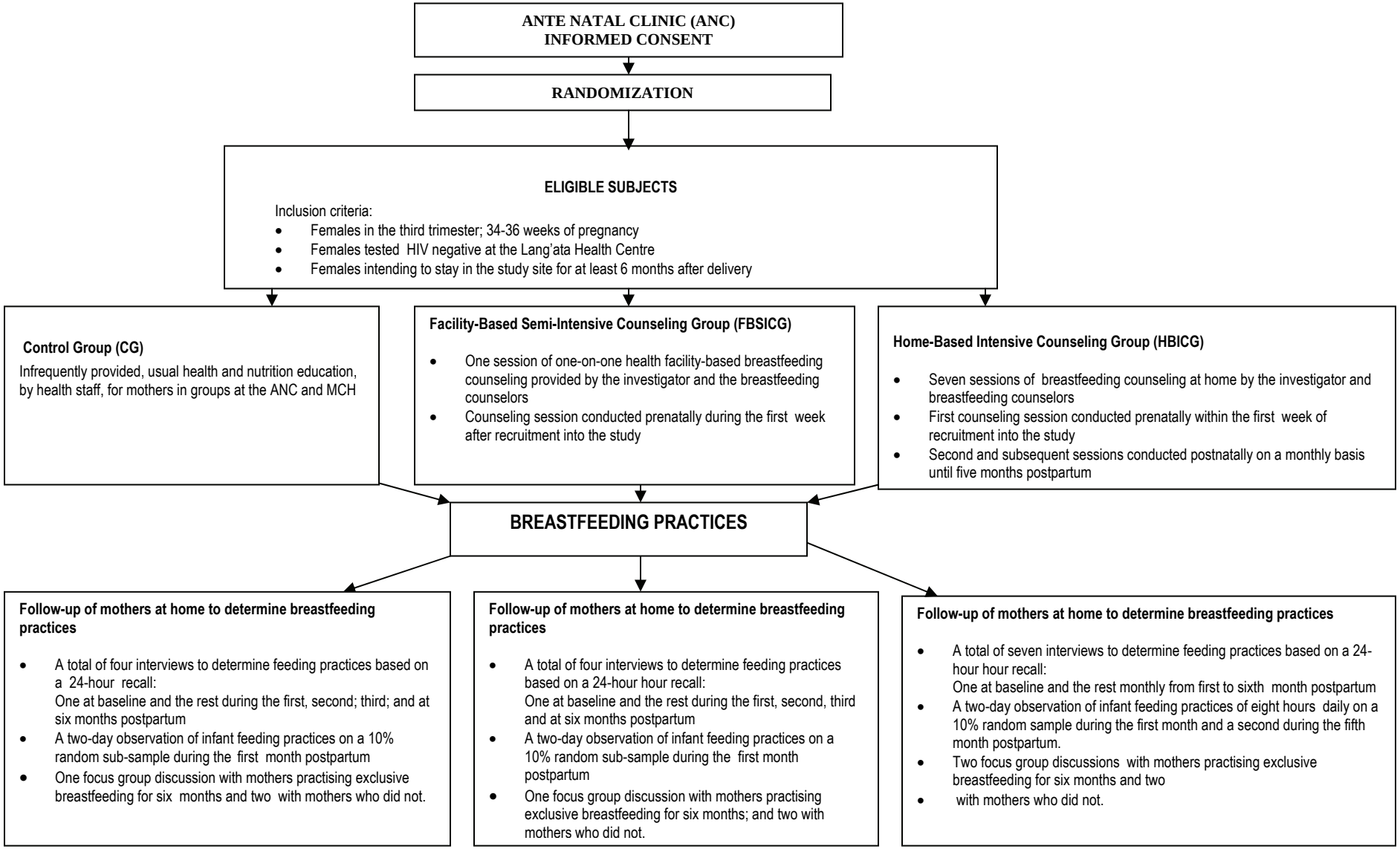


Figure 2.4: Study design and treatments for the three study groups

The mothers in the FBSICG therefore received counseling focused on breastfeeding; this was different from the general health and nutrition education received by the CG. Furthermore, the one-on-one approach offered mothers individualized attention; therefore the counselor could address individual, maternal problems and concerns. This approach also offered mothers an opportunity to ask for clarification on issues affecting them individually.

After this session with the research team, mothers in this group did not receive continued education or breastfeeding support. Nevertheless, this encounter with the mother was important, given that many did not attend the clinic consistently; and were thus likely to miss out altogether on health and nutrition education.

2.4.3 Home-based intensive counseling group (HBICG)

Mothers in the HBICG received intensive home-based breastfeeding counseling. The mothers were visited in their homes and received a total of seven counseling sessions, over a six month period (Figure 2.4). During the first week after enrolment in the study, the first prenatal counseling session, was conducted. Within the first week after delivery, the second session took place, usually on the third to fifth day. Once every month, up to five months postpartum (Figure 2.5), the third to seventh counseling sessions were conducted

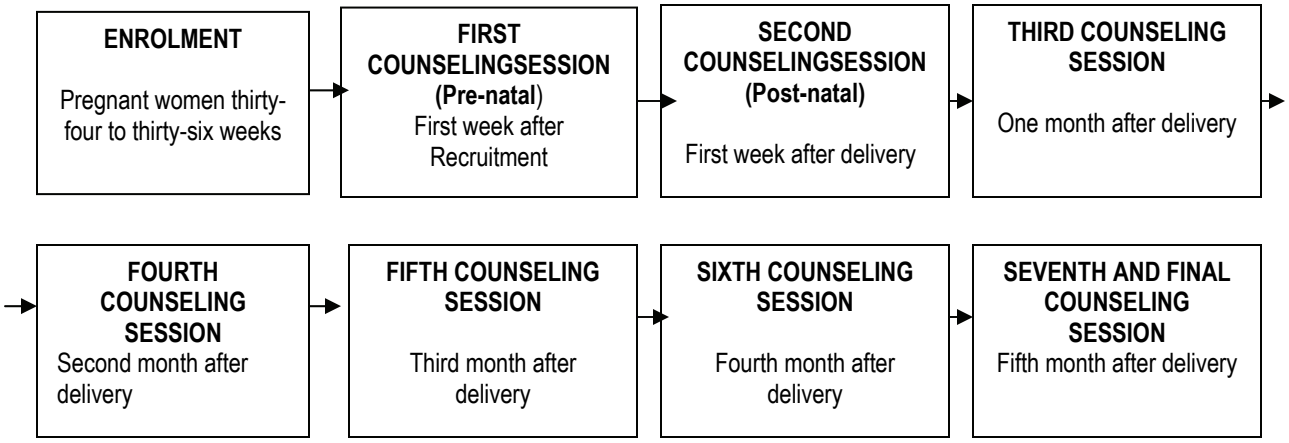


Figure 2.5: Schedule of counseling sessions for HBICG

The counseling content was similar to that given to the mothers in FBSICG (Appendix 1), but repeated at the additional counseling sessions depending on individual maternal needs. The major difference in the

counseling for the two groups was: HBICG received more detailed counseling and continued breastfeeding support up to five months after delivery, whereas the mothers in FBSICG did not receive this treatment. The high frequency of contacts between the counselors and mothers also led to reinforced information. Additionally, mothers in HBICG had more practical exposure to issues such as attachment and position of baby at the breast during breastfeeding; and expression of breastmilk. The mothers were freer to seek clarification on breastfeeding issues at home, than at the health facility; this was because of the rapport between the mothers and counselors. Each counseling session lasted thirty to forty minutes. Mothers were encouraged to ask questions during the counseling sessions; concerns raised by mothers were dealt with as additional topics.

The counseling sessions took place at the maternal house to allow for uninterrupted privacy. Husbands interested in participating in the counseling were allowed to do so. Appointments were made with the mothers regarding the next counseling session; working mothers were visited over weekends.

2.5 Determination of Breastfeeding Practices

2.5.1 Types of data collected

Quantitative data were collected by interviewing all three study groups to determine maternal infant feeding practices. Self-reported maternal information on infant feeding practices was solicited; and also observed. Qualitative data was collected through Focus Group Discussions (FGDs) to provide an in-depth understanding of maternal rationale for the chosen infant feeding practices. Maternal perceptions on the counseling strategies used in the promotion of exclusive breastfeeding were also solicited.

2.5.2 Methods for collection of quantitative data

2.5.2.1 Interviews

Interviews were administered to the mothers in the different study groups as follows (Figure 2.6):

The control group (CG)

A total of four interviews (Figure 2.6) were administered by the investigator and the research assistants to the CG mothers at home as follows:

- First Baseline Interview Within the first week after enrolment into the study

- Second Interview — Within the first month after delivery
- Third Interview — Within the third month after delivery
- Fourth Interview — At six months after delivery

Facility-based semi-intensive counseling group (FBSICG)

A total of four interviews (Figure 2.6) were administered by the investigator and the research assistants to FBSICG mothers, following the same schedule as for the CG mothers at home as follows:

- First Baseline Interview — Within the first week after enrolment into the study
- Second Interview: — Within the first month after delivery
- Third Interview: — Within the third month after delivery
- Fourth Interview: — At six months after delivery

Home-Based Intensive Counseling Group (HBICG)

A total of seven interviews (Figure 2.6) were administered by the investigator and the research assistants to HBICG mothers at home as follows:

- First Baseline Interview: — Within the first week after enrolment into the study
- Second Interview: — Within the first month after delivery
- Third Interview: — Within the second month after delivery
- Fourth Interview: — Within the third month after delivery
- Fifth Interview: — Within the fourth month after delivery
- Sixth Interview — Within the fifth month after delivery
- Seventh and final Interview — At six months after delivery

Fewer visits were made to the CG and FBSICG households to minimize possible influencing of maternal reported breastfeeding practices due to the Hawthorne effect. Improved outcomes due to the mere presence of a home visitor could have confounded the exclusive breastfeeding rates.

The interviews took place inside the maternal home to provide uninterrupted privacy. The interviews lasted twenty to thirty minutes. Appointments were not made with the mothers for the next interview session. Working mothers were visited over weekends.

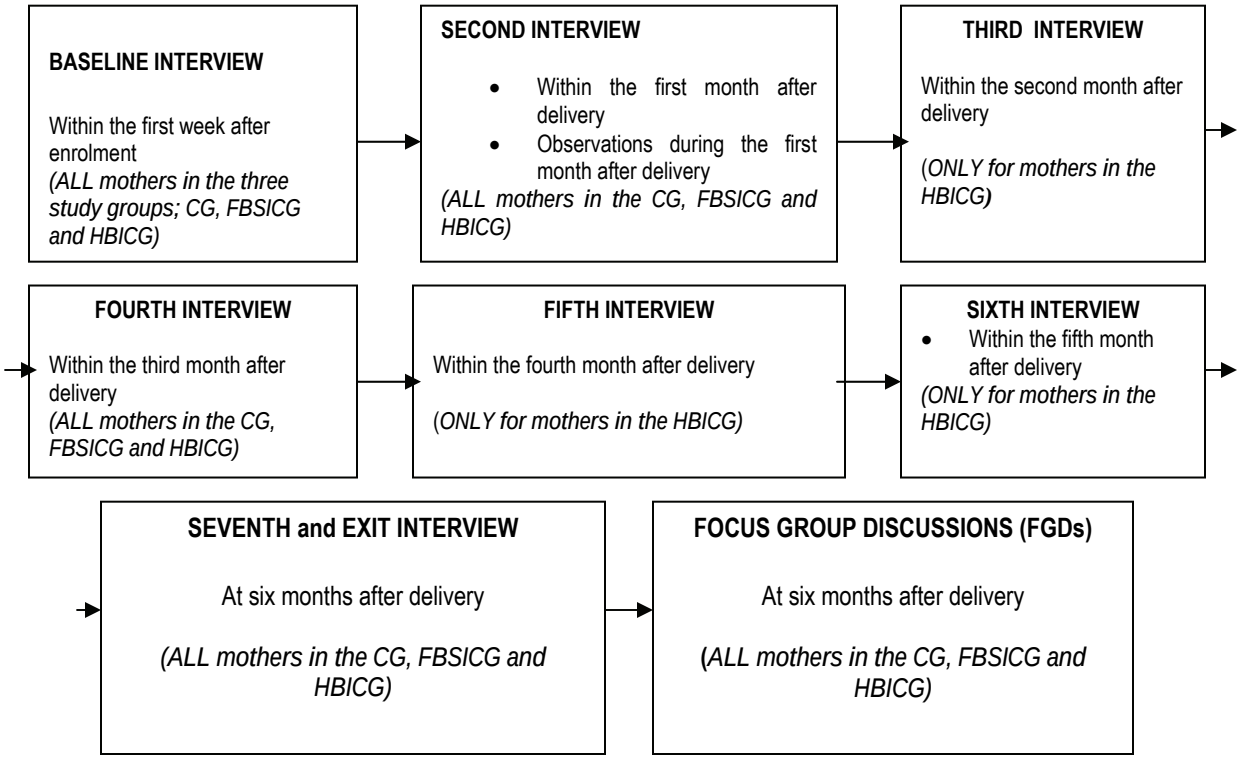


Figure 2.6: Schedule for interviews, observations and FGDs in the three study groups

2.5.2.2 Observations

Observation of a 10% random sub-sample from each of the three study groups (Figure 2.6) by the investigator and research assistants were undertaken to verify maternal reported information on breastfeeding practices. A two-day observation, each lasting eight hours was conducted at home for each of the mothers in the sub-sample to determine the actual feeding practices. The observations started at 08:00 and ended at 17:00 with a one hour lunch break from 13:00 to 14:00.

Selection of the observation sub-sample and selection criteria for the observation sessions

The sampling frame for the observation sub-sample was composed of housewives from all three study groups. Only housewives were included in the observation because they were at home the whole day, or most of the day. The participating mothers in the study were randomly selected using random table numbers.

Selection of the days of observation

The days of observation were selected through the use of random table numbers to represent maternal feeding practices. The observation day was unannounced so that the mother would not vary her usual feeding practices.

Scheduling of observation sessions

The scheduling for the observation sessions for the different study groups was as follows:

- *Control Group (CG)*:
  The two-day observation for mothers in this group was conducted during the first month after delivery.
- *Facility-Based Semi-Intensive Counseling Group (FBSICG):*
  The two-day observation for mothers in this group was conducted during the first month after delivery.
- *Home-Based Intensive Counseling Group (HBICG):*
  Two observations were conducted for mothers in this group: one during the first month after delivery; the second, during the fifth month after delivery.

As was the case with the interviews, fewer visits were made to the households in the CG and FBSICG to minimize the possibility of influencing mothers' breastfeeding practices because of the presence of a member of the research team in the household. This could confound the impact of the home-based intensive counseling on improving exclusive breastfeeding rates.

2.5.3 Collection of qualitative data

2.5.3.1 Focus group discussions (FGDs)

FGDs were considered appropriate for this study, as the resulting qualitative data was important to assess maternal feelings and thoughts; and to determine maternal responses to exclusive breastfeeding. The FGDs were also appropriate for assessing maternal perceptions about the counseling strategies used to promote the practice of exclusive breastfeeding. These important aspects could not be captured from the quantitative data; yet these aspects are important to gain a better understanding of the maternal rationale for the chosen infant feeding method. [71, 75]

FGDs were conducted with the mothers in each of the three study groups. Separate FGDs were conducted by study groups. These were for mothers exclusively breastfeeding to six months; and those who did not (Figure 2.6). The investigator conducted all the focus group discussions with the assistance of a recorder and an observer. Each of the groups was composed of eight to twelve mothers; however, for the CG the five women who exclusively breastfed to six months composed the group. The FGD mothers were purposively sampled to represent a range of ages, education levels and socio-economic status. Information-rich and outgoing mothers were selected to enrich the discussions. The FGDs were conducted at the end of the six-month follow-up period. All the discussions were tape-recorded.

The FGDs were scheduled at a convenient time and place for the participants. Efforts were made to ensure that the selected venues were comfortable, private and free from disturbance. On average, the FGDs lasted eighty minutes.

Progress of the FGDs

At every FGD, the aim was to conduct the proceedings in the following standardized way:

- The investigator-facilitator introduced herself, the recorder and the observer and welcomed the participants, who introduced themselves.
- The facilitator explained the purpose of the meeting and the roles of the observer and the recorder; set the discussion ground rules and also established verbal consent to tape-record the discussion. Earlier, at the time of recruitment into the study, written consent for participation in the FGD had been obtained.
- The facilitator started the discussion by asking the first question about the FGD guidelines. Although the guideline questions were followed as closely as possible during the discussion, efforts were made to ensure a natural flow of conversation, without losing the purpose of the discussion.
- Efforts were also made to ensure a balanced discussion by encouraging participation by the shy or quiet members of the group; also, domination of the discussion by a few participants was discouraged.
- At the end of the discussions, the investigator thanked the participants and assured them the information would be treated confidentially; and used solely for research purposes.

Scheduling of the FDGs

The scheduling for the FGDs for the different study groups was as follows:

- *Control group (CG)*

  Three FGDs were conducted; one for the mothers exclusively breastfeeding infants to six months; and two for those not exclusively breastfeeding infants to six months (Figure 2.4).

- *Facility-based semi intensive counseling group (FBSICG)*

  Three FGDs were conducted; one for the mothers exclusively breastfeeding infants to six months; and two for mothers not exclusively breastfeeding infants to six months (Figure 2.4).

- *Home-based intensive counseling group (HBICG)*

  Four FGDs were conducted; two for the mothers exclusively breastfeeding infants to six months; and another two for mothers not exclusively breastfeeding infants to six months (Figure 2.4).

2.6 Data Collection Tools and the Information Collected

2.6.1 Questionnaires for the interviews

Seven questionnaires were developed and face validated to collect information from mothers. The questionnaires were subjected to multiple pre-tests during their development and finally pilot-tested and refined for clarity and accuracy. The questionnaires were designed to solicit information as follows:

- *Baseline questionnaires were administered to mothers at home within the first week after enrolment in the study to ascertain:* demographic information such as maternal age, ethnicity, education level, marital status and household size; socio-economic status such as maternal occupation and sources of income, ownership of selected items, amount of rent paid; maternal pregnancy-related characteristics, such as parity, age of pregnancy at start of ANC attendance, frequency of ANC attendance; maternal knowledge on breastfeeding; and infant feeding choices for the unborn baby (Appendix 2).
- *Second interview questionnaires were administered to mothers at home within the first month postpartum to ascertain:* details of the current delivery and early infant feeding practices; place and type of delivery; first feed given to the baby; time of initiation of breastfeeding; and giving of pre-lacteals. Information on infant and maternal morbidity prevalence and breastfeeding challenges

experienced by mothers was also collected. Infant and maternal morbidity prevalence were based on a two-week recall. Information, based on a 24-hour recall, on infant feeding status, such as exclusive breastfeeding, predominant breastfeeding, mixed feeding or non-breastfeeding of the baby, was also sought. It was based on the WHO definitions [2] (Appendix 3).

- *Third to sixth interview questionnaires were administered to mothers during the second, third, fourth and fifth months postpartum to ascertain:* information, based on a two-week recall, on infant and maternal morbidity status as well as breastfeeding challenges faced by mothers. Infant feeding status, based on a 24-hour recall, and foods given and reasons for giving these foods was collected (Appendix 4).
- *Seventh exit Interview questionnaire administered to mothers at home at six months postpartum to ascertain:* In addition to information similar to that collected during the third to sixth interviews, for FBSICG and HBICG mothers, information was also solicited on how they responded to exclusive breastfeeding. Maternal perceptions about the counseling strategies used to promote exclusive breastfeeding in the Kibera community were also solicited (Appendix 4).

2.6.2 Observation guidelines

An observation checklist (Appendix 5) was used to collect information on infant feeding practices during the observations. Information collected included: frequency of breastfeeding; whether mothers breastfed on demand or by routine; breastfeeding challenges experienced by mothers and how they were dealt with; foods given to infants and the frequency of consumption; as well as the determination of infant status, based on the WHO criteria. [2]

2.6.3 Focus group discussion (FGDs) guidelines

FGDs guidelines were used to solicit information on: sources of breastfeeding information in the Kibera community; maternal understanding of exclusive breastfeeding and its benefits; exclusive breastfeeding practices in the community; factors encouraging FBSICG and HBICG mothers to practising exclusive breastfeeding; the maternal challenges and perceptions about the counseling strategies used in the study to promote exclusive breastfeeding. Different guidelines were used for the different study groups and maternal exclusive breastfeeding practices. For each study group, separate focus group discussion guidelines were used for mothers practising exclusive breastfeeding to six months and those who did not (Appendix 6). In addition, information on any emerging issues related to the subject of discussion, not in the

guidelines, was recorded. Maternal non-verbal cues related to infant feeding practices during the discussions were also recorded.

2.7 Anthropometry

Infant weight measurements were taken to determine anthropometric status based on the weight-for-age index. This was done to establish the relationship between exclusive breastfeeding and infant nutritional status. The infants were weighed using standard protocols on a pan-type weighing scale, calibrated to the accuracy of 10g, that is, 0.01kg. The infants were weighed wearing very light vests and the vest weight subtracted from the infant weight. The infants were lain down in the middle of the pan. Weight measurements were taken and recorded twice and the mean of the two readings recorded as the infant weight. If the difference between the two readings was more than 10g, that is, 0.01 kg, then a third weight was taken and the average of the two closest to each other recorded as the accurate weight. This procedure was uniformly practised by all research assistants.

2.8 Methods of Data Collection

2.8.1 Logistics of data collection

The study was implemented by a research team consisting of the investigator, three research assistants (RAs), three breastfeeding counselors, three field assistants and sister-in-charge of the ANC at the Lang'ata Health Centre. The roles of the members of the research team were as follows:

The Investigator, a Lactation Management Consultant, was overall in-charge of the implementation of the research activities. She directed, coordinated and supervised all activities. Before commencement of the study, she trained the research assistants and breastfeeding counselors. In addition, the investigator was responsible for identifying and recruiting eligible women in the study assisted by the sister-in charge of ANC at the health centre.

The investigator attended a two-week Lactation Management course at the Kenyatta National Referral Hospital, the largest public hospital in Kenya; and the only one in the country offering this kind of training. The Lactation Management course is implemented as collaboration between the University of Nairobi, the Ministry of Health and the Kenyatta National Hospital. The facilitators are drawn from public Kenyan

universities, with the Paediatric Department of the University of Nairobi taking the lead. The content is based on the WHO breastfeeding counseling training course. [73]

Trained, peer-female breastfeeding counselors were Kibera residents, with at least a secondary school level of education. They counseled both FBSICG and HBICG mothers.

Trained research assistants (RAs) were Kibera residents, with at least a secondary school level of education. They visited mothers at home to collect information on maternal breastfeeding practices. They conducted interviews; made observations of infant feeding practices; and also took infant weight measurements.

Three female field assistants were Kibera residents, with at least a secondary level of education. They *undertook* follow-up surveillance on mothers at home to identify new deliveries and mothers who had lactation problems; the information was reported to the sister-in-charge of ANC at the health centre. Daily, the investigator obtained this information from the sister in-charge and took appropriate action.

Health personnel at the health centre: The sister in-charge of the ANC kept a record of the new deliveries and mothers with lactation problems, as reported to her, by the field assistants conducting the surveillance, through home visits.

2.8.2 Data collection procedure

The investigator reported daily to the health centre to identify and recruit into the study eligible women from those attending ANC. This was done with the assistance of the sister in-charge of the ANC until the required sample size was reached. The data collection started in April 2005 and ended in November 2006. On average, three to four mothers were recruited per day. The investigator and research assistants would go with the recruited study participants to the maternal homes to ascertain the location of these homes. Then, an appointment was made with the mothers for the baseline interview to take place within one week of this initial home-visit. An appointment was also made with the FBSICG and HBICG mothers for the first counseling session. Subsequent interviews and counseling sessions, as well as observation sessions and FGDs for each mother, were scheduled by the investigator. The infant weights were taken during the interview schedules.

2.8.3 Maternal follow-up

A surveillance system was implemented through home visits by the three field assistants. CG and the FBSICG mothers were visited weekly, while HBICG mothers were visited every three days to establish new deliveries and any maternal lactation challenges. Contact with the CG and FBSICG mothers was minimal in comparison with the HBICG mothers. The investigator kept a record of ALL the drop-out mothers, the stage of drop-out and the reasons for drop-out.

Lactation challenges

Mothers with lactation challenges were identified through the surveillance system; the nature of the problems was reported. Mothers were encouraged to report such challenges to a research team member or to the sister in-charge at the Lang'ata Health Centre as soon as they occurred. A record of such cases was used to identify HBICG mothers in need of additional counseling, to help them overcome the breastfeeding challenges. The investigator and the breastfeeding counselors gave advice to mothers on how to handle the lactation challenges, such as engorged breasts; sore and cracked nipples; leaking breasts; and insufficient maternal milk. However, mothers with breast health problems unable to be handled by the investigator, and which could adversely constrain breastfeeding, were referred to the nearby government health facilities and a follow-up was made to establish the advice given; maternal satisfaction with the advice; and to establish recovery progress. There was only one case of a mother with cracked nipples referred to a health centre and given antibiotic treatment.

2.9 Training of Research Assistants and Breastfeeding Counselors

2.9.1. Breastfeeding counselors

Three females were recruited as breastfeeding counselors. The counselors had a minimum of secondary school level of education and were selected from those who resided in the study area and had a good command of both the English and Kiswahili languages. The purpose of the forty hours training was to:

- Explain the objectives and the research methodology;
- Explain the role and responsibilities of the counselors in the study;
- Impart knowledge on breastfeeding to the counselors;
- Train the counselors on counseling skills.

The counseling content included: benefits of breastfeeding, with an emphasis on exclusive breastfeeding; preparation for breastfeeding; initiation and management of common breastfeeding problems; introduction of complementary foods and infant feeding in the context of HIV and AIDS. The content was based on the WHO/UNICEF breastfeeding counseling course [73] and Helping mothers to breastfeed.[74] (Appendix 1).

The training was conducted through lectures, discussions, and brainstorming. Counseling skills were taught through demonstrations and role-plays, followed by practical training in an area similar to, but not, the study site. For more detailed information of training objectives, techniques and standardization of counseling content and procedures (see Appendix 7).The counselors were given a pre-test to determine their level of knowledge about breastfeeding; and a post-test to ensure they had acquired adequate knowledge about breastfeeding, to effectively undertake the counseling. The counseling skills were tested through role-plays and practice sessions with mothers and infants. At the end of the training, the investigator was satisfied that the counselors were competent to effectively undertake the counseling.

2.9.2 Research assistants

Three research assistants were selected based on the same criteria as those for breastfeeding counselors. During training, the objectives of the study were explained to the research assistants, without disclosing the research hypotheses. Interviewing skills were taught through demonstrations and role-plays. In addition, the interviewers were taught practical skills in taking anthropometry of the infants. The interviewers were exposed to practical experience in conducting interviews and taking anthropometry during the pre-testing of the instruments. The research assistant competency was tested by the accuracy, consistency and logical recording of responses. Their interviewing skills were tested through role-plays and practical application of conducting interviews. The investigator observed such sessions and recorded responses. These were then compared with those of the research assistants. To ensure standardization of data collection procedures and recording, the second and third research assistants would also sit through such sessions and record the responses. The investigator, would then advice the research assistants on the appropriate corrective measures to improve their performance. This process was repeated until the investigator was satisfied with the research assistant competency.

2.10 Data Quality Control

The quality of the data was controlled as follows:

- Thorough training of the interviewers and counselors to standardize the interviews and counseling sessions;
- Ten percent (10%) of the interviewer and counselor sessions randomly selected scheduled visits were monitored and observed by the investigator. The investigator recorded responses and compared them with those of the research assistants for differences and similarities;
- The completed questionnaires were checked daily and if information was incomplete, inconsistent or unclear, then the interviewer returned to the home the next day for completion and/or clarification;
- To verify maternal reported feeding practices, a two-day observation, each lasting eight hours was undertaken on a 10% random sub-sample;
- The number of visits made to the CG and the FBSICG mothers were fewer than those made to HBICG mothers to minimize the possibility of influencing maternal reported practices; and
- Triangulation of reported, observed and qualitative data from the FGDs was done.

2.11 Measurement of Variables

2.11.1 Dependent variables

Primary Outcome

Exclusive breastfeeding rate: This was the primary outcome and was measured monthly by the proportion of mothers practising exclusive breastfeeding; and the cumulative frequency of mothers practising exclusive breastfeeding for six months. Exclusive breastfeeding was determined using a 24-hour recall questionnaire.

Secondary Outcomes

Median duration of exclusive breastfeeding: This was measured by determining the median duration of exclusive breastfeeding over the six month-period, in each of the three study groups.

Maternal acceptance and satisfaction with the breastfeeding counseling strategies: This was determined from interviews and focus group discussions about maternal knowledge, attitudes, beliefs and practices regarding the breastfeeding counseling strategies.

2.11.2 Independent variables

Socio-demographic factors:

- *Maternal economic status* was determined by proxy indicators such as: housing type; house size; whether or not house was rented; ownership of selected items; and amount of rent paid.
- *Age* was based on the number of years completed.

Maternal characteristics:

- *Maternal education level* was determined by the highest level of formal education attained.
- *Knowledge on breastfeeding* was established through appropriate answers to questions during the baseline interview.
- *Health status* was determined, based on a two-week recall at each of the second to seventh interviews, in particular, breast health was the focus.
- *Occupational status* was determined by the type of maternal employment

Infant Characteristics:

- *Nutritional status* was determined from anthropometric data using weight-for-age index.
- *Health status* was based on a two-week recall at each of the interviews (2^{nd} - 7^{th}).
- *Birth weight* was determined from the clinic cards of mothers delivered in health facilities.
- *Monthly weight* was determined from the weight measurements taken during the interviews.
- *Mean weight gain* was determined from the weight measurements taken during the interviews.

2.12 Data Analysis

2.12.1 Quantitative data analysis

Data were entered into MS Access 2003 database and transported to Excel 2003. A spread sheet developed and used to cross-check each entry against the questionnaire, before being transported to the data analysis packages. Data from both the interviews and observations were analyzed by computer using STATISTICA version 8 and the Statistical Package for Social Sciences (SPSS) version 15.0. Descriptive summary statistics such as frequencies, means, medians and standard deviations were used to describe the characteristics of the study population; maternal infant feeding practices; exclusive breastfeeding rates and maternal attitudes to beliefs on the breastfeeding counseling strategies used to promote exclusive

breastfeeding. Cumulative exclusive breastfeeding rates to six months were assessed by Kaplan-Meir analysis.

Inferential statistics were used to determine if the three study groups were similar in socio-economic and demographic characteristics at the beginning of the study, a baseline comparison. In addition, inferential statistics were used to determine relationships and associations between variables. Non-Parametric tests; Chi-square tests and Relative Risks (RR) were used to test relationships between categorical variables such as socio-economic and demographic factors; maternal and infant characteristics; and maternal practice of exclusive breastfeeding. T-tests were carried out to determine differences between the CG and either FBSICG or HBICG mothers for continuous variables with normal distributions. Mann-Whitney tests were used to test for differences between the study groups for continuous data with non-normal distributions. Forward Stepwise Multiple Logistic Regression analyses were performed to determine the most important factors, in order of their significance, in influencing maternal practice of exclusive breastfeeding. The significance value to enter the regression model was $p<0.05$ and any variables with a significance $p>0.10$ was left out of the equation. The hypotheses were tested by a two-tailed test of significance. The significance level was set at $p<0.05$.

Data from the observations were used to test the accuracy of the reported data.

The infant anthropometric status was determined using the weight-for-age index. The National Centre for Health Statistics (NCHS)/WHO International Growth Reference (1977) and the WHO Child Growth Standards (2006) were used to determine the weight-for-age status of the infants. Infants below -2SD of the weight-for-age index were considered underweight; those below -3SD were considered to be severely underweight; and those above +2SD were considered overweight.

2.12.2 Qualitative data analysis

Qualitative data was analyzed based on the template, theory-based, approach [75] where categories or themes were identified in advance, based on the questions in the FGD guidelines. Additional themes emerging from the discussions were incorporated into the findings. Data was first transcribed, then coded by assigning labels to the pre-conceived categories. Common themes were then established and clustered in a patterned order to identify variables predicting general concepts and isolate repetitions. Inferences were made from particular data under each theme. Conclusions were then drawn from the findings. The

qualitative data were used for triangulation of the findings; and to complement the quantitative data obtained from reported interview information and observations of maternal infant feeding practices. Simultaneously, disparities were highlighted.

2.13 Ethics Approval

2.13.1 Ethical review committees

The study was approved by the Ethical Committee for Human Research, University of Stellenbosch, Cape Town and the Kenya Medical Research Institute (KEMRI) National Ethical Review Committee (Appendix 8). In addition, consent was given by the Nairobi City Council and the authority of the health facility, from where subjects were recruited.

2.13.2 Informed consent

Before enlisting mothers into the study, informed written consent, by signature or thumbprint, was sought from the mothers (Appendix 9). The benefits of the study were explained to the mothers at the time of recruitment into the study, without revealing the study hypotheses

2.13.3 Participant confidentiality

Maternal identification information was omitted from the study-related materials to ensure participant confidentiality. All conversation and information provided to the investigators by the participants was regarded as confidential. The information provided has been used for this study only, and will not to be shared for any other purposes or projects.

2.14 Pilot Study

The pilot study was conducted among HIV-negative women in the Kawangware slum, an area comparable to the Kibera slum, the study site, in terms of socio-economic and demographic characteristics, as well as infrastructure. The study was conducted over a two-month period from February to March 2005. It was impossible to cover the actual duration of the study; the follow-up period for each mother was approximately seven months. The two-month period was adequate to test all aspects and procedures of the study.

2.14.1 Purpose of the pilot study

The pilot study was conducted to test the proposed study procedures and the data collection instruments for accuracy, clarity, and validity; and to get a feel for the study findings.

2.14.2 Methodology

2.14.2.1 Study design

The pilot study was conducted using a randomized trial consisting of three study groups; a control group (CG) and two intervention groups, a Facility-based Semi-Intensive Counseling Group (FBSICG) and a Home-Based Intensive Counseling Group (HBICG).

2.14.2.2 Village randomization

Nine villages from the Kawangware slum were randomly assigned to three study groups. The randomization was computer-generated, using the Excel 2003 software package. Three villages were assigned to each of the study groups. The randomization of villages was done by the investigator, with the assistance of a University of Stellenbosch statistician.

2.14.2.3 Sampling frame and selection criteria for study participants

The sampling frame was women in their third trimester visiting three health centres in the Kawangware slum, from where recruitment into the study was conducted. The selection criteria for the study participants were the same as those used in the study itself.

2.14.2.4 Recruitment and placement of women into study groups

To shorten the time of the pilot study, the recruitment was done from three health centres, by enrolling adequate numbers of women in as a short a time as possible. The identification and placement of the subjects into the three study groups was conducted by the investigator, assisted by the health personnel in the ANC at each of the three health centres. The health personnel had no knowledge of the treatment given to the three groups, nor of the study hypotheses. The health centres were visited weekly on a rotational basis, from Monday to Friday. At each visit, all the eligible women for inclusion in the study were identified by the health personnel, together with the investigator. The purpose of the study was explained to the eligible mothers by the investigator, without revealing the study hypotheses. The randomization of women into the study groups was done during the first contact with the women, at the ANC, by the investigator.

2.14.3 Description of the intervention

Control group (CG)

The CG mothers did not receive any breastfeeding counseling from the research team; they only received the nutrition and health education provided at the health centres (Figure 2.7).

Facility-based semi-intensive counseling group (FBSICG)

Within the first week after recruitment into the study, the FBSICG mothers received a one-on-one, health facility-based, counseling session from the research team. On average, the counseling sessions lasted thirty-five minutes and the content was structured around the benefits of exclusive breastfeeding; preparation for breastfeeding; initiation and maintenance of breastfeeding; and positioning and attachment of the infant to the breast, during feeding (Figure 2.7).

Home-based intensive counseling group (HBICG)

The mothers in this group received a total of three counseling sessions, one within the first week after enrolment; the second within the first week after delivery; and the third and the final one at three weeks after delivery (Figure 2.7). The counseling content was the same as that provided to FBSICG mothers, but HBICG mothers received continued support for two weeks after delivery.

2.14.4 Follow-up of mothers

Follow-up of the mothers from the three study groups was conducted every three days to identify mothers delivering and mothers with breastfeeding challenges.

2.14.5 Determination of infant feeding practices

The determination of breastfeeding practices for the three study groups was carried out by collecting quantitative information through interviews and observation of maternal infant feeding practices, as well as qualitative information through FGDs (Figure 2.7). The schedule for data collection was as follows:

Interview schedule:

- First (Baseline) Interview — Within three days after recruitment into the study
- Second Interview — Five to ten days after delivery
- Third and final interview — Three weeks after delivery

Observations schedule:
Two one-day observations, each lasting eight hours, in all the study groups as follows:

- First observation — Within seven to fourteen days after delivery
- Second observation — At three weeks after delivery

Focus Group Discussions: Conducted after the third and final interview in all the study groups

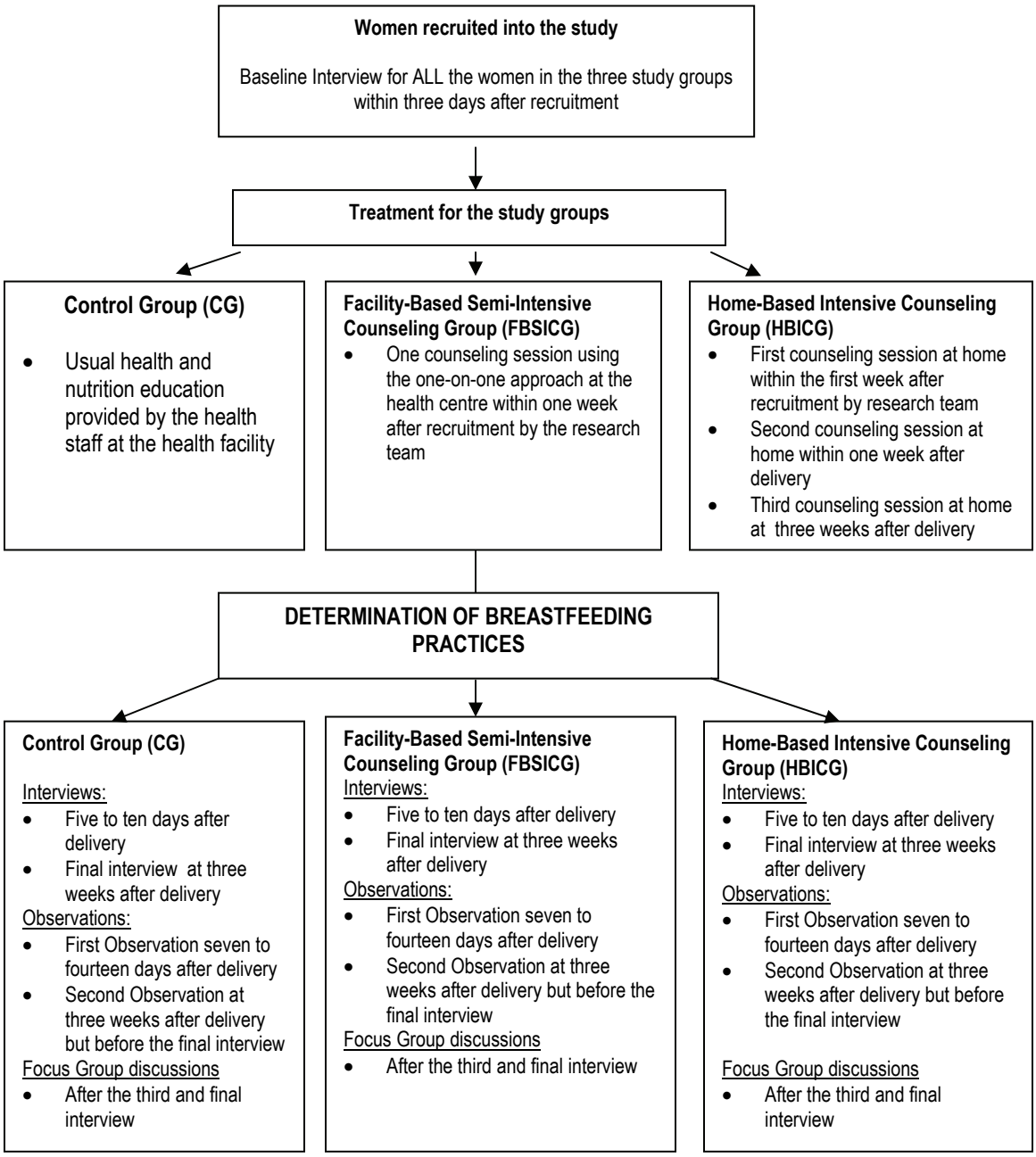


Figure 2.7: Study design, interventions and determination of infant feeding practices in the three study groups

2.14.6 Implementation of the pilot study

The pilot study was implemented by the research team consisting of the investigator, three trained research assistants, trained breastfeeding counselors, field assistants and the ANC health personnel in each of the three health centres from where women were recruited into the study. The research assistants conducted the interviews, the counselors provided breastfeeding education to the mothers and the field assistants followed-up mothers in their homes; they reported deliveries and breastfeeding challenges faced by the mothers. The investigator directed, coordinated and supervised all the study activities.

2.14.7 Testing of study procedures

Each of the study teams collected information necessary to establish successful procedures and modifications required, based on the following guidelines:

Breastfeeding counselors

- Logistical issues, such as time taken per counseling session; and convenient times for mothers to be visited.
- Maternal reaction to the counseling such as interest in the exercise; and the content areas generating interest and/or disinterest.
- General issues such as interest by family members to participate in the counseling sessions; and challenges experienced by the counselors while conducting counseling.

Research Assistants

- Logistical issues such as time taken to administer each interview; and convenient times for mothers to be visited.
- Feedback on clarity and accuracy of questions and maternal reactions to each of the questions. The research assistants were to record words or sentences not well understood and requiring prompting.
- Maternal reaction to questions, especially those considered to be sensitive.

Field assistants

- The convenient times for mothers to be visited.
- Maternal reaction to visits; and whether or not they were useful.

In addition, the investigator attended 10% of the counseling sessions and 10% of the interviews, to gain an understanding of the field experience; and to collect information based on the above guidelines. The investigator met weekly and separately with each of the groups in the research teams to get feedback and share experiences on the implementation procedures.

2.14.8 Data analysis

Quantitative data analysis

Data was entered in the Excel 2003 software package and analyzed using STATISTICA 6.1 soft ware. The data entry was done by the investigator and analyzed by a Stellenbosch University statistician. Descriptive summary statistics such as histograms, frequencies, means, and standard deviations were used to describe the characteristics of the study population; maternal feeding practices; attitudes towards the breastfeeding counseling strategies; and exclusive breastfeeding practices. Inferential statistics were used to determine if there were any statistically significant differences in selected variables between the three study groups. Inferential statistics were also used to establish relationships and associations between selected variables and breastfeeding practices. Analysis of variance (ANOVA) and non-parametric tools such as Kruskal-Wallis, Tests of Homogeneity of Variances and Pearson Chi-square and M-L Chi-square were used for data analysis where appropriate. A significance level of ($p<0.05$) was used in all the statistical tests.

Qualitative Data Analysis

Data from focus group discussions were first transcribed and then coded by assigning labels to variable categories. Common themes were then established and clustered in a patterned order to clarify variables predicting general concepts. Inferences were made from particular data under each theme. Then conclusions were drawn from the findings.

2.14.9 Results of the pilot study

2.14.9.1 Subject Enrolment into the study

A total of 48 females were screened; 38 met the selection criteria. Thirty two of the females meeting the selection criteria agreed to participate and were recruited into the study (Figure 2.8). Of the 6 declining to

participate in the study, 3 (50%), indicated that they would move out of the study site soon after delivery; and 2 (33.3%) reported needing to get permission to participate from husbands; and the remaining 1 (16.7%) did not give any reason for unwillingness to participate in the study. The CG and FBSICG mothers each consisted of 11 females and the HBICG had 10 females.

Out of the randomized group, 4 (36.4%) of the CG participants dropped out of the study for the following reasons: moved to rural homes (*N*=2); shifted to other residential areas within the city (*N*=1); and baby died (*N*=1). From the FBSICG, 2 (18.2%) of participants dropped out before completion of the study for the following reasons: shifted to other residential areas (*N*=1); and baby died (*N*=1). The number of participants dropping out from the HBICG was 2 (22.2%) for the following reasons: moved to rural home (*N*=1); and husband refused permission for participation (*N*=1) (Figure 2.8).

2.14.9.2 Baseline comparisons of the study groups

Baseline comparisons of the study groups on key socio-economic and demographic factors and pregnancy-related factors showed that the randomization was successful because the groups were similar in all respects, with the exception one variable namely parity. FBSICG females had a significantly (ANOVA; p=0.037) higher number of children compared to CG and the HBICG mothers.

2.14.9.3 Key findings

Infant feeding practices at 5-10 days postpartum by study groups

Infant feeding practices were determined on a 24-hour recall. Initiation of breastfeeding was universal in all three study groups. There was a trend for a 7.1 times lower breastfeeding frequency in the CG per day compared to 7.9 times in the FBSICG; and 8.2 times in the HBICG (ANOVA; p=0.897) (Table 2.1). All mothers in the three study groups breastfed infants on demand. There was trend for a higher percentage (100%) of mothers from CG to practice exclusive breastfeeding compared to 88.8% from the FBSICG and 75.0% from HBICG (Chi-square test; p=0.904). No mother from the CG practised predominant breastfeeding, whereas 11.2% of the mothers from the FBSICG and 25.0% of mothers from the HBICG practised predominant breastfeeding.

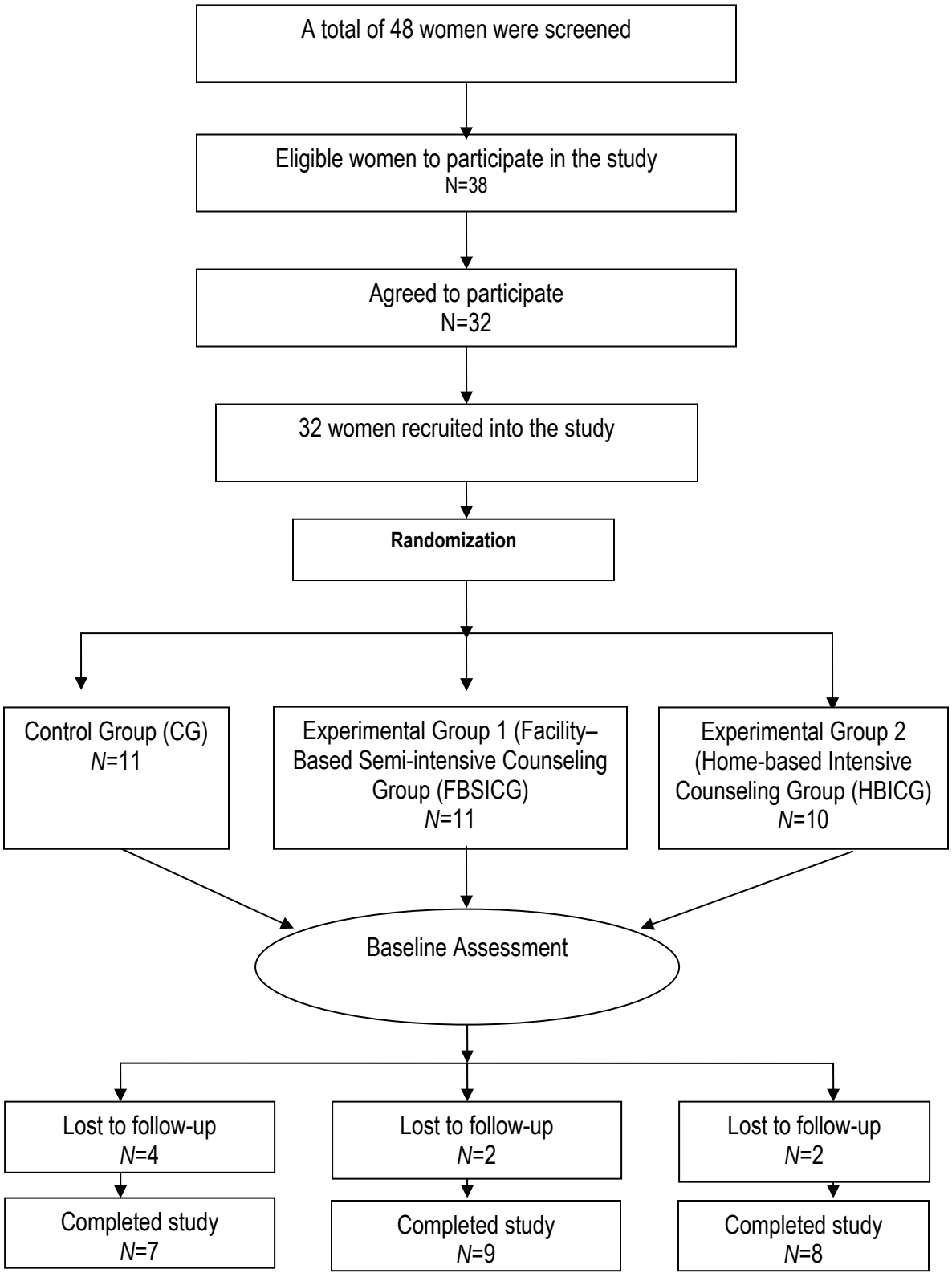


Figure 2.8: Schematic representation of the recruitment process for participants included in the pilot study

Table 2.1: Infant feeding practices at age 5-10 days postpartum by study groups [*N*; (%)]

	CG *N*=7	FBSICG *N*=9	HBICG *N*=8	ANOVA & Chi-square; p
Feeding Frequencies	7.1	7.9	8.2	0.897
Breastfed infants	7 (100)	9 (100)	8 (100)	
Breastfeeding on demand	7 (100)	9 (100)	8 (100)	
Exclusive breastfeeding	7 (100)	8 (88.8)	6 (75.0)	0.904
Predominant breastfeeding	0 (0)	1 (11.2)	2 (25.0)	

CG (Control group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group

Infant feeding practices at 3 weeks postpartum by study groups

All the mothers in the three study groups breastfed infants on demand. There was trend for a lower percentage (71.4%) of mothers in the CG to practice exclusive breastfeeding compared to 77.8% in the FBSICG and 100% in the HBICG (Chi-square test; p=0.867) (Table 2.2). There was a trend for a higher percentage (28.6%) of mothers from the CG to practice predominant breastfeeding compared to 22.2% from the FBSICG and 0% from the HBICG. No mother practised mixed feeding.

Table 2.2: Infant feeding practices at 3 weeks postpartum by study groups [*N*; (%)]

	CG *N*=7	FBSICG *N*=9	HBICG *N*=8	ANOVA & Chi-square; p
Breastfed infants	7 (100)	9 (100)	8 (100)	
Breastfeeding on demand	7 (100)	9 (100)	8 (100)	
Exclusive breastfeeding	5 (71.4)	7 (77.8)	8 (100)	0.867
Predominant breastfeeding	2 (28.6)	2 (22.2)	0 (0)	

The following observations were made from the findings on infant feeding practices from 5 days – 3 week postpartum:

- Maternal infant feeding practices were inconsistent over time; and
- All the mothers from the HBICG reverted to exclusive breastfeeding at 3 week postpartum, the end of the study. This could be attributed to the continued counseling and support offered to mothers in this group, unlike in the other two study groups.

Qualitative data from the FGDs

The FGD findings with mothers from the three study groups are summarized as follows:

Upon being asked the benefits of exclusive breastfeeding, the majority of the mothers stated breastfeeding conferred health benefits to the child; they also mentioned convenience, as breastfeeding required no preparation. The mothers from the three study groups agreed exclusive breastfeeding was rarely practised in the Kawangware slum because of ignorance and cultural perceptions in disagreement with the practice. The mothers from the FBSICG and HBICG receiving breastfeeding counseling from the research team stated they had obtained new and useful information from the counseling; also this counseling should be extended to more mothers. Some of the mothers however felt that exclusive breastfeeding should be for three to four months, as it was not practical to do it for six months.

2.14.9.4 Suggested changes to the study

A report was written on the pilot findings and submitted to the promoters and the statistician for review. The feedback was consequently incorporated into the data analyses for the study itself; and the writing of the thesis. Suggestions for changes in the implementation of the study were also incorporated in the report (Appendix 10). The changes to the study were minimal and as follows:

- *Questionnaires:* No new questions were added, neither were any removed; although a few questions were re-worded. The questionnaire had been subjected to multiple pre-tests in populations with similar characteristics to the study site during the developmental stage;
- Recruitment age for women into the study was changed from 32-34 weeks gestation to 34-36 weeks to minimize follow-up time after delivery; and consequently shorten the overall study time;

- The first breastfeeding counseling session for mothers in the FBSICG and HBICG was changed to the first week after recruitment of mothers into the study and not within two weeks after enrolment, as proposed in the study protocol. This was to ensure the mothers do not lose interest in the study; also to make certain that mothers delivering before 40 weeks gestation are counseled before delivery time;
- The second counseling session for HBICG mothers should be conducted within the first week after delivery, not the second week as proposed in the study protocol; this may be too late as some mothers may have started giving non-breastmilk fluids to their babies;
- There were minor changes in the re-scheduling of interviews; all women from the three study groups were to be interviewed in the first, third and sixth months, whereas only women from the HBICG were interviewed in the second, third and fifth months; and
- Anthropometric measurements, that is, the infant length measurements were not taken as planned because of low maternal compliance. Compliance was low because mothers felt new born infants were too young to have their lengths measured. Probably this is because in Kenya it is not common practice to take length measurements of infants at the MCH; therefore this was a new concept for most mothers.

CHAPTER 3: RESULTS

3.1 Enrolment of Subjects into the Study

3.1.1 Recruitment process and trial profile for study subjects

A total of 432 of the 998 women visiting the Langa'ta Health Centre ANC, during the April 2005 to June 2006 recruitment period, met the selection criteria and were invited to participate in the study. Of the potential 432 participants, 360 (83.3%) consented to participate and were therefore enrolled into the study. Most (*N=42)* of the 72 eligible women refusing to participate in the study did not reveal the reasons for this decision; a minority (*N=8)* cited failure to disseminate results of many previously conducted studies in Kibera; and perceptions that community members did not benefit from research studies (*N=22).* The 360 study participants were randomized into the three study groups of 120 women per group; the control group is referred to as (CG); the experimental group1 receiving Facility-Based Semi-Intensive Counseling and subsequently referred to as FBSICG; and experimental group 2 receiving Home-Based Intensive Counseling referred to as HBICG (Figure 3.1). Thirty-one, thirty-three, and thirty-one participants from the CG, FBSICG and HBICG groups respectively were lost to follow-up; thus leaving eighty-nine, eighty-seven, and eighty-nine participants per respective group completing the study.

3.2 Characteristics of the Study Population

3.2.1 Demographic and socio-economic characteristics of the study population

The median age of the study participants was 23 (range 15-42) years (Table 3.1). Three quarters (75.3%) of the mothers had attained primary school level education; and a quarter (24.7%) of the mothers had secondary level of education. The majority (92.5%) of the mothers were married, 69.7% were housewives, 13.6% self-employed, 9.4% formally employed and 5.6% casual workers. The majority of the women (90.8%) were financially dependent on their husbands, while 14.7% and 10.8% depended on income from their businesses and own salaries, respectively, or their income was in additional to that of their husband. Nearly all (96.7%) of the study participants lived in rented houses. The median number of rooms 1 (1-7) per house, and the median household size was 3 (1-10). All the houses were semi-permanent; all had iron sheet roofs; 47.8% walls were constructed of mud and cement; 28.8% had earthen walls; and 16.9% iron sheet walls. Three quarters (77.5%) of the floors were cemented and the rest (22.5%) were earthen. The median rent was Ksh 600 (100-3000). The majority (87.8%) of households owned radios; 67.5% owned land in the rural homes; 61.1% sofa-sets; 42.5% telephones, mostly mobiles; and 25.6% television sets.

Kerosene was the main source of lighting for 77.5% of the households, while 22.5% used electricity. Two-thirds (67.2%) of the households used kerosene for cooking and 30.3% used charcoal (Table 3.1).

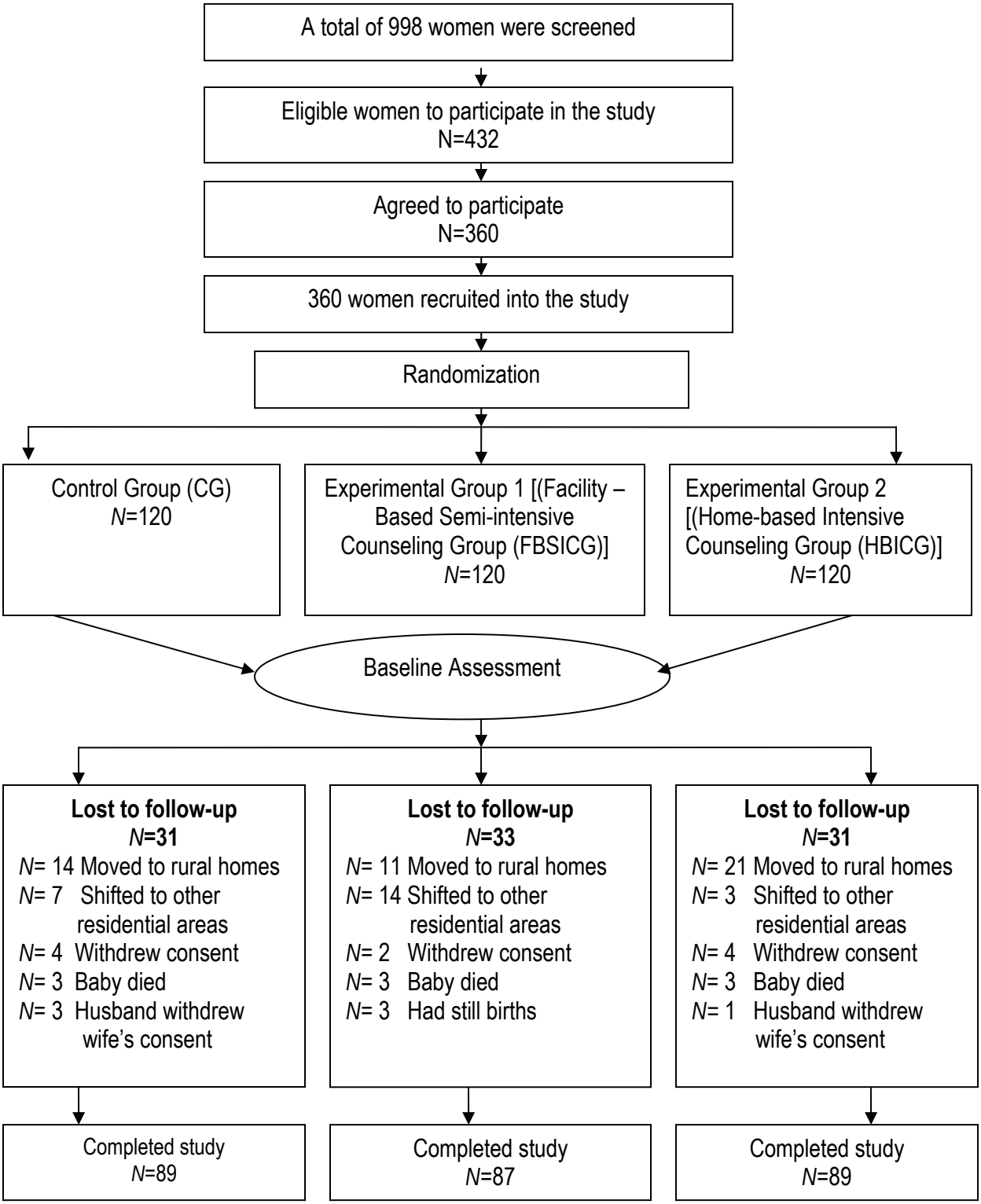


Figure 3.1: Schematic representation of the recruitment process for participants included in the study

Table 3.1 Demographic and socio-economic characteristics of the study population [N; (%)]

Demographic and socio-economic characteristics	*N*=360	
	N	%
Age (years)		
Median (range)	23 (15-42)	
Education:		
Primary school level	271	75.3
Secondary school level	89	24.7
Marital status:		
Married	333	92.5
Single	24	6.7
Widowed	3	0.8
Occupation:		
Housewife	251	69.7
Self-employment	49	13.6
Formal employment	34	9.4
Casual employment	20	5.6
Maternal Income Sources +		
Own salary	39	10.8
Husband	327	90.8
Own business	53	14.7
House Type:		
Living in rented house	348	96.7
Number of rooms:		
Median (range)	1 (1-7)	
Rent per month in Ksh:*		
Median (range)	600 (100 - 3000)	
Household size:		
Median (range)	3.0 (1-10)	
House construction Materials:		
Iron sheet roofs	360	100.0
Mud and cemented walls	172	47.8
Earthen walls	104	28.8
Iron sheet walls	16	16.9
Cemented floor	252	77.5
Earthen floor	81	22.5
Item Ownership:		
Radio	317	87.8
Land	243	67.5
Sofa-set	220	61.1
Telephone	153	42.5
Television	92	25.6
Lighting Source:		
Kerosene	279	77.5
Electricity	81	22.5
Cooking fuel:		
Kerosene	242	67.2
Charcoal	109	30.3

+ Multiple Responses;* Ksh (Kenya Shillings): approximately Ksh 70 = 1 US $ (June 2006)

A. FINDINGS AT BASELINE

3.2.2 Maternal perinatal characteristics at baseline

Baseline information was collected at home during the first and baseline interview with the study participants, within the first week of recruitment into the study; and before any interventions took place.

The median gestational age at enrolment into the study was 34 (range 34-36) weeks, while median gestational age at initiation of ante-natal clinic (ANC) visits was 26 (10-36 weeks). Study participants had attended the ANC a median of 3 (1-8) times by the time they had enrolled in the study.

3.2 3 Maternal Knowledge about breastfeeding practices at baseline

The majority (85.8%) of the mothers stated breastmilk should be the baby's first feed; whereas 6.4% and 3.6% reported the first feed should be a salt-sugar solution and plain boiled water, respectively (Table 3.2). Less than half (43.9%) of the mothers mentioned that breastfeeding should be initiated within one hour after delivery; while 35.3% stated that it should start within 8 hours; and 15.8% did not know the appropriate time. About two-thirds (65.3%) of the mothers knew babies should be breastfed for a period of 2 years or more; 88.3% also knew that babies should be breastfed on demand. In contrast, only 22.2% of the mothers stated babies should be exclusively breastfed for 6 months; whereas about a third (32.2%) stated that exclusive breastfeeding should be done for a period of 1 to 3 months.

3.2.4 Past and intended maternal infant feeding choice for the unborn baby at baseline

During the baseline interview, 98.5% of the mothers with children had breastfed them in the past; and all these mothers intended breastfeeding the expected baby: 14.2% for 1 year; 59.7% for 2 years or longer; and 21.9% for 3 years. About one third (30.8%) of the mothers intended to introduce complementary foods at 6 months; 28.4% at 2-3 months; and 26.7% at 4-6 months (Table 3.3).

Table 3.2: Maternal knowledge about breastfeeding practices at baseline [*N;* (%)]

Aspects of Knowledge	***N*=360**	
	N	%
Baby's first feed:		
Breastmilk	309	85.8
Salt-sugar solution	23	6.4
Plain boiled water	13	3.6
Initiation of breastfeeding:		
Within 1 hour	158	43.9
Within 8 hours	127	35.3
Do not know	57	15.8
Duration of breastfeeding:		
2 years or more	235	65.3
One year	66	18.3
Less than 7 months	24	6.7
Frequency of breastfeeding:		
Breastfeeding on demand	318	88.3
Breastfeeding on routine	39	10.8
Duration of exclusive breastfeeding:		
Less than one week	54	15.0
1 – 2 weeks	34	9.4
3 months	116	32.2
4-6 months	49	13.6
6 months	80	22.2

Table 3.3: Past maternal infant feeding practices and intended infant feeding choice for the unborn baby at baseline [N; (%)]

Feeding Practices	***N*=360**	
	N	%
Breastfed in the Past	262/267	98.5
Intends breastfeeding the unborn baby	360/360	100
Duration of intended breastfeeding of the baby to born:		
Up to 1 year	50	14.2
2 years or more	213	59.7
3 years	79	21.9
Over 3 years	15	4.2
Intended introduction of complementary feeding:		
Within the first month	22	6.1
2 to 3 months	102	28.4
4 to 6 months	96	26.7
6 months	111	30.8
Over 6 months	29	8.0

3.3 Baseline Comparison of Key Demographic and Socio-Economic Characteristics for the Study Groups

The randomization was successful; all three study groups were similar in all respects, with the exception of one variable, namely maternal knowledge on the timing of initiation of breastfeeding (Chi-square test; p=0.027) (Table 3.4). A significantly higher percentage (Chi-square test; p=0.027) of mothers from the FBSICG, compared to those from the CG, stated breastfeeding should be initiated within one hour of birth. The difference in the percentages of mothers in the CG and HBICG stating breastfeeding should be initiated within one hour of birth, was insignificant (Chi-square test; p =0.051)

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B. FINDINGS FOLLOWING THE INTERVENTION

3.4 Completeness of Data Collection

Almost equal proportions of participants from the three study groups did not complete the study. Out of the study participants randomized, 31 (25.8%) from the CG dropped out of the study because they had moved to rural homes (*N*=14); or to other residential areas within the city (*N*=7). Some had withdrawn consent (*N*=4); their infant had died (*N*=3); or their husband had refused their participation (*N*=3). From the FBSICG, 33 (27.5%) dropped out before completion of the study because they had moved to other residential areas (*N*=14); or to rural homes (*N*=11). Some dropped out because their infant had died (*N*=3); they had still births (N=3); or had withdrawn consent (*N*=2). The number leaving from the HBICG was 31 (25.8%). This number included those moving to: rural homes (*N*=21); or to other residential areas within the city (*N*=3). The number also included those whose: infants had died (*N*=2), consent had been withdrawn (*N*=4); husbands had refused their wife's participation (*N*=1) (Figure 3.1).

Comparisons on key maternal demographic and socio-economic characteristics were made among mothers lost to follow-up and those who completed the study to establish any differences between them. Such differences might reflect adversely on the representation of the study population. The median age of mothers completing and dropping out the study was 24 years (16-42) and 22 years (15-40), respectively, the only difference that was significant (T-test; p=0.023) (Table 3.5).

Table 3.4: Baseline Comparison of key demographic, socio-economic and perinatal characteristics for the study groups [N; (%)]

Characteristics	CG (*N*=120)	FBSICG (*N*=120)	HBICG (*N*=120)	Chi-square & ANOVA; p (*N*=120)
Maternal age:				
Mean (SD)	24.1 (5.0)	24.5 (5.4)	24. 8 (5.36)	0.369
Median (range)	23 (16-39)	25 (17-40)	25 (17-40)	
Education:				
Primary	90 (75.0)	91 (75.8)	90 (75.0)	
Secondary	30 (25.0)	29 (24.2)	30 (25.0)	
Married women	110 (91.7)	112 (93.3)	111(92.5)	0.466
Maternal occupation:				0.831
Housewife	88 (71.7)	73 (60.8)	92 (76.7)	
Formally-employed	12 (10.0)	14 (10.0)	14 (11.7)	
Self-employed	12 (10.0)	22 (18.3)	15 (12.5)	
Household Characteristics:				
Household size				
Mean (SD)	3.8 (1.7)	3.5 (1.3)	3.9 (1.8)	
Median (range)	4.0 (2-10)	3.0 (1-7)	3.0 (1-10)	
Monthly house rent:				
Mean (SD)	709 (306)	712 (382)	654 (259)	
Median (range)	700(200-2000)	600(100-3000)	500(300-1800)	
Living in rented house	117 (97.5)	115 (95.8)	116 (96.7)	0.770
Lighting Source:				0.130
Kerosene	101 (84.1)	95 (79.2)	99 (82.5)	
Electricity	19 (15.8)	25 (20.8)	21 (17.5)	0.294
Cooking fuel:				
Kerosene	82 (68.3)	85 (70.8)	83 (69.2)	
Charcoal	34 (28.3)	31 (25.8)	36 (30.10	

CG **= Control group; FBSICG = Facility based semi-intensive counseling group; HBICG = Home based Intensive Counseling group; + Amounts in Ksh (Kenya shillings), 70 = 1 US $ June 2006; Wks (weeks; ANC (antenatal clinic)**

0.220

Table 3.4 Baseline Comparison of key demographic, socio-economic and perinatal characteristics for the study groups [N; (%)] (Cont)

Characteristics	CG (*N*=120)	FBSICG (*N*=120)	HBICG (*N*=120)	Chi-square & ANOVA; p
Items ownership:				
Television	28 (23.3)	34 (29.2)	29 (24.2)	0.538
Radio	110 (91.7)			0.262
Telephone	54 (45.0)	48 (40.0)	51 (68.3)	0.736
Land	82 (68.3)	79 (65.8)	82 (68.3)	0.892
Sofa-sets	75 (62.5)	72 (60.0)	73 (60.8)	0.931
Peri-natal-related characteristics (means):				
1st ANC visit (Wks)	25.8	25.8	25.9	0.592
No of ANC visits	3.1	3.2		0.981
Parity	1.6		3.1	0.715
Knowledge about feeding practices:				
Breastmilk first feed	98 (81.7)	107 (89.2)	104 (86.7)	0.481
Start breastfeeding1 hour	42 (35.0)	62 (51.7)	54 (45.0)	0.027**
Breastfeed for 2 yrs	73 (60.8)	85 (60.8)	85 (70.8)	0.243
EBF for 6 months	26 (21.7)	23 (19.2)	31 (25.8)	0.369

102 (85.0) 105 (87.5) 1.5 1.6

CG **= Control group; FBSICG = Facility based semi-intensive counseling group; HBICG = Home based Intensive Counseling group; ** Significant differences (Chi square test p<.05); Wks (weeks; ANC (antenatal clinic)**

Table 3.5: Comparison of mothers lost to follow-up and those who completed the study on key demographic and socio-economic Characteristics

Characteristics	Completed study N=265	Dropped- out of study N=95	Chi-square & Man-Whitney tests; p
Maternal age:			
Median (range)	24 (16-42)	22 (4.97)	0.023*
Education:			
Primary	199 (75.1)	72 (75.8)	
Secondary	66 (24.9)	23 (24.2)	
Married women		85 (89.5)	0.101
Maternal occupation:			
Housewife	182 (68.7)	69 (72.6)	
Formally-employed	25 (9.4)	9 (9.5)	
Self-employed	88 (14.3)	11 (11.6)	
Household Characteristics:			
Household size (Means)	3.9 (1.8)	3.9 (1.9)	0.798
Amount of rent (Means) +	694 (345.5)	684.8 (351.6)	0.813
Living in rented house	256 (96.6)	92 (96.8)	0.911
Item ownership:			
Radio	68 (25.7)	24 (25.3)	
Telephone		84 (88.4)	0.898
Television		34 (35.8)	0.155
Land		64 (67.4)	0.975
Plot	233 (87.9)	10 (10.5)	0.162
Sofa-sets	119 (44.9)	55 (57.9)	0.455
Peri-natal-related characteristics (means):	179 (67.5)		0.939
Age started attending ANC (Wks)	16 (6.0)	25.6	0.547
No of times attended ANC	165 (62.3)	3.0	0.352
Parity	3.2	1.7	
Knowledge about feeding practices at baseline:			
Breastmilk first feed	223 (84.2)	86 (90.5)	
Start breastfeeding in 1 hour	116 (43.8)	42 (44.2)	0.071
Breastfeed for ≥ 2 yrs	168 (63.4)	67 (70.5)	0.887
EBF for 6 months	53 (20.0)	27 (28.4)	0.201
	0.541	0.442	
	0.887		
			0.136

+ Amounts in Kenya shillings (Ksh) 70 = 1 US $ June 2006; * Significant differences (Man-Whitney Test for means; p<0.05); Wks (weeks; ANC (Ante-natal Clinic)

3.5 Data Quality

A two-day 8-hour observation was conducted on a 10% randomly selected sub-sample of households, to verify reported, maternal, infant feeding practices. This was conducted as a quality control measure to test the reliability of the self-reported data by the mothers. Mothers in the three study groups were observed at 1 month; a second observation was conducted at 5 months, only for mothers in the HBICG (Figure 3.2).

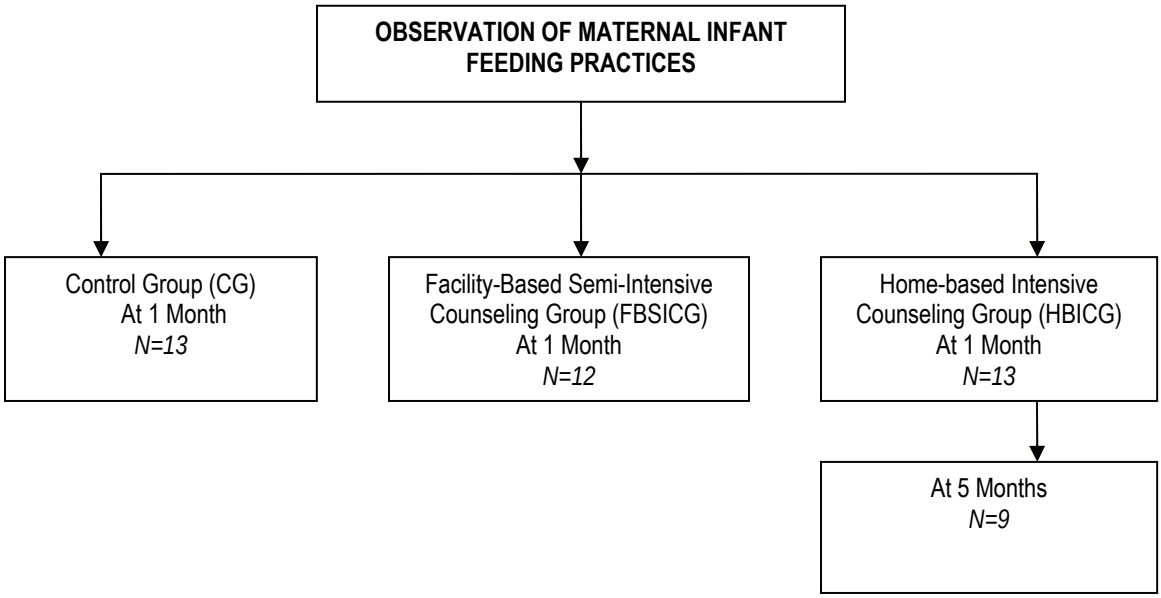


Figure 3.2: Schedule of observation for maternal infant feeding practices in the three study groups

A comparison of maternal self-reported and observed data on breastfeeding practices revealed the reported and observed data were mutually supportive; thus the self-reported data was reliable. At 1 month, 78.9% of the mothers from the observation sample had reported they were exclusive breastfeeding; whereas, 86.8% were observed to be currently exclusively breastfeeding. The percentage of the observation sample of mothers practising predominant breastfeeding based on the reported data, was 46.2%, compared to 13.2% practising predominant breastfeeding during the observation (Chi-square test; p=0.991) (Table 3.6). No mothers practised mixed feeding during the observation, or based on reported data.

Table 3.6: Differences in reported maternal and observed infant feeding practices at one month [N (%)]

	Reported *N; (%)]*	Observation *N; (%)*	Chi-square; p
Exclusive breastfeeding	30 (78.9)	33 (86.8)	0.991
Predominant breastfeeding	8 (46.0)	5 (13.2)	
Mixed feeding	0 (0)	0 (0)	
Total	**38 (100)**	**38 (100)**	

The percentage of mothers changing from exclusive breastfeeding to predominant breastfeeding during observation was 2.6%; whereas, 10.5% of mothers changed from predominant to exclusive breastfeeding. The changes in the breastfeeding practices were insignificant (McNemar Chi-square test; p=0.371); therefore the reported and observed data were mutually supportive.

At 5 months, according to the reported data, the percentage of mothers from the observation sample practising exclusive breastfeeding was 22.2%; and the same percentage practised exclusive breastfeeding based on the observation data. Whereas, according to the reported data, 22.2% of the mothers practised predominant breastfeeding; during the observation, 11.1% practised predominant breastfeeding. According to the reported data, 55.6% of the mothers practised mixed feeding; whereas 66.7% did the same based on the observation data (Chi-square test; p= 0.998) (Table 3.7).

Table 3.7: Differences in reported maternal and observed infant feeding practices at five months [N (%)]

	Recall *[N (%)]*	Observation *[N (%)]*	Chi-square; p
Exclusive breastfeeding	2 (22.2)	2 (22.2)	0.998
Predominant breastfeeding	2 (22.2)	1 (11.1)	
Mixed feeding	5 (55.6)	6 (66.7)	
Total	**9 (100)**	**9 (100)**	

The percentage of mothers, as per reported data, changing from predominant breastfeeding to mixed feeding, during observation, was 11.1%; and the rate of mixed feeding changed from 55.6% to 66.7%. There was no change in the exclusive breastfeeding rates. Changes in breastfeeding practices were insignificant (McNemar-Bowker Chi-square test; p=0.761); therefore the reported and observed data were mutually supportive.

The infant-feeding practice findings in this report are based on self-reported maternal data; since there were no significant changes in the reported and observed practices, the reported data is considered accurate.

3.6 Infant Feeding Practices during the First Week after Birth

3.6.1 The place of delivery, rooming in and counseling opportunities for the study population

The information on early infant feeding-related practices was sought from the mothers in the CG, FBSICG and HBICG at median 16 days (14-32); 16 days, (14-28); and 16 days (11-26), respectively, postpartum. Deliveries in health facilities, of the mothers from the CG, were two-fifths (44.3%) compared to 78.4% from the FBSICG and 53.0% from the HBICG (Chi-square; $p<0.0001$) (Table 3.8). A significantly higher percentage (Chi-square test; $p<0.00001$) of mothers from the FBSICG delivered at health facilities, compared to mothers from the CG; and mothers from the HBICG (Chi-square test; $p<0.00001$). Nearly all mothers delivering at home shared a bed with their infants, irrespective of their study group (Table 3.8). Of the mothers delivering at a health facility, 93.2% from the CG, 96.3% from the FBSICG and 96.2% from HBICG shared a bed with their infants since returning home.

Of the mothers delivering at home, only those from the CG (3.8%) received infant feeding counseling at the time of delivery; whereas insignificantly more mothers delivering in the health facilities received such counseling; that is, 25.0% from the CG, 21.5% from the FBSICG and 20.0% from the BHICG, (Chi-square; $p=0.833$). The study did not however, establish the nature and content of counseling received.

Table 3.8: The place of delivery, rooming in and counseling opportunities for study population [N (%)]

	CG *N*=97	FBSICG *N*=102	HBICG *N*=100	Chi-square; p
Delivery site:				
Health facility	43 (44.3)	80 (78.4)	53 (53.0)	<0.0001***
Home	53 (54.6)	22 (21.6)	45 (45.0)	
Other	1 (1.0)	0 (0.0)	2 (2.0)	
Home delivery:				
Shared bed with baby	52 (98.1)	22 (100)	47(100)	0.432
Received counseling at time of delivery	2 (3.8)	0 (0.0)	0 (0.0)	0.187
Health facility delivery:				0.855
Share bed with baby	41 (93.2)	77 (96.3)	51 (96.2)	
Slept in same room	1 (2.3)	2 (2.5)	1 (1.3)	
Separate rooms	2 (4.5)	1 (1.9)	1 (1.9)	
Shared bed with infant at home	43 (97.7)	80 (100)	53 (100)	0.246
Received counseling at time of delivery	11 (25.0)	17 (21.5)	11 (20.0)	0.833

Frequencies are presented only for selected categories and variables and therefore do not (always) add to 100%. ***Significant differences (Chi square test p<0.0001)

3.6.2 Infant feeding practices during the first week after birth by place of delivery and study groups

3.6.2.1 Infant feeding practices during the first week after birth by study groups

Breastmilk was the first feed for 78.4% of infants of mothers in the CG; 88.2% for those in the FBSICG; and 91.9% for those in the HBICG (Chi-square test; p=0.057) (Table 3.9). Compared to the CG group, mothers from the FBSICG were 13% more likely to give breastmilk as the first feed after birth [RR (Relative Risk) =1.13; 95% Confidence Interval (CI): 0.99 – 1.28; p=0.065], a significant trend. Mothers from the HBICG were 16% more likely to give breastmilk as the first feed after birth, compared to those in CG (RR=1.16; 95% CI: 1.02 – 1.31; p=0.016), a significant difference (Table 3.9). Apart from breastmilk, other first feeds given, by relatively smaller percentages of mothers, were glucose water, plain boiled water and salt-solution. With regard to initiation of breastfeeding, 30.2% of the mothers from the CG; 43.1% from the FBSICG; and 34.3% from the HBICG initiated breastfeeding within one hour of birth (Chi-square test; p=0.153). Compared to the CG, mothers from the FBSICG were 44% more likely to initiate breastfeeding within the first hour of birth (RR=1.44; 95% CI: 0.99-2.10; p=0.057); while those in the HBICG were 14%

more likely to initiate breastfeeding within the first hour after birth than those in the CG (RR=1.14; 95% CI: 0.75-1.7; p=0.538). These differences were insignificant.

Post-lacteal feeds, including non-breastmilk fluids or food, were given within three days of birth by 43.3% of the mothers in the CG, 34.5% of the FBSICG and 24.2% from HBICG (Chi-square test; p=0.018) (Table 3.9). Mothers from the FBSICG were 21% less likely to give post-lacteals compared to those in the CG, (RR=0.79; 95% CI: 0.56 – 1.13; p=0.195), an insignificant difference. On the other hand, mothers in the HBICG were significantly less likely to introduce post-lacteal feeds in the first three days of life compared to those in the CG, (RR=0.56; 95% CI: 0.37- 0.85; p=0.006) (Table 3.9).

Mothers in the CG group had an increased likelihood (25.8%) of giving salt-sugar solution, the most common post-lacteal feed, compared to 20.9% in the FBSICG and 8.0% from the HBICG (Chi-square test; p=0.002) (Table 3.9). Compared to CG, mothers in the FBSICG and HBICG were 20% (RR=0.80; 95% CI: 0.048-1.33; p=0.387) and 69% (RR=0.31; 95% CI: 0.15 – 0.65; p=0.002] less likely to give salt-sugar solution, respectively. Other post-lacteals given by relatively smaller percentages of mothers were glucose water, plain boiled water and salt solution (Table 3.9).

Table 3:9: The impact of counseling strategies on infant feeding practices during the first week after delivery by study groups

Infant feeding Practices	CG *N*=97	FBSICG *N*=102	HBICG *N*=100	Chi-square; P	CG RR=1	FBSICG RR; 95% CI; P value	HBICG RR; 95% CI; P value
	N (%)	*N* (%)	*N* (%)				
First feed:							
Breastmilk	76 (78.4)	90 (88.2)	91 (91.9)			1.13 CI: 0.99 – 1.28; P=0.065	1.16 CI: 1.03 – 1.31; P=0.016*
Salt-sugar solution	9 (9.4)	4 (3.9)	3 (3.0)	0.118			
Glucose water	3 (3.1)	1 (1.0)		0.444			
Plain boiled water	4 (4.1)	1 (4.0)	3 (2.9) 0.057	0.886			
Salt solution							
Initiated breastfeeding within 1 hour	29 (30.2)	44 (43.1) 1 (1.0)	34 (34.3)	0.153		1.44 CI: 0.99 – 2.10; P=0.057	1.14 CI: 0.75 – 1.71; P=0.538
Post-lacteal feeding:	42 (43.3)		24 (24.2)	*		0.79 CI: 0.56 – 1.13; P=0.195	0.56 CI: 0.37 – 0.85; P=0.006**
Post-lacteals given:							
Salt-sugar solution	25 (25.8) 35(34.3)	21 (20.9)	8 (8.0) 0.018	0.002**		0.80 CI: O.48 – 1.33; P=0.387	0.31 CI: 0.15 – 0.65; P=0.002**
Glucose water	8 (8.2)	9 (8.8)	7 (7.0)	0.887			
Plain boiled water	5 (5.2)	4 (3.9)	7 (7.0)	0.622			
Salt solution	4 (4.1)	2 (2.0)	1 (1.0)	0.338			

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); RR (Relative Risk)
Frequencies are presented only for selected categories and variables and therefore do not (always) add to 100%. * Significant differences (Chi-square and RR tests p<0.05), ** Significant differences (Chi-square and RR tests p≤0.001)

3.6.2.2 Infant feeding practices in the first week after birth by delivery site and study group

Of the mothers who delivered at home, initiation of breastfeeding was universal, as all mothers from the three study groups reported having breastfed their babies. With regard to timing of the initiation of breastfeeding, almost one third (30.2%) of the mothers from the CG; 45.4% from the FBSICG; and 23.4% from the HBICG initiated breastfeeding within 1 hour (Chi-square test; p=0.423) (Table 3.10). There was a trend for a lower percentage, (71.7%), of mothers from the CG to give breastmilk as the first feed compared to 81.8% from the FBSICG; and 89.4% from the HBICG (Chi-square test; p=0.265). First feeds given by relatively smaller percentages of the mothers in the three study groups were glucose water, plain water and salt solution (Table 3.10).

Of the mothers delivering at health facilities, initiation of breastfeeding was universal; all mothers from the three study groups reported having initiated breastfeeding. There was a trend for a lower percentage (28.6%) of mothers from the CG to initiate breastfeeding within 1 hour of birth compared to 42.5% from the FBSICG; and 44.2% from the HBICG (Chi-square test; p=0.241) (Table 3.10). Slightly over half (55.5%) of the mothers from the CG initiated breastfeeding within 1-8 hours after delivery, whereas equal proportions (50.0%) of mothers from both the FBSICG and HBICG initiated breastfeeding within 1 hour. The findings show a trend for a lower percentage (86.4%) of mothers from the CG to give breastmilk as the first feed when compared to 90.0% from the FBSCIG; and 94.2% from the HBICG (Chi-square test; p=0.265). Other first feeds given by relatively smaller percentages of mothers after delivery, from all the study groups, were salt-sugar solution, glucose water, plain water and salt-solution (Table 3.10).

Table 3.10: Infant feeding practices in the first week after birth by study groups and delivery site [N; (%)]

Infant feeding practices	CG *N*=97	FBSICG *N*=102	HBICG *N*=100	Chi-square; p
	N;(%)	*N;(%)*	*N;(%)*	
Home delivery	*N*=53	*N*=22	*N*=47	
Initiation of breastfeeding:				0.423
Within one hour	17 (32.1)	10 (45.4)	10 (22.2)	
From one to 8 hours	33 (62.3)	9 (40.9)	31 (65.9)	
9 hours or more	4 (7.5)	3 (13.6)	5 (10.6)	
First feed:				0.148
Breastmilk	38 (71.7)	18 (81.8)	42 (89.4)	
Salt-sugar-solution	8 (15.1)	2 (9.1)	1 (2.1)	
Plain boiled water	3 (5.7)	0 (0.0)	3 (6.4)	
Glucose water	2 (3.8)	1 (4.5)	1 (2.1)	
Salt solution	2 (3.8)	1 (4.5)	0 (0.0)	
Health facility delivery	*N*=44	N=80	*N*=53	
Initiation of breastfeeding:				
Within one hour	12 (28.6)	34 (42.5)	23 (44.2)	0.241
From one to 8 hours	24 (55.8)	40 (50.0)	26 (50.0)	
9 hours or more	7 (16.3)	6 (7.5)	3 (5.7)	
First feed:				0.265
Breastmilk	38 (86.4)	72 (90.0)	49 (94.2)	
Salt-sugar-solution	1 (2.3)	1 (1.2)	1 (2.3)	
Plain boiled water	1 (2.3)	4 (5.0)	0 (0.0)	
Glucose water	1 (2.3)	0 (0.0)	0 (0.0)	

CG (Control Group); FBSICG (Facility-Based Semi-Intensive counseling Group); HBICG (Home-Based Intensive Counseling Group); Frequencies are presented only for selected categories and variables and therefore do not (always) add to 100%.

3.6.2.3 Infant feeding practices during the first week after birth by delivery site

A pooled analysis for all mothers delivering at home and in health facilities, irrespective of their study groups, was conducted to establish if the delivery site had any influence on early, maternal infant-feeding practices. The results showed a significantly (Chi-square test; p=0.013) higher percentage (90.3%) of mothers delivering in the health facilities giving breastmilk as the first feed compared to 80.0% of mothers delivering at home. In terms of initiation of breastfeeding, 39.7% of the mothers delivering in health facilities initiated breastfeeding within 1 hour after birth; and 30.8% of mothers delivering at home did the same (Chi-square test; p=0.120) (Table 3.11).

In the first week of life, maternal infant feeding practices were similar; regardless of whether they delivered in public health facilities or private facilities. Breastmilk was given as the first feed by 93.3% of the mothers delivering in public health facilities; and by 90.3% of mothers delivering in private health facilities (Chi-square test; p=0.154). About one quarter (39.3%) of the mothers delivering in public health facilities initiated breastfeeding within 1 hour after birth; and 41.4% of mothers delivering in private health facilities initiated breastfeeding within 1 hour (Chi-square test; p=0.771). Over one-tenth (14.5%) of the mothers delivering in public health facilities gave post-lacteals, whereas 22.0% of mothers delivering in private health facilities also gave post-lacteals (Chi-square test; p=0.218) (Table 3.11).

Table 3.11: Infant feeding practices in the first week after birth by delivery site [N; (%)]

Practices	Health Facility *N*=174 *N; (%)*	Home *N*=120 *N ;(%)*	Chi-square; p
Breastmilk first feed	158 (90.3)	96 (80.0)	0.013*
Initiated breastfeeding within 1 hour	69 (39.7)	37 (30.8)	0.120
Post-lacteals given:	30 (17.0)	26 (21.7)	0.321
Salt-sugar solution	15 (2.8)	11 (9.2)	0.848
Glucose water	9 (5.1)	10 (8.3)	0.272
Plain water	5 (8.5)	2 (1.7)	0.505
Salt solution	1 (0.6)	2 (0.8)	0.359
Cow milk	1 (0.6)	1 (0.8)	0.786

Frequencies are presented only for selected categories and variables and therefore do not always add to 100%.
*** Significant differences (Chi-square test; p<0.05)**

3.7 The Impact of Breastfeeding Counseling Strategies on Infant Feeding Practices

Information on maternal infant feeding practices was collected for all mothers during months 1, 3 and 6; and an additional 3 interviews for the HBICG group during months 2, 4, and 5. Infant median age during the interview at month 1 was 16 (range11-28) days; 74 (45-88) days; and 182 (180-195) days, at 3 and 6 months respectively for all three groups. The additional interviews for mothers in the HBICG were carried out at a median age of 44 (35-60), 105 (90-116), and 135 (127-150) days (Figure 3.3).

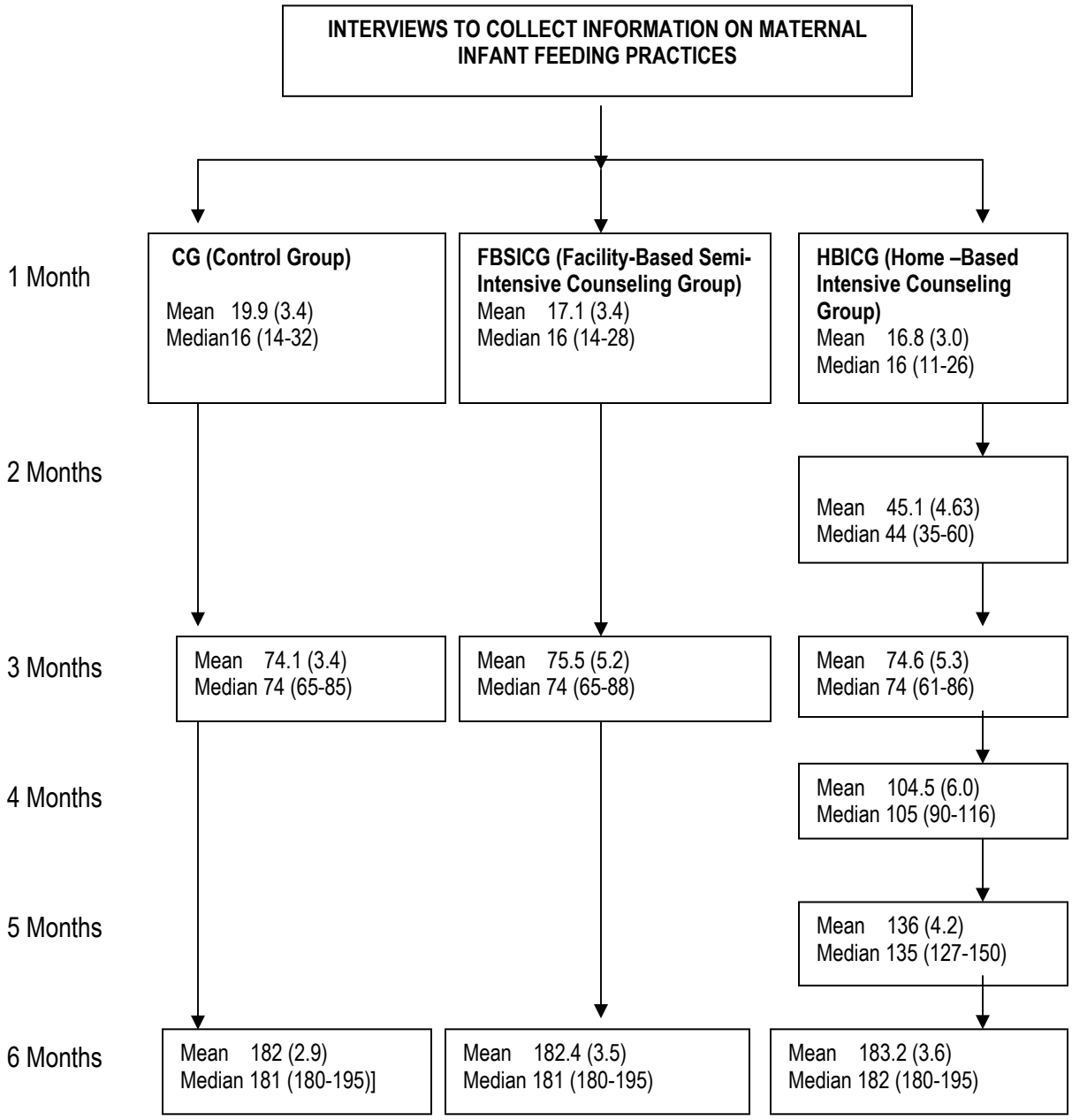


Figure 3.3: Data collection schedule on infant feeding practices in the three study groups [(Timing of interviews in days; Mean (SD); Median (range)]

3.7.1 Infant feeding practices from one month to six months of age

Breastfeeding status was categorized as exclusive breastfeeding, predominant breastfeeding and mixed breastfeeding in accordance with WHO (2004) definitions [1].

Changes in infant feeding practices by time and study groups

Maternal infant feeding practices were inconsistent from day to day; there were shifts from exclusive breastfeeding to either predominant or mixed feeding; and vice versa. At 3 months, an insignificantly lower percentage (30.2%) of mothers from the HBICG; 43.0% from the FBSCIG; and 37.3% from the CG practising exclusive breastfeeding at 1 month switched to either predominant breastfeeding, or mixed feeding. Less than one-tenth of the mothers from the three study groups, 6.0% from the CG; 3.5% from the FBSICG; and 4.6% from HBICG practising either predominant or mixed feeding at 1 month, switched to exclusive breastfeeding at 1month (Chi-square test; p=0.736) (Table 3.12).

At 6 months, an insignificantly higher percentage (39.5%) of mothers from the HBICG, compared to 38.0% from the FBSICG and 33.8% from the CG, practising exclusive breastfeeding at 3 months, changed to either predominant or mixed feeding (Chi-square test; p=0.759). An insignificantly higher percentage (4.9%) of the mothers from the HBICG compared to 1.3% from the FBSICG and 2.5% from the CG, practising either predominant breastfeeding or mixed feeding, switched to exclusive breastfeeding (Chi-square; p=0.837) (Table 3:12).

Table 3.12: Changes in infant feeding practices by time and study groups [N; (%)]

Changes in Infant Feeding Practice	CG [*N;* (%)	FBSICG [*N;* (%)	HBICG [*N;* (%)	Chi-square; p
1 – 3 months:	*N=83*	*N=86*	*N=86*	0.736
EBF to other practices	31 (37.3)	37 (43.0)	26 (30.2)	
Other practices to EBF	5 (6.0)	3 (3.5)	4 (4.7)	
No changes in practice	47 (56.7)	46 (53.5)	56 (65.1)	
3 – 6 months:	*N=80*	*N=79*	*N=81*	
EBF to other practices	27 (33.8)	30 (38.0)	32 (39.5)	0.837
Other practices to EBF	2 (2.5)	1 (1.3)	4 (4.9)	
No changes in practice	51 (63.7)	48 (60.7)	45 (55.6)	

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group; EBF (Exclusive breastfeeding)

3.7.1.1 Exclusive breastfeeding

The findings on cumulative exclusive breastfeeding at 6 months are presented first; the findings from cross-sectional data (with changes in feeding practices) are presented second. The findings with the changes provide useful information for comparison with findings from cross-sectional studies, designed to determine the prevalence of exclusive breastfeeding rates.

Cumulative proportion of mothers practising exclusively breastfeeding at 6 months by study groups

At 6 months, the cumulative proportion of mothers practising exclusive breastfeeding was 3.2% from the CG; 6.9% from the FBSICG; and 15.6% from the HBICG (Chi-square test; p<0.00001) (Figure 3.4).

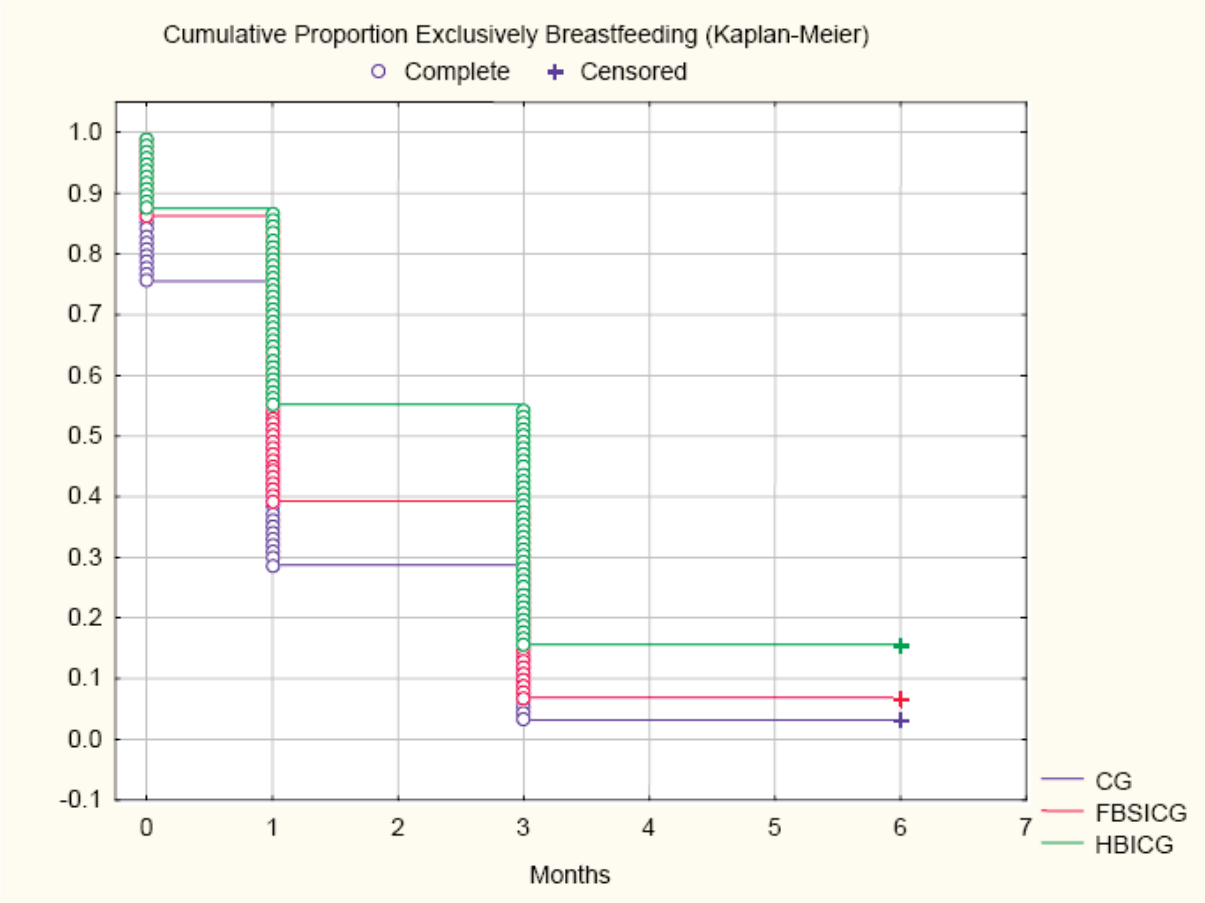


Figure 3.4: Cumulative proportion of exclusive breastfeeding rates by time and study groups

Mothers from the HBICG were three and a half times more likely (RR=3.4; 95% CI: 1.34 -8.80; p=0.010) to practice exclusive breastfeeding at 6 months than those from the CG. Mothers from the FBSICG were one

and a half times more likely to practice exclusive breastfeeding (RR=1.46; 95% CI: 0.49 – 4.33; p=0.494); but this difference was insignificant. The median duration of exclusive breastfeeding in both the CG and FBSICG was 1 month, whereas the median duration of exclusive breastfeeding in the HBICG was 3 months. The mean duration of exclusive breastfeeding in the CG was 1.4 (1.4) months; 1.8 (1.6) months in the FBSICG; and 2.4 (1. 9) months in the HBICG.

Exclusive breastfeeding rates (from cross-sectional data) with changes in infant feeding practices

At 1 month, 72.2% of the women in the CG were exclusively breastfeeding; as were 84.3% in the FBSICG; and 87.0% in the HBICG (Figure 3.5). Compared to the CG, these differences were significant (FBSICG Chi-square test; p=0.037; and HBICG p=0.009). The difference in exclusive breastfeeding rates between the FBSICG and the HBICG was insignificant (Chi-square test; p=0.586). Compared to the CG mothers, the FBSICG and HBICG were significantly more likely to practice exclusive breastfeeding (respectively RR = 1.16; 95% CI 1.00 – 1.36; p=0.041, and RR= 1.21; 95% CI 1.04 – 1.39; p=0.011) (Figure 3.6). The same breastfeeding trends were observed at 3 months, with 36.8% of the mothers in the CG reporting exclusive breastfeeding compared to 47.2% in the FBSICG and 61.4% in the HBICG (Chi-square test; p=0.012) (Table 3.13). Compared to the mothers in the CG, the rate of exclusive breastfeeding among mothers in the HBICG was significantly higher (Chi-square test; p=0.009); whereas the difference with the FBSICG was insignificant (Chi-square test; p=0.157). The difference in the exclusive breastfeeding rates between the FBSICG and the HBICG was also insignificant (Chi-square test; p=0.054). At 3 months, mothers in the FBSICG were 28% more likely (RR = 1.28; 95% CI: 0.90 – 1.83; p=0.161) to practice exclusive breastfeeding compared to the mothers in the CG; whereas mothers in the HBICG were 67% times (RR=1.67; 95% CI; 1.21 – 2.30; p=0.002) more likely to practice exclusive breastfeeding (Figure 3.6).

At 6 months only 5.6% of the women in the CG compared to 9.2% in the FBSICG; and 23.6% in the HBICG were exclusively breastfeeding (Chi-square test; p=0.003). When compared to the mothers in the CG, the difference in the exclusive breastfeeding rates in the FBSICG was insignificant, whereas the difference between the CG and the HBICG was significant (Chi-square test; p<0.00001) (Table 3.13).The difference in exclusive breastfeeding rates between the FBSICG and the HBICG was also significant (Chi-square test; p=0.009). At 6 months mothers in the HBICG had a four-fold increased likelihood of practising exclusive breastfeeding compared to those in the CG group (RR=4.20; (95% CI 1.66 – 10.64; p=0.002) (Figure 3.6). Although rates of exclusive breastfeeding were higher in the FBSICG compared to the CG group, this

difference was insignificant (RR=1.64; 95% CI 0.56 – 4.81; p=0.371). In addition, the exclusive breastfeeding rates in the HBICG were: 73.7% at 2 months; 55.2% at 4 months; and 42.7% at 5 months (Figure 3.5). Thus, at all points of observation mothers in the HBICG group had significantly higher rates of exclusive breastfeeding compared to the mothers in the CG group. Whereas, mothers in the FBSICG had a significantly higher rate of exclusive breastfeeding compared to the CG only at 1 month of observation.

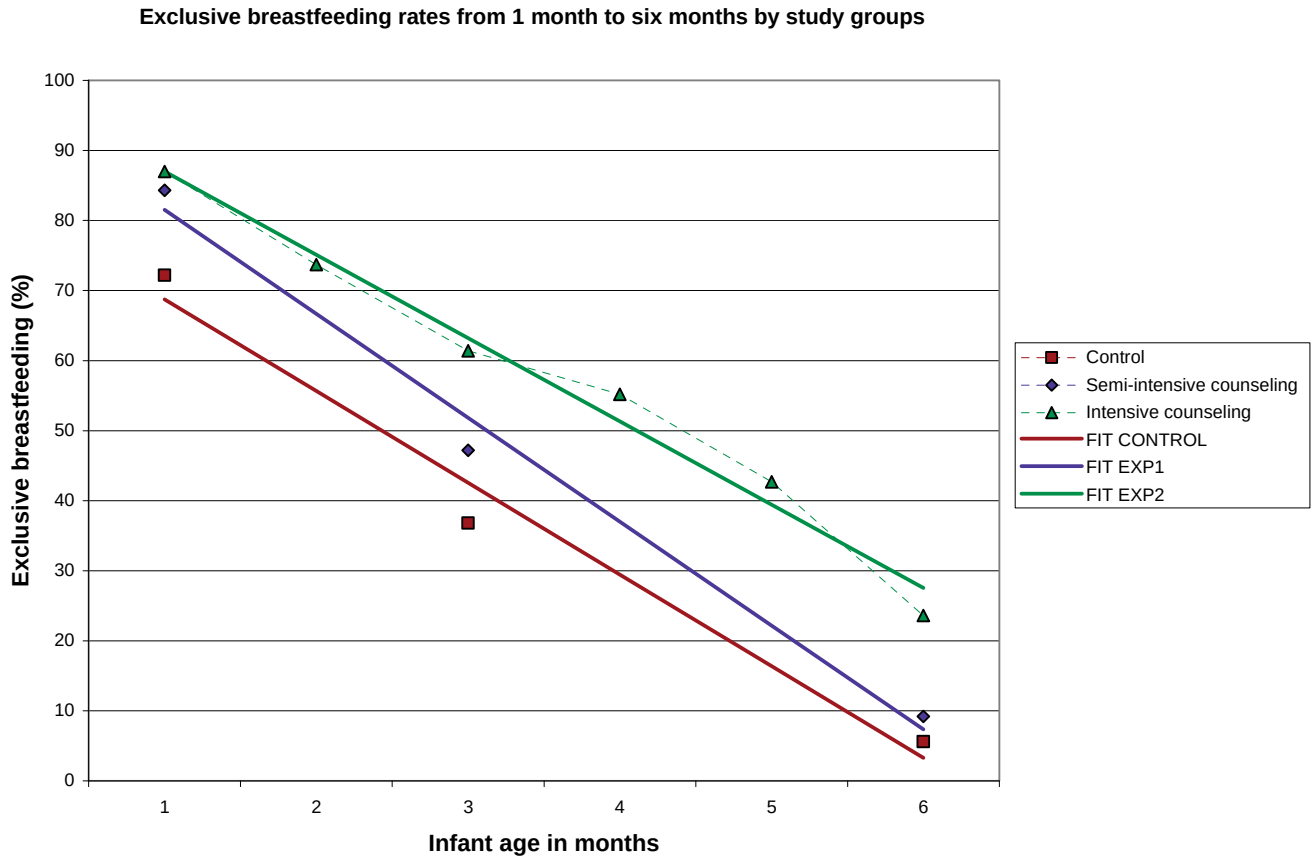


Figure 3.5: Trends in the practice of exclusive breastfeeding in the three study groups by infant age

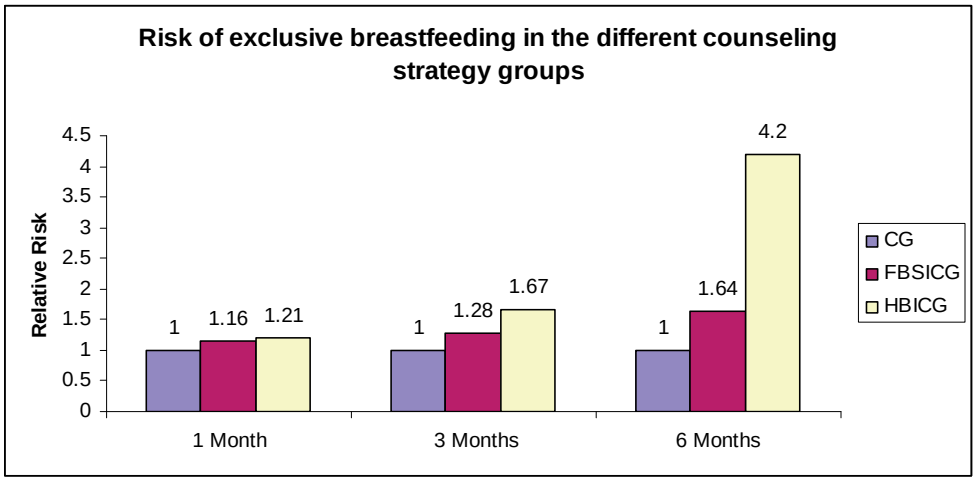


Figure 3.6: Relative risk of exclusive breastfeeding in Facility-Based Semi-Intensive Counseling Group (FBSICG) and Home-Based Intensive Counseling Group (HBICG)

3.7.1.2 Predominant breastfeeding

At 1 month, 15.7% women in the FBSICG were practising predominant breastfeeding compared to 26.9% in the CG (RR= 0.58; 95% CI: 0.33 – 1.01; p=0.054); a significant trend. Only 10.0% of the mothers in the HBICG were practising predominant breastfeeding, a significantly reduced likelihood of predominant breastfeeding compared to the mothers in the CG (RR= 0.37; 95% CI: 0.19 – 0.72; p=0.003) (Table 3.13).

At 3 months, the rate of predominant breastfeeding rate rose in all groups to 33.3% in the CG; 28.6% in the FBSICG; and 26.4% in the HBICG (Figure 3.7). The differences between the groups were insignificant. Mothers in the FBSICG were 14% less likely to practice predominant breastfeeding than mothers in the CG (RR=0.86; 95% CI: 0.55 – 1.33; p=0.492); whereas mothers in the HBICG were 21% less likely to practice predominant breastfeeding (RR= 0.79; 95% CI: 0.050 – 1.24; p=0.312) than mothers in the CG (Figure 3.8).

At 6 months, there was a trend for a lower predominant breastfeeding rate (1.1%) in the CG compared to 5.7% in the FBSICG; and 9.0% in the HBICG (Chi-square test; p=0.038) (Table 3.13). Mothers in the FBSICG were about 5 times more likely to practice predominant breastfeeding than mothers in the CG (RR=5.11; 95% CI: 061 – 42.90; p=0.132); however, this difference was insignificant. On the other hand, compared to the mothers in the CG, mothers in the HBICG were significantly more likely to practice predominant breastfeeding (RR=8.00; 95% CI: 1.02 – 62.64; p=0.048). Mothers in the HBICG were 8 times

more likely to predominantly breastfeed at 6months (Figure 3.8). Additionally, in the intensive counseling group, predominant breastfeeding rate at 2 months was 16.8%; 17.2% at 4 months; and 14.6% at 5 months (Figure 3.7). Thus, at 1 month of observation, mothers in the HBICG had significantly lower rates of predominant breastfeeding compared to the mothers in the CG group; and significantly higher rates of predominant breastfeeding at 6 months of observation.

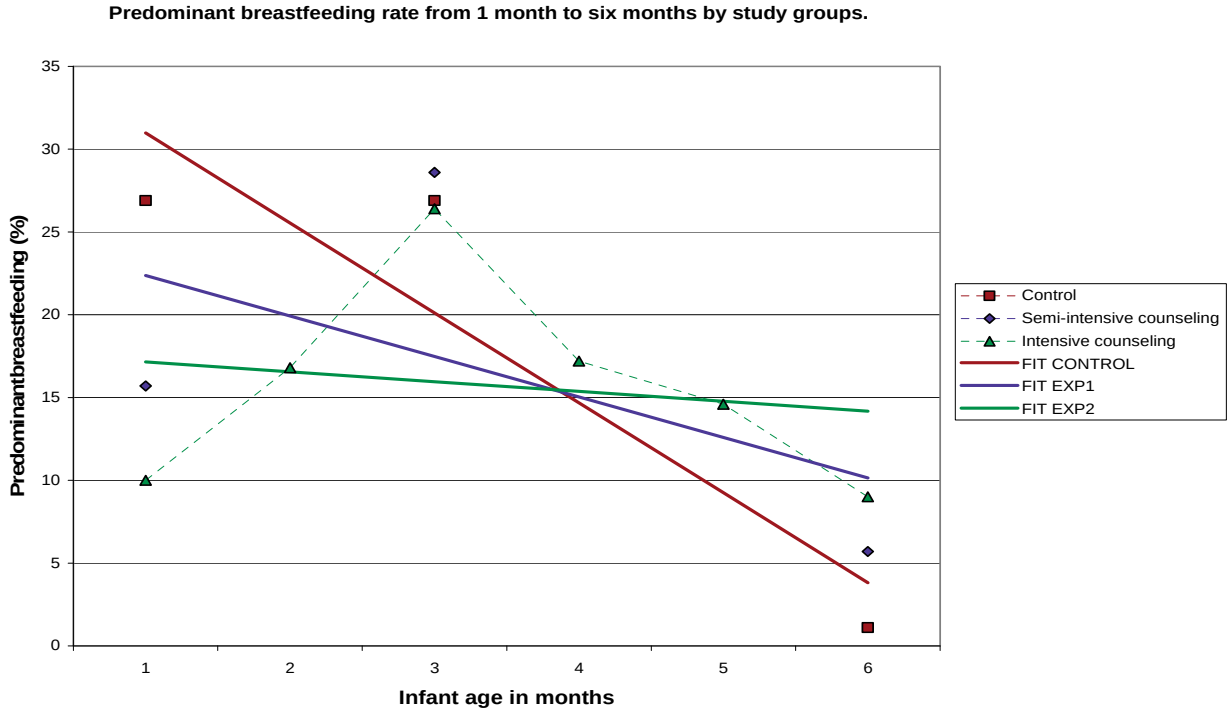


Figure 3.7: Trends in the practice of predominant breastfeeding in the three study groups by infant age

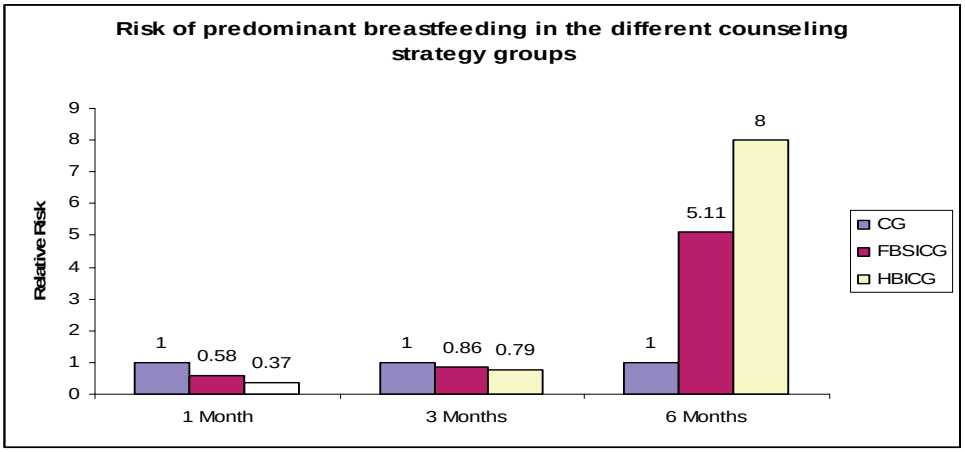


Figure 3.8: Relative risk of predominant breastfeeding in Facility-Based Semi-Intensive Counseling Group (FBSICG) and Home-Based Intensive Counseling Group (HBICG)

Table 3.13: The impact of counseling strategies on maternal infant feeding practices by time and study groups

Age of infant	INFANT FEEDING PRACTICES	CG Relative Risk =1	FBSICG Relative Risk (RR) [(95% CI) P Value]	HBICG Relative Risk (RR) [(95% CI) P Value]	P; CHI-SQUARE TEST
1 Month		*N* = 97	*N* = 102	*N* = 100	
	EBF	72%	84.3%; RR=1.17 [(95% CI: 1.00 -1.36) P=0.041]*	87.0%; RR=1.21 [(95% CI: 1.04 -1.39) P=0.011]*	0.021*
	PBF	26.9%	15.7%; RR=0.58 [(95% CI: 0.33 -1.01) P=0.059]	10.0%; RR=0.37 [(95% CI: 0.19 -0.72) P=0.003]**	0.012*
	EBF+PBF	99.0%	100% ; RR=1.01 [(95% CI: 0.99 -1.03) P=0.317]	97.0%; RR=0.98 [(95% CI: 0.94 -1.02) P=0.325]	0.336
	MF	1.0%	0% RR=1.01 [(95% CI: 0.98 -1.04) P=0.462]	3.0%; RR=2.91 [(95% CI: 0.31 -27.5) P=0.351]	0.336
3 Months		*N*=87	*N*= 91	*N*= 91	
	EBF	36.8%	47.2%; RR=1.28 [(95% CI: 0.90 -1.83) P=0.161]	61.4%; RR=1.67 [(95% CI:1.21- 2.30) P=0.002]**	0.012*
	PBF	33.3%	28.6%; RR=1.86 [(95% CI:0.55 - 1.33) P=0.492]	26.4%; RR=0.79 [(95% CI:0.50- 1.24) P=0.312]	0.585
	EBF+PBF	70.1%	75.8%; RR=1.13 [(95% CI:0.95 - 1.35) P=0.165]	87.9%; RR=1.25 [(95% CI:1.07- 1.47) P=0.004]**	0.030*
	MF	29.1%	24.2%; RR=0.81 [(95% CI:0.50 - 1.31) P=0.392]	12.1%; RR=0.40 [(95% CI:0.21- 0.77) P=0.006]**	0.030*
6 Months		*N*=89	*N*=87	*N*=89	
	EBF	5.6%	9.2% ; RR=1.64 [(95% CI: 0.56 - 4.81) P=0.371]	23.6%; RR=4.20 [(95% CI:1.66 -10.64) P =0.002]**	0.003**
	PBF	1.1%	5.7% ; RR=5.11 [(95% CI: 0.61 - 42.9) P=0.132]	9.0% ; RR=8.00 [(95% CI:1.02 - 62.64)P=0.048]*	0.038*
	EBF+ PBF	6.7%	14.9%; RR=2.22 [(95% CI: 0.88 - 5.57) P=0.090]	32.2%; RR=4.20 [(95% CI:1.82 - 9.60) P= <0.0001***	<0.0001***
	MF	93.3%	83.9%; RR=0.90 [(95% CI: 0.81 - 1.00) P=0.054]	67.4%; RR=0.72 [(95% CI:0.62 –0.84) P= <0.0001***	<0.0001***

CG (Control Group); FBSICG (Facility-based semi-intensive counseling Group); HBICG (Home-Based Intensive Counseling Group); EBF=Exclusive breastfeeding; PBF= Predominant breastfeeding; EBF+PBF=Excusive breastfeeding and predominant breastfeeding; MF=Mixed feeding; *Significant differences (Chi-square test and RR test; p<0.05), ** Significant differences (Chi-square test and RR test; p≤0.001); * Significant differences Chi-square test and RR test; (p<.0001)**

3.7.1.3 Combined exclusive breastfeeding and predominant breastfeeding rates

Predominant and exclusive breastfeeding rates were combined to establish the prevalence rates and differences in the combined exclusive and predominant breastfeeding rates, between the study groups. This was done because emerging scientific evidence indicates that predominant breastfeeding confers the same immunological protection as exclusive breastfeeding.[76] At 1 month, the exclusive breastfeeding and predominant breastfeeding rates were 99.0% in the CG; 100.0% in the FBSICG; and 97.0% in the HBICG (Figure 3.9). The differences in exclusive breastfeeding and predominant breastfeeding among the study groups were insignificant (Chi-square test; p=0.336) (Table 3.13). Compared to the CG, the relative risk of exclusive and predominant breastfeeding in the FBSICG was (RR=1.01; 95% CI: 0.99 – 1.03; p=0.317); and in the HBICG it was (RR=0.98; 95% CI: 0.94 – 1.02; p= 0.325) (Figure 3.10). At 3 months, there was a trend for a lower (70.1%) exclusive breastfeeding and predominant breastfeeding rate in the CG compared to 75.8% in the FBSICG; and 87.9% (Chi-square test; p=0.010) (Table 3.13). Compared to CG, the relative risk of exclusive and predominant breastfeeding in the FBSICG and HBICG were, respectively, RR=1.13; 95% CI: 0.95 – 1.35; p =0.165 and RR= 1.25; 95% CI 1.07 – 1.47; p=0.004). At 6 months, there was a trend towards a lower rate (6.7%) of the mothers in the CG to practice exclusive and predominant breastfeeding compared to 14.9% in the FBSICG; and 32.6% in the HBICG (Chi-square test; p<0.0001). Compared to the CG, the relative risk of exclusive and predominant breastfeeding in the FBSICG was (RR=2.22; 95% CI: 0.88 – 5.57; p=0.090), a significant trend; and in the HBICG (RR=4.20; 95% CI 1.82 – 9.60; p<0.0001). In addition to the 1, 3 and 6 months exclusive and predominant breastfeeding rates in the HBICG were 90.5% at 2 months; 72.4% and 57.3% at months 4 and 5, respectively (Figure 3.9). Thus, at 3 and 6 months observation, mothers in the HBICG had significantly higher rates of exclusive and predominant breastfeeding compared to the mothers in the CG.

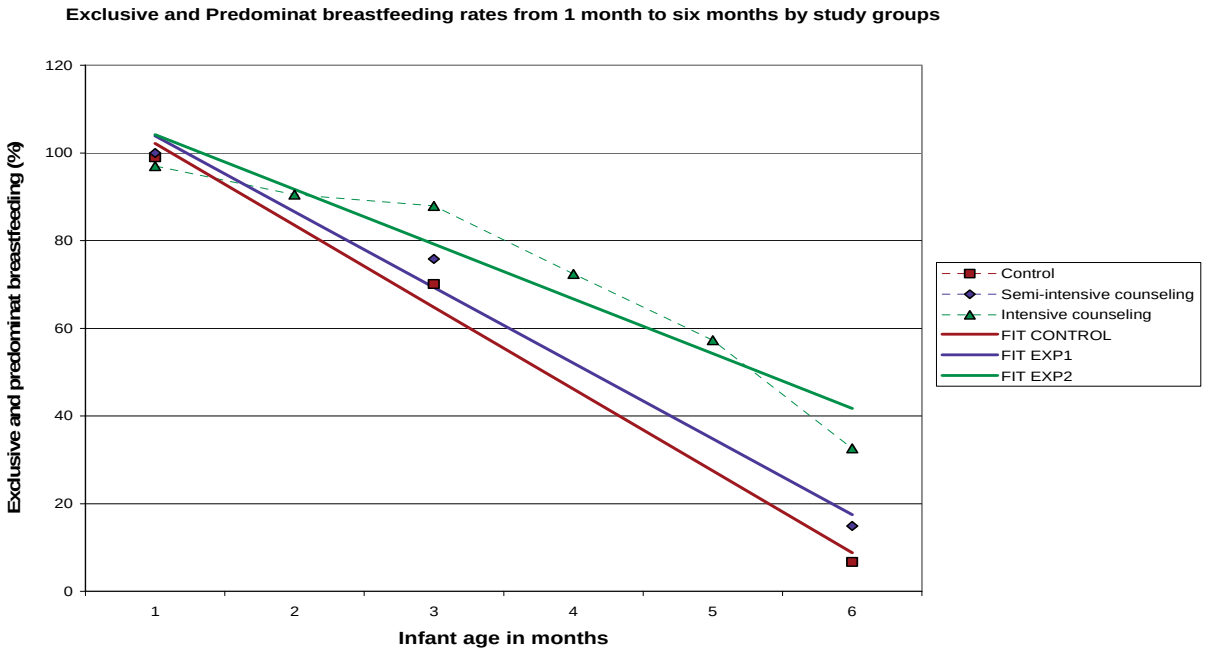


Figure 3.9: Trends in the practice of exclusive and predominant breastfeeding in the three study groups by infant age

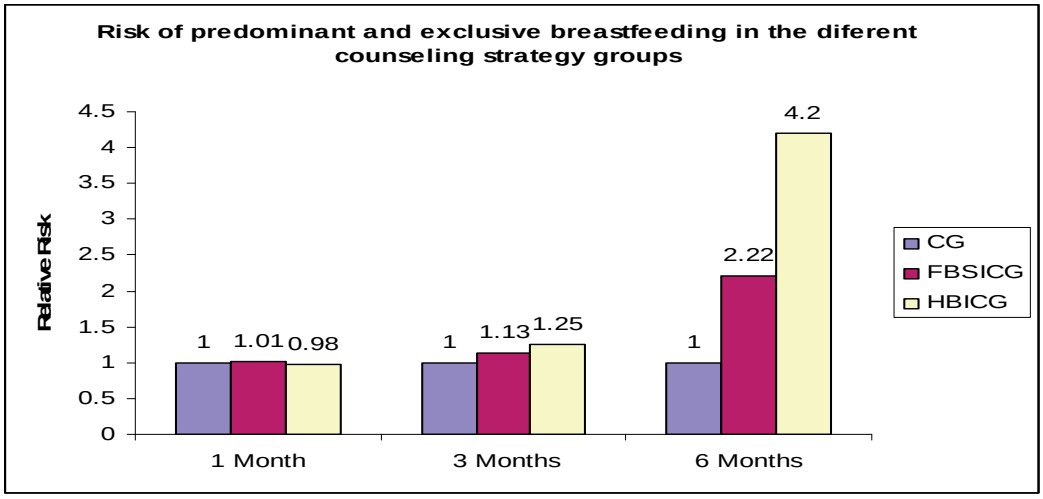


Figure 3.10: Relative risk of exclusive and predominant breastfeeding in Facility-Based Semi-Intensive Counseling Group (FBSICG) and Home-Based Intensive Counseling Group (HBICG)

3.7.1.4 Mixed feeding practices

At 1 month, the rate of mixed feeding was 1.0% in the CG; 0% in the FBSICG; and 3.0% in the HBICGG (Figure 3.11); these differences were insignificant. Mothers in the HBICG were about 3 times more likely to practice mixed feeding compared to those in the CG (RR=2.91; 95% CI: 0.31 – 27.50; p=0.351), whereas,

there was no difference in the mixed feeding rate between the CG and FBSICG (Figure 3.12). At 3 months there was a trend towards a higher rate (29.1%) of mixed feeding in the CG compared to 24.2% in the FBSICG; and 12.1% in the HBICG (Figure 3.11). The differences in the mixed feeding rates were significant (Chi-square test; p=0.030) (Table 3.13). Compared to those in the CG, the risk of mixed feeding in the FBSICG and HBICG were, respectively, (RR=0.81; 95% CI: 0.50 – 1.31; p=0.392 and RR=0.40; 95% CI: 0.21-0.77; p=0.006). At 6 months there was a trend towards a higher rate (93.3%) of mixed feeding in the CG compared to 83.9% in the FBSICG; and 67.4% in the HBICG (Chi-square test; p<0.0001). Compared to the CG the risk of mixed feeding for FBSICG was (RR=0.90; 95% CI: 0.81 – 1.00; p=0.054], a significant trend; compared to the CG the risk for mixed feeding in HBICG was (RR=0.72; 95% CI: 0.62 – 0.84; p<0.0001], a significant difference. Thus at 3 and 6 months observation, mothers in the HBICG had significantly lower rates of mixed feeding compared to mothers in the CG.

Mixed feeding rate from 1 month to six months by study groups.

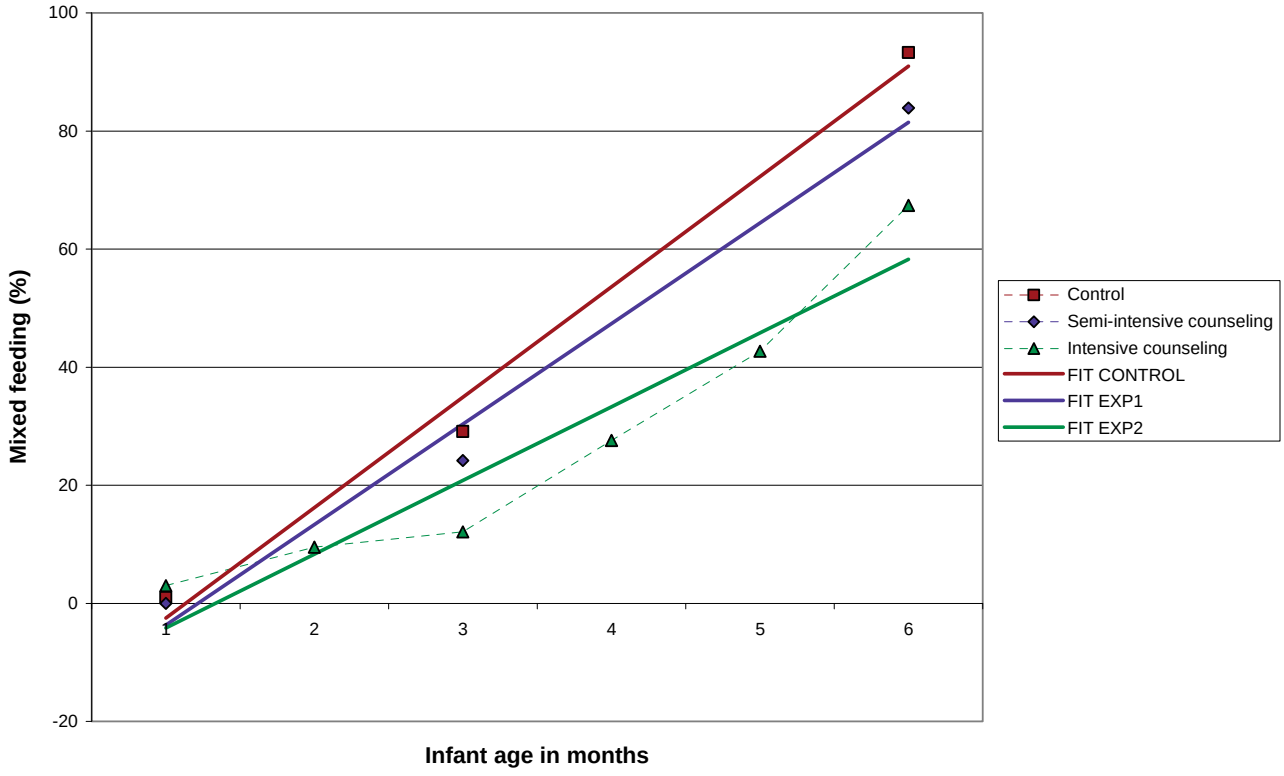


Figure 3.11: Trends in the practice of mixed feeding in the three study groups by infant age

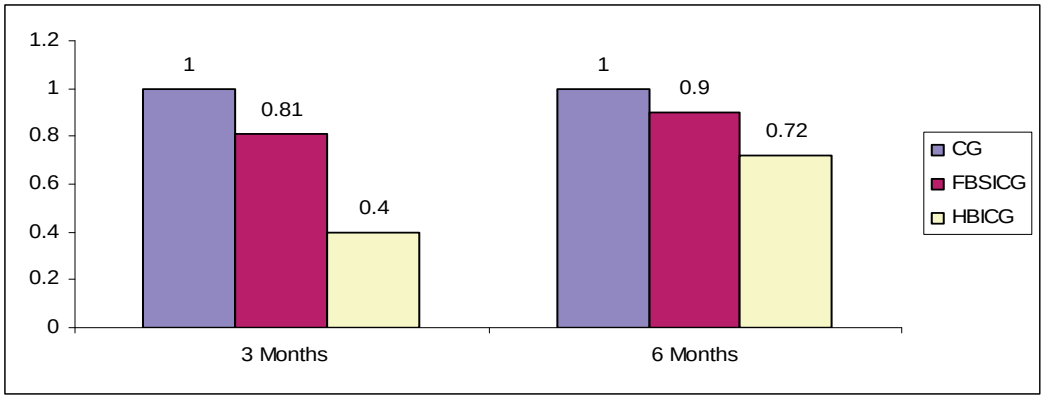


Figure 3.12: Relative risk of mixed feeding in Facility-Based Semi-Intensive Counseling Group (FBSICG) and Home-Based Intensive Counseling Group (HBICG)

3.8 Factors Associated with Exclusive Breastfeeding

Maternal breastfeeding practices and information likely to influence exclusive breastfeeding for all three study groups was determined at three points during the study, namely at 1 month, 3 months and 6 months (Figure 3.13).

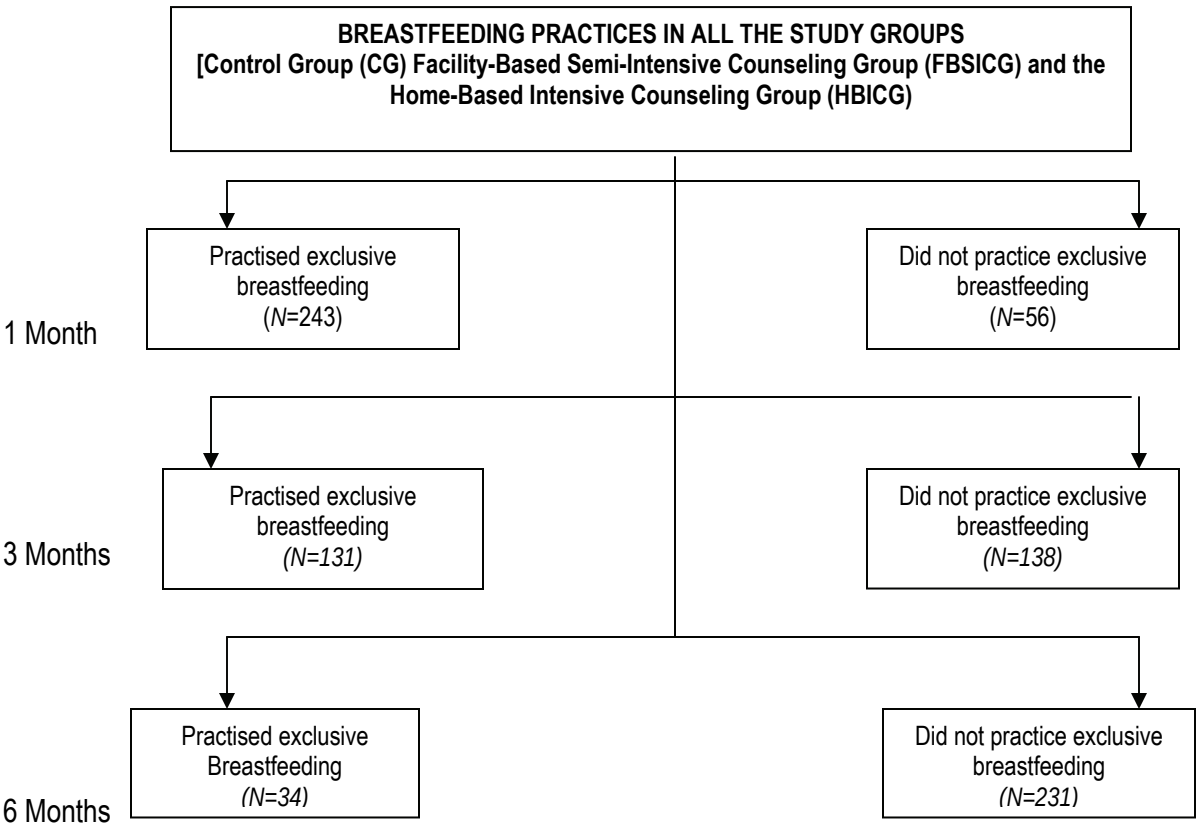


Figure 3.13: Schedule for determination of factors associated with exclusive breastfeeding practices in all the study groups

Maternal breastfeeding practices and information likely to influence exclusive breastfeeding for the HIBCG group only was determined at 3 additional points during the study, namely at 2 months, 4 months and 5 months (Figure 3.14).

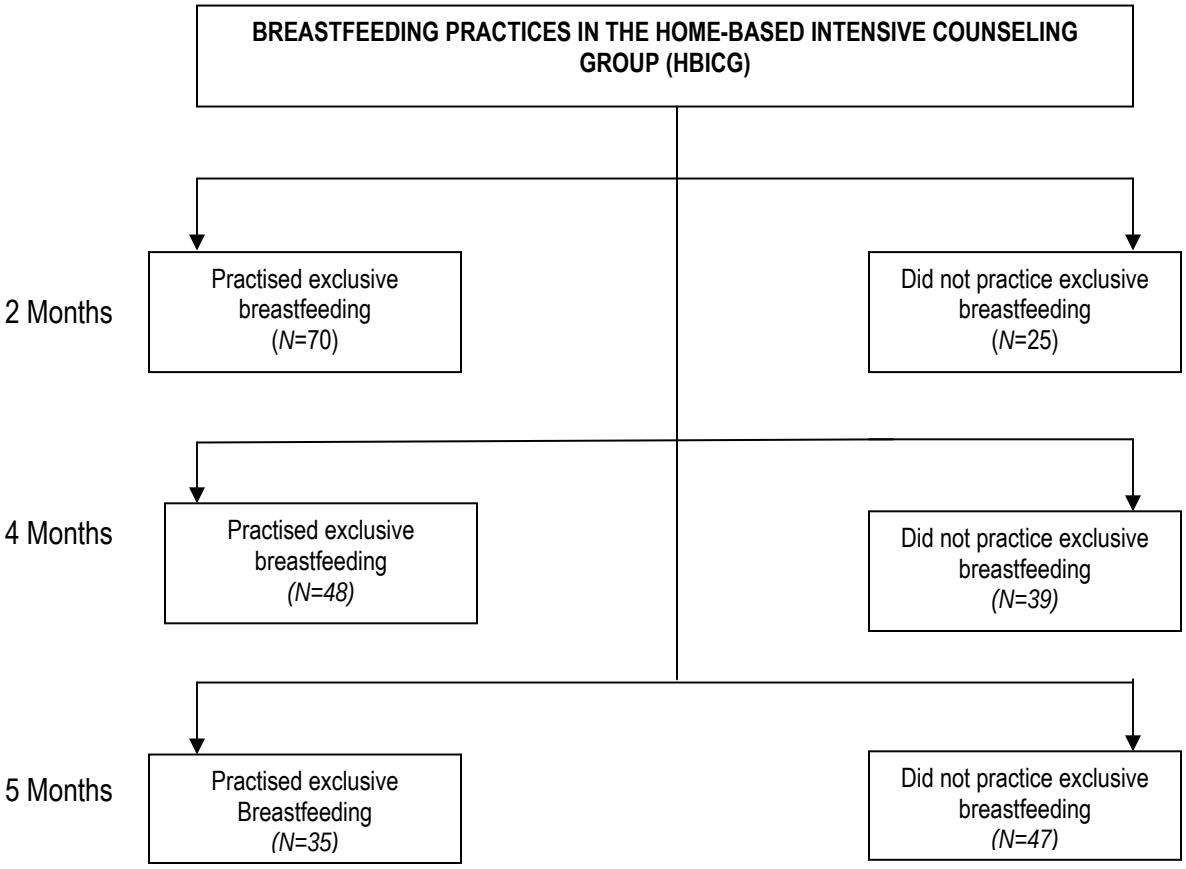


Figure 3.14: Schedule for determination of factors associated with exclusive breastfeeding practices in HBICG

Maternal socio-economic and demographic factors; age, education, marital status, household size, maternal income source, maternal occupation, item ownership, house size, and monthly house rent and their association with maternal exclusive breastfeeding status was conducted. Maternal knowledge about infant feeding practices and planned feeding choices for the unborn baby at baseline and the association with the practice of exclusive breastfeeding was investigated. The aspects of maternal knowledge on infant feeding investigated were appropriate: first feed after birth; timing of initiation of breastfeeding; duration of breastfeeding and exclusive breastfeeding; and timing of the introduction of complementary feeding. Perinatal-related characteristics: maternal gestation age at time of recruitment into the study; maternal gestation age at first ANC visit; and the frequency of ANC visits and their association with the practice of

exclusive breastfeeding was also investigated. Maternal morbidity and breastfeeding complications and their association with exclusive breastfeeding practices were investigated. Maternal infant feeding practices during the first week after birth: timing of initiation of breastfeeding; first feed given after birth; and the giving of post-lacteal feeds and their relationship with the practice of exclusive breastfeeding was investigated. Contextual factors, such as place of delivery and type of delivery and their relationship with exclusive breastfeeding were also examined.

3.8.1 Maternal demographic and socio-economic characteristics and exclusive breastfeeding practices

Household size was the only demographic characteristic having an association with maternal exclusive breastfeeding practices at 1 month (Chi-square test; p=0.027). As for the socio-economic characteristics, at 3 months, telephone ownership was associated with exclusive breastfeeding (Chi-square test; p=0.009); and at 4 months, television ownership was also associated with exclusive breastfeeding (Chi-square test; p=0.005) (Table 3.14). Information on the variables, maternal age, education, marital status, occupation and income sources; household size and monthly house rent having insignificant associations with exclusive breastfeeding is presented in Appendix 11.

Table 3.14: Maternal demographic and socio-economic characteristics and exclusive breastfeeding status [N; (%)]

		Exclusively breastfeeding *N* (%)	Not exclusively breastfeeding *N* (%)	Chi-square & T-test; p
At 1 month:				
Household size (means)		3.87 (1.6)	3.32 (1.7)	0.027*
At 3 months:				
Owned Telephones	YES	45 (34.4)	69 (50.0)	0.009**
	NO	86 (65.6)	69 (50.0)	
At 4 months:				
Owned Television	YES	7(14.6)	16 (41.0)	0.005**
	NO	41(85.4)	23 (59.0)	

Means (SD); *Significant differences (T-test; p<0.05); ** Significant differences (Chi-square test p<0.0001)

3.8.2 Maternal knowledge on infant feeding practices and feeding choices for the unborn baby at baseline and exclusive breastfeeding practices

The only factors associated with exclusive breastfeeding were maternal knowledge on duration of breastfeeding and the planned time of introduction of complementary feeding to the unborn baby. Maternal knowledge on duration of breastfeeding was associated with exclusive breastfeeding at three points of observation; at 1 month (Chi-square test; p=0.034); at 2 months (Chi-square test; p=0.004); at 3 months (Chi-square test; p=0.036). Additionally, planned breastfeeding duration was associated with the practice of exclusive breastfeeding at 2 months (T-test; p=0.002); and at 3 months (T-test; p=0.005). Planned time of introduction of complementary feeding was associated with the practice of exclusive breastfeeding at 3 months (T-test; p=0.040) (Table 3.15). Information on the variables, that is, knowledge about the appropriate timing of initiation of breastfeeding; appropriate first feed after birth; and appropriate duration of exclusive breastfeeding with insignificant association with exclusive breastfeeding, is presented in Appendix 12.

3.8.3 Maternal perinatal-related factors at baseline and exclusive breastfeeding practices

The findings showed that at 4 months postpartum, mothers recruited into the study at a later stage, 35.3 (1.0) weeks pregnant, were more likely to practice exclusive breastfeeding compared to the recruits of a younger pregnancy, 34.8 (1.0) weeks; and the difference was statistically significant (T-test; p=0.037). Information on the variables, that is, the gestation period at the first ANC visit and frequency of ANC attendance, with insignificant associations with exclusive breastfeeding are presented in Appendix 13.

Table 3.15: Maternal knowledge about infant feeding practices and intended feeding choices at baseline and exclusive breastfeeding practices

		Exclusive breastfeeding *N;* (%)	Not exclusively breastfeeding *N*; (%)	Chi-square & T-test; p
Knowledge at baseline				
1 month:				
Duration of breastfeeding ≥ 2 yrs				0.034*
	YES	167 (68.7)	30 (53.6)	
	NO	76 (31.3)	26 (46.4)	
2 Months:				
Duration of breastfeeding ≥ 2 yrs				
	YES	51 (72.9)	10 (40.0)	0.004**
	NO	19 (27.1)	15 (60.0)	
3 Months:				
Duration of breastfeeding ≥ 2 yrs				0.036*
	YES	92 (70.2)	80 (58.0)	
	NO	39 (29.8	58 (42.0)	
4 Months:				
Duration of breastfeeding ≥ 2 yrs				0.002**
	YES	35 (72.9)	19 (48.7)	
	NO	13 (27.1)	20 (51.3)	
Intended infant feeding choices for unborn baby				
2 Months:				
Duration of breastfeeding in months (mean)		2.4 (0.8)	1.8 (0.7)	0.002**
3 Months:				
Duration of breastfeeding in months (mean)		2.2 (0.7)	1.9 (0.7)	0.005**
Age of introduction of CF in months (mean)		4.8 (1.8)	4.3 (1.9)	0.040*

CF =Complementary Feeding; Means (SD) * Significant differences (Chi-square test and T-test; p<0.05); **Significant differences (Chi-square test and T-test; p<0.001)

3.8.4 Maternal infant feeding practices in the first week after birth and exclusive breastfeeding practices

The findings (Table 3.16) showed post-lacteal feeding to be associated with the practice of exclusive breastfeeding at 1 to 6 months. At 1 month certain post-lacteal feeds were associated with the maternal practice of exclusive breastfeeding, these were: salt-sugar solution (Chi-square test; p<0.00001); plain water (Chi-square test; p=0.018); glucose water (Chi-square test; p<.00001); and salt solution (Chi-square

test; p=0.022). At 2 months, cow milk was associated with the maternal practice of exclusive breastfeeding (Chi-square test; p=0.021). At 3 months, salt-sugar solution (Chi-square test; p=0.017) and glucose water (Chi-square test; p=0.002) were associated with exclusive breastfeeding. At 4 months, glucose water was associated with exclusive breastfeeding (Chi-square test; p=0.022); similarly at 5 months, glucose water was associated with exclusive breastfeeding (Chi-square test; p=0.003). At 6 months, infant formula (Chi-square test; p=0.004) and salt-sugar solution (Chi-square test; p=0.024) were associated with the practice of exclusive breastfeeding (Table 3.16). Information on the variables, that is, the duration taken after birth before initiation of breastfeeding and first feed given after birth, had insignificant associations with exclusive breastfeeding, is presented in Appendix 14.

3.8.5 Maternal morbidity and breastfeeding complications and the impact on maternal exclusive breastfeeding practices

Maternal morbidity status and presence or absence of breastfeeding complications were determined based on a two week-recall. The main illnesses mothers suffered were malaria, back pain, headaches and flu. The breastfeeding complications reported by the mothers were: inadequate breastmilk and pain in the breasts, mainly sore nipples. The presence of breastfeeding complications was the only factor related to the practice of exclusive breastfeeding; at 1 month (Chi-square test; p=0.023); 3 months (Chi-square test; p<0.00001); 4 months (Chi-square test; p<0.00001) and 5 months (p=0.004) (Table 3.17). At 2 months and 6 months there was no relationship between the presence of maternal breastfeeding complications and the practice of exclusive breastfeeding. Maternal perception of the adequacy of breastmilk was related to exclusive breastfeeding status; at 2 months (Chi-square test; p=0.032); 3 months (Chi-square test; p<0.00001); 3 months (Chi-square test; p<0.00001); 5 months (Chi-square test; p=0.004). There were insignificant differences in the practice of exclusive breastfeeding between ill mothers and those not ill (Appendix 15).

Table 3.16: Maternal infant feeding practices during the first week after birth and exclusive breastfeeding practices [N; (%)]

		Exclusive breastfeeding N; (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
1 Month:				
Gave post-lacteals	YES	46 (19.0)	55 (98.2)	<0.00001****
	NO	196 (81.0)	1 (1.8)	
Salt-sugar solution	YES	29 (11.9)	25 (44.6)	<0.00001****
	NO	214 (88.1)	31 (55.4)	
Plain water	YES	9 (3.7)	7 (12.5)	0.018**
	NO	234 (96.3)	49 (87.5)	
Glucose water	YES	6 (2.5)	18 (32.1)	<0.0001***
	NO	237 (97.5)	38 (67.9)	
Salt solution	YES	3 (1.2)	4 (7.1)	0.022*
	NO	240 (98.8)	52 (92.9)	
2 Months				
Gave post-lacteals	YES	9 (14.3)	12 (50.0)	0.001**
	NO	54 (85.7)	12 (50.0)	
Cow milk	YES	0 (0.0)	2 (8.3)	0.021*
	NO	(100.0)	22 (91.7)	
3 Months:				
Gave post-lacteals	YES	28 (22.8)	61 (46.6)	<0.00001****
	NO	95 (77.2)	70 (53.4)	
Salt-sugar solution	YES	15 (12.1)	32 (24.4)	0.017*
	NO	109 (87.9)	99 (75.6)	
Glucose water	YES	4 (3.2)	113 (86.3)	0.002**
	NO	120 (96.8)	18 (13.7)	
4 Months:				
Gave post-lacteals	YES	6 (13.6)	15 (39.5)	0.007**
	NO	38 (86.4)	23 (60.5)	
Glucose water	YES	1 (2.2)	6 (15.8)	0.022*
	NO	44 (97.8)	32 (84.2)	
5 Months:				
Gave post-lacteals	YES	4 (12.1)	18 (41.9)	0.003**
	NO	29 (87.9)	25 (58.1)	
Glucose water	YES	0 (0.0)	7 (16.3)	0.003**
	NO	34 (100.0)	36 (83.7)	
6 Months:				
Formula feed	YES	2 (5.9)	32 (94.1)	0.004**
	NO	0 (0.0)	216 (100.0)	
Salt-sugar solution	YES	2 (5.9)	44 (20.4)	0.024*
	NO	32 (94.1)	172 (79.6)	

***Significant differences (Chi-square test; p<0.05), ** Significant differences (Chi-square test; p≤0.001; *** Significant differences (Chi-square test; p<0.0001); ****Significant differences (Chi-square test; p<0.00001)**

Table 3.17: Maternal morbidity and breastfeeding complications and exclusive breastfeeding practices [N; (%)]

		Exclusive breastfeeding *N;* (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
1 Month:				
Breastfeeding complications	YES	4 (1.6)	4 (7.1)	0.023*
	NO	239 (98.4)	51 (91.1)	
2 Months:				
Breastfeeding complications	YES	4 (5.7)	5 (20.0)	0.050
	NO	66 (94.3)	20 (80.0)	
Inadequate breastmilk	YES	2 (2.9)	4 (16.0)	0.032*
	NO	68 (97.1)	21 (84.0)	
3 Months:				
Breastfeeding complications	YES	2 (1.5)	26 (18.8)	<0.00001****
	NO	129 (98.5)	112 (81.2)	
Inadequate breastmilk	YES	2 (1.5)	24 (17.4)	<0.00001****
	NO	129 (98.5)	114 (82.6)	
Pain in the breast	YES	0 (0.0)	131 (100.0)	0.009**
	NO	5 (3.6)	133 (96.4)	
4 Months:				
Breastfeeding complications	YES	0 (0.0)	8 (20.5)	<0.00001****
	NO	48 (100)	31 (79.5)	
Inadequate breastmilk	YES	0 (0.0)	7 (17.9)	0.001**
	NO	48 (100)	32 (82.1)	
5 Months:				
Breastfeeding complications	YES	0 (0.0)	7 (14.9)	0.004**
	NO	35 (100)	40 (85.1)	
Inadequate breastmilk	YES	0 (0.0)	7 (14.9)	0.004**
	NO	35 (100)	40 (85.1)	

***Significant differences (Chi-square test; p<0.05), ** Significant differences (Chi-square test; p≤0.001; ****Significant differences (Chi-square test; p<0.00001)**

3.8.6 Contextual issues: place of delivery, type of delivery and type of facility where delivery took place and their relationship with exclusive breastfeeding

Investigations were conducted to establish the influence of contextual issues: home or health facility delivery; private or public facility; and vaginal or caesarian delivery on maternal practice of exclusive breastfeeding. The results of Chi-square analyses showed no association between contextual issues and maternal exclusive breastfeeding practices. The information on the contextual variables is presented in Appendix 16.

3.8.7 Multiple regression analyses of factors associated with exclusive breastfeeding from one to six months

The findings of stepwise multiple logistic regression analyses showed that at 1 month postpartum, post-lacteal feeding was most significantly associated with the practice of exclusive breastfeeding. Mothers not giving post-lacteals were 181 times more likely [Odds Ratio (OR) =181.19; 95% CI: 24.13 – 136.57; p<0.00001] to practice exclusive breastfeeding compared to mothers giving post-lacteal feeds (Table 3.18). The second most significant factor associated with exclusive breastfeeding was glucose water used as a post-lacteal feed. Mothers who gave glucose water were 75% less likely (OR=0.25; 95% CI: 0.08 – 0.75; p=0.014) to practice exclusive breastfeeding compared to mothers not giving glucose water. Mothers living in smaller households were 22% less likely (OR=0.78; 95% CI; 0.61- 0.98; p=036) to practice exclusive breastfeeding than mothers living in larger households.

At 2 months, the giving of post-lacteals was most significantly associated with the practice of exclusive breastfeeding; mothers not giving post-lacteals were 5 times more likely (OR=4.67; 95% CI: 1.51– 14.47; p=0.008) to practice exclusive breastfeeding compared to mothers giving post-lacteals (Table 3.18). The second most significant factor was the planned duration of breastfeeding for the unborn baby at baseline; mothers planning to breastfeed for shorter duration were 64% less likely (OR=0.34; 95% CI: 0.14 – 0.82; p=0.016) to practice exclusive breastfeeding than mothers planning to breastfeed for a longer duration.

At 3 months, the most significant factor associated with exclusive breastfeeding was post-lacteal feeding (Table 3.18). Mothers not giving post-lacteals were 2.5 times (OR= 2.5; 95% CI; 1.41 – 4.49; p=0.002) more likely to exclusively breastfeed compared to mothers feeding post-lacteals. Secondly, mothers not owning telephones were 2 times (OR= 2.2; 95% CI; 1.30 – 3.87; p=0.004) more likely to practice exclusive breastfeeding compared to mothers owning telephones. Thirdly, mothers not having a breast health problem were about 11 times (OR: 11.62; 95% CI: 2.62 – 51.47; p=0.001) more likely to practice exclusive breastfeeding compared to mothers with a breast health problem.

At 4 months, post-lacteal feeding was most significantly associated with the practice of exclusive breastfeeding; mothers not giving post-lacteals were 5 times (OR: 5.07; 95% CI; 1.55 – 16.62; p=0.007) more likely to practice exclusive breastfeeding than mothers giving post-lacteals (Table 3.18). Secondly, mothers stating breastfeeding duration should be less than 2 years were 67% (OR; 0.33; 95% CI; 0.12 –

0.91; p=0.032) less likely to exclusively breastfeed than mothers knowing the duration of breastfeeding should be 2 years of more. Thirdly, mothers not owning televisions were about 4 times (OR; 4.32; 95 CI: 1.39 – 13.43; p=0.011) more likely to practice exclusive breastfeeding that mothers owning televisions.

At 5 months, only post-lacteal feeding was significantly associated with the practice of exclusive breastfeeding. Mothers not giving post-lacteals were 5 times (OR; 5.22; 95% CI: 1.56 – 17.47; p=0.007) more likely to exclusively breastfeed compared to mothers giving post-lacteals (Table 3.18). At 6 months no factors were significantly associated with exclusive breastfeeding.

Table 3.18: The findings of logistic regression analysis of factors associated with exclusive breastfeeding from one to six months

Independent Variables	Odds Ratio (OR) 95% CI:	p Value
1 Month		
Post-lacteal feeding	181.19; CI: 24.13 – 136.57;	<0.00001***
Giving glucose water as a post-lacteal	0.25; CI: 0.08 – 0.75	0.014*
Household size	0.78; CI; 0.61- 0.98	0.036*
2 Months		
Post-lacteal feeding	4.67; CI: 1.51 – 14.47	0.008**
Planned duration of breastfeeding of baby to be born	0.34; CI: 0.14 – 0.82	0.016*
3 Months		
Post-lacteal feeding	2.52; CI: 1.41 – 4.49	0.002**
Telephone ownership	2.24; CI: 1.30 – 3.87	0.004**
Presence of breast heath problem	11.62; CI: 2.62 – 51.47	0.001**
4 Months		
Post-lacteal feeding	5.07; CI: 1.55 – 16.62	0.007**
Maternal knowledge about the duration of breastfeeding	0.33; CI: 0.12 – 0.91	0.032*
Television ownership	4.32; CI: 1.39 – 13.43	0.011*
5 Months		
Post-lacteal feeding	5.22; CI; 1.56 – 17.47	0.007**

*** Significant differences (OR; p<0.05); **Significant differences (OR; p<0.01); ***Significant differences (OR; p<0.00001)**

3.9 Trends in Infant Feeding Practices from one month to six months of age

Trends in infant feeding practices were determined in all three study groups at 1, 3 and 6 months. Additional interviews were conducted for mothers in the HBICG at 2, 4 and 5 months. Infant feeding practices were based on a 24-hour recall.

3.9.1 Trends in breastfeeding practices from one month to six months of age

The findings showed that breastfeeding was universal in all the study groups from 1 to 6 months. At 1 month, all the mothers in the study groups breastfed. At 3 months, all mothers in the CG and the FBSICG breastfed, while only one mother (1.0%) from the HBICG did not breastfeed. At 6 months, a similar percentage (98.9%) of the mothers in the FBSICG and HBICG breastfed, while all the mothers in the CG breastfed (Table 3.19) either exclusively or non-exclusively.

Table 3.19 Maternal breastfeeding practices either exclusively or non-exclusively over time by study groups

		CG	FBSICG	HBICG	Chi-square test; p
1 Month		*N*=97	*N*=102	*N*=100	
Breastfeeding	YES	97 (100)	102 (100)	100 (100)	
	NO	0 (0)	0 (0)	0 (0)	
2 Months				*N*=95	
Breastfeeding	YES			94 (98.9)	
	NO			1 (1.1)	
3 Months		*N*=87	*N*=93	*N*=91	
Breastfeeding	YES	87 (100)	92 (98.9)	91 (100)	0.383
	NO	0 (0)	1 (1.1)	0 (0)	
4Months				*N*=87	
Breastfeeding	YES			87 (100)	
	NO			0 (0)	
5 Months				*N*=82	
Breastfeeding	YES			82 (100)	
	NO			0 (0)	
6 Months		*N*=89	*N*=87	*N*=89	
Breastfeeding	YES	89 (100)	86 (98.9)	88 (98.9)	0.439
	NO	0 (0)	1 (1.1)	1 (1.1)	

Control Group (CG); Facility-Based Intensive Counseling Group (FBSICG); Home-Based Intensive Counseling Group (HBICG)

3.9.2 Trends in non- breastmilk liquid feeding

At 1 month, there was a trend for a higher percentage (27.8%) of mothers from the CG to give non-breastmilk liquids compared to 15.7% from the FBSICG; and 14.0% from the HBICG (Figure 3.15); these differences were significant (Chi-square test; p=0.031) (Table 3.20). Compared to the CG, mothers from the FBSICG were 44% less likely to give non-breastmilk liquids (RR=0.56; 95% CI: 0.32 – 0.97; p=0.042); while mothers in HBICG were 50% less likely (RR=0.50; 95% CI: 0.28 – 0.90; p=0.021) to give non-breastmilk liquids (Table 3.20). There was a trend for a higher percentage (14.4%) of mothers from the CG to give salt-sugar solution compared to 9.8% of mothers from the FBSICG; and 2.0% from the HBICG (Chi-square test; p=0.002). Mothers in the FBSICG were 33% less likely to give salt sugar solution than mothers in the CG (RR=0.67; 95% CI: 0.32 – 1.46; p=0.061), a significant trend; whereas mothers in the HBICG were 86% less likely (RR=0.14; 95% CI: 0.03 – 0.59; p=0.066) to give salt-sugar solution than mothers from the CG. Other non-breastmilk liquids given by relatively smaller percentages of the mothers were glucose water and plain boiled water (Table 3.20).

At 3 months, there was a trend for a higher percentage (62.1%) of mothers from the CG to give non-breastmilk liquids compared to 49.5% from the FBSICG; and 38.5% from the HBICG (Figure 3.15); these differences were significant (Chi-square test; p=0.007) (Table 3.20). Mothers in the FBSICG were 19% less likely to give non-breastmilk liquids than mothers in the CG (RR=0.81; 95% CI: 0.62 – 1.05; p=0.106), while mothers in the HBICG were 79% less likely to give non-breastmilk liquids than mothers in the CG, (RR=0.21; 85% CI: 0.12 – 0.37; p<0.00001). Analysis of the type of non-breastmilk liquids showed a trend for a higher percentage (25.3%) of mothers from the CG to give glucose water compared to 15.4% from the FBSICG; and 6.6% from the HBICG (Chi-square test; p=0.001) (Table 3.20). Compared to the CG mothers from the FBSICG were 40% less likely to give glucose water (RR=0.60; 95% CI: 0.33 – 1.10; p=0.098); whereas, mothers in the HBICG were 74% less likely to give glucose water (RR=0.26; 95% CI: 0.11 – 0.61; p=0.002). There was a trend for a higher percentage (25.3%) of mothers in the CG to give salt-sugar solution compared to 12.9% in the FBSICG and 13.2% in the HBICG (Chi-square test; p=0.043). Compared to the CG, mothers in the FBSICG were 58% less likely to give salt-sugar solution (RR=0.52; 95% CI: 0.27 – 0.98; p=0.042), while in the HBICG mothers were also 58% less likely to give salt-sugar solution (RR= 0.52; 95% CI: 0.27-0.99; p=0.458). The other non-breastmilk liquids given by relatively lower percentages of mothers were cow milk, and plain water (Table 3.20).

At 6 months, the trend towards non-breastmilk liquids was similar to that observed at 1 and 3 months. Most (91.0%) of the mothers in the CG; 87.4% in the FBSICG; and 65.5% in the HBICG gave non-breastmilk liquids (Figure 3.15); these differences were significant (Chi-square test; p=0.03) (Table 3.20). Compared to HBICG, a significantly higher percentage of mothers in the CG gave non-breastmilk liquids (Chi-square test; p<0.00001), whereas the difference between the CG and the FBSICG was insignificant (Chi-square test; p=0.434). Mothers from the FBSICG were 4% less likely to give non-breastmilk liquids than mothers in the CG (RR=0.96; 95% CI: 0.86 – 1.06; p=0.436); mothers in the HBICG were 28% less likely (RR=0.72; 95% CI: 0.61 – 0.84; p<0.000001) to give non-breastmilk liquids than those in the CG.

An investigation into the types of liquid feeding showed a trend towards a higher percentage (65.2%) of mothers from the CG feeding cow milk compared to 52.9% of mothers in the FBSICG; and 44.9% from the HBICG (Chi-square test; p=0.023) (Table 3.20). Mothers in the FBSICG were 19% less likely to give cow milk than mothers in the CG (RR=0.81; 95% CI: 063 – 1.04; p=0.100); however this difference was insignificant. On the other hand, compared to the CG, mothers in the HBICG were significantly less likely to give cow milk than mothers in the CG (RR=0.69; 95% CI: 0.52 – 0.91; p=0.008). There was a trend for a higher percentage (24.7%) of mothers in the CG to give glucose water compared to 24.1% in the FBSICG; and 11.2% in the HBICG (Chi-square test; p=0.031). Mothers in the FBSICG were 2% less likely than mothers in the CG to give glucose water (RR=0.98; 95% CI: 0.58 – 1.64; p=0.928); but this difference was insignificant. On the other hand, compared to the CG, mothers in the HBICG were significantly less likely to give glucose water compared to those in the CG (RR=0.45; 95% CI: 0.23 – 0.90; p=0.024). There was a trend towards a higher percentage (22.5%) of mothers from the CG feeding salt-sugar solution compared to 17.2% from the FBSICG; and 6.7% from the HBICG (Chi-square test; p=0.008). Compared to the CG, mothers in the FBSICG were 23% less likely to give salt-sugar solution (RR=0.77; 95% CI: 0.42 – 1.39; p=0.387) compared to the CG; mothers from the HBICG were 70% less likely to give salt-sugar solution (RR=0.30; 95% CI: 0.13 – 0.71; p= 0.006). Other non-breastmilk liquids given by relatively smaller percentages of mothers were plain water and infant formula; these were given by relatively lower percentages of mothers (Table 3.20).

In addition at 2 months, salt-sugar solution was given by 12.5%, cow milk by 10.5%, plain water by 7.4% and glucose water by 5.3% of the mothers in HBICG. At 4 months, cow milk was given by 21.8%, plain

water by 18.4%, salt-sugar solution by 11.5%, glucose water by 10.3% and infant formula by 2.3% of the mothers in the HBICG. At 5 months, infant formula was given by 3.7% of the mothers, cow milk by 9.8%, plain boiled water by 17.1% and glucose water by 13.4% of the mothers in HBICG group (Figure 3.15).

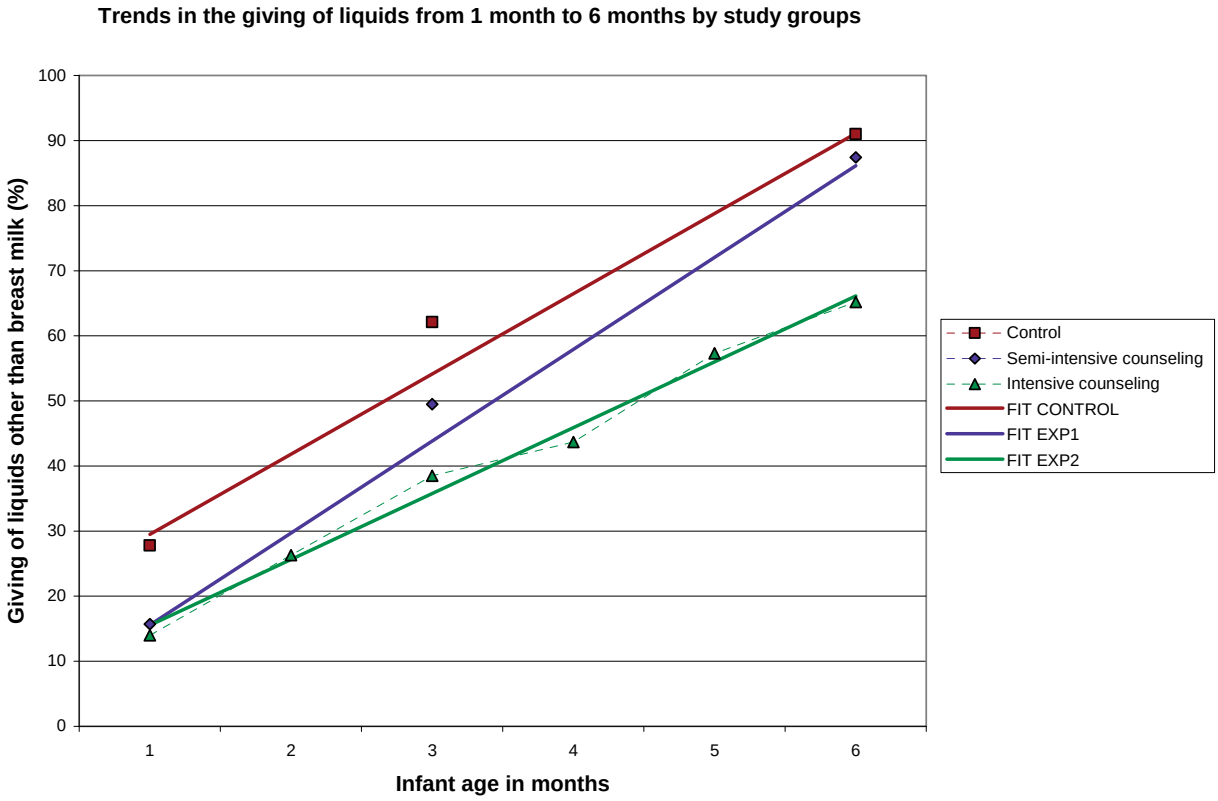


Figure 3.15: Trends in giving of non-breastmilk liquids by infant age and study groups

Table 3.20: Differences in maternal practice of giving non-breastmilk liquids by infant age and study group

Infant feeding Practices	CG *N*=97	FBSICG *N*=102	HBICG *N*=100	Chi-square; P	CG RR=1	FBSICG RR (95% CI; P value)	HBICG RR (95% CI; P value)
	N (%)	*N* (%)	*N* (%)				
1 month: *N*=97	*N=102*	*N=100*					
Salt-sugar solution	14 (14.1)	10 (9.8)	2 (2.0)	0.002**		0.67 CI: 0.32 – 1.46; P=0.320	0.14 CI: 0.03 – 0.59; P=0.008**
Glucose water	11 (11.3)	4 (3.9)	4 (4.0)	0.050		0.35 CI: 0.11 - 1.05; P=0.061	0.35 CI: 0.12 _ 1.07; P=0.066
Plain boiled water	2 (2.1)	2 (2.0)	3 (3.0)	0.871		0.14 CI: 0.14 – 6.62; p=0.950	1.45 CI: 0.25 – 8.53; P=0.677
Total giving liquids	**27 (27.8)**	**16 (15.7)**	**14 (14.0)**	**0.031***		**0.56 CI: 0.32 –0.97; P=0.042***	**0.50 CI: 0.28 –0.90; P=.021***
2 Months:			*N=95*				
Salt-sugar solution			12 (12.6)				
Cow milk			10 (10.5)				
Plain water			7 (7.4)				
Glucose water			5 (5.3)				
Total giving liquids			**25 (26.3)**				
3 Months:	*N=87*	*N=92*	*N=91*				
Salt-sugar solution	22 (25.3)	12 (12.9)	12 (13.2)	0.043*		0.52 CI: 0.27 – 0.98; P=0.042*	0.52 CI: 0.27 – 0.99; P=0.458
Glucose water	22 (25.3)	14 (15.1)	6 (6.6)	0.002**		0.60 CI: 0.33 – 1.10; P=0.098	0.26 CI: 0.11 – 0.61; P=0.002**
Cow milk	17 (19.5)	15 (16.1)	12 (3.2)	0.516		0.83 CI: 0.44 – 1.56; P=0.573	0.67 CI: 0.34 – 1.33; P=0.255
Plain water	8 (9.2)	14 (15.1)	13 (14.3)	0.431		1.65 CI: 0.77 – 3.75; P=0.227	1.55 CI: 0.68 – 3.56; P=0.298
Total giving liquids	**54 (62.1)**	**46 (49.5)**	**35 (38.5)**	**0.007****		**0.81 CI: 0.62 – 1.05; P=0.106**	**0.21 CI: 0.12 – 0.37; P=<0.000001******
4 Months:			*N=87*				
Cow milk			19 (21.8)				
Plain water			16 (18.4)				
Salt-sugar solution			10 (11.5)				
Glucose water			9 (10.3)				
Infant formula			2 (2.3)				
Total liquid giving liquids			**38 (43.7)**				

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); RR (Relative Risk; Multiple responses; Frequencies are presented only for selected categories and variables and therefore do not (always) add to 100%. * Significant differences (Chi-square and RR tests p<0.05); ** Significant differences (Chi-square and RR tests p≤0.0001); ****Significant differences (RR test p<0.000001)

Table 3.20: Differences in maternal practice of giving non-breastmilk liquids by infant age and study group (Cont)

Infant feeding Practices	CG *N*=97	FBSICG *N*=102	HBICG *N*=100	Chi-square; P	CG RR=1	FBSICG RR (95% CI; P value)	HBICG RR (95% CI; P value)
5 Months:			*n=82*				
Plain water			14 (17.1)				
Glucose water			11 (13.4)				
Cow milk			8 (9.8)				
Infant formula			3 (3.7)				
Total giving liquids			**47 (57.3)**				
6 Months:	*N=89*	*N=87*	*N=89*				
Cow milk	58 (65.2)	46 (52.9)	40 (44.9)	*		0.81 CI: 0.63 – 1.04; P=0.100	0.69 CI: 0.52 – 0.91; P=0.008**
Salt-sugar solution	20 (22.5)	15 (17.2)		0.008**		0.77 CI: 0.42 – 1.39; P=0.387	0.30 CI; 0.13 – 0.71; P=0.006**
Glucose water	22 (24.7)	21 (24.1)	10 (11.2)	0.031*		0.98 CI: 0.58 – 1.64; P=0.928	0.45 CI: 0.23 – 0.90; P=0.024*
Plain water	19 (21.3)	17 (19.5)	23 (25.8) 0.023	0.588		1.02 CI: 0.88 – 1.19; P=0.766	0.94 CI: 0.80 – 1.11; P=0.481
Infant formula		9 (10.3) 6 (6.7)	4 (4.5)	0.279		1.84 CI: 0.64 – 5.27; P=0.255	0.80 CI: 0.22 – 2.88; P=0.732
Total giving liquids	81 (91.0)	76 (87.4)	58 (65.2)	<0.0001***		**0.96 CI: 0.86 – 1.06: P=0.436**	**0.72 CI: 0.61 – 0.84; P<0.00001*** **
		5 (5.5)					

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); RR (Relative Risk); Multiple responses; Frequencies are presented only for selected categories and variables and therefore do not (always) add to 100%. * Significant differences (Chi-square and RR tests p<0.05), * Significant differences (Chi-square and RR tests p≤0.00001)**

3.9.3 Reasons for giving of liquids other than breastmilk

At 1 month, there was a trend for a higher percentage (19.6%) of mothers from the CG to give non-breastmilk liquids to soothe stomachache and colic compared to 12.7% mothers from the FBSICG; and 6.0% from the HBICG (Chi-square test; p=0.014) (Table 3.21). Less than one-tenth of the mothers from all the study groups: 7.2% from the CG; 3.9% from the FBSICG and 6.0% from the HBICG gave non-breastmilk liquids because the baby was hungry (Chi-square test; p=0.585). Other reasons given by relatively smaller percentages of mothers from the three study groups were because of advice from friends or health staff advice.

At 3 months, there was a trend towards a higher percentage (46.0%) of mothers from the CG to give non-breastmilk liquids to soothe colic compared to 31.2% from the FBSICG; and 28.6% from the HBICG (Chi-square test; p=0.034) (Table 3.21). Compared to the FBSICG a significantly higher percentage (Chi-square test; p=0.041) of mothers in the CG gave non-breastmilk liquids to soothe colic; similarly, a significantly higher percentage (Chi-square test; p=0.016) of mothers in the CG compared to the HBICG gave non-breastmilk liquids for the same reason. There was a trend towards a higher percentage (31.0%) of mothers in the CG giving non-breastmilk liquids because the baby was hungry compared to 24.7% of the mothers in the FBSICG and 18.7% in the HBICG (Chi-square test; p=0.160). About one-tenth (11.5%) of the mothers in the CG gave the liquids because they produced inadequate breastmilk, whereas 1.1% in the FBSICG and 4.4% in the HBICG gave the liquids for the same reason (Chi-square test; p=0.294) (Table 3.21).

At 6 months, there was a trend for a higher percentage (73.0%) of mothers in the CG to give liquids other than breastmik because of infant hunger compared to 64.4% in the FBSICG; and 46.1% from the HBICG (Chi-square test; p= 0.003) (Table 3.21). A significantly (Chi-square test; p<0.00001) higher percentage of mothers in the CG gave non-breastmilk liquids because of infant hunger compared to mothers in the HBICG; whereas there was a trend (Chi-square test; p=0.427) towards a higher percentage of mothers from the CG feeding non-breastmilk liquid to soothe colic compared to mothers in the FBSICG (Chi-square test; p=0.125). There was a trend towards a higher percentage of mothers (43.8%) in the CG to give non-breastmilk liquids to soothe colic compared to 37.9% of the mothers in the FBSICG; and 29.2% of the mothers in the HBICG (Chi-square test; p=0.125).

In addition, at 2 months, the reasons for giving non-breastmilk liquids by the mothers in the HBICG were: to soothe colic (13.7%); and inadequate production of breastmilk (8.4%). At 4 months, 33.3% of the mothers gave the liquids to soothe colic; 25.3% because the baby was hungry; and 9.2% because of inadequate breastmilk production. At 5 months, 41.4% of the mothers gave non-breastmilk liquids because the baby was hungry; 25.6% to soothe colic and 13.6% because of inadequate breastmik (Table 3.21).

3.10 Trends in feeding Semi-Solid and Solid Foods to the Infants by Study Groups

Information on the trends in semi-solid and solid food feeding was collected for all mothers during months 1, 3 and 6; and at an additional three interviews for the HBICG group during months 1, 4 and 5.

At 1 month, (1.0%) of the mothers in the CG and a similar percentage (1.0%) in the HBICG gave semi-solid or solid foods, whereas no mother in the FBSICG gave these foods (Figure 3.16). These differences were insignificant (Chi-square test; p=0.473) (Table 3.22). At 3 months, there was a trend towards a higher percentage (14.9%) of mothers in the CG giving semi-solid or solid foods compared to 10.9% of the mothers in the FBSICG; and 8.8% in the HBICG (Chi-square test; p=0.304). At 6 months, there was trend towards a higher percentage of mothers (86.5%) in the CG to give semi-solid and solid foods compared to 81.6% of mothers in the FBSICG; and 62.9% in the HBICG (Chi-square test; p=0.001). Compared to the HBICG group, a significantly higher percentage of mothers in the CG gave semi-solid or solid foods (Chi-square test; p=0.0001), whereas the difference between the FBSICG and the CG was insignificant (Chi-square test; p=0.375).

In addition, at 2 months, 4.2% of the mothers in the HBICG gave semi-solid or solid foods; 18.4% at 4 months and 24.4% at 5 months, respectively (Figure 3.16). Although an investigation into foods given was not conducted, porridge was usually the first food, followed by mashed starchy foods, such as potatoes, bananas; fruits; and fruit juices were added to the diet as the baby grew older.

Table 3.21: Reasons for giving of non-breastmilk liquids by study groups [N; (%)]

	CG	FBSICG	HBICG	Ch-square test; p
	[N; (%)]	*[N; (%)]*	*[N; (%)]*	
1 Month:	*N*=97	*N*=102	*N*=100	
Soothe colic	19 (19.6)	13 (12.7)	6 (6.0)	0.014*
Baby hungry	7 (7.2)	4 (3.9)	6 (6.0)	0.585
Inadequate bm	3 (3.1)	1 (1.0)	5 (5.0)	0.215
Advised by friend	4 (4.1)	1 (1.0)	1 (1.0)	0.223
Advised at clinic	1 (1.0)	1 (1.0)	1 (1.0)	0.999
2 Months:			*N*=95	
Soothe colic			13 (13.7)	
Inadequate bm			8 (8.4)	
Advised by friend			1 (1.1)	
3 Months:	*N*=87	*N*=91	*N*=91	
Soothe colic	40 (46.0)	29 (31.2)	26 (28.6)	0.034*
Baby hungry	27 (31.0)	23 (24.7)	17 (18.7)	0.160
Inadequate bm	10 (11.5)	6 (6.5)	5 (5.5)	0.294
Advised by friend	3 (3.4)	1 (1.1)	4 (4.4)	0.341
Advised at clinic	1 (1.1)	0 (0.0)	0 (0.0)	0.320
4 Months:			*N*=87	
Soothe colic			29 (33.3)	
Baby hungry			22 (25.3)	
Inadequate bm			8 (9.2)	
Advised by friend			3 (3.4)	
5 Months:			*N*=82	
Baby hungry			34 (41.5)	
Soothe colic			21 (25.6)	
Inadequate bm			12 (14.6)	
Advised at clinic			2 (2.4)	
Advised by friend			1 (1.2)	
6 months:	*N*=89	*N*=87	*N*=89	
Baby hungry	65 (73.0)	56 (64.4)	41 (46.1)	0.003**
Soothe colic	39 (43.8)	33 (37.9)	26 (29.2)	0.125
Inadequate bm	14 (15.7)	6 (6.9)	4 (4.5)	0.026*
Advised by friend	4 (4.5)	6 (6.9)	3 (3.4)	0.550

Multiple responses; bm (breastmilk); *Significant differences (Chi-square test; p<0.05), ** Significant differences (p≤.001)

Figure 3.16: Trends in maternal practices in the giving of semi-solid and solid foods by infant age and study groups

Table 3.22: Differences in maternal practice of giving semi-solid and/or solid foods by infant age and study groups [N; (%)]

Characteristics	CG	FBSICG	HBICG	Chi-square test; p
	(*N*=120)	(*N*=120)	(*N*=120)	
1 Month:	*N*= 97	*N*=102	*N*=100	
Gave semi-solids/solid foods	1 (1.0)	0 (0.0)	1 (1.0)	0.473
2 Months:			*N*=95	
Gave semi-solids/solid foods			4 (4.2)	
3 Months:	*N*=87	*N*=92	*N*=91	
Gave semi-solids/solid foods	13 (14.9)	10 (10.9)	8 (8.8)	0.304
4 Months:			*N=87*	
Gave semi-solids/solid foods			16 (18.4)	
5 Months:			*N=87*	
Gave semi-solids/solid foods			20 (24.2)	
6 Months:	*N*=89	*N*=87	*N*=89	
Gave semi-solids/solid foods	77 (86.5)	71 (81.6)	56 (62.9)	0.001**

**** Significant differences (Chi-square test; p<0.0001)**

3.10.1 Reasons for giving semi-solid or solid foods

At 1 month, 1.0% of the mothers from the CG and 1.0% from the HBICG gave semi-solid or solid foods because the baby was hungry; whereas no mothers from the FBSICG gave semi-solid or solid (Chi-square test; p=0.432). Another 1.0% of the mothers from the HBICG gave these foods because of inadequate breastmilk production (Table 3.23).

At 3 months, there was a trend towards a higher percentage of mothers (12.6%) from the CG to give semi-solid or solid foods because the baby was hungry compared to 9.7% from the FBSICG; and 8.8% from the HBICG (Chi-square test; p=0.684). About one-tenth (8.0%) of the mothers from the CG gave semi-solid or solid foods because of inadequate breastmilk compared to 6.5% from FBSICG; and 8.8% from HBICG (Chi-square test; p=0.829). Other reasons mentioned for giving semi-solid and solid foods, by relatively lower percentages of mothers, were advice from friends and health staff (Table 3.23).

At 6 months, there was a trend for a higher percentage of mothers (76.4%) from the CG to give semi-solid and solid foods because the baby was hungry compared to 75.9% from the FBSICG; and 58.4% from the HBICG (Chi-square test; p=0.013) (Table 3.23). Compared to the mothers in the HBICG, a significantly higher percentage (Chi-square test; p<0.001) of mothers from the CG gave these foods because the baby was hungry; whereas, the difference between the FBSICG and the CG was insignificant (Chi-square test; p=0.373). Over a quarter (27.0%) of the mothers from the CG; 11.5% from the FBSICG; and 12.4% from the HBICG gave semi-solid and solids foods because of inadequate breastmilk (Chi-square test; p=0.011). Compared to the mothers from the FBSICG, a significantly higher percentage of mothers from the CG gave these foods because of inadequate breastmilk (Chi-square test; p=0.008). Similarly, when compared to HBICG, a significantly higher percentage of mothers from the CG gave semi-solid and solid foods because of inadequate breastmilk (Chi-square test; p=0.013). Over one-tenth (12.4 %) of mothers from the CG; 12.6% from the FBSICG; and 6.7% from the HBICG gave semi-solid and solid foods because of health staff advice (Chi-square test; p=0.329). There was a trend for a higher percentage (11.2%) of mothers from the CG to give semi-solid and solid foods because they were advised to do so by friends compared to 6.9% of mothers from the FBSICG; and 1.1% from the HBICG (Chi-square; p=0.011) (Table 3.23).

In addition, at 2 months, 4.2% of the mothers in the HBICG gave semi-solid or solid foods because the baby was hungry; 4.2% because they did not have adequate breastmilk; 2.1% to soothe stomach

pain/colic; and 1.1% because of advice from a friend. At 4 months, 14.9% of the mothers in the HBICG gave the foods because the baby was hungry; 10.3% because of inadequate breastmilk; and 2.3% because of advice from friends. At 5 months, 22.0% of the mothers in the HBICG gave semi-solid or solid foods because the baby was hungry; 2.8% because of inadequate breastmilk; 2.4% because of health staff advice; and 1.2% because of advice from friends (Table 3.23).

Overall, most of the mothers gave their infants semi-solid or solid foods because the babies were hungry, so needed the breastmilk and additional food. The second most commonly given reason was maternal perception about inadequate breastmilk production. Compared to the mothers in the HBICG, these reasons were given by significantly higher percentages of mothers from the CG at 6 months.

Table 3.23: Reasons for giving semi-solid and solid foods by infant age and study groups [N; (%)

	CG *N; (%)*	FBSICG *N; (%)*	HBICG *N; (%]*	Chi-square; p
1 Month:	*N*=97	*N*=102	*N*=100	
Baby hungry	1 (1.0)	0 (0.0)	1 (1.0)	0.432
Inadequate breastmilk	0 (0.0)	0 (0.0)	1(1.0)	0.455
2 Months:			*N*=95	
Baby hungry			4 (4.2)	
Soothe stomach pain			2 (2.1)	
Inadequate breastmilk			4 (4.2)	
Advised by friends			1 (1.1)	
3 Months:	*N*=87	*N*=91	*N*=91	
Baby hungry	11 (12.6)	9 (9.7)	8 (8.8)	0.684
Inadequate breastmilk	7 (8.0)	6 (6.5)	8 (8.8)	0.829
Advised by friends	0 (0.0)	0 (0.0)	1 (1.1)	0.342
Advised by health staff	1 (1.1)	1 (1.1)	0 (0.0)	0.430
4 Months:			*N*=87	
Baby hungry			13 (14.9)	
Inadequate breastmilk			9 (10.3)	
Advised by friends			2 (2.3)	
5 Months:			*N*=82	
Baby hungry			18 (22.0)	
Inadequate breastmilk			10 (2.8)	
Advised by friends			1 (1.2)	
Health staff			2 (2.4)	
6 Months:	*N*=89	*N*=87	*N*=89	
Baby hungry	68 (76.4)	66 (75.9)	52 (58.4)	0.013*
Inadequate breastmilk	24 (27.0)	10 (11.5)	1 (12.4)	0.011*
Advised by health staff	11 (12.4)	11 (12.6)	6 (6.7)	0.329
Advised by friends	10 (11.2)	6 (6.9)	1 (1.1)	0.011*

CG (Control Group); FBSICG (Facility-Based Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); multiple responses; Significant differences (Chi-square test; p<0.05)

3.11 Maternal Perceptions about the Breastfeeding Counseling Strategies Conducted during the Study

3.11.1 Maternal knowledge about breastfeeding after counseling provided by the research team

Maternal knowledge about infant feeding was sought from the mothers in the FBSICG and HBICG, the study groups receiving breastfeeding counseling from the research team. About a quarter of the mothers (22.1% from the FBSICG and 21.3% from the HBICG) had previously received breastfeeding counseling, an insignificant difference (Chi-square test; p=0.905) (Table 3.24). The main breastfeeding information source for all the mothers in the FBSICG receiving infant feeding counseling prior to the study, was the health facility; and 94.7% for the mothers in the HBICG. A higher percentage (63.1%) of mothers from HBICG reported the information received during the counseling, provided by the research team, was more detailed compared to 42.1% of the mothers from the FBSICG (Chi-square test; p=0.946). A higher percentage (47.4%) of mothers from the FBSICG stated they had not been taught exclusive breastfeeding for 6 months; whereas only 21.0% of mothers in the HBICG gave the same information. (Chi-square test; p=0.818). About one-quarter (21.0%) of the mothers from the FBSCIG found no difference between the counseling received prior to the study and that received during the study; whereas all the mothers in the HBICG found a difference between the counseling received previously and that received during the study (Chi-square test; p=0.613) (Table 3.24).

Of all mothers, those receiving infant counseling previously and those who had not, a higher (91.9%) percentage from the FBSICG received new information from the counseling offered by the research team compared to 94.4% from the HBICG (Chi-square test; p=0.508) (Table 3.24). For a higher percentage (81.4%) of the mothers from the FBSICG, exclusive breastfeeding for 6 months was new information; whereas the same information was new for 75.3% of the mothers from the HBICG (Chi-square test; p=0.326). Information on appropriate positioning and attachment during breastfeeding was new to 60.5% of the mothers from the FBSICG; and 65.2% of the mothers from the HBICG. Over one-tenth of the mothers from both groups,15.1% from the FBSICG and 13.5% from HBICG, had no prior knowledge about breastmilk being expressed and fed to the baby; whereas 10.5% of the mothers from the FBSICG; and 12.4% from the HBICG did not know breastfeeding assists in spacing births (Chi-square test; p= 0.693). For about one-tenth (6.7%) of mothers from the HBICG and 1.2% from the FBSICG, breastfeeding imparting immunity to infants was new information (Chi-square test; p=0.047). Overall, therefore, there were

insignificant differences in breastfeeding knowledge between the two groups, the mothers in FBSICG and HBICG.

Table 3.24: Maternal knowledge about breastfeeding after counseling by the research team by study groups (N ;%)

Aspects of knowledge	FBSICG *N*=86		HBICG *N*=89		Chi-square test; p
	N (%)		*N (%)*		
Received counseling previously	19	(22.1)	19	(21.3)	0.905
• Counseling at health facility	19/19	(100.0)	18/19	(94.7)	
• Differences in information received:					
• Information more detailed	8/19	(42.1)	12/19	(63.1)	0.946
• Taught EBF for less than 6 months	9/19	(47.4)	4/19	(21.0)	0.818
• No difference	4/19	(21.0)	0	(0.0)	0.613
• Received new information	79	91.9	84	94.4	0.508
• New Information received: **+**					
• EBF for 6 months	70	81.4	67	75.3	0.326
• Appropriate positioning and attachment	52	60.5	58	65.2	0.520
• Expressing of breastmilk	13	15.1	12	13.5	0.757
• Breastfeeding assists in birth spacing	9	10.5	11	12.4	0.693
• Breastfeeding imparts immunity to baby	1	(1.2)	6	(6.7)	0.047*****

FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Semi-Intensive Counseling Group); + Multiple Responses; EBF (Exclusive breastfeeding); *Significant differences (Chi-square test; p<0.05)

3.11.2 Maternal attitudes towards breastfeeding counseling strategies conducted during the study

A higher percentage of mothers (32.6%) from the HBICG found the breastfeeding counseling excellent compared to 18.6% from FBSICG (Chi-square test; p=0.007); whereas 79.1% from the FBSICG and 66.3% from the HBICG found it good (Chi-square test; p=0.045) (Table 3.25). Almost equal percentages of the mothers from each of the groups, 89.5% from the FBSICG and 89.9% from the HBICG, found the counseling content sufficient. A higher percentage (87.6%) of mothers from the HBICG liked the information received compared to 81.4% from FBSICG (Chi-square test; p=0.326); whereas 17.4% from the FBSICG liked some of the information compared to 10.1% from the HBICG. Relatively fewer mothers from the two groups, 1.1% from the FBSICG and 2.2% from HBICG, did not like the information received.

A higher percentage (72.1%) of mothers from the FBSICG liked the exclusive breastfeeding information compared to 66.3% from HBICG (Chi-square test; p=0.406) (Table 3.25). Almost equal percentages of mothers (48.8%) from the FBSICG and 48.3% from the HBICG, liked the exclusive breastfeeding information because exclusive breastfeeding practice promotes infant health. A higher percentage (17.4%)

of mothers from the FBSICG compared to 10.1% of the mothers from the HBICG, liked the exclusive breastfeeding information because exclusive breastfeeding practice promotes faster infant growth (Chi-square test; p=0.157). A higher percentage (17.4%) of mothers from the FBSICG compared to 11.2% of the mothers from the HBICG, liked the exclusive breastfeeding information because exclusive breastfeeding practice was cheap, no additional feeds were purchased (Chi-square test; p=0.240).

Almost equal percentages (47.7%) of mothers from the FBSICG and 47.2% from the HBICG liked the information on correct positioning and attachment of baby to the breast during breastfeeding. Mothers liked this information because the practice increased breastmilk production; this was reported by 22.1% of the mothers from the FBSICG and 19.1% from the HBICG (Chi-square test; p=0.624) (Table 3.25). A higher percentage (18.6%) of mothers from the FBSICG compared to 14.6% of the mothers from HBICG liked the information on correct positioning and attachment of the baby to the breast during breastfeeding because the practice reduced the incidence of health problems (Chi-square test; p=0.477).

On the contrary, exclusive breastfeeding for 6 months did not appeal to 9.3% from the FBSICG and 10.1% from the HBICG (Chi-square test; p=0.856) (Table 3.25).The mothers did not like the 'exclusive breastfeeding for six months' information because of inadequate breastmilk; this was stated by 8.1% from the FBSICG and 11.2% from the HBICG. A higher percentage (4.6%) of mothers from the FBSICG compared to 1.1% of mothers from the HBICG did not like the 'breastfeeding assisting in the spacing of births' information (Chi-square test; p=0.148); similar percentages in both groups did not like the idea of expressing breastmilk. The mothers not liking the 'breastfeeding delaying conception' information indicated it does not work for all women, while 3.5% of the mothers mentioned expressing breastmilk is culturally unacceptable.

About four-fifths of the mothers from the two groups, 79.1% from the FBSICG and 79.8% from the HBICG stated they agreed with all the information received (Table 3.25). About equal percentages of mothers from both groups, 11.6% from FBSICG and 11.2% from HBICG, did not agree with exclusive breastfeeding for 6 months because infants become hungry. Other reasons mentioned by relatively fewer women for disagreeing with exclusive breastfeeding for 6 months were that it is neither feasible for working mothers nor practical to exclusively breastfeed for 6 months. Less than one-tenth (6.9%) of the mothers from FBSICG disagreed with expressing of breastmilk for the baby, as did 4.5% from the HBICG (Chi-square

test; p=0.748). The reasons given were that the breastmilk could get contaminated, 2.3% from FBSICG and 1.1% from HBICG; and 4.6% of the mothers from FBSICG and 1.1% from HBICG mentioned expressing breastmilk is culturally inappropriate (Chi-square test; p=0.138). A smaller (4.6%) from the FBSICG disagreed that exclusive breastfeeding delays conception compared to 6.7% from the HBICG (Chi-square test; p=0.550) (Table 3.25). Overall, therefore, there were insignificant differences in maternal attitudes in FBSICG and HBICG regarding the counseling strategies used in the study to promote breastfeeding.

Table 3.25: Maternal attitudes towards breastfeeding counseling strategies after the intervention by the study [N; (%)]

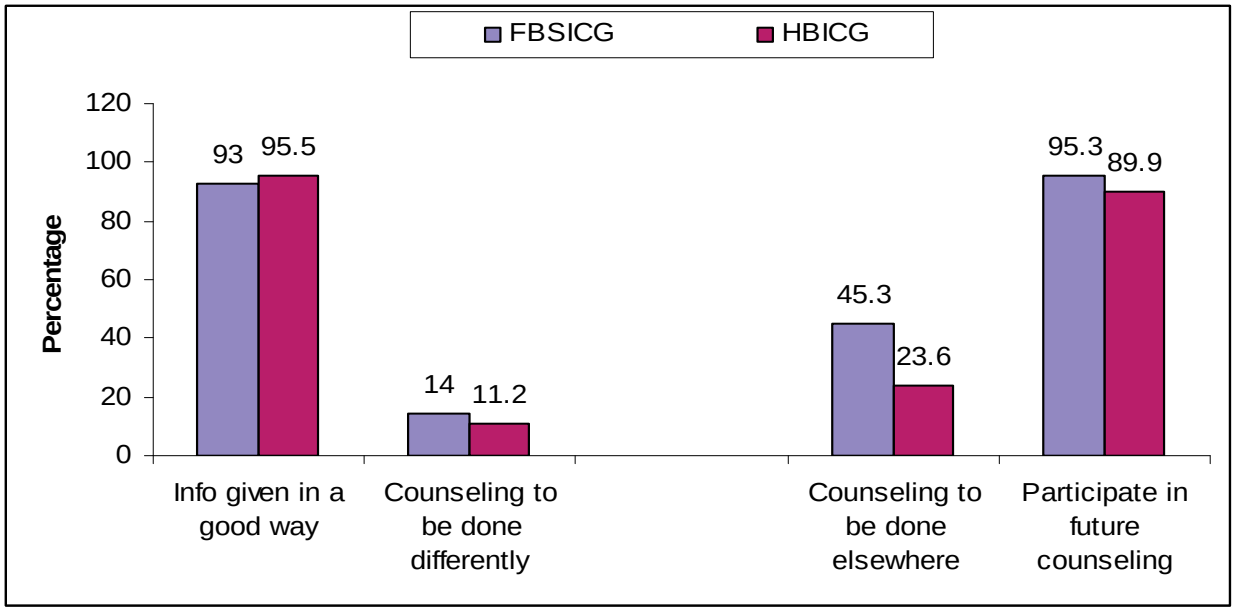
Attitudes	FBSICG (*N*=86)	HBICG (*N*=89)	Chi-square test; p
	N; (%)	*N; (%)*	
Rating of breastfeeding counseling:			
Excellent	16 (18.6)	29 (32.6)	0.007**
Good	68 (79.1)	59 (66.3)	0.045*
Feeling about counseling content:			0.939
Sufficient	77 (89.5)	80 (89.9)	
Fairly sufficient	9 (10.5)	9 (10.1)	
Liked information received:			
Yes	70 (81.4)	78 (87.6)	0.326
Some of it	15 (17.4)	9 (10.1)	
Disliked it	1 (1.1)	2 (2.2)	
Aspects liked:+			
EBF for 6 months	62 (72.1)	59(66.3)	0.406
Positioning and attachment	41 (47.7)	42(47.2)	0.949
Appropriate nutrition for mothers	7 (8.1)	7(7.9)	0.946
Why liked EBF:+			
Promotes infant health	42 (48.8)	43 (48.3)	0.945
Promotes infant growth	15 (17.4)	9 (10.1)	0.157
Cheap	15 (17.4)	10 (11.2)	0.240
Why liked Positioning & attachment:			
Increased milk production	19 (22.1)	17 (19.1)	0.624
Less breast problems	16 (18.6)	13 (14.6)	0.477
Aspects disliked:			
EBF for 6 months	8 (9.3)	9 (10.1)	0.856
Breastfeeding assists in spacing births	4 (4.6)	1 (1.1)	0.148
Expressing breastmilk	4 (4.6)	1 (1.1)	0.148
Agreed with all the information	68 (79.1)	71 (79.8)	0.908
Aspects disagreed with:			
EBF for 6 months	10 (11.6)	10 (11.2)	0.935
Expressing breastmilk	6 (6.9)	4 (4.5)	0.478
Breastfeeding assists in spacing births	4 (4.6)	6 (6.7)	0.550

FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); + Multiple Responses; EBF (Exclusive Breastfeeding); *Significant differences (Chi-square test; p≤0.05; **Significant differences (Chi-square test; p≤0.0001)

3.11.3 Maternal attitudes towards how the breastfeeding counseling was conducted by study groups

Maternal attitudes on how the breastfeeding was conducted indicated that the information was acceptably shared, as indicated by 93.0% of the mothers from FBSICG; and 95.5% from the HBICG (Figure 3.17). Relatively few mothers from each of the groups (15.1% from the HBSICG and 11.2% from the BICG) would have liked the counseling done differently (Chi-square test; p=0.402). Of those wanting the counseling done differently, a higher percentage (53.8%) of the mothers from the FBSICG compared to 30.0% from the HBICG stated exclusive breastfeeding should be recommended for less than 6 months, because it is impractical (Chi-square test; p=0.971). A significantly higher (45.3%) percentage of mothers from the FBSICG compared to 23.6% from the HBICG (Figure 3.17) would have liked the counseling done elsewhere (Chi-square test; p=0.002). About one third (32.5%) of the mothers from the FBSICG would have liked the counseling done at home because of convenience; the freedom to express themselves without inhibition; however, 9.0% of the mothers from the HBICG would have preferred the counseling done at health facilities, so that more mothers can be reached. A higher percentage (19.1%) of mothers from the FBSICG compared to 10.1% mothers from the HBICG (Chi-square test; p=0.071) would have preferred the counseling to have been done in public places such as *barazas;* these are public meetings convened by local administration leaders, such as chiefs or assistant chiefs. All community members could be invited to discuss or to gain information on issues pertaining to the welfare of mothers and infants; this information could then be widely disseminated to churches and schools.

A higher percentage (96.5%) of mothers from the FBSICG compared to 89.9% of the mothers from the HBICG indicated a willingness to participate in future breastfeeding counseling (Figure 3.17). The difference in the percentages of willing participants in future breastfeeding counseling in the two groups was insignificant (Chi-square test; p=0.193). A higher percentage (92.7%) of mothers from the FBSICG would participate in future counseling to get new information on infant feeding practices compared to 68.5% from the HBICG (Chi-square test; p<0.0001). A lower percentage (5.8%) of mothers from the FBSICG would participate in future breastfeeding counseling because infant health improved as a result of the information compared to 22.5% from of mothers in the HBICG (Chi-square test; p=0.001).

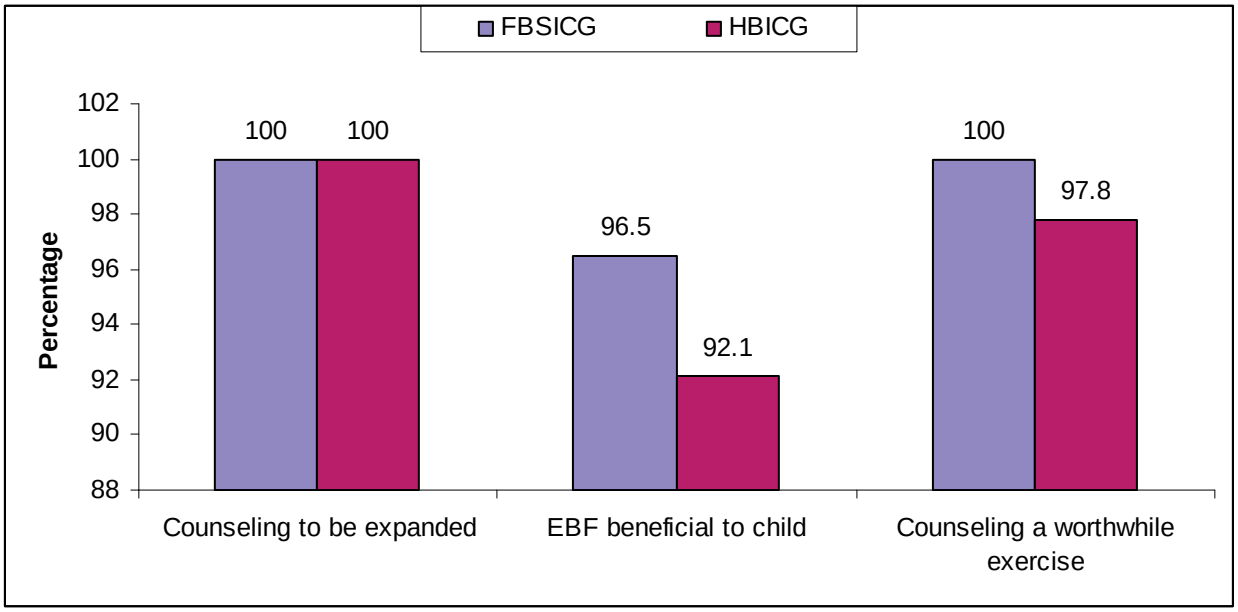


FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group)

Figure 3.17: Maternal attitudes on how the breastfeeding counseling was conducted and how it should be conducted in the future

3.11.4 Maternal beliefs about the usefulness of the breastfeeding counseling strategies

The mothers from the two study groups reported the breastfeeding counseling should be extended to include more mothers than were reached through this research. A higher (96.5%) percentage of mothers from the FBSICG compared to 88.8% from the HBICG stated that the inclusion of a wider range of mothers would provide opportunities to gather more new and in-depth information on infant feeding practices.(Figure 3.18); the difference between the groups was significant (Chi-square test; p=0.045). Most mothers, 96.5% from the FBSICG; and 92.1% from the HBICG reported exclusive breastfeeding was beneficial for the infant (Chi-square test; p=0.444). All mothers in the FBSICG and 97.7% from the HBICG believed the breastfeeding counseling was worthwhile (Chi-square test; p=0.099).



FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group; EBF (Exclusive breastfeeding)

Figure 3.18: Maternal attitudes about the usefulness of the breastfeeding counseling strategies by study groups

3.11.5 The association between the study breastfeeding counseling and maternal infant feeding practices by study groups

A higher percentage (85.3%) of mothers from the HBICG compared to 74.4% from the FBSICG reported the breastfeeding counseling offered by the research team influenced infant feeding practices (Chi-square test; p=0.068) (Table 3.26). A higher percentage (61.8%) of the mothers from the HBICG delayed initiation of complementary feeding compared to 46.5% from the FBSICG (Chi-square test; p=0.661). Over one third (39.5%) of mothers from the FBSICG and 40.4% from the HBICG adopted the practice of correct positioning and attachment of infant to the breast during feeding (Chi-square test; p=0.755).

About one third (31.4%) of the mothers from the FBSICG and 29.2% from the HBICG experienced difficulties in practising some of the aspects taught during counseling (Table 3.26). Equal proportions of mothers from study groups, 31.4% and 31.5% from the FBSICG and the HBICG, respectively, experienced difficulty in practising exclusive breastfeeding for 6 months. Despite this, most mothers, 68.6% from the FBSICG and 64.0% from the HBICG, found exclusive breastfeeding for six months the most useful aspect of counseling. Almost equal proportions of mothers from the study groups 48.8%, in the FBSICG and 49.4% in the HBICG found appropriate positioning and attachment of infants to the breast during feeding,

the most useful aspect of breastfeeding counseling. The least useful aspect of counseling was the information on breastfeeding delaying conception, as reported by 10.5% of mothers from the FBSICG; and 7.9% from the HBICG (Chi-square test; p =0.550). About one-tenth of the mothers, 7.0% from FBSICG and 10.1% from the HBICG found information on exclusive breastfeeding for 6 months least useful; 7.0% of the mothers from the FBSICG; and 3.4% from the HBICG found expressing breastmilk the least useful aspect of breastfeeding counseling (Chi-square test; p=0.276) (Table 3.26).

Table 3.26: The association between the study breastfeeding counseling and maternal infant feeding practices by study groups

Practices	FBSICG (N=86)	HBICG (N=89)	Chi-square test; p
	N (%)	*N* (%)	
Information influenced practices	64 (74.4)	76 (85.3)	0.068
Adapted practices:			
Delayed start of comp feeding	40 (46.5)	55 (61.8)	0 .661
Correct positioning and attachment	26 (30.2)	25 (28.1)	0 .755
Experienced difficulties in practice	27 (31.4)	26 (29.2)	0.508
Did not experience difficulties	56 (65.1)	58 (66.2)	0.948
Difficulties with EBF for 6 months+	27 (31.4)	28 (31.5)	0.993
Difficulties with Expressing bm+	5 (5.8)	1 (1.1)	0.076
Most useful aspects of counseling: +			
EBF for 6 months	59 (68.6)	57 (64.0)	0.523
Positioning and attachment	42 (48.8)	44 (49.4)	0.937
Least useful aspects of counseling:			
Birth spacing	9 (10.5)	7 (7.9)	0.550
EBF for 6 months	6 (7.0)	9 (10.1)	0.457
Expressing breastmilk	6 (7.0)	3 (3.4)	0.276

Multiple responses; FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); Info (Information); EBF (exclusive breastfeeding); bm (breastmilk.

3.12 Focus group discussions (FGDs)

The focus group discussions (FGDs) were analyzed, for common themes emerging from the discussions as the guiding questions were discussed. The findings are presented separately for each of the three study groups, within each group for mothers exclusively breastfeeding for 6 months; and for mothers not breastfeeding exclusively. Two FDGDs were conducted for mothers in the CG not practising exclusive breastfeeding for 6 months; and one FGD for those practising exclusive breastfeeding for 6 months;

because there were only 5 mothers in this group practising exclusive breastfeeding. Two FGDSs were conducted for mothers not practising exclusive breastfeeding for 6 months and one for the 9 mothers from the FBSICG practising exclusive breastfeeding. Two FGDs were conducted for mothers exclusively breastfeeding for 6 months; and another two for mothers from the HBICG not practising exclusive breastfeeding for 6 months.

3.12.1 Focus group discussions with mothers from the CG practising exclusive breastfeeding for six months

13.12.1.1 Understanding of the exclusive breastfeeding concept

Mothers were asked to explain their understanding of exclusive breastfeeding. All 5 mothers agreed exclusive breastfeeding meant giving a baby breastmilk only, without any other feeds, including water, for six months. All the mothers heard the 'exclusive breastfeeding for six months' information from a health facility.

13.12.1.2 Sources of breastfeeding information in the Kibera community

When asked about the sources of breastfeeding information in the Kibera community, the participants mentioned public and private health facilities; Non-Governmental Organizations (NGOs); friends and relatives. Public health facilities were the most common source of infant feeding-practice information.

3.12.1.3. Exclusive breastfeeding benefits

Asked about of their understanding of exclusive breastfeeding benefits, mothers agreed on the following:

- *Health benefits.* Exclusive breastfeeding imparts immunity to infants because, from the maternal experience, infants exclusively breastfed suffered fewer coughs, colds and diarrhoea episodes compared to older siblings not receiving exclusive breastfeeding. One mother said, *"What we were told at the clinic is true. Exclusive breastfeeding triggers the child's immunity to disease".*
- *Convenient and cheaper.* The participants stated exclusive breastfeeding was convenient because no food preparation was necessary. This made the practice cheap because no food purchases were necessary, nor were additional costs on extra cooking fuel incurred.

3.12.1.4 Exclusive breastfeeding practices in the Kibera community

There was general consensus among the participants that the practice of exclusive breastfeeding was very rare in Kibera. The reasons volunteered for the low prevalence of the practice were:

- Exclusive breastfeeding knowledge was very low; most had never heard of exclusive breastfeeding for six months;
- Culturally, for most ethnic groups living in Kibera, infants are introduced to porridge at two to three months; thus most did not believe in exclusive breastfeeding; and
- During the day, many mothers were not at home with infants for long periods as they had to go to formal or informal work or were engaged in small scale businesses; thus complementary foods had to be introduced to infants earlier than six months.

3.12.1.5 Challenges experienced by mothers in exclusive breastfeeding practices

Mothers were asked to share the challenges in exclusive breastfeeding. The responses indicated:

- High levels of maternal commitment and conviction to practice exclusive breastfeeding, especially in a community where people did not think it was the right way to feed babies;
- High levels of pressure from friends and relatives to introduce complementary foods to the babies; mothers were told exclusively breastfed infants get insufficient food for adequate growth and development;
- Strong beliefs that infants need water to quench their thirst. A mother said, *"My mother-in-law was so furious that her grand-daughter was not being given water at two weeks after birth and stated that this practice would adversely affect the baby's digestion system. If it had not been for the support and encouragement I received from my husband, I would have been forced to give up the practice of exclusive breastfeeding";* and
- Exclusive breastfeeding is a full-time job; thus it was difficult to attend to family needs, especially those away from home.

3.12.1.6 Factors promoting the 'exclusive breastfeeding for six months' practice

All five mothers practising exclusive breastfeeding for six months were neither in employment, nor involved in business. When asked to explain the factors that encouraged them to practice exclusive breastfeeding up to six months, in spite of the many challenges, the following responses were elicited:

- Mothers were encouraged to continue with exclusive breastfeeding because of improved infant health;
- Two mothers found exclusive breastfeeding convenient and cheap as no costs were incurred; and
- Three mothers were supported by husbands and other family members to practice exclusive breastfeeding.

3.12.1.7 Suggestions on how to encourage the 'exclusive breastfeeding' practice in the community

The participants agreed there was need for wider dissemination of exclusive breastfeeding information and the health benefits for the infant. The following suggestions for information dissemination about exclusive breastfeeding were offered:

- Health facilities, through avenues, such as ANC and MCH clinics should have education sessions for mothers on the benefits of exclusive breastfeeding; these sessions should be frequent, consistent and planned rather than ad hoc;
- Home visits by health workers should especially target mothers hardly visiting the clinics; and
- Seminars and *Barazas,* at the community level, targeting all stakeholders, males, females and youth, in infant breastfeeding practices

Non-verbal communication: All the mothers breastfed freely and on demand during the discussions; additionally, some gave fruit and porridge.

3.12.2 Results of the discussions with CG mothers not practising exclusive breastfeeding for six months

The discussion with this group of participants started with soliciting the participants' views on breastfeeding in general and then progressed to establishing their understanding of the concept of exclusive breastfeeding. This approach was necessary because being in the CG, these participants did not receive breastfeeding counseling from the research team and the fact that they did not practice exclusive

breastfeeding; the investigator had to first establish if they were aware of exclusive breastfeeding before any meaningful discussions on the topic could take place.

3.12.2.1 Breastfeeding benefits

Asked the benefits of breastfeeding in general, the participants responded as follows:

- Breastmilk is good for the infant because it contains most of the nutrients the infant needs for healthy growth and development;
- Breastfeeding is cheaper than buying other types of milk for the baby; and
- Breastfeeding encourages psychological bonding between the mother and infant.

3.12.2.2 Breastfeeding practices in the Kibera community

Participants were asked about the adequacy of breastfeeding practices in the Kibera community. According to the participants, breastfeeding practices in the community were mostly satisfactory because:

- Most mothers breastfed infants for over one year; and
- All mothers initiated breastfeeding. There was no knowledge of any woman not initiating breastfeeding.

No mother talked of exclusive breastfeeding at this stage of the discussion.

3.12.2.3 Participant understanding of exclusive breastfeeding

The investigator explained the exclusive breastfeeding concept without telling the participants exclusive breastfeeding should be practised for six months. The participants were then asked how long an infant should be exclusively breastfed. This question elicited varying responses from single participants as follows:

- Exclusive breastfeeding is impossible because infants, after birth, should be given glucose water or salt-sugar solution, to prevent hunger while waiting for one to two days for breastmilk to be produced;
- Infants need water to quench thirst; therefore exclusive breastfeeding should not be practised. A mother said,*" I would not practice exclusive breastfeeding because it is obvious that a baby needs water just like adults do";*
- Infants should be exclusively breastfed for four to six months before introduction of complementary foods. This knowledge, according to the mothers with this information, was received at the health

facilities. Some of the mothers however stated they were told they could give water in addition to breastfeeding during the four to six months; and

- Two mothers mentioned they had recently been told at the clinic infants should be exclusively breastfed for six months, but had yet to find a mother practising this feeding.

3.12.2.4 Participant perceptions about dissemination of exclusive breastfeeding information to target large numbers of women

Participants were asked what strategies could be used to disseminate the exclusive breastfeeding information to target large numbers of women because there was a consensus that most women did not know about exclusive breastfeeding for six months; and its health benefits. The following suggestions were made:

- The information should be disseminated more frequently, at the clinics; and in greater detail than is currently being done;
- The Ministry of Health and the Non-Government Organizations (NGOs) working in Kibera should conduct seminars for women, men and the youth to sensitize them to the current recommended infant feeding practices, with emphasis on the exclusive breastfeeding for six months practice. This is important because if the information is restricted to the health facilities, the current practice, the information on exclusive breastfeeding will take too long to reach most people; and
- The radio would be a viable media to disseminate the information on exclusive breastfeeding, since most Kenyans own radios.

3.12.3 Results of the Focus group discussions with FBSICG mothers practising exclusive breastfeeding for six months

3.12.3.1 Sources of breastfeeding information in the Kibera community

When asked about the source, apart from the research team, of breastfeeding information in the Kibera community, the sources mentioned were: neighbours/relatives/friends; public and private health facilities; and NGO facilities. There was a consensus that these sources offered minimal information; moreover, exclusive breastfeeding, particularly for six months was hardly mentioned at these facilities.

3.12.3.2 Exclusive breastfeeding practices in the Kibera community

When asked if exclusive breastfeeding was commonly practised in Kibera, all mothers stated exclusive breastfeeding was uncommon; it was rare to find a mother practising exclusive breastfeeding. Asked why the practice of exclusive breastfeeding was uncommon, there was consensus that the following reasons prevented mothers from practising exclusive breastfeeding:

- *Lack of knowledge about exclusive breastfeeding, particularly for six months*

  Knowledge among the females, about exclusive breastfeeding, in particular for 6 months, was limited;
- *Belief that an infant cannot survive without water*

  The participants mentioned it is commonly believed that an infant needs plain water, glucose water or salt-sugar solution to soothe colic and prevent constipation; also, water is essential to quench infant thirst.
- *Breastmilk is inadequate for infants*

  It is commonly believed breastmilk is inadequate to nourish infants; also, male infants are hungrier than female infants, therefore they should be introduced to semi-solid or solid foods earlier than females;
- *Mothers produce insufficient breastmilk*

  Many mothers believed they produce inadequate breastmilk for infants. As one mother explained, " *If I had not received the breastfeeding counseling from the research team, I would have introduced salt-sugar solution to my baby on the first day after birth and porridge at one month because I believed that I did not produce adequate breastmilk";*
- *Unfeasible to practice exclusive breastfeeding*

  Another reason why exclusive breastfeeding was uncommon is because it was believed to be unfeasible because many mothers were away from home for long periods, to attend to other duties, including work; and
- *Exclusive breastfeeding makes mothers unhealthy*

  There was a belief among some of the Kibera community members that exclusive breastfeeding, especially after three months is too demanding on maternal health; and renders the mother "thin and weak".

3.12.3.3 Maternal perceptions about exclusive breastfeeding benefits

Asked about the benefits of exclusive breastfeeding, participant responses were as follows:

- *Health benefits*

The participants agreed exclusive breastfeeding for six months improved infant health. The following statement by a mother illustrates this sentiment,*" The baby whom I exclusively breastfed for six months has not suffered from any infections since birth unlike the older siblings who were not exclusively breastfed. My baby has not had a single episode of diarrhoea, cough or stomach upset since birth";*

The following benefits of exclusive breastfeeding were received from single participants:

- *Babies develop faster*

One of the mothers stated her baby was active, alert and always happy. She said, "*My baby is an active happy baby. After breastfeeding him, I put him in a safe place from where he can see me, he happily plays on his own, while I perform my household chores. This was not the case with my older infants whom I did not exclusively breastfeed and who were not calm and happy as the exclusively breastfed one";*

- *Convenience and cost*

Breastfeeding was convenient as no preparation was required before feeding; and

- *Psychological bonding*

Breastfeeding plays a critical role in creating an emotional bond between the mother and her baby.

3.12.3.4 Challenges experienced in exclusive breastfeeding practice

Participant responses about challenges in exclusive breastfeeding practice were:

- Exclusive breastfeeding for six months is very frustrating, sometimes the mother feels the breastmilk is insufficient as the infant often wants to feed. Furthermore, this frequent feeding interferes with maternal household chores and other duties;
- Adequate breastmilk production requires mothers to eat well, adequate food is often unavailable;
- Huge pressure from friends/relatives/neighbours to introduce complementary food earlier than six months, based on the argument that breastmilk alone is inadequate for the infant. Sometimes even the health staff advise mothers to introduce complementary foods from four months;
- Expressing breastmilk is difficult, tedious and time consuming. None of the mothers in the discussion group reported having expressed breastmilk for infants to take while away from home; and

- Exclusive breastfeeding cannot be practised when the mother is sick, or has breast health problems, such as sore or cracked nipples.

3.12.3.5 Factors providing motivation for mothers to practice exclusive breastfeeding for six months

When mothers were asked about factors encouraging the 'exclusive breastfeeding up to six months' practice, responses were as follows:

- Infants exclusively breastfed for six months had fewer infections, particularly colds, coughs and diarhhoea, compared to their older siblings or neighbours' infants, of more or less the same age, but not exclusively breastfed for six months. This experience provided a motivation to continue breastfeeding for six months;
- The research team breastfeeding counselors teaching on the appropriate positioning and attachment of the baby to the breast during feeding, resulted for some mothers in more milk production; and for two mothers to no cracked or sore nipples, as previously experienced; and
- Exclusively breastfed for six months infants appeared to grow faster compared to infants not exclusively breastfed for six months. Some mothers indicated infants gained weight faster than that of older siblings, not exclusively breastfed for six months.

3.12.3.6 Maternal perceptions about the facility-based semi-intensive breastfeeding counseling strategy

Asked about the semi-intensive, one-on-one, facility-based counseling offered during the study, the following opinions were elicited:

- The counseling was an important and worthwhile exercise because it offered vital, new and detailed information on breast feeding practices. For most, the new information received was about exclusive breastfeeding for six months; appropriate positioning and attachment of the baby to the breast during feeding. The mothers explained they had little counseling on breastfeeding practices at the health facilities; even when this was provided, it was infrequent and general. A mother stated that, *"A mother may never get such counseling throughout her visits to the ANC and deliver without having got this vital information";*
- Mothers liked the individual approach to breastfeeding counseling compared to the standard "group education sessions" offered at the health facilities. One mother stated that' "*The individual*

approach offered me an opportunity to ask questions on personal issues and problems regarding infant feeding which I would not have asked during the group education sessions"; and

- The counseling influenced the mothers to change infant feeding practices after receiving the new information.

3.12.3.7 Recommendations for the improvement of the Facility-Based Semi-Intensive Counseling Strategy

The suggestions offered by mothers on how the facility-based semi-intensive breastfeeding counseling could be improved focused on wider, infant-feeding information dissemination because most people lack this information. The suggestions made were:

- Breastfeeding counseling to improve breastfeeding practices should extend to include all Kenyan mothers, particularly in the rural areas. The breastfeeding counseling should not be restricted to research activities because mothers urgently require this information;
- To increase the appropriate breastfeeding information dissemination, the counseling should be offered by community health workers, at home, church, *Barazas, women* and other community meetings;
- Breastfeeding counseling should also target groups other than mothers, such as males, the youth and older women, often left to care for infants; these people are all stakeholders in the infant feeding;
- The individual counseling approach should be adopted by health facilities. Most mothers preferred this individual attention to the group approach currently used by the health facilities. Also, there is usually very little client participation in the group education sessions, because of time constraints and maternal reluctance to speak openly in such forums; and
- More than one session of the one-on-one, facility-based breastfeeding counseling offered by the research team is necessary for the mothers to get enough information. The following statement by a mother illustrates this point, "*More individual counseling sessions should be offered as one session is not enough to provide all the information and support that the mother requires".*

Non-verbal communications: The mothers breastfed their babies on demand during the discussions without inhibition. A few of the mothers had brought food mainly porridge and fruit, to feed infants, on demand.

3.12.4 Results of the discussions with FBSICG mothers not practising exclusive breastfeeding for six months

3.12.4.1 Sources of information on infant feeding in Kibera community

Asked about the source, apart from the research team, of infant feeding information in Kibera, the participants stated health facilities, friends/relatives/neighbours; these offered limited information about infant feeding.

3.12.4.2 Exclusive breastfeeding practices in Kibera community

The participants agreed the practice of exclusive breastfeeding was rare in Kibera and many mothers introduced salt-sugar solution and glucose water within the first week after birth; whereas porridge was introduced from two to three months after birth.

3.12.4.3 Reasons why mothers do not practice exclusive breastfeeding

Asked why mothers in Kibera do not practice exclusive breastfeeding, the question elicited the following responses:

- Lack of exclusive breastfeeding knowledge and the importance of breastfeeding for infant health. Exclusive breastfeeding for six months is not emphasized at the health facilities;
- Cultural perceptions impeding exclusive breastfeeding are: water must be given to the baby to quench thirst, breastmilk is inadequate for infant nutrition; the belief of some ethnic groups that water should be the first feed given to a baby after birth, to assist in removing the first stool. One mother said,*" I was committed to practice exclusive breastfeeding because the breastfeeding counselor from the research team told me that my baby would not suffer from many incidences of infections. But my son was not getting enough of breastmilk. I breastfed him on demand but he was always wanting more and more. I was forced to introduce porridge at one month".*
- Exclusive breastfeeding is unhealthy for the mother because of the high nutritional demands on her to produce adequate breastmilk for the baby;
- Most Kibera mothers are too poor to afford adequate diets to produce enough breastmilk to practice exclusive breastfeeding; and
- Mothers have to be away from home for long periods of time; therefore the baby has to be introduced to complementary foods earlier than six months.

3.12.4.4 Maternal perceptions about exclusive breastfeeding benefits

The participating mothers in the discussion had practised exclusive breastfeeding for periods ranging between one and four months. Asked about exclusive breastfeeding benefits, based on personal experience, the following benefits were offered by single participants:

- Exclusive breastfeeding resulted in fewer episodes of infections; infants were less likely to suffer from stomach upsets. One mother reported that, *"For the three months that I practised exclusive breastfeeding, my child did not fall ill and did not have stomach upsets. When I introduced porridge and salt-sugar water, I noticed that my child started getting diarrhoea"; and*
- Exclusive breastfeeding is cost-effective because it is unnecessary to purchase complementary foods and extra fuel for the preparation of infant feeds.

3.12.4.5 Maternal perceptions about the facility-based semi-intensive breastfeeding counseling strategy

Generally, participant responses were positive towards the breastfeeding counseling in terms of the content and site, that is, the health facility. The discussion elicited the following:

- The counseling offered new and detailed information compared to that previously received. The new information included: exclusive breastfeeding for six months; appropriate positioning and attachment of baby to the breast during feeding;
- The one-on-one approach used in the counseling allowed for individuals to address personal issues, not accorded time or the privacy required, in a group session at the clinics; and
- The one-on-one approach is time consuming, unless more than one health staff member is available to simultaneously conduct the sessions; these may not be appropriate for busy mothers attending to other duties, such as going to work or taking care of young children at home.

3.12.4.6 Suggestions for the improvement of the facility-based semi-intensive counseling strategy

The following were suggestions to improve the semi-intensive counseling strategy:

- Exclusive breastfeeding should be recommended for a period of between two to four months because it is not feasible to practice it for six months;

- The counseling should have included practical suggestions to address the challenges of exclusive breastfeeding. For example, expressing sufficient breastmilk sufficient for a baby for a whole day is not feasible, or culturally acceptable in some communities; and
- The counseling should be extended to other health facilities for wider breastfeeding information dissemination.

3.12.5 Results of the focus group discussions with HBICG mothers practising exclusive breastfeeding for six months

3.12.5.1 Sources of breastfeeding information in the Kibera community

Asked about the source of breastfeeding information in the community, apart from that offered by the research team, the participants mentioned neighbours/relatives and public, private and NGO health facilities. The consensus was these sources offered minimal information; moreover, there was little mention of exclusive breastfeeding for six months.

3.12.5.2 Exclusive breastfeeding practices in the Kibera community

Asked if exclusive breastfeeding was commonly practised in Kibera, all participants responded in the negative. The consensus was women hardly practised exclusive breastfeeding for more than one month.

Asked why the exclusive breastfeeding practice was uncommon, there was agreement on the reasons mothers shared for not practising exclusive breastfeeding; these were:

- *Lack of knowledge on exclusive breastfeeding particularly for six months*

Knowledge on exclusive breastfeeding, in particular exclusive breastfeeding for six months, among females was limited. As a mother stated, *"Most mothers in Kibera have no idea about exclusive breastfeeding, particularly exclusive breastfeeding for six months".* While another said*: "Mothers rarely receive breastfeeding counseling in the health facilities and even when they do, in a majority of the cases they are informed that they could give water in addition to breastmilk for the first six months or in some of the health facilities mothers are told to introduce complementary feeding at four months";*

- *Inadequate maternal breastmilk production*

Most mothers believe they produce inadequate breastmilk for infants. It was believed that the high poverty level in the community renders most maternal diets inadequate, to produce enough breastmilk, to sustain exclusive breastfeeding. A mother in the group stated, "*Before the teaching I received on breastfeeding*

from the research team, I used to breastfeed my babies less frequently because I believed that I did not produce adequate breastmilk. After the teaching, I tried the practice of appropriate positioning and attachment of the baby to the breast during breastfeeding and I noticed that I produced more milk';

- *Not feasible to practice exclusive breastfeeding*

Most mothers are not at home with infants throughout the day; therefore exclusive breastfeeding cannot be practised. This sentiment is illustrated in the following statement made by one of the women, *"Many women are forced by circumstances beyond their control to leave their babies at home as early as 1 month to look for casual employment to ensure the family gets food and other basic requirements";*

- *Cosmetic reasons*

Some mothers do not practice exclusive breastfeeding for cosmetic reasons because of the belief that breastfeeding makes the breasts flat and thus makes them lose shape;

- *Community perception about exclusive breastfeeding and modern lifestyle*

There was a belief among some members of the Kibera community that exclusive breastfeeding is not concomitant with a modern lifestyle. The following statement made by a mother demonstrates this, *"In Kibera if a mother practices exclusive breastfeeding she is told she is not behaving like a modern woman. Some people will even tell you stop breastfeeding so that the baby may not get attached to you so as to have adequate time to attend to household chores and other duties";* and

- *Exclusive breastfeeding makes mothers unhealthy*

Some people belief that exclusive breastfeeding is too demanding on maternal health and renders the mother "thin and weak".

3.12.5.3 Maternal perceptions about exclusive breastfeeding benefits

Asked the benefits of exclusive breastfeeding, participants mentioned the following benefits:

- *Health benefits*

Mothers enthusiastically explained exclusive breastfeeding for six months improved infant health compared to older siblings, not exclusively breastfed. Most said infant weight gain was consistent, unlike in older siblings. A mother made this statement,*" Exclusive breastfeeding is good as every time I take my child to the clinic or when weighed by the research team, her weight keeps going up"*. Other health benefits mentioned were reduced incidences of morbidity, especially ARIs and diarrhoea. Some mothers said infants had not fallen ill since birth. Additionally, the babies were said not to suffer from stomach upsets;

and easily passed stools. There was consensus that exclusive breastfeeding conferred health benefits to the child;

- *Faster development*

Some of the mothers stated that exclusive breastfeeding made their infants more active and alert; they also developed faster than older siblings or neighbour infants of the same age, not exclusively breastfed. One mother said this about her infant, "*My baby is very active and playful and always wants to discover his surrounding compared to my neighbour's child of the same age who stopped breastfeeding at the age of one month";*

The following benefits of exclusive breastfeeding were received from single participants:

- *Exclusive breastfeeding is convenient and not costly*

Breastfeeding is convenient, as it does not require preparation; it is cheap because no additional foods or cooking fuel are purchased for feed preparation; and

- *Psychological bonding*

Breastfeeding plays an important role in creating an emotional bond between the mother and infant.

3.12.5.4 Challenges experienced in exclusive breastfeeding practice for six months

Participant responses about challenges faced in the practice of exclusive breastfeeding were:

- Exclusive breastfeeding is a full time job, leaving the mother with very little time and energy to attend to other important responsibilities outside the home. It is especially challenging for working women, or those involved in activities outside the home;
- For mothers to produce adequate breastmilk, they need to eat well, yet good quality food is not always available;
- The exclusive breastfeeding practice needs conviction and commitment on the part of the mother because there is a lot of pressure from friends/relatives/neighbours to introduce complementary foods earlier than six months. A mother, therefore needs a lot of support from the husband and family members to continue exclusive breastfeeding for six months; and
- Expressing breastmilk was difficult for most mothers attempting it. Furthermore, cultural perceptions were also a hindrance to this practice; members of some communities believe only mothers whose babies have died express breastmilk, if this is done by a woman with a living infant it is a bad omen, as the baby could die.

3.12.5.5 Factors motivating mothers to practice exclusive breastfeeding for six months

The participants listed the factors encouraging the practice of exclusive breastfeeding up to six months, despite the challenges experienced; these factors were:

- The continuous support received from the breastfeeding counseling research team motivated them to continue with the practice of exclusive breastfeeding. As a mother said, *"When ever I experienced challenges in exclusive breastfeeding and was about to give up the practice, the breastfeeding counselor from the research team visited me and encouraged me not to stop. She would also give me advice me on how to overcome my problem";*
- Exclusive breastfeeding made our infants healthier compared to older siblings not receiving exclusive breastfeeding; this motivated us to continue exclusive breastfeeding for six months;
- The mothers experienced fewer breast health problems, such as cracked and sore nipples resulting from inappropriate positioning and attachment of the baby to the breast during feeding. We also observed the correct practice of appropriate positioning and attachment, enabled us to produce more breastmilk for infants; and
- The exclusively breastfed babies appeared to grow faster compared to those not exclusively breastfed. Some of the mothers indicated infants gained weight faster than older siblings not exclusively breastfed.

3.12.5.6 Maternal perceptions about the home-based intensive breastfeeding counseling strategy

Asked to comment on the home-based intensive breastfeeding counseling strategy offered during the study, the following comments were elicited:

- The counseling was an important and worthwhile exercise; it offered frequently, vital, new and detailed breast feeding information. A mother stated that, *"Most mothers in Kibera have no idea about exclusive breastfeeding. The information received from the research was the best as it was detailed and frequent and thus any emerging breastfeeding challenges were dealt with';*
- The new information about exclusive breastfeeding for six months and appropriate positioning and attachment of baby to the breast during feeding, influenced the mothers to change infant feeding practices; and
- The mothers liked the idea of breastfeeding counseling at home because they could attend to household chores and not waste time going to the health facilities for this service. Moreover, it was

conducted openly and freely; mothers were accorded individual attention and could ask personal questions.

3.12.5.7 Recommendations for the improvement of the home-based intensive breastfeeding counseling strategy

The suggestions focused on the need for extending the counseling for wider dissemination of breastfeeding information. The recommendations were:

- The intensive home-based counseling should be extended to include more mothers, throughout Kenya so that mothers can improve their breastfeeding practices. Counseling should not be restricted to research activities as many needed to be sensitized to appropriate infant feeding practices;
- One way of increasing the number of mothers targeted with this information is by extending the counseling from home visits to churches, *Barazas,* women and other community meetings;
- The use of peer counselors especially those who have practised exclusive breastfeeding and had experienced its benefits should be adopted. In addition, community health workers should make home visits to provide breastfeeding counseling; and
- Breastfeeding support groups, to provide counseling, should be formed, especially for those mothers not attending clinics. The participants were willing to form such groups because they had acquired a lot of information on breastfeeding; they would like a forum to share this information with other mothers.

Non-verbal communications: The mothers breastfed their babies on demand during the discussions without any inhibition. A few of the mothers had brought food, mainly porridge, for infants; they gave this freely on demand.

3.12.6 Discussions with HBICG mothers not practising exclusive breastfeeding for six months

3.12.6.1 Sources of infant feeding information in the Kibera community

The participants reported that the sources, in Kibera, apart from that offered by the research team, of infant feeding information were: public, private and NGO health facilities; and friends/relatives/neighbours. Nevertheless, it was agreed among the participants that the infant feeding information offered at the health facilities was minimal, infrequent and focused on HIV-infected mothers. A mother stated that, *"The most common message given in the health facilities is that mothers who are HIV-infected should ideally not*

breastfeed their babies but give infant formula and that those mothers who cannot afford infant formula or chose to breastfeed, should exclusively breastfeed their babies and not practice mixed breastfeeding".

3.12.6.2 Exclusive breastfeeding practices in the Kibera community

The consensus among the participants was that exclusive breastfeeding was rarely practised in the Kibera community. The participants reported few women practising exclusive breastfeeding and those who did so for a period ranging between two weeks to one month.

3.12.6.3 Reasons for low exclusive breastfeeding practice

Asked why the practice of exclusive breastfeeding is uncommon in the community, the reasons given were:

- Most females do not have information on exclusive breastfeeding for six months;
- Breastmilk is perceived as inadequate to nourish the baby;
- It is not a cultural norm to practice exclusive breastfeeding as infants are introduced to porridge form about two to three months;
- Most mothers produce inadequate breastmilk because of poor maternal diets;
- It is difficult to practice exclusive breastfeeding because mothers are away from home at work, or to attend to other responsibilities; and
- Exclusive breastfeeding can compromise maternal health, perceived as poor because of an inadequate dietary intake.

3.12.6.4 Maternal perceptions about exclusive breastfeeding benefits

Maternal responses about the benefits were:

- Exclusive breastfeeding conferred immunity to infants; consequently infants suffered fewer episodes of diarrhoea and ARIs;
- Exclusive breastfeeding was convenient and cheap, no feed purchases or preparation were necessary; and
- Exclusively breastfed babies were mostly active, alert and happy;

Nevertheless, some of the mothers doubted that exclusive breastfeeding can delay conception. A mother said, *"Exclusive breastfeeding may delay conception for some mothers but may not work for others".*

3.12.6.5 Challenges experienced in exclusive breastfeeding practice

The participants reported they had exclusively breastfed infants for periods ranging from two to five months, most practised exclusive breastfeeding for four months. Asked why they did not practice exclusive breastfeeding for six months, the participants gave these reasons:

- Mothers were away from home for long periods of time, either at work or engaged in small scale enterprises. As one mother reported, '*I exclusively breastfed my baby for four months when I introduced porridge and cow milk because I had to go and look for casual employment";*
- Breastmilk is insufficient for some infants, who get very hungry despite being breastfed on demand;
- Insufficient production of breastmilk due to inadequate maternal diet;
- Pressure from the relatives and friends to introduce complementary foods. One participant, a young, first-time mother, despite her efforts to exclusively breastfeed her baby was convinced by her husband's relatives the infant would be unhealthy if not given complementary foods; therefore she abandoned exclusive breastfeeding;
- Expressing breastmilk was difficult, time consuming and sometimes contradicted cultural perceptions and practices. In some communities, expressing breastmilk is a bad omen because it may cause the baby to die prematurely, only mothers whose babies have died express breastmilk.

3.12.6.6 Maternal perceptions about the home-based intensive breastfeeding counseling strategy

The following responses were offered by the participants asked for an opinion about the counseling strategy:

- Through the counseling, the participants acquired a lot of knew and detailed information. For example, many mothers had not heard of exclusive breastfeeding for six months; and appropriate positioning and attachment of baby to the breast during feeding and its importance; and
- Mothers liked the continuous support offered during the six month follow-up. Although many mothers did not exclusively breastfeed for six months, they introduced complementary foods later than they would have without the continuous research team support.

3.12.6.7 Recommendations for improvement of the home-based intensive breastfeeding counseling strategy

The suggestions offered for improvement of the breastfeeding counseling strategy were:

- The counseling should be extended to other areas in Kenya for wider dissemination of breastfeeding information. Many mothers do not have the infant-feeding information received during the breastfeeding counseling. In addition to being conducted at home, the counseling should be extended to public places such as churches and *Barazas* to target men, youth and all other members of the community; they are also stakeholders in the infant feeding issue; and
- Exclusive breastfeeding should be recommended for four months; it is not feasible to practice it for six months.

Non-verbal communications: Mothers breastfed their babies on demand, without inhibition; and some gave cows milk, porridge or fruit during the discussions.

3.12.7 Summary of the main findings and common participant agreements among all the study groups

In summary, the findings of the FGDs showed the main breastfeeding information sources in the Kibera community were health facilities and family / friends (Table 3.27). The breastfeeding information provided in the health facilities was superficial in content, with no focus on exclusive breastfeeding for six months; nor was it regularly provided. The mothers indicated the major benefit of exclusive breastfeeding was the improvement in infant health. All participants agreed the practice of exclusive breastfeeding was rare in Kibera. The major reasons for the rarity of the practice were: limited knowledge on exclusive breastfeeding for six months; mothers being away from home for long periods of time; and cultural perceptions and practices not in agreement with exclusive breastfeeding (Table 3.27).

The main challenges experienced by mothers practising exclusive breastfeeding for six months were: pressure from family and friends to introduce complementary feeding; time constraints; and inadequate breastmilk production (Table 3.27). On the other hand, the factors encouraging mothers to continue the practice of exclusive breastfeeding to six months were: the health benefits for the infant; spousal support; the continuous support offered by the research team for the mothers in the HBICG. Suggestions to improve the counseling strategies all focused on the need for wider dissemination of the exclusive breastfeeding

information. The channels proposed for dissemination included: more frequent breastfeeding counseling sessions at the health facilities; addressing the issue of exclusive breastfeeding in a more detailed and consistent manner; and using community-level channels such as seminars, community meetings and peer-educators. There was consensus that the dissemination should target all members of the community, not only the mothers.

Table 3.27: A summary of the main and common agreements about exclusive breastfeeding issues by mothers from the FBSICG and HBICG study groups

Main focus areas of the FGDS	Main and common agreements by mothers from FBSICG and HBICG study groups
Sources of breastfeeding information	• Health facilities, public, private and NGOs • Family, friends and neighbours
Benefits of exclusive breastfeeding	• Health benefits to the baby; fewer episodes of diarrhoea and ARIs, infant development optimal • Convenience, no maternal feed preparation necessary • Cheaper, no purchase of foods and additional fuel
Exclusive breastfeeding practices in Kibera	Rarely practised
Reasons for low practice of exclusive breastfeeding in Kibera	• Limited knowledge about exclusive breastfeeding for six months • Exclusive breastfeeding is a fulltime job, mothers are away from home for long periods of time • Mothers do not produce adequate breastmilk due to poor diets • Cultural perceptions and practices: o Babies need water to quench their thirst o Breastmilk is inadequate to nourish the baby o Exclusive breastfeeding makes mothers unhealthy
Challenges experienced by mothers who practised exclusive breastfeeding for six months	• Pressure from relatives and friends to introduce complementary feeding because exclusive breastfeeding is not the right way to feed babies • Inadequate diets leading to inadequate breastmilk production • Time constraints • Expressing breastmilk is tedious and time consuming, it is also culturally inappropriate for some communities
Factors encouraging mothers to practise exclusive breastfeeding for six months	• Health benefits of exclusive breastfeeding for the baby • Support from husbands • Breast health benefits to the mother – fewer episodes of cracked or sore nipples, appropriate positioning and attachment of the baby to the breast is received during to the breastfeeding counseling and practised • The practice of appropriate positioning and attachment of the baby to the breast during breastfeeding resulted in higher production of breastmilk • The continuous support offered to mothers in the HBICG
Factors discouraging mothers from practising exclusive breastfeeding for six months	• Inadequate breastmilk production • Mothers away from home for long periods of time and expressing breastmilk in adequate amounts was a major challenge • Pressure from relatives and friends to introduce complementary feeding
Suggestions on the improvement of the breastfeeding counseling strategies	• Wider dissemination of exclusive breastfeeding information through: o Health facilities to offer more, frequent and consistent education o Seminars, *Barazas*, community and churches meetings targeting all members of the community o Peer counselors and breastfeeding support groups, practising exclusive breastfeeding for six months

3.13 Infant Outcomes

Information on infant outcomes was collected from all mothers during months 1, 3 and 6 and the additional 3 interviews for the mothers in the HBICG during months 2, 4 and 5 of the study. First, infant outcomes are presented by intent to treat analysis; second, for actual maternal practice of exclusive breastfeeding; that is mothers practising exclusive breastfeeding versus mothers not practising exclusive breastfeeding.

3.13.1 Gender and birth weight of infants by study groups

About half (49.5%) of the infants in the CG compared to 46.1% in the FBSICG and 54.0% in the HBICG were males; whereas, there were 50.5% females in the CG; 53.9% in the FBSICG; and 46.0% in the HBICG (Chi-square; p= 0.528) (Table 3.28). Data on infant birth weight was available only for those mothers delivering in health facilities, that is, (43.3%) from the CG, 76.5% from the FBSICG and 52.0% from the HBICG. The mean infant birth weight in the CG was 3.1kg (0.5); in the FBSICG, 3.3kg (0.5); and 3.1kg (0.5) in the HBICG (ANOVA test; p=0.131). The percentage of low birth weight (<2.5kg) infants was; 1.0% from the CG, 2.9% from the FBSICG and 4.0% from the HBICG (Chi-square test; p=0.473) (Table 3.28).

Table 3:28: Gender and birth weight of infants by study groups

	CG *N*=97	FBSICG *N*=102	HBICG *N*= 100	ANOVA & Chi-square; p
	N (%)	*N (%)*	*N (%)*	
Gender of infants:				0.528
Males	48 (49.5)	47 (46.1)	54 (54.0)	
Females	49 (50.5)	55 (53.9)	46 (46.0)	
Birth weight:				
Low birth weight (<2.5kg)	1 (1.0)	3 (2.9)	4 (4.0)	0.473
Mean birth weight (kg)	3.1 (0.46)	3.3 (0.05)	3.1 (0.48)	0.131

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group); Means (SD)

3.13.2 Trends in monthly weight of infants

3.13.2.1 Monthly trends in infant weight by study groups

Information on the infants from all the study groups with low births weights (4.7%) was excluded from the computation of the mean monthly weights. Information on birth weight was available for only 57.6% of the infants from all the three study groups. At 1 month, the mean weight of the infants in the CG was 3.6kg (0.5); in the FBSICG 3.7kg (0.4); and 3.6kg (0.4) in the HBICG (ANOVA test; p=0.362). At 3 months, the mean weight of infants in the CG was 5.3kg (0.9); in the FBSICG 5.5kg (0.7); and 5.5kg (0.8) in the HBICG (ANOVA test; p=0.059). At 6 months, the infants in the CG had a mean weight of 8.1kg (1.0); in the FBSICG 8.0kg (1.0); and 7.9kg (1.2) in the HBICG (ANOVA test; p=0.585) (Table 3.29).

Table 3:29: Mean monthly weight of infants by study groups

	CG *N*= 120	FBSICG *N*=120	HBICG *N*=120	ANOVA; p
1 Month	*N*=95 3.6 kg (0.5)	*N*=98 3.7 kg (0.4)	*N*=96 3.6 kg (0.4)	0.362
2 Months			*N*=90 4.7kg (0.7)	
3 Months	*N*=86 5.3 kg (0.9)	*N*=91 5.5 kg (0.7)	*N=88* 5.6 kg (0.8)	0.059
4 Months			*N*=83 6. 4 kg (0.8)	
5 Months			N=78 6.8 kg (0.9)	
6 Months	*N*=88 8.1 kg (1.0)	*N*=84 8.0 kg (1.0)	*N*=85 7.9 kg (1.2)	0.585

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group)

3.13.2.2 Monthly trends in infant weight for exclusive breastfeeding status

There was a trend for the monthly mean weights of exclusively breastfed infants to be higher compared to those not exclusively breastfed from 1 to 5months; whereas, at 6 months the infants not exclusively breastfed had a higher mean weight (Figure 3.19).

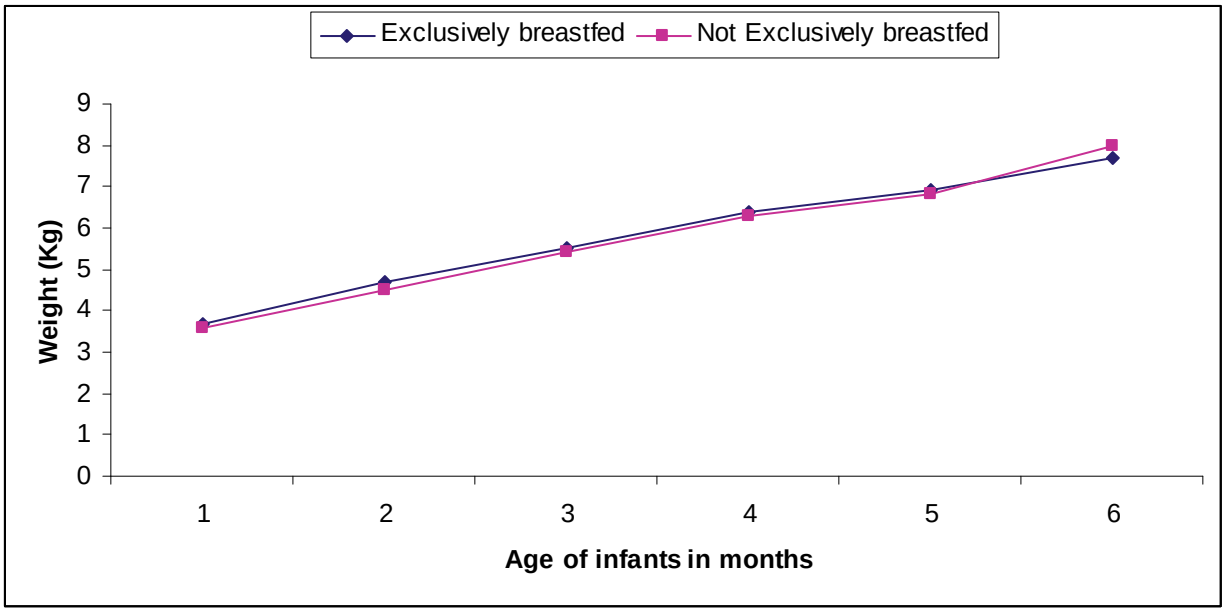


Figure 3.19: Monthly trends in weights of exclusively and non-exclusively breastfed infants

At 1 month, the mean weight of exclusively breastfed infants was 3.7kg (0.4); and 3.6kg (0.5) for those not exclusively breastfed (T-test; p=0.119) (Table 3.30). At 2 months, the mean weight of exclusively breastfed infants was 4.7kg (0.7); and 4.5kg (0.8) for those not exclusively breastfed (T-test; p=0.171). At 3 months the mean weight of exclusively breastfed infants was 5.5Kg (0.7); and 5.4kg (0.9) for those not exclusively breastfed (T-test; p=0.648). The mean weight of exclusively breastfed infants at 5 months was 6.9kg (1.1); and 6.8kg (0.8) for non-exclusively breastfed infants (T-test; p=0.755). At 6 months, the non-exclusively breastfed infants had a higher [8.0kg (1.1)] mean weight compared to 7.7kg (1.1) exclusively breastfed babies (T-test p; 0.112) (Table 3.30).

Table 3.30: Mean monthly weight of infants by exclusive breastfeeding status

	Exclusively breastfed Infants *[mean kg ;(sd)]*	Not exclusively breastfed Infants *[mean kg ;(sd)]*	T-test; p
Weight:			
1 Month	3.7 (0.4)	3.6 (0.5)	0.119
2 Months	4.7 (0.7)	4.5 (0.8)	0.171
3 Months	5.5 (0.7)	5.4 (0.9)	0.648
4 Months	6.4 (0.8)	6.3 (0.9)	0.781
5 Months	6.9 (1.0)	6.8 (0.8)	0.755
6 months	7.7 (1.1)	8.0 (1.1)	0.112

3.13.3 Trends in weight gain of infants

3.13.3.1 Infant weight gain trends by time and study groups

There was a trend for a significantly higher mean weight gain [0.6kg (0.3)] from birth to one month for infants in the HBICG compared to 0.5kg (0.3) in the CG; and 0.4kg (0.3) in the FBSICG (ANOVA; p=0.032) (Table 3.31). There was a trend for a higher mean weight gain [1.9kg (0.8)] from one to three months for infants in the HBICG compared to 1.8kg (0.7) for infants in the FBSICG; and 1.7kg (0.8) for infants in the CG (ANOVA; p=0.094), a significant trend. On the contrary, there was trend for a significantly higher mean weight gain [2.8kg (1.4)] between months three to six months for infants in the CG compared to 2.5kg (1.2) from the FBSICG; and 2.3kg (1.1) from the HBICG (ANOVA; p=0.028).

Table 3:31: Weight gains of infants by time and study groups

	CG *[mean kg ;(sd)]*	FBSICG *[mean kg ;(sd)]*	HBICG *[mean kg ;(sd)]*	ANOVA; p
Weight gain 0- 1 month: Mean kg (SD)	*N=40* 0.5 (0.3)	*N=74* 0.4 (0.3)	*N= 48* 0.6 (0.3)	0.032*
Weight gain 1-3 months: Mean kg (SD)	*N=81* 1.7 (0.8)	*N=84* 1.8 (0.7)	*N=82* 1.9 (0.8)	0.094
Weight gain 3-6 months: Mean kg (SD)	*N=79* 2.8 (1.4)	*N=79* 2.5 (1.2)	*N=76* 2.3 (1.1)	0.028*

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group; Significant differences (ANOVA; p<0.05)

3.13.3.2 Infants weight gain trends by time and breastfeeding status

The mean weight gain for the exclusively breastfed infants from birth to 1 month was 0.5kg (0.3); and 0.4kg (0.3) for those not exclusively breastfed (Table 3.32). The mean weight gain for exclusively breastfed infants from 1-2 months was 1.0kg (0.6); and 0.9kg (0.6) for those not exclusively breastfed. The mean weight gain from 2-3 months was 0.8kg (0.6) for exclusively breastfed infants; and 1.0kg (0.9) for non-exclusively breastfed infants. Whereas, the mean weight gain from 3-4 months for exclusively breastfed infants was 0.7kg (0.7); and 0.7kg (0.7) for the non-exclusively breastfed infants. The mean weight gain from 4-5 months was 0.6kg (0.7) for the exclusively breastfed infants compared to 0.7kg (0.9) for the non-exclusively breastfed infants. From 5-6 months, the mean weight gain for exclusively breastfed infants was

0.7kg (1.0); and non-exclusively breastfed infants 1.1kg (1.0). The differences in the monthly weight gains at all points of observation were insignificant (Table 3.32).

Table 3:32: Mean weight gains of infants by time and breastfeeding status

	Exclusively breastfed *[mean kg; (sd)]*	Not Exclusively breastfed *[mean kg; (sd)]*	T-test; p
Weight gain 0-1 month:	*N=133*	*N=29*	
Means (SD)	0.5 (0.3)	0.4 (0.3)	0.252
Weight gain 1-2 months:	*N=62*	*N=21*	
Means (SD)	1.0 (0.6)	0.9 (0.6)	0.648
Weight gain 2-3 months	*N=120*	*N=124*	
Means (SD)	0.8 (0.6)	1.0 (0.9)	0.169
Weight gain 3-4 months	*N=43*	*N=31*	
Means (SD)	0.7 (0.7)	0.7 (0.7)	0.607
Weight gain 4-5 months	*N=29*	*N=42*	
Means (SD)	0.6 (0.7)	0.7 (0.9)	0.623
Weight gain 5-6 months	*N=19*	*N=57*	
Means (SD)	0.7 (1.0)	1.1 (1.0)	0.202

3.13.4 Prevalence of morbidity among infants

3.13.4.1 Prevalence of morbidity among infants by time and study groups

Information on infant outcomes was collected from all mothers in the three study groups during months 1, 3 and 6; and during the additional 3 interviews for the mothers in the HBICG at months 2, 4 and 5 months of the study. Information on infant morbidity status was based on a two-week recall.

At 1 month, 26.8% of the infants from the CG; 29.4% from the FBSICG; and 23.0% from the HBICG were ill (Chi-square test; p=0.581). The most common illness was the common cold affecting 17.5% of the infants in the CG; 9.8% in the HBSICG; and 12.0% in the HBICG (Chi-square test; p=0.260). The highest percentage (6.9%) of infants with fever were in the FBSICG compared to 3.1% in the CG; and 3.0% in the HBICG (Chi-square test; p=0.329). More or less equal percentages of infants in each of the study groups suffered from coughs; 3.1% from the CG; 1.9% in the FBSICG; and 2.0% from the HBICG (Table 3.33).

At 3 months, 43.7% of the infants in the CG; 32.3% in the FBSICG; and 38.5% in the HBICG were reported sick (Chi-square test; p=0.285). The common cold afflicted 20.7% of the infants in the CG; 18.3% in the FBSICG; and 19.8% in the HBICG (Chi-square test; p=0.918). There was a trend for a higher percentage (14.9%) of infants in the CG to have fever compared to 8.6% in the FBSICG; and 6.6% in the HBICG (Chi-square test; p=0.164). The highest percentage of infants with a cough were in the HBICG (18.7%); followed by the CG (10.3%); and the lowest percentage (5.4%) was in the FBSICG; and these differences were significant (Chi-square test; p=0.016) (Table 3.33).

At 6 months, 34.8% of the infants in the CG; 42.5% in the FBSICG; and 43.8% in the HBICG were sick (Chi-square test; p=0.415). There was a trend for a higher percentage (15.7%) of infants in the CG to suffer from the common cold compared to 13.8% from the FBSICG; and 13.5% from the HBICG; these differences were insignificant (Chi-square test; p=0.899). Slightly over one-tenth of the infants experienced fever; 11.2% in the CG; 16.1% in the FBSICG and 12.3% in the HBICG (Chi-square test; p=0.555). Less than one-tenth (9.0%) of the infants in the CG; 10.3% in the FBSICG; and 9.0% in the HBICG suffered from diarrhoea (Chi-square test; p=0.940). Less than one-tenth (7.9%) of the infants in the CG; 16.1% in the FBSICG; and 11.2% in the HBICG suffered from coughs (Chi-square test; p=0.234). Relatively smaller percentages of infants from all the three study groups suffered from malaria and vomiting (Table 3.33).

Table 3.33: Prevalence of morbidity among infants by time and study groups [N; (%)]

	CG	FBSICG	HBICG	Chi-square test; p
	[N; (%)]	*[N; (%)]*	*[N; (%)]*	
1 Month:	*N*=97	*N*=102	*N*=100	
Fever	3 (3.1)	7 (6.9)	3 (3.0)	0.329
Cold	17 (17.5)	10 (9.8)	12 (12.0)	0.260
Vomiting	0 (0.0)	0 (0.0)	1 (1.0)	0.333
Malaria	2 (2.1)	1 (1.0)	1 (1.0)	0.240
Cough	3 (3.1)	2 (2.0)	2 (2.0)	0.844
Diarrhoea	0 (0.0)	2 (2.0)	2 (2.0)	0.260
Total	**26 (26.8)**	**30 (29.4)**	**23 (23.0)**	**0.581**
2 Months:			*N*=95	
Fever			6 (6.3)	
Cold			25 (26.3)	
Malaria			2 (2.1)	
Cough			10 (10.5)	
Diarrhoea				
Total			**34 (35.8)**	
3 Months:	*N*=87	*N*=91	*N*=91	
Fever	13 (14.9)	8 (8.6)	6 (6.6)	0.164
Cold	18 (20.7)	17 (18.3)	18 (19.8)	0.918
Diarrhoea	2 (2.3)	2 (2.2)	4 (4.4)	0.623
Vomiting	1 (1.1)	2 (2.2)	1 (1.1)	0.810
Cough	9 (10.3)	4 (5.4)	17 (18.7)	0.016*
Total	**38 (43.7)**	**30 (32.3)**	**35 (38.5)**	**0.285**
4 Months:			*N*=87	
Fever			7 (8.0)	
Cold			15 (17.2)	
Diarrhoea			4 (4.6)	
Vomiting			2 (2.3)	
Malaria			4 (4.6)	
Cough			8 (9.2)	
Total			**29 (33.3)**	
5 Months:			*N*=82	
Fever			8 (9.8)	
Cold			7 (8.5)	
Diarrhoea			9 (11.0)	
Vomiting			5 (6.1)	
Malaria			6 (7.3)	
Cough			6 (7.3)	
Total			**24 (29.3)**	
6 Months:	*N*=89	*N*=87	*N*=89	
Fever	10 (11.2)	14 (16.1)	10 (11.2)	0.555
Cold	14 (15.7)	12 (13.8)	12 (13.5)	0.899
Diarrhoea	8 (9.0)	9 (10.3)	8 (9.0)	0.940
Vomiting	8 (9.0)	7 (8.0)	3 (3.4)	0.244
Malaria	8 (9.0)	6 (6.9)	11 (12.4)	0.329
Cough	7 (7.9)	14 (16.1)	10 (11.2)	0.234
Total	**31 (34.8)**	**37 (42.5)**	**39 (43.8)**	**0.415**

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group; HBICG (Home-Based Intensive Counseling group); Multiple responses; *Significant differences (Chi-square test; p<0.05)

3.13.4.2 Prevalence of morbidity among infants by time and exclusive breastfeeding status

At 1 month, a higher percentage (26.8%) of non-exclusively breastfed infants suffered from common cold compared to 9.9% of exclusively breastfed infants (Chi-square test; p=0.002). At 3 months, a significantly higher percentage (13.8%) of non-exclusively breastfed infants had fever compared to 6.1% of exclusively breastfed infants (Chi-square test; p=0.034). A significantly higher percentage (5.1%) of non-exclusively breastfed infants suffered from diarrhoea compared to 0.8% of exclusively breastfed infants (Chi-square test; p=0.027). No exclusively breastfed baby suffered from vomiting, whereas 2.9% of non-exclusively breastfed infants suffered from this condition (Chi-square test; p=0.020). At 5 months, a significantly higher percentage (19.1%) of non-exclusively breastfed infants suffered from common cold compared to 2.9% of exclusively breastfed infants (Chi-square test; p=0.016). At 6 months, a higher percentage (16.0%) of non-exclusively breastfed infants suffered from common cold compared to 2.9% of exclusively breastfed infants (Chi-square test; p=0.018) (Table 3.34). Information on the variables, coughs and malaria that had insignificant relationships to exclusive breastfeeding is presented in Appendix 17.

Table 3.34: Differences in morbidity prevalence between exclusively and non- exclusively breastfed infants [N; (%)]

		Exclusively breastfed Infants [*N;* (%)]	Non-exclusively breastfed Infants [*N*; (%)]	Chi-square test; p
1 Month:		*N=243*	*N=56*	
Cold	YES	24 (9.9)	15 (26.8)	0.002**
	NO	219 (90.1)	1 (73.2)	
3 Months:		*N=70*	*N=25*	
Fever	YES	8 (6.1)	19 (13.8)	0.034*
	NO	123 (93.9)	119 (86.2)	
Diarrhoea	YES	1 (0.8)	7 (5.1)	0.027*
	NO	130 (99.2)	131 (94.9)	
Vomiting	YES	0 (0.0)	4 (2.9)	0.020*
	NO	131 (100)	134 (97.1)	
5 Months:		*N=35*	*N=47*	
Cold	YES	1 (2.9)	9 (19.1)	0.016*
	NO	34 (97.1)	38 (80.9)	
6 Months:		*N=34*	*N=231*	
Cold	YES	1 (2.9)	37 (16.0)	0.018*
	NO	33 (97.1)	194 (84.0)	

***Significant differences (Chi-square test; p< 0.05); ** Significant differences (Chi-square test; p<0.001)**

3.13.5 Anthropometric status of infants

Anthropometric status of the infants was determined using the weight-for-age index; underweight. It was interpreted using both the National Centre Health Statistics WHO International Growth Reference (1977); and the WHO Child Growth Standards (2006). Infant weight was recorded monthly, at the interviews to determine maternal infant feeding practices. Infants below -2 Z-scores on the weight-for-age index were considered underweight; those below -3 Z-scores were considered severely underweight; those between -3 and <-2 Z-scores were considered to be moderately underweight; and those above +2 Z-scores were considered overweight.

3.13.4.1 Anthropometric status of the infants by time and study groups

Anthropometric status of the children based on the NCHS WHO International Growth Reference

At 1 month a non-significantly higher percentage (2.1%) of infants in the CG was moderately underweight compared to no cases of underweight in both the FBSICG and HBICG (Chi-square; p=0.107) (Table 3.35). Equal percentages (1.0%) of infants in the FBSICG and HBICG were overweight compared to no cases of overweight in the CG. At 3 months, a non-significantly higher percentage (2.4%) of the infants in the CG was moderately underweight compared to no cases of underweight in either the FBSICG or the HBICG (Chi-square; p=0.108). A higher percentage (7.5%) of infants in the HBICG was overweight compared to 4.9% from the CG; and 3.5% from the HBSICG. At 6 months, a significantly higher percentage (3.8%) of infants from the HBICG was moderately underweight compared to no cases of underweight in the CG and FBSICG (Chi-square; p=0.034). There were no cases of overweight infants in any of the three study groups (Table 3.35).

At 2 months, no infant in the HBICG was underweight; at 4 months, 5.1% were moderately underweight and at 5months 1.4% were moderately underweight (Table 3.35).

Anthropometric status of the children based on the WHO Child Growth Standards

At 1 month, a significantly higher percentage (6.3%) of infants from the CG was moderately underweight compared to 1.0% from both the FBSCIG and HBICG (Chi-square; p=0.047). There were no cases of overweight infants from all the study groups. At 3 months, a significantly higher percentage (16.1%) of infants in the CG was underweight compared to 7.1% in the FBSICG; and 3.8% in the HBICG (Chi-square;

p=0.005). Of the underweight infants in the CG, 10.1% were moderately underweight; 6.1% severely underweight; whereas all the underweight infants in the FBSICG and HBICG were moderately underweight. A higher percentage (3.7%) of infants in the HBICG was overweight compared to 1.2% in the CG; and 2.3% in the FBSICG. At 6 months, a non-significantly higher percentage (6.3%) of infants in the HBICG was underweight compared to 1.2% in the CG; and 3.8% in the FBSICG (Chi-square test; p=0.408). Of the underweight infants in the HBICG, 5.0% were moderately, and 1.3% severely, underweight; in the FBSICG 2.5% were moderately, and 1.3% severely, underweight; whereas in the CG there was no case of severe underweight. There were no cases of overweight in the CG, while equal percentages (1.3%) of infants in both the FBSICG and HBICG were overweight (Table 3.35).

At 2 months, there was no case of underweight infants in the HBICG, but 4.8% of infants were overweight. At 4 months, 5.1% of the infants in the HBICG were moderately underweight; and 3.8% were overweight. At 5 months, 4.1% of the infants in the HBICG were moderately underweight; 1.4% severely underweight while 1.4% were severely overweight (Table 3.35).

A comparison of the anthropometric status of the children based on the NCHS/WHO International Growth Reference and the WHO Child Growth Standards by time and breastfeeding status

At 1 month the WHO Standards yielded insignificantly higher levels of underweight in the three study groups compared to the NCHS Reference; in the CG (NCHS; p=0.02; 95% CI: 0 – 0.05; WHO; p=0.06; 95% CI: 0.01 – 0.11); in the FBSICG (NCHS; p=0; 95% CI: 0 – 0; WHO; p= 0.01 95% CI: 0.01 – 0.03) and in the HBICG (NCHS; p=0; 95% CI: 0 – 0; WHO; p = 0.01; 95% CI: 0.01 – 0.03) (Table 3.35). The differences in the prevalence of underweight between the study groups were significant by the WHO Standards, but not by the NCHS Reference. No infants were categorized as overweight in any of the three study groups, based on the WHO Standards; whereas there were cases of overweight infants in the FBSICG and HBICG according to the NCHS Reference (Table 3.35).

At 2 months, no infants were categorized as underweight by either the NCHS Reference or the WHO Standards; equal percentages of infants were categorized as overweight. At 3 months, the WHO Standards yielded significantly higher levels of underweight in the CG and FBSICG compared to the NCHS Reference; in the CG, (NCHS; p=0.02; 95% CI: 0 – 0.06; WHO; p=0.17; 95% CI: 0.09 – 0.25); and in the

FBSICG (NCHS; p=0; 95% CI: 95% CI: 0 – 0: WHO; p=0.07: 95% CI: 0.02 – 0.12). The WHO Standards categorized infants in the CG as severely underweight; whereas the NCHS Reference did not categorize any infants as severely underweight in any of the study groups. At 4 months, the WHO Standards categorized infants in the HBICG as underweight; whereas the NCHS Reference did not categorize any infant as underweight (NCHS; p=0; 95% CI: 0 – 0; WHO; p = 0.05; 95% CI: =0.0 – 0.09). The level of overweight was insignificantly higher by the NCHS Reference compared to the WHO Standards. At 5 months, the WHO Standards yielded an insignificantly higher percentage of underweight in the HBICG compared to NCHS Reference (NCHS; p=0.01; 95% CI: 0 – 0.04; WHO; p=0.05; 95% CI: 0.0 – 0.11). At 6 months, the WHO Standards yielded insignificantly higher percentages of underweight in all three study groups compared to the NCHS Reference. In the CG (NCHS; p=0.0; 95% CI: 0 – 0; WHO; p=0.01; 95% CI: 0.0 – 0.03); in the FBSICG (NCHS; p=0; 95% CI: 0 – 0; WHO; p=0.04; 95% CI: 0 – 0.08) and in the HBICG (NCHS; p=0.04; 95% CI: 0 – 0.08; WHO; p=0.06: 95% CI: 0.01–0.12). At 6 months, the WHO Standards categorized infants in the FBSICG and HBICG as overweight; whereas the NCHS Reference did not. Additionally, the WHO Standards categorized infants in the FBSICG and HBICG as severely underweight; whereas the NCHS Reference did not (Table 3.35).

Overall, the WHO Standards, yielded higher rates of underweight compared to the NCHS Reference at 1, 3, 5 and 6 months of observation. It was only at 2 months that there were no cases of underweight, as judged by both the NCHS Reference and the WHO Standards. The levels of overweight were generally higher, based on the NCHS compared to the WHO Standards.

Table 3.35: Prevalence of infant underweight by time and study groups based on NCHS growth reference and WHO growth standards

WEIGHT-FOR-AGE STATUS	NCHS WHO INTERNATIONAL GROWTH REFERENCE (1977)				WHO CHILD GROWTH STANDARDS (2006)				COMPARISON OF ANTHROPOMETRIC STATUS BY NCHS AND WHO P value and 95% Confidence Interval (CI)					
	CG *N (%)*	FBSICG *N (%)*	HBICG *N (%)*	Chi-square test; P	CG *N (%)*	FBSICG *N (%)*	HBICG *N (%)*	Chi-square test; P	NCHS CG	WHO CG	NCHS FBSICG	WHO FBSICG	NCHS HBICG	WHO HBICG
1 Month	*N=95*	*N=98*	*N=96*		*N=95*	*N=98*	*N=96*							
Well Nourished	93 (97.9)	97(99.0)	95 (99.0)	**0.107**	89 (93.7)	97 (99.0)	95 (99.0)	**0.047***	0.02	0.06	0	0.01	0	0.01
Overweight	0 (0)	1 (1.0)	1 (1.0)		0 (0)	0 (0)	0 (0)		[0 – 0.05]	[0.01-0.11]	[0-0]	[0-0.03]	[0 – 0]	[0-0.03]
Moderate Underweight	2 (2.1)	0 (0)	0 (0)		6 (6.3)	1 (1.0)	1 (1.0)							
Severe Underweight	0 (0)	0 (0)	0 (0)		0 (0.0)	0 (0.0)	0 (0)							
Total Underweight	**2 (2.1)**	**0 (0)**	**0 (0)**		**6 (6.3)**	**1 (1.0)**	0 **1 (1.0)**							
2 Months			*N=83*				*N=83*							
Well Nourished			79 (95.2)				79 (95.2)						0	0
Overweight			4 (4.8)				4 (4.8)						[0 – 0]	[0 – 0]
Moderate Underweight			0 (0)				0 (0)							
Severe Underweight			0 (0)				0 (0)							
Total Underweight			**0 (0)**				**0 (0)**							
3 Months	*N=82*	*N=85*	*N=80*		*N=82*	*N=85*	*N=80*							
Well Nourished	76 (92.7)	82 (96.5)	80 (100)	**0.108**	67 (81.7)	77 90.6)	74 (92.5)	**0.005****	0.02	0.17	0	0.07	0	0.04
Overweight	4 (4.9)	3 (3.5)	6 (7.5)		1 (1.2)	2 (2.3)	3 (3.7)		[0-0.06]	[0.09-0.25]	[0-0]	[0.02-0.12]	[0-0]	[0-0.08]
Moderate Underweight	2 (2.4)	0 (0)	0 (0)		9 (10.1)	6 (7.1)	3 (3.8)							
Severe Underweight	0 (0)	0 (0)	0 (0)		5 (6.1)	0 (0)	0 (0)							
Total Underweight	**2 (2.4)**	**0 (0)**	**0 (0)**		**14 (16.1)**	**6 (7.1)**	**3 (3.8)**							
4 Months			*N=79*				*N=79*							
Well Nourished			74 (93.7)				72 (91.1)						0	0.05
Overweight			5 (6.3)				3 (3.8)						[0-0]	[0.0-0.09]
Moderate Underweight			0 (0)				4 (5.1)							
Severe Underweight			0 (0)				0 (0)							
Total Underweight			**0 (0)**				4(5.1)							

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group; * Significant differences (Chi-square test; p<0.05); **Significant differences (Chi-square test; p<0.0001)

Table 3.35: Prevalence of infant underweight by time and study groups based on NCHS growth reference and WHO growth standards (contd)

WEIGHT-FOR-AGE STATUS	**NCHS WHO INTERNATIONAL GROWTH REFERENCE (1977)**				**WHO CHILD GROWTH STANDARDS (2006)**				**COMPARISON OF ANTHROPOMETRIC STATUS BY NCHS AND WHO** **P value and 95% Confidence Interval (CI)**					
	CG *N (%)*	**FBSICG** *N (%)*	**HBICG** *N (%)*	**Chi-square test; P**	**CG** *N (%)*	**FBSICG** *N (%)*	**HBICG** *N (%)*	**Chi-square test; P**	**NCHS CG**	**WHO CG**	**NCHS FBSICG**	**WHO FBSICG**	**NCHS HBICG**	**WHO HBICG**
5 Months			*N=73*				*N=73*							
Well Nourished			70 (95.9)				69 (94.5)						0.01	0.05
Overweight			2 (2.7)				1 (1.4)						[0-0.04]	[0-0.11]
Moderate Underweight			1 (1.4)				3 (4.1)							
Sever Underweight			0 (0)				1 (1.4)							
Total Underweight			**1 (1.4)**				**4 (5.5)**							
6 Months	*N=84*	*N=78*	*N=79*		*N=84*	*N=79*	*N=79*							
Well Nourished	84(100)	78 (100.)	76 (96.2)	**0.034***	83 (98.8)	75 (94.9)	73 (92.4)	**0.408**	0	0.01	0	0.04	0.04	0.06
Overweight	0 (0)	0 (0)	0 (0)		0 (0)	1 (1.3)	1 (1.3)		[0-0]	[0-0.03]	[0-0]	[0-0.08]	[0-0.08]	[0.01-0.12]
Moderate Underweight	0 (0)	0 (0)	3 (3.8)		1 (1.2)	2 (2.5)	4 (5.0)							
Severe Underweight	0 (0)	0 (0)	0 (0)		0 (0.0)	1 (1.3)	1 (1.3)							
Total Underweight	**0 (0)**	**0 (0)**	**3 (3.8)**		**1 (1.2)**	**3 (3.8)**	**5 (6.3)**							

CG (Control Group); FBSICG (Facility-Based Semi-Intensive Counseling Group); HBICG (Home-Based Intensive Counseling Group; * Significant differences (Chi-square test; p<0.05)

3.13.4.2 Anthropometric status of infants by time and breastfeeding status

Anthropometric status of the children based on the NCHS/WHO International Growth Reference by time and breastfeeding status

At 1 month, a significantly higher percentage (3.6%) of non-exclusively breastfed infants was moderately underweight compared to no cases of underweight among the exclusively breastfed infants (Chi-square; p=0.010) (Table 3.36). There was no case of overweight among the non-exclusively breastfed infants; whereas 0.9% of exclusively breastfed infants were overweight. At 2 months, no exclusively breastfed and no non-exclusively breastfed infants were underweight and equal percentages (4.8%) of infants from both groups were overweight. At 3 months, 1.6% of the non-exclusively breastfed infants were moderately underweight compared to no cases of under weight among the exclusively breastfed infants (Chi-square; p= 0.100). A non-significantly higher percentage (1.6%) of non-exclusively breastfed infants was moderately overweight compared to no cases of underweight among the exclusively breastfed. At 4 months, there were no cases of underweight among the exclusively and non-exclusively breastfed infants; whereas the percentage of overweight was higher (8.6%) among the non-exclusively breastfed infants compared to 4.5% of the exclusively breastfed infants. At 5 months, a non-significantly higher percentage (3.0%) of the exclusively breastfed infants was moderately underweight compared to no cases of underweight among the non-exclusively breastfed infants. About one-tenth (9.1%) of exclusively breastfed infants was overweight compared to no cases of overweight among the non-exclusively breastfed infants. At 6 months, 3.0% of exclusively breastfed infants and 2.1% of non-exclusively breastfed infants were moderately underweight (Chi-square; p=0.384) whereas equal percentages (2.9%) of infants from both groups were overweight (Table 3.36).

Anthropometric status of the children based on the WHO Child Growth Standards by time and breastfeeding status

At 1 month, a significantly higher percentage (9.9%) of the non-exclusively breastfed infants was moderately underweight compared to 1.3% of exclusively breastfed infants (Chi-square; p=0.006) (Table 3.36). No infants, neither exclusively breastfed, nor non-exclusively breastfed, were overweight. At 2 months there were no cases of underweight among the exclusively breastfed and non-exclusively breastfed; and equal percentages (4.8%) of infants from both the groups were overweight. At 3 months, a significantly higher percentage (14.4%) of non-exclusively breastfed infants was underweight compared to 4.2% of exclusively breastfed infants (Chi-square; p=0.005). Of the underweight infants, 4.0% of non-

exclusively breastfed infants were severely underweight; whereas all the exclusively breastfed infants were moderately underweight. At 5 months, an insignificantly higher percentage (6.0%) of exclusively breastfed infants was moderately underweight compared to 5.7% of non-exclusively breastfed infants (Chi- square; p=0.414). Less than one-tenth (9.1%) of exclusively breastfed infants was overweight compared to no cases of overweight among non-exclusively breastfed infants. At 6 months, a non-significantly higher percentage (6.1%) of the exclusively breastfed infants was underweight compared to 3.4% of non-exclusively breastfed infants (Chi-square; p=0.434). The percentage of severe underweight was 1.0% among the non-exclusively breastfed infants; while there were no cases of severe underweight among the exclusively breastfed infants. Almost equal percentages of exclusively breastfed (3.0%) and non-exclusively breastfed (2.9%) infants were overweight (Table 3.36).

A comparison of the anthropometric status of the children based on the NCHS/WHO International Growth Reference and the WHO Child Growth Standards by time and breastfeeding status

At 1 month, the WHO Standards yielded a higher but insignificant level of underweight among the exclusively breastfed infants compared to NCHS Reference (WHO; p=0.01; 95% CI: 0 – 0.03; NCHS; p=0.0; 95% CI: 0 – 0). The WHO Standards also yielded an insignificantly higher level of underweight among the non-exclusively breastfed infants compared to the NCHS Reference (WHO: p= 0.09; 95% CI: 0.01 – 0.17; NCHS: p=0.04; 95% CI: 0 – 0.09). No exclusively breastfed and non-exclusively breastfed infants were categorized as overweight, based on the WHO Standards; whereas there were cases of overweight of exclusively breastfed infants, based on the NCHS Reference (Table 3.36).

At 2 months, no infants were categorized as underweight by either the NCHS Reference or the WHO Standards; equal percentages of infants were categorized as overweight. At 3 months, the WHO Standards yielded a significantly higher level of underweight among the exclusively breastfed infants compared to NCHS Reference (WHO; p= 0.04 95% CI: 0.01 – 0.08; NCHS; p=0; 95% CI: 0 - 0). Similarly, the WHO Standards yielded a significantly higher level of underweight among the non-exclusively breastfed infants compared to NCHS (WHO; p=0.14; 95% CI: 0.08 – 0.21; NCHS; p=0.16; 95% CI: 0 – 0.04). The WHO Standards categorized non-exclusively breastfed infants as severely underweight; whereas the NCHS Standards did not categorize any infants, either exclusively breastfed or non-exclusively breastfed, as severely underweight. The overweight rates were similar for exclusively and non-exclusively breastfed infants, on both the WHO Standards and the NCHS Reference (Table 3.36).

At 4 months, the WHO Standards yielded an insignificantly higher rate of underweight among the non-exclusively breastfed infants compared to the NCHS Standards (WHO; p=0.03; 95% CI: 0 – 0.11; NCHS; p=0; 95% CI: 0 – 0). Similarly, the WHO Standards yielded a non-significantly higher rate of underweight among the non-exclusively breastfed infants compared to the NCHS Standards (WHO; p=0.06; 95% CI: 0 – 0.013; NCHS; p=0; 95% CI: 0 – 0). The levels of overweight for both the exclusively and non-exclusively breastfed infants were similar by the WHO Standards and the NCHS Reference (Table 3.36).

At 5 months, the WHO Standards yielded an insignificantly higher rate of underweight among exclusively breastfed infants compared to the NCHS Reference (WHO; p=0.06; 95% CI: 0 – 0.14; NCHS; p=0.03; 95% CI: 0 – 0.09). Similarly, the WHO Standards yielded an insignificantly higher rate of underweight among non-exclusively breastfed infants compared to the NCHS Reference (WHO; p=0.05; 95% CI: 0 – 0.12; NCHS; p=0; 95% CI: 0 -0). The overweight rates were similar, on both the WHO Standards and the NCHS Reference. At 6 months, the WHO Standards yielded an insignificantly higher rate of underweight among exclusively breastfed infants compared to the NCHS Reference (WHO; p=0.06; 95% CI: 0 – 0.14; NCHS; p=0.03; 95% CI: 0 – 0.09) and among the non-exclusively breastfed infants (WHO; p=0.03: 95% CI: 0.01 – 0.06: NCHS; p=0.01: 95% CI; 0 – 0.02). The WHO Standards categorized some of the non-exclusively underweight infants as severe, unlike the NCHS, which did not categorize any infants as severely underweight. The rate of overweight was similar among the exclusively and non-exclusively breastfed infants on both the WHO Standards and NCHS Reference (Table 3.36).

Overall, the WHO Child Growth Standards, yielded higher rates of underweight compared to the NCHS International Growth Reference at 1, 3, 4, 5 and 6 months observation. It was only at 2 months that there were no cases of underweight according to both the NCHS International Growth Reference and the WHO Child Growth Standards. The levels of overweight were generally similar, on the NCHS International Growth Reference and the WHO Child Growth Standards.

Table 3.36: Prevalence of infant underweight by time and breastfeeding status based on the NCHS growth reference and WHO growth standards

WEIGHT-FOR-AGE STATUS	**NCHS WHO INTERNATIONAL GROWTH REFERENCE (1977)**			**WHO CHILD GROWTH STANDARDS (2006)**			**COMPARISON OF ANTHROPOMETRIC STATUS BY NCHS AND WHO** **P value and 95% Confidence Interval (CI)**			
	Exclusively breastfed *N (%)*	Not exclusively breastfed *N (%)*	Chi-square test; P	Exclusively breastfed *N (%)*	Not exclusively breastfed *N (%)*	Chi-square test; P	Exclusively breastfed **NCHS**	Exclusively breastfed **WHO**	Not exclusively breastfed **NCHS**	Not exclusively breastfed **WHO**
1 Month Well Nourished Overweight Moderate Underweight Severe Underweight **Total Underweight**	*N=234* 232 (99.1) 2 (0.9) 0 (0) 0 (0) **0 (0)**	*N=55* 53 (96.4) 0 (0) 2 (3.6) 0 (0) **2 (3.6)**	0.010*	*N=234* 231 (98.7) 0 (0) 3 (1.3) 0 (0) **3 (1.3)**	*N=55* 50 (90.9) 0 (0) 5 (9.9) 0 (0) **5 (9.9)**	0.006**	0 [0 - 0]	0.01 [0 – 0.03]	0.04 [0 – 0.09]	0.09 [0.01 – 0.17]
2 Months Well Nourished Overweight Moderate Underweight Severe Underweight **Total Underweight**	*N=62* 59 (92.2) 3 (4.8) 0 (0) 0 (0) **0 (0)**	*N=21* 20 (95.2) 1 (4.8) 0 (0) 0 (0) **0 (0)**		*N=62* 59 (95.2) 3 (4.8) 0 (0) 0 (0) **0 (0)**	*N=21* 20 (95.2) 1 (4.8) 0 (0) 0 (0) **0 (0)**					
3 Months Well Nourished Overweight Moderate Underweight Severe Underweight **Total Underweight**	*N=120* 116 (96.7) 4 (3.3) 0 (0) 0 (0) **0 (0)**	*N=125* 118 (94.4) 7 (5.6) 2 (1.6) 0 (0) **2 (1.6)**	0.100	*N=120* 111 (92.5) 4 (3.3) 5 (4.2) 0 (0) **5 (4.2)**	*N=125* 100 (80.0) 7 (5.6) 13 (10.4) 5 (4.0) **18 (14.4)**	0.005**	0 [0 – 0]	0.04 [0.01 – 0.08]	0.16 [0 – 0.04]	0.14 [0.08 – 0.21]
4 Months Well Nourished Overweight Moderate Underweight Severe Underweight **Total Underweight**	*N=44* 42 (95.4) 2 (4.5) 0 (0) 0 (0) **0 (0)**	*N=35* 32 (91.4) 3 (8.6) 0 (0) 0 (0) **0 (0)**		*N=44* 40 (90.9) 2 (4.5) 2 (4.5) 0 (0) **2 (4.5)**	*N=35* 30 (87.5) 3 (8.6) 2 (5.7) 0 (0) **2 (5.7)**	0.814	0 [0 – 0]	0.04 [0 – 0.11]	0 [0 – 0]	0.06 [0 – 0.13]

***Significant differences (Chi-square test; p<0.05); **Significant differences (Chi-square test; p<0.0001)**

Table 3.36: Prevalence of underweight of infants by time and breastfeeding status based on the NCHS growth reference and WHO growth standards (cont)

WEIGHT-FOR-AGE STATUS	**NCHS WHO INTERNATIONAL GROWTH REFERENCE (1977)**			**WHO CHILD GROWTH STANDARDS (2006)**			**COMPARISON OF ANTHROPOMETRIC STATUS BY NCHS AND WHO** **P value and 95% Confidence Interval (CI)**			
	Exclusively breastfed *N (%)*	Not exclusively breastfed *N (%)*	Chi-square test; P	Exclusively breastfed *N (%)*	Not exclusively breastfed *N (%)*	Chi-square test; P	Exclusively breastfed **NCHS**	Exclusively breastfed **WHO**	Not exclusively breastfed **NCHS**	Not exclusively breastfed **WHO**
5 Months	*N=33*	*N=40*		*N=33*	*N=40*					
Well Nourished	30 (90.9)	40 (0)	0.205	28 (84.8)	38 (95.0)	0.414	0.03	0.06	0	0.05
Overweight	3 (9.1)	0 (0)		3 (9.1)	0 (0)		[0 – 0.09]	[0 – 0.14]	[0 – 0]	[0 – 0.12]
Moderate Underweight	1 (3.0)	0 (0)		1 (3.0)	2 (5.7)					
Severe Underweight	0 (0)	0 (0)		1 (3.0)	0 (0)					
Total Underweight	**1 (3.0)**	**0 (0)**		**2 (6.0)**	**2 (5.7)**					
6 Months	*N=33*	*N=208*		*N=33*	*N=209*					
Well Nourished	30 (90.9)	200 (96.1)	0.384	28 (84.8)	196 (93.8)	0.434	0.03	0.06	0.01	0.03
Overweight	1 (2.9)	6 (2.9)		1 (3.0)	6 (2.9)		[0 – 0.09]	[0 - 0.14]	[0 – 0.02]	[0.01 – 0.06]
Moderate Underweight	1 (3.0)	2 (1.0)		2 (6.1)	5 (2.4)					
Severe Underweight	0 (0)	0 (0)		0 (0)	2 (1.0)					
Total Underweight	**1 (3.0)**	**2 (1.0)**		**2 (6.1)**	**7 (3.4)**					

CHAPTER 4: DISCUSSION

4.1 Introduction

This study was a randomized controlled trial to assess the impact of home-based intensive and facility-based semi-intensive breastfeeding counseling strategies in improving exclusive breastfeeding rates in the Kibera slum of Nairobi, Kenya; and to investigate the factors associated with exclusive breastfeeding. In many documented intervention trials infant feeding practices are determined on maternal self reported information only; in this study observation was conducted to verify maternal reported information. Qualitative data were, collected from FGDs to give an in-depth understanding of the maternal rationale for choice of infant feeding practices. The reported and observation data were mutually supportive; and in agreement with the qualitative data. This was a well executed study; the sample was representative of the study population, the randomization was successful and drop-out rates were about equal for each of the study groups. Nevertheless, the drop-out rates in each of the study groups was higher than the anticipated 20% allowed for in the sample size.

This was the first and only study so far in Kenya to test and document the impact of breastfeeding education on exclusive breastfeeding. The home-based intensive breastfeeding counseling strategy significantly improved exclusive breastfeeding rates from birth to six months; whereas the facility-based semi-intensive counseling strategy significantly improved exclusive breastfeeding at one month postpartum only. The findings of this study offer scientific evidence for the implementation and strengthening of community-based breastfeeding promotion strategies, or both, to complement the hospital-based efforts in achieving the WHO goal of exclusive breastfeeding for six months.[5] Furthermore, the results of this study can be used as a basis to plan strategies for improving the rate of exclusive breastfeeding at 6 months in similar communities such as the study site.

The promotion and support of breastfeeding is a global priority.[3-5] Breastfeeding presents clear short-term benefits for the child, mainly protection against morbidity and mortality from infections; [4, 6-9] and long-term benefits in the prevention of chronic diseases and obesity and overweight in adulthood.[10-12] The benefits of breastfeeding increase with increased exclusiveness of breastfeeding. [21] Despite the rise in exclusive breastfeeding in sub-Saharan Africa, the rates are far below the WHO goal. The challenge from a public health perspective is to translate the vast literature on breastfeeding and recommendations into effective interventions understood and accepted by the population at large.

In spite of the knowledge of the importance of exclusive breastfeeding offered in this study, only 15.6% of the mothers were able to exclusively breastfeed for up to six months in the setting of a trial and despite the intensive home-based follow-up and support. This study shows that changing the mind-set

of mothers to practice exclusive breastfeeding and of the community as a whole requires intensive home-based breastfeeding support, a practice that may not be feasible in most of the set-ups in developing countries. This study demonstrates the enormous impact of cultural beliefs and maternal perceptions on infant feeding influencing the practice of exclusive breastfeeding. This finding has implications, particularly, for communities with high HIV prevalence in terms of the feasibility of the WHO's recommendation that exclusive breastfeeding should be practised by HIV-infected mothers unless replacement feeding is AFASS. In view of the intensive training approach implemented in this community trial which resulted only in modest improvements in exclusive breastfeeding rates, this study also clearly identifies the urgent need to devise new multifaceted approaches for the promotion of exclusive breastfeeding.

4.2 The Impact of Breastfeeding Counseling on Exclusive Breastfeeding from One to Six Months

Studies have consistently demonstrated the efficacy of home-based counseling in increasing the prevalence of exclusive breastfeeding, even though the rates fall short of meeting the WHO exclusive breastfeeding goal. [6, 47, 63-68] It would appear that mothers need continuous support for sustained exclusive breastfeeding. Available evidence [64] suggests a dose-response relationship exists between the number of visits to the mother and the likelihood of exclusive breastfeeding. In the present study, the home-based intensive breastfeeding counseling strategy significantly improved exclusive breastfeeding rates at one, three and six months. On the other hand the facility-based semi-intensive counseling significantly improved the exclusive breastfeeding rate at one month only. This demonstrated the critical role of frequent counseling and continuous support in the sustenance of exclusive breastfeeding; a finding in agreement with the findings of other studies. [6, 47, 63-68] In the present study, there was a 4.2 fold increased likelihood for mothers in the HBICG to practice exclusive breastfeeding compared to mothers in the CG. Currently, the national rate of exclusive breastfeeding in Kenya for six month old infants is only 2.1%. [27]

Varying rates in cumulative and non-cumulative exclusive breastfeeding have been reported in studies in Africa [47, 68, 78, 81] indicating maternal infant feeding practices are inconsistent from day to day. These studies demonstrated cross-sectional studies using 24-hour recall give a higher estimate of exclusive breastfeeding than rates determined through prospective studies. In agreement with these findings, in the present study, the cumulative proportion of mothers practising exclusive breastfeeding at six months was lower than those reported from the cross-sectional data. At six months, 3.2% of the mothers from the CG, 6.9% from the FBSICG and 15.6% from the HBICG, practised exclusive

breastfeeding (Chi-square test; p<0.00001). Mothers from the HBICG had a 3.4 fold increased likelihood of practising exclusive breastfeeding (p=0.010), whereas the difference between the CG and FBSICG was insignificant. The median duration of exclusive breastfeeding was one month in both the CG and the FBSICG; and three months in the HBICG. Thus the home-based intensive counseling strategy increased the median duration three fold.

The varying rates in the cumulative and non-cumulative exclusive breastfeeding rates should be interpreted appropriately depending on the end use of the data. The inflated rates of exclusive breastfeeding from cross-sectional studies could be useful in determining trends, rather than the magnitude of exclusive breastfeeding. Accurate estimates of exclusive breastfeeding rates is especially important in the context of HIV/AIDS, as inflated rates may give a feeling of false security resulting in policy makers not being sufficiently alert to the need to focus on better breastfeeding practices.

The exclusive breastfeeding rate achieved in this study by the home-based intensive counseling strategy was lower than those reported in previous studies. Unlike in the present study, the studies in Mexico [64], Ghana [68] and KwaZulu Natal South Africa [47]were conducted in areas with an active BFHI activity. In the studies conducted in Dhaka, the Bangladesh study [65], Ghana [68] and Kwazulu Natal South Africa [47], there were more home visits than in the present study, to promote exclusive breastfeeding. In Ghana [68], the study design did not allow for testing whether the effect was due to general counseling or repeated contact with the research personnel because a group having no contact with the research personnel was not included in the study. In the present study, the possibility of attaining these results because of the Hawthorne effect was minimized. This was done by making fewer visits to the households in the CG and FBSICG to conduct interviews and observations, to determine infant feeding practices. In the present study, there was a possibility of cross-contamination of the breastfeeding information between the women in the different study groups because they lived in the same community. This bias was minimized by blinding the mothers and interviewers to the study hypotheses and treatments given to the study groups.

Overall, mothers in the HBICG had significantly higher rates of exclusive breastfeeding at one, three and six months compared to the rates in the CG. Despite the higher rates of exclusive breastfeeding in the FBSICG compared to the CG, the differences were only significant at one month. These findings disprove the hypothesis that the home-based intensive counseling strategy does not improve exclusive breastfeeding; thus the null hypothesis is rejected. On the contrary, the finding that the facility-based

semi-intensive counseling strategy significantly improved exclusive breastfeeding at one month only indicates this strategy has an immediate and short-term positive impact on exclusive breastfeeding rates. It cannot therefore be relied on to support exclusive breastfeeding up to six months. These findings support the hypothesis that the semi-intensive counseling strategy does not improve exclusive breastfeeding rates; therefore the null hypothesis is accepted. The findings also disprove the hypothesis that there is no difference in the rate of exclusive breastfeeding associated with the facility-based semi-intensive counseling strategy and the home-based intensive counseling strategy.

Community-based breastfeeding initiatives are necessary to complement hospital-based programmes to accelerate the achievement of the WHO goal of exclusive breastfeeding for six months.

4.3 The Impact of Breastfeeding Counseling on Predominant Breastfeeding from One to Six Months

A recent study comparing the infant feeding patterns and child growth in Ghana, Peru, and India found an insignificant difference in the risk of death between exclusively breastfed and predominantly breastfed infants. Furthermore, non-breastfed infants had a significantly greater risk of death than those exclusively and predominantly breastfed. [76] A cross-sectional study in Malawi found the feeding of *mzuwula,* a herbal infusion prepared from boiled water, was not associated with poor infant growth. Whereas the introduction of porridge, usually made in the mornings and fed to the child throughout the day, was associated with worse anthropometric status.[82] The findings of this study however, need further verification using a more appropriate design for causal analysis. Furthermore, the immunological protection of predominant breastfeeding in areas where there is a scarcity of safe water, for the preparation of water-based drinks, may be compromised. The author's view is that messages aimed at the promotion of exclusive breastfeeding should continue to specifically discourage the practice of predominant breastfeeding. Particularly, low socio-economic status females, with limited facilities, including poor quality water, should be targeted.

Few studies have investigated the impact of community-based counseling on predominant breastfeeding. The findings of a study conducted in India [6] documented that mothers receiving community-based breastfeeding counseling were less likely to practice predominant breastfeeding compared to mothers not receiving such counseling. In the present study, predominant breastfeeding was commonly practised. Over one-tenth of the mothers in all thee three study groups had practised this mode of feeding at one month, even though mothers from the HBICG were significantly less likely to practice this mode of infant feeding when compared to those from the CG. At six months,

predominant breastfeeding rates had reduced to less than 10% in all three study groups and mothers in the HBICG were eight times more likely to practice predominant breastfeeding than mothers in the CG. The home-based intensive counseling therefore had a positive impact on discouraging the practice of predominant breastfeeding soon after birth, from the first month and at six months; but did not influence the practice at three months. On the contrary, the facility-based semi-intensive counseling did not influence predominant maternal breastfeeding practices during the six-month observation period.

4.4 The Impact of Breastfeeding Counseling on Mixed Feeding from One to Six months

Introduction of mixed feeding before the WHO recommended age of six months is reported to be a common practice [6, 25, 27, 46, 48-49, 78, 81-82]. Few studies have investigated the impact of community-based counseling on mixed feeding. A community-based cluster randomized trial to promote exclusive breastfeeding in India [6] reported that at three months, a significantly higher proportion of mothers from the control group compared to the intervention group practised mixed feeding. Similarly in the present study mixed feeding was a common practice starting very early, with less than 5% of the mothers having introduced this mode of feeding at one month; there was an insignificant difference between the study groups. At three and six months significantly higher percentages of mothers from the CG practised mixed feeding compared to those from the HBICG; but the difference between the CG and the FBSICG was insignificant. The home-based intensive counseling discouraged mothers from premature introduction of mixed feeding at three and six months, whereas the facility-based semi-intensive counseling made no impact on this mode of feeding.

The high rates of mixed feeding pose a challenge not only in the promotion of exclusive breastfeeding for HIV-negative women, but also in the context of HIV/AIDS. This is because scientific evidence about exclusive breastfeeding suggests it carries less risk of transmission of the HIV virus, whereas mixed feeding carries a higher risk of HIV transmission.[2, 22-24]. The WHO recommends HIV-positive mothers breastfeed exclusively for six months, unless replacement-feeding is AFASS, conditions not easily met by most sub-Saharan African populations.

4.5 Hindrances to the Practice of Exclusive Breastfeeding

The population of the present study consisted of young women with a low educational level, living in a poor socioeconomic environment. Breastfeeding was universal and in agreement with documented breastfeeding practices in Kenya and sub-Saharan Africa.[27, 25] Maternal knowledge about breastfeeding

before the study intervention was satisfactory in terms of the duration of breastfeeding and the first appropriate feed after birth. In contrast, knowledge about appropriate time of initiation of breastfeeding after birth and the duration of exclusive breastfeeding was relatively low. It was reported by fewer than half, and fewer than a quarter, of the study participants, respectively. The low knowledge about these optimal breastfeeding practices was reported to be a result of the limited, in terms of quantity and quality, breastfeeding education offered at health centres. This view is confirmed because the study participants, at enrolment at the health centre, had already attended ANC a median of three times. Limited knowledge about exclusive breastfeeding was one of the reasons for the rare practice of exclusive breastfeeding in Kibera; and the quantitative and qualitative data were mutually supportive in this regard.

The rate of exclusive breastfeeding achieved was modest and far below the WHO [5] target, despite: mothers acquiring satisfactory levels of breastfeeding knowledge through the home-based intensive and facility-based semi-intensive counseling strategies; positive maternal attitudes towards the information received; the intensity of the breastfeeding counseling; and the continuous support provided. Whilst knowledge and correct attitudes towards exclusive breastfeeding are a prerequisite to appropriate infant feeding practices, other factors were clearly involved in the choice of infant feeding in the study community. Therefore, the promotion of breastfeeding programmes should not only focus on providing appropriate information on infant feeding practices, but should equally address all other factors in the infant-feeding decision making process.

The major challenges to the practice of exclusive breastfeeding, even after the intensive counseling received, were: cultural perceptions about exclusive breastfeeding resulting from family and societal pressure to introduce complementary feeding; the misconception about inadequacy of breastmilk production; practical perceptions about the excessive demands on maternal time against other competing responsibilities; maternal absence from home for long periods of time. Consequently, mothers introduced supplementary feeding much earlier than the recommended six months. These findings have been reported in other studies.[46, 48-49, 81]

Early supplementation of breastfeeding with non-breastmilk liquids reduces breastmilk output, since the production and release of milk is modulated by the frequency and intensity of suckling.[21, 73-74] Giving an infant food other than breastmilk during the first six months of life displaces the more nutritious breastmilk from the infant diet and risks introducing diarrhoea-causing pathogens.[9] Despite this scientific evidence, studies have shown that the practice of giving pre- and post-lacteal feeds is the

norm in many communities. [6, 25, 27-28, 46, 48-49, 81-82] In this study, the practice of post-lacteal feeding within three days after birth was common among the mothers in the three study groups. A significantly lower percentage of the mothers in the HBICG gave these feeds compared to the CG. The most common post-lacteal feed given was a salt-sugar solution; this practice may be dangerous to infant health if hypertonic solutions are prepared. The home-based intensive breastfeeding counseling strategy positively discouraged mothers from giving post-lacteals, a finding in agreement with this study was conducted in India. [6] Few studies have investigated the impact of community-based counseling on the practice pre- or post-lacteal feeding.

Significantly higher percentages of mothers in the CG introduced non-breastmilk liquids compared to mothers in the HBICG at one, three and six months. Thus, the home-based intensive counseling had a positive impact on the discouragement of mothers from giving these liquids; whereas the semi-intensive counseling had an insignificant effect on the maternal practice of feeding non-breastmilk liquids.

Semi-solid or solid foods were introduced much earlier than the recommended six months.[9] At three months, over one-tenth of the mothers in the CG and FBSICG, and less than one-tenth of mothers in the HBICG, had introduced semi-solid or solid foods. By six months, over four-fifths of mothers in both the CG and FBSICG had introduced mixed feeding compared to two-thirds in the HBICG. A significantly lower percentage of mothers in the HBICG than in the CG practised mixed feeding; thus the home-based intensive counseling discouraged mothers from this practice. The main reasons for non-breastmilk liquid and semi-solid and solid foods feeding were: to soothe colic, because the baby was hungry; because of maternal perception about inadequate breastmilk production. These findings are in accord with the qualitative data from the FGDs; and with findings from other studies. [46, 48-49, 80-81]

The rationale for early supplementation of breastmilk is embedded mainly in cultural perceptions stipulating: breastmilk is an incomplete food source for infants; quench of thirst in infants requires water [46, 48-49]; water together with herbs, purges and cleans the infant stomach.[49] Programmes to promote exclusive breastfeeding should therefore address cultural issues involved in infant feeding.

4.6 Factors Encouraging Mothers to Practice Exclusive Breastfeeding

Despite most mothers not practising exclusive breastfeeding for six months, many reported the counseling encouraged the delay of the introduction of complementary feeding; and the quantitative

and qualitative data were mutually supportive on this finding. The median duration of breastfeeding was three months in the HBICG; and one month in both the FBSICG and CG.

The factors encouraging mothers in this study to practice exclusive breastfeeding were the health benefits of exclusive breastfeeding to the infant. Also, the newly acquired skill, that is, the appropriate positioning and attachment of baby to the breast during feeding was a motivating factor because the practice resulted in higher milk production; and fewer episodes of cracked and sore nipples. Family support, particularly from husbands, and the continuous support received from the study team, by mothers in the HBICG, was a source of inspiration to practice exclusive breastfeeding. Trials to promote exclusive breastfeeding have not investigated the factors encouraging mothers to practise exclusive breastfeeding; thus, this study has generated new data and contributed to the current knowledge on exclusive breastfeeding practices. The implications of these findings for breastfeeding promotion programmes are: not only mothers, but all stakeholders of infant feeding practices should receive breastfeeding- practice information; continuous breastfeeding support is essential for mothers to enable them to overcome the exclusive breastfeeding challenges; and demonstrations on breastfeeding techniques should be provided. Even though breastfeeding is a natural act, it is also a learned behaviour. [54]

4.7 Factors Associated with Exclusive Breastfeeding

To achieve the WHO exclusive breastfeeding goal, it is important to understand the factors influencing exclusive breastfeeding; and how best to promote this behaviour [33]. Socio-economic, demographic, psychosocial, cultural and contextual factors have been found to influence exclusive breastfeeding in a number of communities and settings, in different ways and varying degrees [31]. Interventions to promote exclusive breastfeeding should be tailored to the individual needs of each population [33].

In this study, the results of univariate analyses showed that mothers living in larger households were more likely to practice exclusive breastfeeding compared to mothers living in smaller households. As for socio-economic characteristics, mothers owning telephones and televisions were less likely to practice exclusive breastfeeding compared to mothers not owning these items. Other socio-demographic characteristics, maternal age, education, marital status, occupation and income source, were not associated with exclusive breastfeeding. These findings indicate a higher socio-economic status, based on television and telephone ownership, was negatively associated with exclusive breastfeeding; this is probably because mothers from economically better-off households could afford supplementary

feeds. These findings concur with those of studies conducted in Honduras [36] and Kwa-Zulu Natal South Africa. [47, 81] They are not in agreement with the findings of studies conducted in Ghana [31] and Tanzania [32], implying that demographic and socio-economic factors influence exclusive breastfeeding differently, depending on the circumstances.

Maternal knowledge about infant feeding practices is considered to be a pre-requisite for appropriate breastfeeding practices. Some studies have reported positive associations between maternal knowledge about breastfeeding and exclusive breastfeeding [32]; while others [31, 33] have reported no associations between the two. In this study, mothers knowledgeable about the recommended duration of breastfeeding being two years or longer were significantly more likely to practice exclusive breastfeeding. Mothers planning to breastfeed the unborn baby for a longer duration were significantly more likely to practice exclusive breastfeeding compared to mothers planning to breastfeed for a shorter time. Mothers planning to introduce complementary feeding at a later stage were significantly more likely to practice exclusive breastfeeding than mothers planning to introduce complementary feeding earlier. These findings are consistent with those of studies conducted elsewhere [31, 81]. Whereas knowledge about the duration of breastfeeding positively influenced exclusive breastfeeding practice, knowledge about the appropriate duration of exclusive breastfeeding was not associated with exclusive breastfeeding in this study. This confirms that factors other than knowledge about exclusive breastfeeding influenced the maternal decisions about infant feeding practices in the study community.

Studies have reported some mothers give early supplementary feeds after delivery, but revert to exclusive breastfeeding thereafter. [47, 78, 81] Post-lacteal feeding was negatively associated with the practice of exclusive breastfeeding throughout observation from one to six months; thus, there is a need to strongly discourage this practice, embedded in cultural perceptions and practices.

Few studies have investigated the association between maternal morbidity and health breast conditions, such as sore or cracked nipples; and the practice of exclusive breastfeeding. An Argentinian [42] study found mothers with breast health problems were less likely to practice exclusive breastfeeding. Similarly, in the present study, mothers with breast health conditions were less likely to practice exclusive breastfeeding compared to mothers without this condition. Maternal morbidity was not associated with the practice of exclusive breastfeeding; and there is scarce information on studies investigating an association between the two.

Maternal misconception of inadequate breastmilk production has been documented to negatively influence the practice of exclusive breastfeeding [49, 79-80] In this study, maternal perception of inadequate breastmilk was associated with less likelihood of the practice of exclusive breastfeeding. Almost all mothers however, can produce enough milk if helped with positioning and attachment in the early days after delivery and if breastfeeding is practised on demand [9]. According to both quantitative and qualitative data in this study, one of the motivating factors for exclusive breastfeeding was the newly received information and skills on appropriate positioning of the baby to the breast during feeding. This improved milk supply, as well as reduced the incidence of breast health problems. Any strategy to promote exclusive breastfeeding should include the physiology and techniques of breastfeeding.

In multivariate analyses, the greatest predictor of exclusive breastfeeding was the non-giving of post-lacteals. Other predictors of exclusive breastfeeding were: planned long duration of breastfeeding; living in smaller households; non- telephone and television ownership; absence of breast health problems; correct knowledge about breastfeeding duration.

These findings support the hypothesis that maternal age and education are not associated with exclusive breastfeeding practices; whereas the hypothesis that socio-economic characteristics of the mother is not associated with exclusive breastfeeding practices is rejected.

4.8 Exclusive Breastfeeding and Infant Outcomes

4.8.1 Trends in monthly weight of infants

Previous observational studies have reported reduced weight gain in infants receiving exclusive and prolonged breastfeeding. In general, breastfed infants tend to grow rapidly in the first three months; thereafter they gain weight less rapidly during the remainder of the first year compared to formula-fed infants. [84-88] When breastfeeding continues through twelve months, the difference in weight gain is particularly evident from six to twelve months, even when complementary feeding is initiated at the appropriate age.[88] The same trend of weight gain patterns have been reported in exclusively breastfed infants.[85] Evidence to date suggests there are no apparent adverse consequences with the lower weight gain of breastfed infants.[18, 86]

In this study, there was a trend for infants in the HBICG to be heavier at one and three months compared to infants in the CG and FBSICG. By six months, the infants in the HBICG had a lower weight than the infants in the CG and the FBSICG. Analysis of infant weight gain by maternal exclusive

breastfeeding behaviour showed the same trend: exclusively breastfed infants gained more weight than those non-exclusively breastfed from one to three months, then gained less weight from three to six months. The trend in weight gain of exclusively and non-exclusively breastfed infants reported in this study is in agreement with those documented in other studies.[84-85, 87-88]

4.8.2 Anthropometric status

There is evidence that breastfed infant growth, following the WHO recommendations for prolonged and exclusive breastfeeding, [5] deviate from the NCHS child growth reference. Previous studies are fairly consistent in showing a downward trajectory in Z scores beginning at two or three months, until approximately twelve months [84-89], findings concurring with the present study. Based on the NCHS growth reference, there was a trend for a higher prevalence of underweight among the infants in the CG at one and three months compared to infants in the FBSICG and HBICG; even though the differences were insignificant. At six months, a significantly higher percentage of infants in the HBICG were underweight compared to infants in the CG and the FBSICG. An interpretation of underweight by the WHO child growth standards showed the same trend as that based on the NCHS growth reference. At one and three months, the prevalence of underweight in the CG was significantly higher than in the FBSICG and HBICG. At six months, the prevalence of underweight was insignificantly higher in the HBICG.

The prevalence of underweight by maternal breastfeeding practice, whether exclusively breastfeeding or not, and based on the NCHS growth reference, showed a trend for non-exclusively breastfed infants to have a higher prevalence of underweight at one and three months compared to exclusively breastfed infants; and a lower prevalence at five and six months. The same trend in the prevalence of underweight was observed using the WHO child growth standards.

These findings do not support the null hypothesis that there is no relationship between exclusive breastfeeding and infant nutritional status; thus the null hypothesis is rejected.

4.8.3 Comparison of the anthropometric status by NCHS growth reference and WHO child growth standards

As a departure from previous growth reference charts used to measure babies and children, the new WHO Child Growth Standards are based on the premise that the breastfed baby is the norm for healthy growth among infants. Until the development of the WHO child growth standards, existing child growth references were based on infants breast and/or artificially fed. As such, WHO Child Growth Standards

are designed as a standard rather than a reference; and are recommended for application to all children independent of the type of feeding. Because breastfed babies are lean babies, the shape of the curve in the new WHO Child Growth Standards differs from earlier references, particularly during the first six months of life when growth is rapid. [90-91]

Rates of underweight have been reported to be higher during the first six months of infancy and decrease thereafter, leveling off at twelve months, based on the WHO standards compared to the NCHS growth reference.[84, 92] In agreement with the findings of these studies, the rate of underweight based on the WHO growth standards, was higher in each of the three study groups at one, three and six months compared to the NCHS growth reference in this study. The same trend was observed in the rates of underweight by maternal exclusive breastfeeding status from one to six months. This was with the exception of two months because no infant was categorized as underweight by both the NCHS reference and WHO standards.

Because of the slower growth velocity of breastfed infants, when their weight is plotted on NCHS growth chart, they often appear to falter in growth after three months, even if they are healthy and thriving. This may create a crisis of confidence among lactating mothers; and be a significant barrier to the promotion of exclusive breastfeeding for six months. Health workers need to be equipped with this knowledge, so they can counsel mothers appropriately. [87] This barrier is overcome by the use of child health growth cards based on the WHO standards, as healthy breastfed infants track along the weight-for-age mean Z score. [84] Furthermore, the WHO standards could help alleviate breastfeeding mothers fears of infant referral for underweight, or show growth drop after three months compared to the non-breastfed babies. The WHO standards would increase the proportion of babies defined as heavy and could reduce the risk of obesity in later life, if appropriate infant feeding counseling is provided.

4.8.4 Prevalence of morbidity among infants

Vast scientific literature demonstrates exclusive breastfeeding results in substantial health benefits associated with lower morbidity and mortality from diarrhoea and ARIs.[4, 6-9, 14-15] In agreement with the scientific evidence, non-exclusively breastfed infants had a significantly higher prevalence of the common cold, fever, diarrhoea and vomiting in this study compared to exclusively breastfed infants.

These findings do not support the null hypothesis that there is no relationship between exclusive breastfeeding and infant morbidity status; thus the null hypothesis is rejected.

Breastfeeding promotion messages should emphasize the health benefits of exclusive breastfeeding to inspire mothers to practice this feeding mode. One of the factors encouraging mothers to practice exclusive breastfeeding in this study was the health benefits of exclusive breastfeeding to the baby.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Limitations of the Study

1. Cost-effectiveness analysis of the breastfeeding counseling strategies was not part of the defined study objectives. Although the findings of this study are relevant to many countries, it is recommended that additional research be conducted to investigate the cost-effectiveness of the home-based intensive breastfeeding counseling strategy to ascertain the feasibility of implementing it in various circumstances.

2. Due to limitations of resources, it was not feasible to collect data on the birth weight of infants born at home and therefore it was not possible to establish the impact of the breastfeeding counseling on the birth weight of the infants. Over half (54.5%) of the deliveries in Kenya take place at home. The data on the percentage of infants with low birth weight (from health facility deliveries) in this study is in agreement with the Kenya national data on low birth weight (3.5%), which is derived from 45.5% of the deliveries that take place in health facilities. [27] It is recommended that additional research to investigate how the type of early feeding, especially exclusive breastfeeding, affects the growth of low birth weight children be conducted, given the limited availability of such information in Kenya and in Africa as a whole.

3. Collection of mortality data for the infants was not part of the defined objectives of the research programme and as such association with exclusive breastfeeding could not be investigated.

5.2 Conclusions

1. It was feasible to promote and sustain exclusive breastfeeding for six months in low socio-economic environments, using the home-based intensive counseling strategy; even though the rate achieved was modest. On the contrary, the facility-based semi-intensive counseling strategy was effective in initiating exclusive breastfeeding, but did not sustain the practice beyond one month as it did not provide the continuous support necessary to motivate mothers to continue with the practice of exclusive breastfeeding.

2. The major hindrances to exclusive breastfeeding in the study community were:
   - Limited knowledge about exclusive breastfeeding;
   - Cultural perceptions not in agreement with exclusive breastfeeding;
   - Pressure from family members and friends to introduce complementary feeding because exclusive breastfeeding was not believed to be the right way to feed infants;

- Exclusive breastfeeding demanded too much maternal time for mothers with other competing responsibilities; and
- Maternal absence from home for long periods of the day.

3. The factors encouraging mothers in this study to practice exclusive breastfeeding were the:
   - Health benefits of exclusive breastfeeding to the infant;
   - Newly acquired skill of appropriate positioning and attachment of the infant to the breast during feeding;
   - Support received from the family members; and
   - Continuous support received from the study team.

4. The greatest predictor of exclusive breastfeeding was non-giving of post-lacteal feeds. Thus inappropriate feeding in the early life of an infant can deter mothers from practising exclusive breastfeeding, even with subsequent counseling. Low socio-economic status, correct knowledge about appropriate duration of breastfeeding, as well as planned long duration of breastfeeding, by mothers, before delivery, were also predictors of exclusive breastfeeding in the study community.

5.3 Recommendations

1. Community-based breastfeeding initiatives are necessary to complement hospital-based programmes to accelerate the achievement of the WHO goal of exclusive breastfeeding for six months. The findings of this study have shown mothers need continuous breastfeeding support to sustain exclusive breastfeeding up to six months. In view of the modest improvement in exclusive breastfeeding rates despite the intensive counselling given to mothers, new innovative and multifaceted approaches should be devised to improve the counselling methods currently employed in promoting exclusive breastfeeding. In this regard, the Ministry of Health, NGOs and other organizations involved in child survival activities in Kenya should strengthen and adopt, or adopt, community-based strategies to promote exclusive breastfeeding. The use of channels such as seminars for community members, *Barazas,* community and church meetings, and mother-to-mother breastfeeding support groups is recommended to allow for wider dissemination of the exclusive breastfeeding information to all community members. The findings of this study have shown family members to be key decision makers in the choice of infant feeding; therefore there is a strong need to target them in the promotion of exclusive breastfeeding.

2. Hospital based breastfeeding education programmes need to be strengthened to accelerate the achievement of exclusive breastfeeding for six months. Breastfeeding education should provide more detailed information more frequently and in a consistent and planned manner. The study participant level of knowledge about exclusive breastfeeding was very low despite having been enrolled in the study from a health centre. All available channels: the ANC, MCH, maternity wards and outpatient clinic and all cadres of health workers, such as, nurses, nutritionists, doctors and clinical officers having contact with mothers of infants should, in the course of their work promote appropriate breastfeeding practices. The Ministry of Health should ensure implementation of BFHI to improve the promotion of exclusive breastfeeding.

3. Breastfeeding promotion messages should be re-packaged to:
    - Clearly stipulate that exclusive breastfeeding should be for six months. It was reported in this study that health centres provided varying information. Some stated breastfeeding should be for four months, while others stated water could be given in addition to breastmilk during the first six months;
    - Address the cultural attitudes to breastfeeding to promote the desirable practices, such as universal initiation and long duration of breastfeeding; while discouraging inappropriate ones like early supplementation of breastfeeding; and
    - Include information on the physiology of breastfeeding to deal with the misconception about inadequate breastmilk production.

4. Breastfeeding promotion should include demonstrations on the techniques of breastfeeding. The newly acquired skill of appropriate positioning and attachment of infant to the breast during feeding was reported to have motivated mothers in this study to continue practising exclusive breastfeeding; because it stimulated milk production and reduced incidences of cracked and sore nipples.

5. Additional research is needed to investigate the effectiveness of breastfeeding promotion at the heath facility level; while identifying constraints and challenges to the activity, if any, and how they can be overcome. Research is also needed to identify the most feasible and cost-effective community-based approaches in promoting exclusive breastfeeding in different contexts. Equally important is the need for research to identify the breastfeeding messages having the greatest impact in influencing mothers to practice exclusive breastfeeding; and how these messages should be packaged to be well understood and appreciated by the target audience.

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APPENDICES

APPENDIX 1: BREASTFEEDING COUNSELING CONTENT

1. Benefits of breastfeeding with especial emphasis on exclusive breastfeeding
   Health and nutrition benefits
   Psychological and economic benefits

2. The composition of breast milk vs other types of milk
   Disadvantages of artificial feeding

3. Lactation anatomy and physiology
   Psychological aspects of breastfeeding

4. Preparation for breastfeeding
   Maternal nutrition during pregnancy and lactation
   Care of breasts and nipples during pregnancy

5. Initiation and Management of breastfeeding
   Importance of initiating breastfeeding immediately after birth
   The importance of colostrum to the baby
   Discouragement of pre-lacteal and post-lacteal foods
   Rooming in of mother and baby
   Feeding on demand
   Duration of feeds
   Feeding from both breasts
   Positioning of baby at the breast
   Re-lactation and sustaining of breastfeeding

6. Management of common breastfeeding problems
   Typical early problems of breastfeeding (breast too full and hurting, sore nipples and cracked nipples etc.
   Later problems of breastfeeding (inadequate amount of milk, baby cries too much, mother has to go back to work)

7. Breastfeeding in special circumstance/situations
   Full-term twins
   Low birth weight babies
   Feeding ill children
   When mother is ill or pregnant
   Breastfeeding for working mothers

8. Complementary foods
   When to start giving complementary foods
   Health risks of starting too early or too late
   What weaning foods to give
   Continue breastfeeding 2 years and beyond
   Stopping breastfeeding

9. Infant feeding and HIV/Aids
   MCTT of HIV/Aids
   Prevention of MTCT through infant feeding
   Appropriate feeding practices for HIV-infected women.

The content of the breastfeeding COUNSELING is based on the following references:

- WHO (1993): Breastfeeding COUNSELING: A training Course. Division of Diarrhoeal and acute respiratory disease control, WHO/CDR/93. 3-6 and UNICEF/NUT/93. Geneva.
- King F.S. (1993): Helping mothers to breastfeed. Nairobi: African Medical and Research Foundation.

THIS COURSE IS DESIGNED TO TAKE 40 HOURS.

APPENDIX 2: BASELINE QUESTIONNAIRE

TO BE ADMINISTERED TO MOTHERS IN ALL THE THREE GROUPS WITHIN THE FIRST WEEK AFTER ENROLMENT INTO THE STUDY

ADMINISTRATIVE DETAILS

Questionnaire ID NO_____Treatment group_____Name of Village_____

Name of Interviewer_____Name of Respondent_____

Date of Interview _____Questionnaire checked_____ _____Date checked_____

SECTION A: DEMOGRAPHIC DATA

A1. Age of mother in completed years _____

A2.Mothers Ethnic group

a. Luo [ ]
b. Luhyia [ ]
c. Akamba [ ]
d. Kikuyu [ ]
e. Nubian [ ]
f. Kalenjin [ ]
e. Other (Specify)_____

A3. Highest Education level attained by mother

a. No formal Education [ ]
b. Standard 1-4 [ ]
c. Standard 5-7/8 [ ]

e. Secondary School [ ]
f. Certificate Level training [ ]
g. Diploma Level training [ ]
h. University level education [ ]
i. Adult Literacy [ ]

A4. What is your occupation?

a. Casual worker [ ]
b. Housewife [ ]
c. Formally/regularly employed (Specify type of job)_____
d. Self-employed (Specify)_____

A5. Marital status of mother: *(Tick Appropriately)*

a. Married [ ]
b. Widowed [ ]
c. Divorced/separated [ ]
d. Single [ ]

A6. What is your husband's occupation?

a. Casual worker [ ]
c. Formally/regularly employed (Specify type of job)_____
e. Self-employed (Specify)_____
f. NOT applicable [ ]

A7. How many people live in your house? _____

SECTION B: SOCIO-ECONOMIC FACTORS

B1. What are your sources of income? *(Tick ALL applicable responses)*

a. Salaried job [ ]
b. Husband [ ]
c. Own Business [ ]
d. Other specify_____

B2. Which of the following items do you own? **1 = Owned 2 = Not Owned**

a. Television [ ]
b. Radio [ ]
c. Telephone [ ]
d. Videocassette player [ ]
e. Vehicle [ ]
f. Bicycle [ ]
g. Land [ ]
h. Plot [ ]
i. Sofa set [ ]
j. Motorcycle [ ]

B3. Do you live in a:

a. Rented House [ ]
b. Owned House [ ]

B4. What is the number of rooms in your house?

☐ ☐ ☐ ☐
1 2 3 4

B5. If rented, how much do you pay per month? (Ksh per month)

a. (Enter actual amount)_____
b. (NOT Applicable [ ]

B6. Indicate the following about the house:
Wall made of _____ Roof made of_____ Floor made f_____

Codes: 1=Iron sheets 2=mud and cement 3=Earth 4=cement 5=Timber 6=Stone/bricks/blocks

*7= Other Specify*_____

B7. What is your **MAIN** source of lighting? [ ]

Codes: 1=Kerosene 2=Electricity 3=Solar 4=Candle

5= Other (specify) _____

B8. What is your **MAIN** source of cooking fuel? [ ]

Codes: 1=Kerosene 2=Electricity 3=Firewood 4=Gas 5=Charcoal
*6=Other*_____

B9. How much money do you use on the following items per month? *(If mother has difficulty remembering amounts on monthly basis, then ask for amounts on weekly or daily basis and compute for the monthly amounts)*

a. Food 1._____
b. Education 2._____
c. Health 3._____

SECTION C: HISTORY OF PREGNANCY

C1. How many children have you given birth to?

_____

(Indicate NONE if mother has NOT had any children)

C2. How many of them are still alive?

_____

For Questions C3 to C5, cross check responses with clinic card and record what is indicated in the card

C3. Age of pregnancy in completed weeks_____
(To calculate age, obtain information on the date of the last monthly period [LMP] and the expected data of delivery [EDD] from card and record these below).

b Date of last monthly period (LMP) _____Expected date of delivery (EDD) _____

C4. At what age of pregnancy did you start attending antenatal clinic (ANC)?
(Enter Age of pregnancy in weeks)_____

C5. How many times have you attended the clinic during this pregnancy?

a. Once [ ]
b. Twice [ ]
c. Three times [ ]
d. Four times [ ]
e. Other (specify)_____

C6. Have you had any complications with the present pregnancy?

a. YES [ ] b. NO [ ]

C7. If YES, what complications have you had?

_____

SECTION D: KNOWLEDGE ON BREASTFEEDING

D1.Have you ever received breastfeeding counseling?

a. YES [ ] b. NO [ ]

D2. If YES, in what manner? **[TICK ALL REPSONSES]**

a. Health Facility [ ]
b. In school [ ]
c. Over the Radio [ ]
d. From relatives/friends [ ]
e. Any other (specify)_____

D3. What should be given to a baby immediately after a safe delivery?

a. Breast milk [ ]
b. Formula Milk [ ]
c. Cow's milk [ ]
d. Glucose water [ ]
e. Plain boiled water [ ]
f. Salt solution [ ]
g. Sugar-salt solution [ ]
h. Any other (specify)_____

D4. How soon after birth should the baby be put on the breast if the delivery is normal and the mother
and baby are fine?

a. Within half an hour after birth [ ]
b. From 1-8 hour after delivery [ ]
c. 9 hours or more after delivery [ ]
d. Does not know [ ]
e. Any other (Specify)_____

If a. is selected, then go to question D5 and skip question D6
If a. is NOT selected, then go to question D6

D5. Why should the baby be put on the breast within the first half hour /immediately after birth?
(*Probe for responses. Tick ALL applicable responses)*

a. To create a strong bond between mother and baby [ ]
b. To stimulate milk production [ ]
c. Baby is hungry after the birth process [ ]
d. To give baby colostrums/for immunity [ ]
e. I do not know [ ]
g. Any other specify_____

D6. Why should the baby be put on the breast within (state the actual duration mentioned in question D4) after birth? *(Probe for responses. Tick ALL applicable responses)*

a. There is no milk before then [ ]
b. Colostrum is not good for baby [ ]
c. The mother needs to rest after the birth process [ ]
d. Any other (specify)_____

D.7 How long do you think breast milk alone, without even water is sufficient for the baby?

a. Less than one week [ ]
b. One week to two weeks [ ]
c. One to three months [ ]
d. Four to six months [ ]
e. Six months [ ]
f. Any other specify_____

D8. How often should a baby be breastfed?

a. On demand [ ]
b. By routine [ ]
c. Other (specify)_____

D9. For how long should babies be breastfed?

a. Less than I month [ ]
b. 1-2 months [ ]
c. 3-5 months [ ]
d. 6 months [ ]
e. 1 year [ ]
f. 2 years [ ]
g. More than 2 years [ ]
h. Any other (specify)_____

D10. Should a pregnant mother breastfeed her baby?

a. YES [ ]
b. NO [ ]
c. Do not know [ ]

If NO, go to question D11
If YES, or DO NOT KNOW go to question D12

D11. Why should a pregnant mother **NOT** breastfeed her baby? **[TICK ALL RESPONSES]**

a. The milk is not good for the baby [ ]
b. The mother may become unhealthy [ ]
c. The breastfed baby may become unhealthy [ ]
d. The milk will dry up anyway [ ]
e. To wean off the baby before the birth of the unborn one [ ]
f. Any other (Specify)_____

D12. At what age should complementary foods be introduced to a baby?
[Probe for liquid and solid foods. List the age in days, weeks or months]

Food /Liquid	Age
a._____	1._____
b._____	2._____
c._____	3._____
d._____	4._____

D13. Have you breastfed ALL your children/or child in the past?
a. YES [ ]
b. NO [ ]
c. Not Applicable [ ]

D14.If NO, why not? Probe for employment, health and cultural reasons.
_____
_____

SECTION E: INTENDED FUTURE BREASTFEEDING PRACTICES

E1. Do you intend to breastfeed the baby to be born?
a. YES [ ] b. NO [ ]

E2. If YES, for how long?
_____

E3. If NO, Why not?
_____

E4. When do you intend to introduce complementary foods to the baby to be born?
_____

APPENDIX 3: QUESTIONNAIRE FOR SECOND INTERVIEW

TO BE ADMINISTERED TO ALL MOTHERS IN THE THREE GROUPS DURING THE FIRST MONTH POST PARTUM

ADMINISTRATIVE DETAILS

Questionnaire ID NO_____Treatment group_____ Name of village_____

Name of Interviewer_____Name of Respondent_____

Date of Interview _____Questionnaire checked _____Date checked_____

SECTION A. BABY'S BIODATA

A1. Name of baby_____A2 Sex: Male [ ] Female [ ]

A3. Date of birth_____A4.Age of baby in days_____

A5. Birth weight (Check Card if available)_____
(If baby was born at home and birth weight not known please indicate "Home Delivery")

A6. Position of baby in the family (1st, 2nd born etc.)_____

Baby's Anthropometric measurements

A7. Weight (to the nearest 0.01kg)_____

SECTION B: HISTORY OF DELIVERY

B1. Where did you deliver your baby?
- a. Health facility [ ]
- b. Home [ ]
- c. Other (specify)_____

Questions B2 to B7 to be asked of mothers who delivered at home

B2. Who assisted you during delivery?
- a. Traditional birth Attendant (TBA) [ ]
- b. Friend/Relative/Neighbour [ ]
- c. Self [ ]
- d. Other (specify) _____

B3.Do you sleep with your baby in the same bed?

a. YES [ ] b. NO [ ] c. SOMETIMES [ ]

B4. What was the first feed given to the baby after delivery?

a. Breast milk [ ]
b. Formula milk [ ]
c. Cow's milk [ ]
d. Glucose water [ ]
e. Plain boiled water [ ]
f. Salt solution [ ]
g. Sugar-salt solution [ ]
e. Any other (specify)_____

B5. How soon after birth did you put the baby to the breast?

a. Within half an hour/immediately after birth [ ]
b. 1 to 8 hours after birth [ ]
c. 9 hours or more after birth [ ]
d. Any other (specify)_____

Why did you put the baby to the breast at this time?_____

B6. Did you receive any breastfeeding counseling immediately after delivery?

a. YES [ ] b. NO [ ]

B7. If YES, Who provided the counseling?

a. A women's support group [ ]
b. Relative/friend/neighbour [ ]
c. TBA [ ]
c. Other
(specify)_____

Questions B8 to B16 to be asked of mothers who delivered in a health facility

B8. At which health facility did you deliver?

a. Public health facility (Specify)_____
b. Private health facility (Specify)_____

B9. What type of delivery did you have? *[CHECK CARD]*

a. Normal (Vaginal) [ ]
b. Caesarian [ ]
c. Other (Specify)_____

B10. For how many days did you stay at the health facility after delivery?_____

B11. Did your baby stay with you in the same room/bed while at the health facility?

a. Same bed [ ]
b. Same room but separate beds [ ]
c. Separate rooms [ ]
d. Any other (specify) _____

B12. Do you share the same bed with your baby since you returned home?

a. YES [ ] b. NO [ ]C. SOMETIMES [ ]

B13. What was the first feed given to the baby after delivery?

a. Breast milk [ ]
b. Formula Milk [ ]
c. Cow's [ ]
d. Glucose water [ ]
e. Plain water [ ]
f. Salt solution [ ]
g. Sugar-salt solution [ ]
h. Any other (specify)_____

B14. How soon after birth did you put the baby to the breast?

a. Within half an hour/immediately after birth [ ]
b. Within 1 to 8 hours after birth [ ]
c. 9 hours or more after birth [ ]
d. Any other (specify)_____

Why did you put the baby to the breast at this time?_____

B15. Did you receive any breastfeeding counseling at the health facility immediately after delivery?

a. YES [ ] b. NO [ ]

If YES, go to question B16
If NO, skip question B16 and go to question B17.

16. If YES, who provided the breast-feeding counseling?

a. Medical Staff [ ]
b. Non-medical staff (Specify)_____

Questions B17 to B19 to be asked of ALL mothers

B17. Since your baby was born, has he/she been given anything else besides breast milk?

a. YES [ ] b. NO [ ]

If NO, skip questions B18 and B19

B18. If YES, What has the baby been fed on? **[TICK ALL REPSONSES]**

a. Formula milk [ ]
b. Cow's milk [ ]
c. Sugar-salt solution [ ]
d. Plain boiled water [ ]
e. Glucose water [ ]
f. Salt solution [ ]
g. Any other (specify)_____

B19. When was the first time that the baby was given this feed?

(Indicate time in terms of baby's age, in hours, days or weeks. Indicate timing for each food, if more than one food is mentioned.

Food/Liquids	Time first given
a. _____	1._____
b. _____	2._____
c. _____	3._____
d. _____	4._____

SECTION C: BREASTFEEDING PRACTICES BASED ON A 24-HOUR RECALL

C1. Has the baby breastfed in the last 24 hours?
a. YES [ ] b. NO [ ]

If NO, go to questions C2 and C3

C2. If NO, why **not**?
a. The baby has been unwell [ ]
b. I have been unwell [ ]
c. I have had to go to back to work [ ]
d. Any other (specify)_____

C3. Do you intend to resume breastfeeding?
a. YES [ ] b. NO [ ] c. NOT SURE [ ]

C4. Have you given the baby any liquid/s in the last 24 hours?
a. YES [ ] b. NO [ ]

C5. If YES, what liquid/s have you given? *[Tick applicable responses]*
a. Formula milk [ ]
b. Cow's milk [ ]
c. Sugar-salt solution [ ]
d. Plain boiled water [ ]
e. Glucose water [ ]
f. Salt solution [ ]
g. Any other (specify)_____

C6.Why did you give the baby this liquid? **[TICK ALL RESPONSES]**
a. To sooth stomach pain [ ]
b. Baby gets hungry [ ]
c. Not producing enough milk [ ]
d. Advised by friends/relatives/neighbours [ ]
e. Advised by health care providers [ ]
f. Other (Specify)_____

C7. Have you given the baby any solid or semi-solid foods in the last 24 hours?
a. YES [ ] b. NO [ ]

If YES, go to questions C8 and C9
IF NO, skip questions C8 and C9 and go to question C10

C8. If YES, Name the food/s given.

_____

C9. Why did you give the baby the food/s? **[TICK ALL RESPONSES]**

a. Baby gets hungry [ ]
b. Not producing enough milk [ ]
c. Advised by health care providers [ ]
d. Advised by friends/relatives/neighbours [ ]
e. Advised by TBA [ ]
f. To sooth stomachache caused by wind [ ]
g. Other (Specify)_____

C10. Has the baby been unwell since birth?

a. YES [ ] b. NO [ ]

If YES, go to questions C11 to C17
If NO, skip questions C11 to C17 and go to question C18

C11. If YES, what condition was/is the baby suffering from? **[TICK ALL REPSONSES]**

a. Fever [ ]
b. Common cold/flu [ ]
c. Diarrhoea [ ]
d. Vomiting [ ]
e. Malaria [ ]
f. Cough [ ]
g. Any other (specify)_____

C12. Did you seek medical care for the baby?

a. YES [ ] b. NO [ ]

If YES, go to questions C13 and C14
If NO, go to question C15

C13. Where did you seek these services? **[TICK ALL REPSONSES]**

a. Public health facility [ ]
b. Private health facility [ ]
c. Bought drugs off the counter [ ]
d. Sought help from relatives/friends/neighbours [ ]
e. Used herbal medicine [ ]
f. Other (specify)_____

C14. Is the baby on treatment at present?

a. YES [ ] b. NO [ ]

C15. If NO, Why did you not seek medical help?

_____
_____

C16. Has the illness interfered with the baby's breastfeeding?

a. YES [ ] b. NO [ ]

If YES, go to question C17

If NO, go to question C18

C17. How has the illness of the CHILD affected breastfeeding?

_____

_____

C18. Are you (MOTHER) experiencing any problem/s in breastfeeding your baby?
a. YES [ ] b. NO [ ] c. NOT BREASTFEEDING [ ]

If YES, go to questions C19 to C22
If NO, go to questions C23

C19. What problems are you experiencing? [**TICK ALL APPLICABLE RESPONSES]**
a. Inadequate breastmilk [ ]
b. Baby refusing to breastfeed [ ]
c. Pain in the breasts [ ]
d. Other (Specify)_____

C20. Have the problems interfered with breastfeeding?
a. YES [ ] b. NO [ ]

C21. How has the problem interfered with breastfeeding?

_____

C22. How have you dealt with the problem/s? **[TICK ALL APPLICABLE RESPONSES]**
a. Done nothing [ ]
b. Public health facility [ ]
c. Private health facility [ ]
d. Bought drugs off the counter [ ]
e. Sought help from relatives/friends/neighbours [ ]
f. Used herbal medicine [ ]
g. Other (Specify)_____

C23. Have you (respondent) been sick in the last two weeks? *(Cross check this Information with the data collected prospectively on mother's health condition)*
a. YES [ ] b. NO [ ]

C24. If YES, what were/are you suffering from? _____

C25. Did/Has the illness interfered with breastfeeding of the baby?
a. YES [ ] b. NO [ ] c. N/A [ ]

C26. If YES, how did/has the illness affect/affected breastfeeding?

_____

C27. Breastfeeding status of the baby **(to be determined from the information given above based on the previous 24 hours and the definitions below)**

a. Exclusive breastfeeding [ ]
b. Predominant breastfeeding [ ]
c. Partly breastfed [ ]
d. Non-breastfed [ ]

APPENDIX 4: QUESTIONNAIRE FOR THIRD – TO SEVENTH INTERVIEWS

ADMINISTRATIVE DETAILS

Questionnaire ID NO_____Treatment group_____Name of village_____

Name of Interviewer_____Name of Respondent_____

Date of Interview _____Questionnaire checked _____Date checked_____

SECTION A. BABY'S BIODATA

A1. Name of baby_____

A2. Date of birth_____A3. Age of child in months_____

Baby's Anthropometric measurements

A4 Weight of baby_____

SECTION B: BREASTFEEDING PRACTICES BASED ON A 24-HOUR RECALL

B1. Has the baby breastfed in the last 24 hours?
a. YES [ ] b. NO [ ]

If NO, go to questions B2 and B3

B2. If NO, why **not**?
a. The baby has been unwell [ ]
b. I have been unwell [ ]
c. I have had to go to back to work [ ]
d. Any other (specify)_____

B3. Do you intend to resume breastfeeding?
a. YES [ ] b. NO [ ] c. NOT SURE [ ]

B4. Have you given the baby any liquid/s in the last 24 hours?
a. YES [ ] b. NO [ ]

B5. If YES, what liquid/s have you given? *[Tick applicable responses]*
a. Formula milk [ ]
b. Cow's milk [ ]
c. Sugar-salt solution [ ]
d. Plain boiled water [ ]
e. Glucose water [ ]
f. Any other (specify)_____

B6. Why did you give the baby this liquid/s? **[TICK ALL APPLICABLE RESPONSES]**

a. To sooth stomach pain [ ]
b. Bay gets hungry [ ]
c. Not producing enough milk [ ]
d. Advised by friends/relatives/neighbours [ ]
e. Advised by health care providers [ ]
g. Any other (Specify)_____

B7. Have you given the baby any solid or semi-solid foods in the last 24 hours?

a. YES [ ] b. NO [ ]

If YES, go to questions B8 and B9
IF NO, skip questions B8 and B9 and go to question B10

B8. If YES, Name the food/s given.

_____

B9. Why did you give the baby the food/s? **[TICK ALL RESPONSES]**

a. Baby gets hungry [ ]
b. Not producing enough breastmilk [ ]
c. Advised by health care providers [ ]
d. Advised by friends/relatives/neighbours [ ]
e. Advised by TBA [ ]
f. To sooth stomachache caused by wind [ ]
g. Other (Specify)_____

B10. Has the baby been unwell in the last two weeks?

a. YES [ ] b. NO [ ]

If YES, go to questions B11 to B16
If NO, skip questions B11 to B16 and go to question B17

B11. If YES, what condition was/is the baby suffering from? **[TICK ALL REPSONSES]**

a. Fever [ ]
b. Common cold/flu [ ]
c. Diarrhoea [ ]
d. Vomiting [ ]
e. Malaria [ ]
g. Cough [ ]
f. Any other (specify)_____

B12. Did you seek medical care for the baby?

a. YES [ ] b. NO [ ]

If YES, go to questions B13 and B14
If NO, go to question B15

B13. Where did you seek these services? **[TICK ALL REPSONSES]**

a. Public health facility [ ]
b. Private health facility [ ]
c. Bought drugs off the counter [ ]
d. Sought help from relatives/friends/neighbours [ ]
e. Used herbal medicine [ ]
f. Other (Specify)_____

B14. Is the baby on treatment at present?

a. YES [ ] b. NO [ ]

B15. If NO, Why did you not seek medical help?

_____

B16. Has the illness interfered with the baby's breastfeeding?

a. YES [ ] b. NO [ ]

If YES, go to question B17

If NO, go to question B18

B17. How has the illness of the CHILD affected breastfeeding?

_____

B18. Are you (MOTHER) experiencing any problem/s in breastfeeding your baby?

a. YES [ ] b. NO [ ] c. NOT BREASTFEEDING [ ]

If YES, go to questions B18 to B21
If NO, go to questions B22

B19. What problems are you experiencing? [**TICK ALL APPLICABLE RESPONSES]**

a. Inadequate breastmilk [ ]
b. Baby refusing to breastfeed [ ]
c. Pain in the breasts [ ]
d. Other (Specify)_____

B20. Have the problems interfered with breastfeeding?

a. YES [ ] b. NO [ ]

B21. How has the problem interfered with breastfeeding?_____

B22. How have you dealt with the problem/s? **[TICK ALL APPLICABLE RESPONSES]**

a. Done nothing [ ]
b. Public health facility [ ]
c. Private health facility [ ]
d. Bought drugs off the counter [ ]
e. Sought help from relatives/friends/neighbours [ ]
f. Used herbal medicine [ ]
g. Other (Specify)_____

B23. Have you (respondent) been sick in the last two weeks? *(Cross check this Information with the data collected prospectively on mother's health condition)*

a. YES [ ] b. NO [ ]

B24. If YES, what were/are you suffering from? _____

B25. Did/Has the illness interfered with breastfeeding of the baby?

a. YES [ ] b. NO [ ] c. N/A [ ]

B26. If YES, how did the illness affect breastfeeding?

_____

B27. Breastfeeding status of the baby **(to be determined from the information given above based on the previous 24 hours and the definitions below)**

a. Exclusive breastfeeding [ ]
b. Predominant breastfeeding [ ]
c. Partly breastfed [ ]
d. Non-breastfed [ ]

SECTION C OF THE SEVENTH INTERVIEW FOR MOTHERS IN FBSICG AND HBICG

MOTHERS' KNOWLEDGE, ATTITUDES, BELIEFS AND PRACTICES REGARDING THE BREASTFEEDING COUNSELING STRATEGIES

C1. Had you ever received information on breastfeeding practices prior to this study?

a. YES [ ] b. NO [ ]

C2. If YES, from which source did you get this information?

_____

C3. How would you rate the breastfeeding counseling received during this study?

a. Excellent [ ]
b. Good [ ]
c. Fair [ ]
d. Poor [ ]

C4. How do you rate your feeling about the breastfeeding content covered during this study?

a. Sufficient [ ]
b. Fairly sufficient [ ]
c. Insufficient [ ]

C5. How different was the information received during the previous breastfeeding counseling from the current one?_____

_____

C6. Did you receive any new information?

a. YES [ ] b. NO [ ]

C7. If YES, mention the new information that you acquired.

_____

_____

C8. Did you like the information passed on to you during the counseling?

a. YES [ ] b. NO [ ] c. Some of it [ ]

C9. If YES or SOME OF IT, what aspects did you like? Give reasons.

_____

_____

C10. If NO or SOME OF IT, what aspects did you **not** like? Give reasons.

_____

_____

C11. Did you agree with all aspects of what was discussed during the breastfeeding counseling?

a. YES [ ] b. NO [ ]

C12. If NOT, what aspects did you not agree with? Give reasons why.

_____

_____

C13. Did the information result in a change in your breastfeeding practices?

a. YES [ ] b. NO [ ]

C14. If YES, how did the information affect your breastfeeding practices?

_____

_____

C15. Did you have difficulties in practising what was suggested during counseling?

a. YES [ ] b. NO [ ] c. SOMETIMES [ ]

C16. If YES, or SOMETIMES, which aspects did you have difficulty with?

_____

_____

C17. Which aspects of the counseling did you find most useful?

_____

_____

C18. Which aspects of the counseling were least useful?

_____

_____

C19. How do you rate your feeling about the way the breastfeeding information was given to you?

a. Good [ ]
b. Fair [ ]
c. Poor [ ]

C20. Would you have liked it done differently?

a. YES [ ]
b. NO [ ]
c. NOT SURE [ ]

C21. If YES, probe for aspects that should be done differently.

_____

_____

C22. Would you prefer the breastfeeding counseling to be done elsewhere?

a. YES [ ]
b. NO [ ]

C23. If YES, where and why?

_____

C24. Would you like to undergo breastfeeding counseling with subsequent pregnancies?

a. YES [ ]
b. NO [ ]
c. NOT SURE/MAY BE [ ]

C25. Give reasons for your answer to the previous question (C 24).

_____

C26. In your opinion, should the breastfeeding counseling strategy be expanded to cover more mothers?

a. YES [ ] b. NO [ ]

C27. Probe for reasons for response to question C26

_____

_____

C28. Dou you believe that exclusive breastfeeding is beneficial to the child?

a. YES [ ]
b. NO [ ]
c. NOT SURE/MAY BE [ ]

C29. Do you believe that the breastfeeding counseling was a worthwhile exercise?

a. YES [ ]
b. NO [ ]

APPENDIX 5: OBSERVATION GUIDELINES

TO BE ADMINSTERED TO THE MOTHERS IN THE THREE GROUPS AT ONE AND THREE MONTHS AFTER DELIVERY

ADMINISTRATIVE DETAILS

Questionnaire ID NO_____ Treatment group____Name of village_____

Name of Interviewer_____Name of Respondent_____

Date of Interview _____Questionnaire checked _____Date checked_____

A. BABY'S BIODATA

A1.Name_____ A2. Date of birth_____

A3.Age in (days/months)_____ A4.Sex: Male [ ] Female [ ]

B: OBSERVATION GUIDELINES

B1. Day of observation:
a. Day one [ ]
b. Day two [ ]

B2. Frequency of breastfeeding **(number of times baby breastfed during the observation)**_____

B3. Breastfeeding pattern:
a. On demand [ ]
b. Routine [ ]

B3. Problems with breastfeeding if any and how they are dealt with.

_____

_____

B.4 Complementary foods given during the observation. **(List them)**

_____

B.5 Frequency of giving foods during the observation period **(Number of times each food given)**

Food	Frequency of feeding
a._____	1._____
b._____	2._____
c._____	3._____

B6. Feeding Status of the baby:
a. Exclusive breastfed [ ]
b. Predominantly breastfed [ ]
c. Partly breastfed [ ]
d. Non-breastfed [ ]

APPENDIX 6: FOCUS GROUP DISCUSSION GUIDELINES

A. FOCUS GROUP DISCUSSIONS GUIDELINES FOR MOTHERS IN THE CONTROL GROUP WHO DID NOT PRACTICE EXCLUSIVE BREASTFEEDING

To be administered after the exit interview at six months after delivery

1. What are the benefits of breastfeeding?
2. In your opinion, are the breastfeeding practices in this community satisfactory?

3 a) What is exclusive breastfeeding?

b) Is exclusive breastfeeding common in this community?

4. Should babies be exclusively breastfed?
5. What factors influence women to either exclusively breastfeed or not?
6. Do you think that the practice of exclusive breastfeeding should be encouraged?
7. What strategies should be used to encourage exclusive breastfeeding?

B. FOCUS GROUP DISCUSSIONS GUIDELINES FOR MOTHERS IN THE CONTROL GROUP WHO PRACTICED EXCLUSIVE BREASTFEEDING

To be administered after the exit interview at six months after delivery

1. What the sources of breastfeeding in this community?
2. In your opinion, are the breastfeeding practices in this community satisfactory?

3 a) What is exclusive breastfeeding?

b) Is exclusive breastfeeding common in this community?

4. Should babies be exclusively breastfed?
5. What factors influence women to either exclusively breastfeed or not?
6. What factors motivated you to practice exclusive breastfeeding?
7. What challenges did you experience in exclusive breastfeeding?
8. Do you think that the practice of exclusive breastfeeding should be encouraged?
9. What strategies should be used to encourage exclusive breastfeeding?

C. FOCUS GROUP DISCUSSIONS GUIDELINES FOR MOTHERS IN FBSICG AND HBICG WHO PRACTICED EXCLUSIVE BREASTFEEDING

To be administered after the exit interview at six months after delivery

1a) Are there other sources of breastfeeding counseling in this community apart from the counseling you underwent during this study?

b) If YES, are the services offered adequate?

2. In your opinion, are the breastfeeding practices in this community satisfactory?
3. Is exclusive breastfeeding common in this community?
4. What are the benefits of exclusive breastfeeding?
5. What factors influence women to either exclusively breastfeed or not?
6. What challenges did you experience/discouraged you from practising exclusive breastfeeding for 6 months?
7. What factors motivated you to practice exclusive breastfeeding?
8. Is breastfeeding counseling important?
9. What is your opinion on the one-on-one health facility-based counseling/Home-based intensive counseling that you received? (Probe for methodology of delivering the messages, depth of information covered, frequency)

D. FOCUS GROUP DISCUSSIONS GUIDELINES FOR MOTHERS IN FBSICG AND HBICG WHO PRACTICED EXCLUSIVE BREASTFEEDING (

To be administered after the exit interview at six months after delivery

1. Apart from the breastfeeding information from the research team, what are the sources of infant feeding information in this community?
2. If YES, are the services offered adequate?
3. In your opinion, are the breastfeeding practices in this community satisfactory?
4. Is exclusive breastfeeding common in this community?
5. What are the benefits of exclusive breastfeeding?
6. What factors influence women to either exclusively breastfeed or not?
7. What challenges did you experience in practising exclusive breastfeeding for 6 months?
8. What factors motivated you to practice exclusive breastfeeding?
9. Is breastfeeding counseling important?
10. What is your opinion on the one-on-one health facility-based counseling/Home-based intensive counseling that you received? (Probe for methodology of delivering the messages, depth of information covered, frequency)

E. FOCUS GROUP DISCUSSIONS GUIDELINES FOR MOTHERS IN FBSICG AND HBICG WHO DID NOT PRACTICE EXCLUSIVE BREASTFEEDING

To be administered after the exit interview at six months after delivery

1a) Are there other sources of breastfeeding counseling in this community apart from the counseling

you underwent during this study?

b) If YES, are the services offered adequate?

2. In your opinion, are the breastfeeding practices in this community satisfactory?
3. Is exclusive breastfeeding common in this community?
4. What are the benefits of exclusive breastfeeding?
5. What factors influence women to either exclusively breastfeed or not?
6. What challenges did you experience in practising exclusive breastfeeding for 6 months?
7. What factors discouraged from practising exclusive breastfeeding?
8. Is breastfeeding counseling important?
9. What is your opinion on the counseling strategy that you received?(Probe for methodology of delivering the messages, depth of information covered, frequency)

APPENDIX 7: TRAINING OF BREASTFEEDING COUNSELORS

Objectives of the training:

1. To explain the objectives and the research methodology.
2. To explain the role and responsibilities of the counselors in the study.
3. To impart knowledge on breastfeeding to the counselors.
4. To train the counselors on counseling skills. These will include:
    - Listening and learning skills
    - Confidence and support skills
    - Use of non-verbal and verbal skills to encourage mother to talk without asking too many questions
    - Responding to mothers' feelings with empathy
    - Avoiding use of words which suggest judgment of the mother and baby
    - Asking non-leading questions
    - Phrasing advise tactfully
    - The importance of personal and moral support to mothers
    - Keeping track with mothers' special difficulties

Duration of training

The training took two weeks. The researcher who is a qualified nutritionist (MSc in Applied Human Nutrition) and a Lactation Management consultant conducted the training.

Mode of training

The counselors' knowledge on breastfeeding was pre-tested prior to the training to establish the level and the gaps in knowledge. The training was conducted through use of the following techniques:

- Lectures
- Discussions
- Brainstorming
- Role-Plays
- Demonstrations
- Practice. The counselors were exposed to practical sessions, with mothers and babies to give them practice in a real life situation. The mothers were drawn from a similar area but not the study site.

Standardization of Counselors performance:

The counselor's knowledge and skills were tested to ensure their capability to undertake the counseling exercise. The following techniques were used:

1. Knowledge on breastfeeding was tested through two written tests during the training; a pre- and post-tests.
2. Counseling skills were tested through role-plays and practices sessions with mothers and their babies.

APPENDIX 8: ETHICAL REVIEW COMMITTEES APPROVAL

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot • your knowledge partner

18 February 2005

Ms SA Ochola
Dept of Human Nutrition

Dear Ms Ochola

RESEARCH PROJECT: **"EVALUATION OF TWO COUNSELLING STRATEGIES TO IMPROVE EXCLUSIVE BREASTFEEDING RATES AMONG HIV-NEGATIVE MOTHERS IN KIBERA SLUM OF NAIROBI, KENYA: A RANDOMIZED CLINICAL TRIAL"**

PROJECT NUMBER : N04/07/105

At a meeting of the Committee for Human Research that was held on 4 August 2004 the above project was approved on condition that further information that was required, be submitted.

This information was supplied and the project was finally approved on 17 February 2005. This project is therefore now registered and you can proceed with the work. Please quote the above-mentioned project number in all further correspondence.

Yours faithfully

CJ VAN TONDER
RESEARCH DEVELOPMENT AND SUPPORT (TYGERBERG)

CJVT/ev

Copy to: Prof D Labadarios

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Fakulteit Gesondheidswetenskappe • Faculty of Health Sciences

Verbind tot Optimale Gesondheid • Committed to Optimal Health
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KENYA MEDICAL RESEARCH INSTITUTE

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E-mail: kemri-hq@nairobi.mimcom.net; director@kemri.org Website: www.kemri.org

KEMRI/RES/7/3/1

23rd November 2004

Sophie Ochola
Department of Foods, Nutrition & Dietetics
Kenyatta University
PO Box 43844
NAIROBI.

Dear Madam,

RE: NON SSC Protocol – Evaluation of two counseling strategies to improve exclusive breastfeeding rates among HIV negative mothers in Kibera slum of Nairobi Kenya: A randomized clinical trial, by Sophie Ochola (PhD. Research Proposal)

This is to inform you that during the 117th meeting of the KEMRI/National Ethical Review Committee held on 23rd November 2004, the above protocol was discussed.

Further to your letter of November 1, 2004, this is to inform you that during the 117th meeting of the KEMRI/National Ethical Review Committee held on the 23rd November 2004, the committee fully ratified the approval that had been given by the Chairman.

Kindly continue with your study.

R. C. M. KITHINJI,
FOR: SECRETARY,
KEMRI/NATIONAL ETHICAL REVIEW COMMITTEE

APPENDIX 9: INFORMED CONSENT FORM

Committee for Pharmaceutical Trials
Patient information sheet

Patient identification number: . . . . / . . . . . **Patient initials:**

Title of the study:
EVALUATION OF TWO COUNSELING STRATEGIES TO IMRPOVE EXCLUSIVE BREASTFEEDING RATES AMONG HIV-NEGATIVE MOTHERS IN KIBERA SLUM OF NAIROBI, KENYA: A RANDOMIZED CLINICAL TRIAL
Protocol number:
Sponsor: NESTLE FOUNDATION
Name of Principal Investigator: MRS SOPHIE A OCHOLA
Address of site/institution where study will be conducted:
KIBERA SLUM OF NAIROBI, KENYA

1. INTRODUCTION - VOLUNTARY PARTICIPATION

You are invited to take part in a clinical research study Sponsored by Nestle Foundation. Before deciding to take part in the study, it is important for you to understand why the research is done and what will happen to you. This information sheet will provide you with information about this study and your rights as a research participant so that you can decide if you want to take part.
If you decide to take part in this study, it is entirely voluntary. If you do not want to take part, you will not lose any benefits to which you would otherwise be entitled by attending this facility. You may also withdraw from the study any time without penalty or consequence on your future care.
This study has been approved by the South African Medicines Control Council (MCC) and the Committee for Pharmaceutical Trials of Stellenbosch University and the National Ethical Review Committee in Kenya. These are groups of scientific and non-scientific people. They review and approve or disapprove research involving patients. The study is in accordance with the guidelines of the International Conference on Harmonization (ICH) for Good Clinical Practice (GCP) and with the Declaration of Helsinki (version 2000). These are policy statements that protect the rights of study patients.
You should inform your general practitioner (your house doctor) that you are taking part in this study. If you have a life insurance policy, you must tell the company involved that you will be taking part in this study.

2. PURPOSE OF THE STUDY

The purpose of the study is to determine Infant Feeding Practices among HIV-negative mothers in order to provide information that will be useful to the Ministry of Health, and NGOs dealing with child survival programmes in Kenya, in developing more effective breastfeeding counseling strategies.

3. ELIGIBILITY

You qualify to participate in this study because you meet the following criteria:

- You are 32-34 weeks pregnant
- You are HIV-negative
- You intend to continue staying in Kibera for at least 6 months after delivery.
- You are willing to be visited in your home by the study team
- You do not suffer from Diabetes Mellitus, heart disease or eclampsia.

If you decide to take part in this study, the study team will go through this form with you and ask you to sign it. You will be given a copy of this form to keep.
360 women (older than 15 years) from Kibera slum will take part in this study. All the participants will be accessed through Lang'ata Health Centre.

4. STUDY PROCEDURES

The study will be involve monthly visits to your home from the time of recruitment in the study until the baby to be born is six months of age. This means that the study will last between eight to nine months for each mother.
During these visits, discussions will be held with you on how to feed your child. You will also be asked questions on how you will feed your child to be born from birth to six months of age. The study team will also want to learn why you will give your child the foods/liquids that you will give him or her.

5. STUDY MEDICATION

There will no medication given to you by the study team. Incase you or your child get ill, you will be referred to the public health facilities in and around Kibera.

6. YOUR RESPONSIBILITIES

As a participant in this study, you are responsible for:
- allowing the study team to visit you in your home
- answering the questions asked by the study team
- being involved in discussions with the study team
- reporting any breastfeeding problems you experience to the study team

7. POTENTIAL RISKS
The study carries no potential risks, as no medicines will be given to participants in this study.

8. ALTERNATIVE TREATMENT

If you decide not to take part in this study, then you will be free to continue to attend the clinic and receive the same care as before.

9. PAYMENTS/EXPENSES

You will not be paid for participating in this study, either financially or materially.

10. RESEARCH RELATED INJURIES

There are no anticipated research-related injuries in this study.

11. CONFIDENTIALITY

If you consent to take part in this study, record of your data may be directly inspected by the study Sponsors, the Medicines Control Council of South Africa, other Medicines Regulatory Authorities, the Committee for Pharmaceutical Trials of the Stellenbosch University and the National Ethical Review Committee Kenya to make sure that the study is being done correctly. By signing this written informed consent form you are giving permission for this to be done.

The information collected during the study will be stored in a computer but your name will not be stored. Only your study team will know that the information is related to you. The results of the study may be published in the medical literature, but your identity will not be revealed.

12. NEW FINDINGS

The study coordinator will let you know as soon as any information becomes available that may have an effect on your choice to carry on in the study.

13. TERMINATION OF THE PATIENT'S STUDY PARTICIPATION

Taking part in the study is voluntary. If you decide to take part in the study, you are free to withdraw from the study at any time. If you decide to withdraw from the study, you should inform a member of the study team immediately. The study team will not be upset and you will not be penalized in any way, and your future care at the clinic will not be affected. Should you withdraw from the study, the study data collected before your withdrawal may still be processed along with other data collected as part of the study.

In addition, circumstances may arise that will lead to end your participation in this study. Such circumstances could include:

- an illness that will affect your ability to breastfeed the baby
- if there are not enough patients in the study;
- Medicines Control Council or the Committee for Pharmaceutical Trials and the National Ethical Review Committee Kenya stops or suspends the research,
- the Sponsor stops the study.

14. CONTACTS

If during the course of this study, you have questions about the nature of the research or your rights, or you believe that you have sustained a research-related injury, you should contact one of the following:

Name: SOPHIE OCHOLA…Dept. of Nutrition, Kenyatta University, P.O BOX 43844, NAIROBI.
Telephone number(s) (available 24 hours) 0721 449 803

If you have any questions about your rights as a participant in a research experiment/trial, you can contact:

The National Ethical Review Committee
P.O BOX 54840, NAIROBI, KENYA
TEL: 27222541
Contact Person: Mr. George Seko
Cell Phone: 0720486866

INFORMED CONSENT FORM

Patient identification number: . . . . / . . . . . **Patient initials:**

Project title: EVALUATION OF TWO COUNSELING STRATEGIES TO IMRPOVE EXCLUSIVE BREASTFEEDING RATES AMONG HIV-NEGATIVE MOTHERS IN KIBERA SLUM OF NAIROBI, KENYA: A RANDOMIZED CLINICAL TRIAL
Protocol number:

By signing and dating this document,

- I confirm that I have had time to read carefully and understand the patient information sheet provided for this study.
- I confirm that I have had the opportunity to discuss the study and ask questions and I am satisfied with the answers and explanations that I have been provided.

- I give permission for my medical records (the medical records of my child) to be reviewed by the Sponsor or designee, and/or representatives of the Medicines Control Council or Committee for Pharmaceutical Trials and/or the National Ethical Review Committee, Kenya.
- I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without my medical care or legal rights being affected.
- I voluntary agree to take part (that my child takes part) in this study.

PARTICIPANT _____ _____ _____
Name (capital letters) Signature Date

PARTICIPANT'S LEGALLY ACCEPTABLE REPRESENTATIVE

_____ _____ _____
(where required) Name (capital letters) *Signature* *Date*

PERSON OBTAINING CONSENT

_____ _____ _____
Name (capital letters) Signature Date

WITNESS _____ _____ _____
(where required) Name (capital letters) Signature Date

INFORMATION AND INFORMED CONSENT DOCUMENT

TITLE OF THE RESEARCH PROJECT:
EVALUATION OF TWO COUNSELING STRATEGIES TO IMRPOVE EXCLUSIVE BREASTFEEDING RATES AMONG HIV-NEGATIVE MOTHERS IN KIBERA SLUM OF NAIROBI, KENYA: A RANDOMIZED CLINICAL TRIAL

REFERENCE NUMBER: ……..……

PRINCIPAL INVESTIGATOR: **MRS SOPHIE A OCHOLA**

Address: **DEPT. OF NUTRITION, KENYATTA UNIVERSITY, P.O BOX 43844 00100, NAIROBI.**

DECLARATION BY OR ON BEHALF OF PATIENT/*PARTICIPANT:
I, THE UNDERSIGNED, …….. *(name)*

[ID No: ……..……] the patient/*participant or* in my capacity as …….

of the patient/*participant [ID No: …… of

……..……..……..……*(address).*

A. HEREBY CONFIRM AS FOLLOWS:

1. I/*The patient/*participant was invited to participate in the above mentioned research project which is being undertaken by the Department of ……HUMAN NUTRITION……., Faculty of Health Sciences, Stellenbosch University.
2. The following aspects have been explained to me the participant:
   2.1 **Aim:** The study is designed to provide information on Infant Feeding Practices among HIV-negative mothers that will be useful to the Ministry of Health in developing more effective breastfeeding counseling strategies in order to improve breastfeeding practices among mothers.
   2.2 **Procedures:** The study will be conducted through monthly home visits and will involve interviews and discussions with the study group. The study will involve 360 women from Kibera slum and will take about eight to nine months for each mother involved.

2.3 **Possible benefits:** There will be no payments both financial and material for participating in the study.

2.4 **Confidentiality:** The information collected will be treated as confidential, it will be included in a thesis, a publication in a professional journal, etc, without disclosing the identity of the person).

2.5 **Voluntary participation/refusal/discontinuation:** Participation is voluntary and that the potential participant may consequently refuse to participate, and that the participant may discontinue participation at any time and that such refusal or discontinuation would not prejudice the participant's future treatment at this institution and that the investigator may withdraw the participant from the study should he/she feel that it would be in the participant's best interest.

3. The information above was explained to me the participant by ……... *(name of relevant person)* /English/Kiswahili and I am the participant is in command of this language/*it was satisfactorily translated to me/*him/*her by ……. *(name of translator).* I/*The participant/*patient was given the opportunity to ask questions and all these questions were answered satisfactorily.
4. No pressure was exerted on me the participant to consent to participation and I the participant understand that I the participant may withdraw at any stage without any penalization.
5. Participation in this study will not result in any additional costs to myself/*the participant/*patient.

B. I HEREBY CONSENT VOLUNTARILY TO PARTICIPATE IN THE ABOVE MENTIONED PROJECT/*THAT THE PATIENT/*POTENTIAL PARTICIPANT MAY PARTICIPATE IN THE ABOVE MENTIONED STUDY.

Signed/confirmed at …….. on ……20 …...
(place) *(date)*

*Signature or right thumb print of patient/*representative of the patient/*participant* *Signature of witness*

STATEMENT BY OR ON BEHALF OF INVESTIGATOR(S):

I, ……, declare that

- I explained the information given in this document to ……. *(name of the patient/*participant)* and/*or his/*her representative ……..…… *(name of the representative);*
- he/*she was encouraged and given ample time to ask me any questions;
- this conversation was conducted in English /Kiswahili/*Other ……..…… and no translator was used/*this conversation was translated into …….. *(language)* by ……..……..……. *(name).*

Signed at ……..….. on ……..……...20 ….
(place) *(date*

*Delete where not applicable

DECLARATION BY TRANSLATOR:

I, ……..……*(name)*, confirm that I

- translated the contents of this document from English into ……..(*indicate the relevant language)* to the patient/*the patient's representative/*participant;
- explained the contents of this document to the patient/*participant/*patient's representative;
- also translated the questions posed by ……*(name),* as well as the answers given by the investigator/*the investigator's representative; and
- conveyed a factually correct version of what was related to me.

- Signed at …… on ……..20 ……
  (place) *(date)*
  Signature of translator *Signature of witness*

IMPORTANT MESSAGE TO PATIENT/*REPRESENTATIVE OF PATIENT/*PARTICIPANT:

Dear patient/*representative of the patient/*participant,

Thank you for your/*the patient's participation in this study. Should, at any time during the study,

- an emergency arise as a result of the research, or
- you require any further information with regard to the study, or
- the following occur:
  - ILLNESS OR A PROBLEM THAT WILL INTERFERE WITH BREASTFEEDING

  kindly contact …MRS. SOPHIE OCHOLA telephone number 0721 449 803 (*available on a 24 hour basis)*

9/02/02
bd/Guidelines

APPENDIX 10: PILOT STUDY REPORT

(This appendix should be read in conjunction with the extract of the pilot study described in Chapter 2: Methodology)

EVALUATION OF TWO COUNSELING STRATEGIES TO IMPROVE EXCLUSIVE BREASTFEEDING RATES AMONG HIV-NEGATIVE MOTHERS IN KIBERA SLUM OF NAIROBI, KENYA: A RANDOMIZED TRIAL

1. Introduction

The pilot study was conducted for two months; February to March 2005 in Kawangware slum, an area comparable to the study site. All aspects of the study were covered and all the data collection instruments tested. The pilot study tested the proposed study procedures and the data collection instruments for accuracy, clarity, and validity and also to get a feel of the study findings.

2. Methodology

Selection and training of research assistants and breastfeeding counselors

The research assistants and breastfeeding counselors were selected according to the criteria proposed in the study protocol. The training for breastfeeding counselors lasted 5 days and was based on the WHO recommended 40-hours training and Helping mothers to breastfeed as stated in the protocol. The trainees underwent a pre-test prior to the training to determine their level of knowledge about breastfeeding and a post-test to establish the level of knowledge after the training. At the end of the training, all the breastfeeding counselors had adequate knowledge and skills to conduct breastfeeding counseling.

The research assistants were trained for 7 days during which the objectives of the study were explained to them without disclosing the research hypotheses. The training involved detailed explanation of the essence of all the questions in the questionnaires and observation checklist. The training was conducted through demonstrations, role-plays and practical sessions. At the end of the training, all the research assistants acquired adequate skills to conduct the interviews and record responses accurately.

The number of breastfeeding counselors and research assistants was each increased by one making a total of three in each group. This decision was made during the preparation for the study when it was

realized that the number planned for would not be adequate to conduct the research in the planned time.

2.2 Study Design

The villages in the pilot study area were randomized into the three study groups: the control group (CG); experimental group one, the Facility-Based Semi-Intensive Counseling Group (FBSICG); experimental group two, the Home-Based Intensive Counseling Group (HBICG). The mothers were accessed through three health facilities: Makina and Joseph Kangethe public health centres and Ushirika health centre run by a Community-Based Organization (CBO). On average three mothers were recruited per day.

2.2 Treatment for the Groups

The CG received no breastfeeding counseling from the research team; the FBSICG received one session of one-one facility-based breastfeeding counseling prenatally; and the HBICG received 3 sessions, one prenatally and the rest within the second and third weeks postpartum.

2.3 Follow-ups

Follow-ups of the study mothers were conducted every three days to identify mothers who had delivered and who may have lactation problems. It was felt that the visits after every three days were not necessary especially for mothers who had not delivered. It was observed that some of the mothers shared the same sentiments. It is proposed therefore that during the actual study, the follow-ups be done once every week for each mother.

2.4 Determination of Breastfeeding Practices

The determination of maternal breastfeeding practices in the three study groups was carried out as follows:

Interviews scheduled as follows:

- First (Baseline Interview): Within three days after recruitment into the Study
- Second Interview 5-10 days after delivery
- Third and final interview 3 weeks after delivery

Observations scheduled as follows:

Two one-day observations:

- First observation 7-14 days after delivery
- Second observation At 3 weeks after delivery

Focus group discussions as follows: At 3 weeks after delivery, following the third and final interview

2.5 Data Analysis

Quantitative data was been entered in excel 2003 according to the guidelines by a statistician at the university of Stellenbosch and analyzed using SPSS soft ware. This process revealed changes requiring to be made on the questionnaires; in order for data analysis to be undertaken according to the proposed statistical tools and also to meet the objectives of the study.

3. Results

3.1 Socio-economic characteristics of the households

About half of the households (53.0%) owned televisions; 53.0% owned telephones and almost all households (97.0%) owned radios; 78.0% owned sofasets and 72.0% owned land in their rural homes. The majority (91.0%) of the households lived in rented one roomed (84.0%) houses (Table 3.1). All the houses had iron sheet roofs and cemented floors; 75.0% of the walls were constructed out of mud. About half of the households (53.0%) used kerosene for lighting and 47.0% used electricity. Kerosene was the main cooking fuel for 84.0% of the households and charcoal was used by 16.0% of the households.

3.2 Maternal characteristics

One third (34.0%) of the women were between 21-35 years old; 25.0% were 21-25 years old, 34.0% were 26-30 years old, and 25.0% were 31-35 years old (Table 3.2). Over half (56.0%) had primary school level of education and 31.0% had secondary level of education. Most of the women (91.0%) were married and 81.0% were housewives. The majority; 84.0% depended on their husband's income whereas 41.0% had business enterprises. About one quarter (22.0%) had no children and half of them (50.0%) had 1-2 children and 19.0% had 3-4 children.

Table 3.1: Socio-economic characteristics of the households

	N =32	%
Ownership of items:		
Television	17	53
Radio	31	97
Telephone	17	53
Video Cassette	3	9
Bicycle	7	22
Land	23	72
Plot	4	13
Sofaset	25	78
Type of house:		
Rented	29	91
Owned	3	9
One- roomed house	27	84
Two-roomed house	4	13
Rent Ksh 500-1000	17	53
Rent Ksh >1000-1500	4	13
Rent Ksh >2000	4	13
Walls made of mud	24	75
Roof made of iron sheets	27	84
Cemented floor	32	100
Source of lighting:		
Kerosene	17	53
Electricity	15	47
Cooking fuel:		
Kerosene	27	84
Charcoal	5	16

3:2 Maternal Characteristics

Maternal Characteristics	*N* (32)	%
Age:		
< 16 years	1	3
16-20 years	3	9
21-25 years	8	25
26-30 years	11	34
31-35 years	8	25
36-40 years	1	3
Education:		
No formal education	1	3
Primary school level	18	56
Secondary school level	10	31
Tertiary level	3	9
Occupation:		
Casual worker	2	6
Housewife	26	81
Formally/Regularly employed	2	6
Self-employed	2	6
Marital status:		
Married	29	91
Divorced/separated	1	3
Single	2	6
*** Source of Income:**		
Husband	27	84
Own business	13	41
Salary	4	13
Parity:		
No children	7	22
1-2 children	16	50
3-4 children	6	19
5-6 children	3	9

***Multiple Responses therefore more than 100%**

3.3 Maternal pregnancy-related characteristics

The majority of the mothers (97.0%) were recruited into the study at 36 weeks gestational age (Table 3.3). The first ANC visit for about half (47.0%) of them was at 20-25 weeks gestational age, whereas one third (34.0%) made the first visit to the ANC at 30-34 weeks gestational age. About two-fifths (38.0%) had made 4 visits; 25.0% 5 visits; 19.0% 3 visits, 16.0%, and 3.0% one visit to the ANC at the time of recruitment into the study.

Table 3.3: Maternal pregnancy-related characteristics

	N=32	%
Age of pregnancy at recruitment:		
36 weeks	31	97
34weeks	1	3
Age of pregnancy at first ANC attendance:		
<20 weeks	4	13
20-25 weeks	15	47
30-34 weeks	11	34
35-39 weeks	2	6
Frequency of ANC attendance at recruitment:		
Once	1	3
Twice	5	16
Three	6	19
Four	12	38
Five	8	25

3.4 Breastfeeding counseling received prior to the study

The majority of the mothers (75%) had received breastfeeding counseling prior to the study whereas 25.0% had not breading counseling. Of those who received counseling; 37.5% were from the CG, 33.3% from the FBSICG and 29.2% from the HBICG (Figure 3.1). These differences were insignificant (Chi-square test; p=0.804).

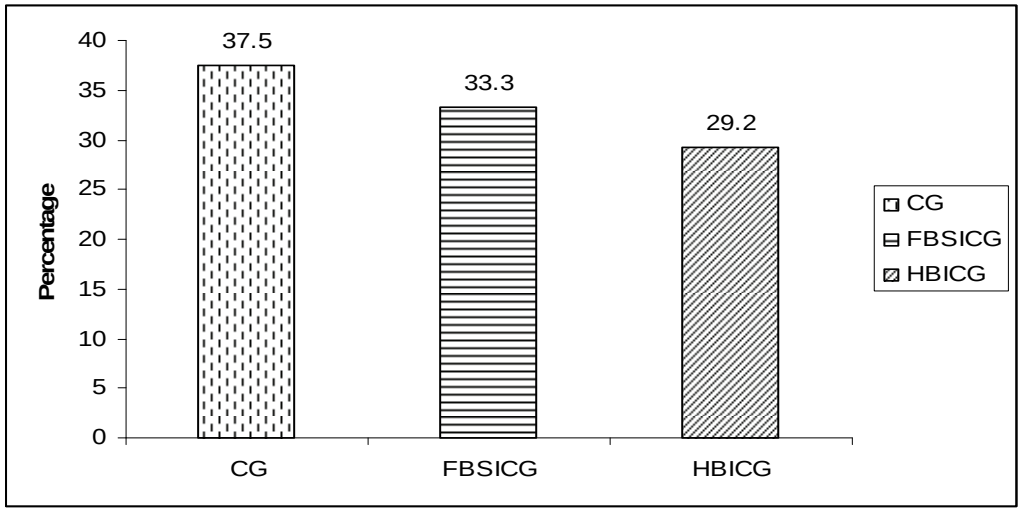
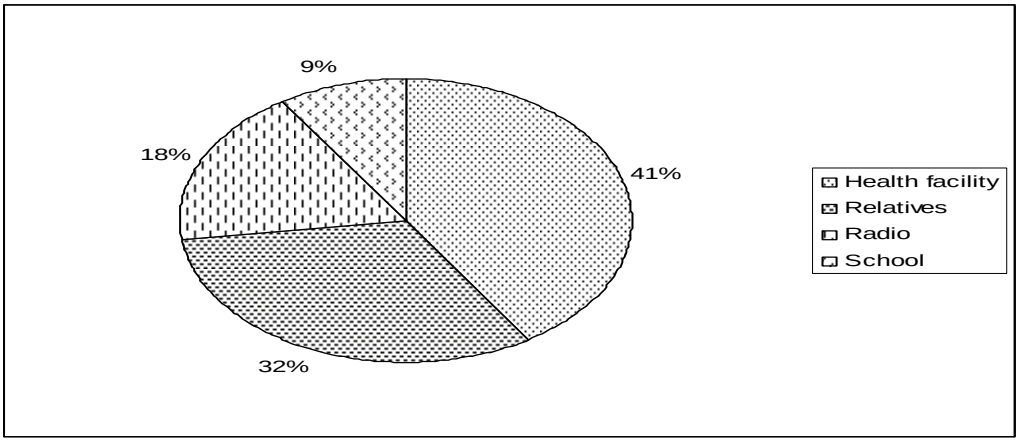


Figure 3.1: Percentage distribution of mothers receiving breastfeeding counseling prior to the study
by study groups

3.4.1 Sources of breastfeeding information

The most important sources of breastfeeding information were; the health facility and relatives. Over half (56.0%) of the mothers received breastfeeding counseling from health facilities; 44.0% from relatives; 25.0% from the radio and 12.5% from school (Figure 3.2).



3.5 Maternal knowledge on infant feeding practices prior to the study intervention

The majority of the mothers (91.0%) knew that breastmilk should be the first feed for the baby and 84.0% correctly stated that babies should be breastfed for ≥2 years and a similar proportion (84.0%) knew that babies should be fed on demand. In contrast, 56.0% of the mothers knew that breastfeeding should be initiated within one hour after delivery and only 13% knew that babies should be exclusively breastfed for 6 months of age (Table 3.4).

Table 3.4: Maternal knowledge on infant feeding before the study intervention

Aspects of Infant Feeding knowledge	***N*=32**	**%**
Breast milk should be baby's first feed	29	91%
Initiation of breastfeeding within an hour after hour	18	56%
Exclusive breastfeeding for 6 months	4	13%
Breastfeed on demand	27	84%
Breastfeed for ≥2 years	27	84%

Multiple responses

3.6 Mothers past and intended future infant feeding practices

All mothers breastfed their children in the past and all intended to breastfeed the baby to be born. The majority (81%) intended to breastfeed the unborn baby for 2 years or longer; whereas 50.0% would introduce complementary foods at 3-4 months and only 13.0 at % at 6 months (Table 3.5).

Table 3.5: Past and intended future infant feeding practices

Infant Feeding Practices	***N*=32**	**%**
Breastfed in the past	32	100%
Plan to breastfeed the baby to be born	32	100%
Plan to breastfeed unborn baby for ≥ 2 years	26	81%
Introduction of complementary foods at:		
6 months	4	13%
3-4 months	15	50%

4. Proposed changes to the data collection instruments

There were minor changes in the questionnaires; no questions were deleted or new ones added. It is proposed that where possible data is not collected in a categorized manner; categorization be done during analysis if need necessary in order to allow for the use of a variety of statistical tools.

5. Attrition Rate

The attrition rate was 16% in all the study groups. Some mothers re-located to other residential areas while others did not indicate their reasons for dropping out. It is proposed that a more thorough explanation to the mothers on the purpose and process of the research be undertaken before recruitment into the study. It will also be emphasized to a greater depth that participation is voluntary and mother's unwillingness to participate will not interfere with the provision of services at the health facility from where she is recruited.

APPENDIX 11: MATERNAL DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING

Maternal demographic and socio-economic characteristics not associated with exclusive breastfeeding status [N; (%)]

	Exclusively breastfeeding *N* (%)	Not exclusively breastfeeding *N* (%)	Chi-square & T-test; p
1 month:			
Maternal age (means- yrs)	24.2 (4.6)	23.2 (5.5)	0.346
Rent per month (means-Ksh)*	695 (328)	745 (324)	0.301
Maternal Education			
Primary	83 (75.3)	44 (88.6)	0.287
Secondary	60 (24.7)	12 (21.4)	
Maternal occupation (Housewife)	171 (70.4)	38 (67.9)	0.203
Marital status (married)	227 (93.4)	53 (94.6)	0.535
Owned television	60 (24.7)	13 (23.2)	0.816
Owned radio	216 (88.9)	50 (89.3)	0.932
Owned telephone	105 (43.2)	22 (39.3)	0.591
2 months:			
Maternal age (means- yrs)	23.7 (4.2)	24.7 (5.1)	0.351
Rent per month (means-Ksh)*	662 (261)	681 (263)	0.752
Household size (means)	3.9 (1.6)	3.3 (1.7)	0.158
Maternal Education			0.710
Primary	50 (71.4)	19 (76.0)	
Secondary	20 (28.6)	6 (24.0)	
Maternal occupation (Housewife)	55 (78.6)	17 (68.0)	0.468
Marital status (married)	66 (94.3)	24 (96.0)	0.735
Owned television	16 (22.9)	23 (92.0)	0.889
Owned radio	60 (85.7)	22 (88.0)	0.773
Owned telephone	28 (40.0)	13 (52.0)	0.300
3 months:			
Maternal age (means- yrs)	24.0 (3.9)	24.4 (5.4)	0.555
Rent per month (means-Ksh)*	688 (285)	714 (348)	0.503
Household size	3.7 (1.6)	3.8 (1.7)	0.724
Maternal Education			0.666
Primary	95 (82.5)	106 (76.8)	
Secondary	36 (27.5)	32 (23.2)	
Maternal occupation (Housewife)	92 (70.2)	95 (68.8)	0.224
Marital status (married)	122 (93.1)	131 (94.9)	0.555
Owned television	29 (22.1)	37 (26.8)	0.373
Owned radio	114 (87.0)	124 (89.9)	0.467

*** Ksh (Kenya shillings), 70= 1 US$ June 2006**

Maternal demographic and socio-economic characteristics not associated with exclusive breastfeeding status [N; (%)] (cont)

	Exclusively breastfeeding *N* (%)	Not exclusively breastfeeding *N* (%)	Chi-square & T-test; p
4 months:			
Maternal age (means- yrs)	24 (3.8)	24 (5.3)	1.000
Rent per month (means-Ksh)*	622 (182)	625 (269)	0.959
Household size	3.7 (1.7)	4.1 (1.8)	0.265
Maternal Education			0.210
Primary	33 (68.8)	33 (84.6)	
Secondary	15 (31.2)	6 (15.4)	
Maternal occupation (Housewife)	37 (77.1)	29 (74.4)	0.513
Marital status (married)	45 (93.8)	37 (94.9)	0.822
Owned radio	41 (85.4)	32 (82.1)	0.672)
5 months:			
Maternal age (means- yrs)	24.1 (3.7)	24.0 (5.3)	0.973
Rent per month (means-Ksh)*	654 (271)	635 (246)	0.739
Household size (means)	3.7 (1.8)	4.1 (2.0)	0.336
Maternal Education			
Primary	21 (60.0)	38 (80.8)	0.116
Secondary	14 (40.0)	9 (19.1)	
Maternal occupation (Housewife)	29 (82.9)	33 (70.2)	0.281
Marital status (married)	32 (91.4)	45 (95.7)	0.422
Owned television	8 (22.9)	14 (29.8)	0.481
Owned radio	30 (85.7)	40 (85.1)	0.939
Owned telephone	13 (37.1)	23 (48.9)	0.286
6 months:			
Maternal age (means- yrs)	24.3 (3.7)	24.3 (4.9)	0.912
Rent per month (means-Ksh)*	680 (345)	696 (317)	0.793
Household size	4.0 (1.4)	3.7 (1.7)	0.893
Maternal Education			
Primary	22 (64.7)	177 (76.6)	0.268
Secondary	12 (35.3)	54 (23.4)	
Maternal occupation:			
Housewife	28 (82.4)	154 (66.7)	0.118
Self-employed	3 (8.8)	35 (15.2)	
Marital status (married)	31 (94.1)	216 (93.5)	0.654
Owned television	8 (23.5)	60 (26.0)	0.759
Owned radio	32 (94.1)	201 (87.0)	0.198
Owned telephone	17 (44.2)	102 (44.2)	0.523

*** Ksh (Kenya shillings), 70= 1 US$ June 2006**

APPENDIX 12: MATERNAL KNOWLEDGE AND PLANNED FEEDING PRACTICES NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING

Aspects of maternal knowledge on infant feeding practices at baseline not associated with exclusive breastfeeding practices

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding *N*; (%)	Chi-square & T-test; p
Knowledge at baseline			
1 month:			
Duration of EBF 6 months	50 (20.6)	14 (25.0)	0.473
Breastmilk appropriate 1st feed	213 (87.7)	45 (80.4)	0.169
Breast feeding initiation within 1 hour	107 (44.0)	24 (42.9)	0.873
2 Months:			
Duration of EBF 6 months	28 (25.7)	8 (32.0)	0.549
Breastmilk appropriate 1st feed	63 (90.0)	20 (80.0)	0.215
Breast feeding initiation within 1 hour	36 (51.4)	8 (32.0)	0.091
3 Months:			
Duration of EBF 6 months	27 (20.6)	30 (21.7)	0.821
Breastmilk appropriate 1st feed	118 (90.1)	116 (84.1)	0.140
Breast feeding initiation within 1 hour	60 (45.8)	60 (43.5)	0.702
4 months:			
Duration of EBF 6 months	9 (18.8)	11 (28.8)	0.218
Breastmilk appropriate 1st feed	44 (91.7)	31 (79.5)	0.101
Breast feeding initiation within 1 hour	27 (56.3)	14 (35.9)	0.057
5 months:			
Duration of breastfeeding ≥ 2 yrs	25 (71.4)	27 (57.4)	0.191
Duration of EBF 6 months	9 (25.7)	12 (25.5)	0.985
Breastmilk appropriate 1st feed	31 (88.6)	39 (83.0)	0.474
Breast feeding initiation within 1 hour	19 (54.3)	17 (36.2)	0.102
6 months:			
Duration of breastfeeding ≥ 2 yrs	23 (67.6)	145 (62.8)	0.579
Duration of EBF 6 months	5 (14.7)	48 (20.8)	0.393
Breastmilk appropriate 1st feed	29 (85.3)	194 (84.0)	0.844
Breast feeding initiation within 1 hour	14 (41.2)	102 (44.2)	0.743)

EBF = Exclusive breastfeeding

Maternal planned feeding practices at baseline not associated with exclusive breastfeeding practices

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding *N*; (%)	T-test; p
1 month:			
Duration of breastfeeding in years (mean)	2.1 (0.7)	1.9 (0.90	0.107
Age of introduction of CF in months (mean)	4.6 (1.8)	4.3 (1.6)	0.173
2 months:			
Age of introduction of CF in years (mean)	5.2 (2.1)	4.8 (1.6)	0.379
4 months:			
Duration of breastfeeding in years (mean)	2.2 (0.8)	2.1 (0.8)	0.466
Age of introduction of CF in months (mean)	4.7 (2.0)	4.8 (1.7)	0.862
5 months:			
Duration of breastfeeding in years (mean)	2.3 (0.8)	2.1 (0.8)	0.248
Age of introduction of CF in months (mean)	5.1 (2.0)	4.7 (1.9)	0.268
6 months:			
Duration of breastfeeding in years (mean)	2.2 (0.9)	2.1 (0.7)	0.577
Age of introduction of CF in months (mean)	4.7 (2.1)	4.4 (1.8)	0.328

CF =Complementary Feeding

APPENDIX 13: MATERNAL PERINATAL-RELATED FACTORS (AT BASELINE) NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING

Maternal perinatal-related factors (at baseline) not associated with exclusive breastfeeding

	Exclusively breastfeeding *mean (sd)*	Not exclusively breastfeeding *mean (sd*	T-test; p
1 month:			
Gestation age (wks) at enrollment	35.0 (1.0)	34.8 (1.0)	0.183
Gestation age (wks) at 1st ANC visit	5.8 (4.9)	24.8 (5.3)	
0.203			
Freq of ANC visits at enrollment	3.2 (1.3)	3.4 (1.3)	0.172
2 months:			
Gestation age (wks) at enrollment	35.0 (1.0)	35.0 (1.0)	0.914
Gestation age (wks) at 1st ANC visit	25.8 (5.4)	25.0 (5.7)	0.551
Freq of ANC visits at enrollment	3.2 (1.3)	3.2 (1.3)	0.933
3 months:			
Gestation age (wks) at enrollment	35.1 (1.0)	34.9 (1.0)	0.222
Gestation age (wks) at 1st ANC visit	26.0 (5.0)	25.4 (4.8)	0.277
Freq of ANC visits (wks) at enrollment	3.1 (1.3)	3.3 (1.2)	0.359
4 months:			
Gestation age (wks) at 1st ANC visit	26 (5.0)	25.3 (5.5)	0.596
Freq of ANC visits at enrollment	3.2 (1.3)	3.1 (1.2)	0.819
5 months:			
Gestation age (wks) at enrollment	35.3 (1.0)	35.0 (1.0)	0.108
Gestation age (wks) at 1st ANC visit	26.0 (5.4)	26.0 (5.1)	0.952
Freq of ANC visits at enrollment	3.2 (1.4)	3.1 (1.1)	0.710
6 months:			
Gestation age (wks) at enrollment	35.1 (1.0)	35.0 (1.0)	0.414
Gestation age (wks) at 1st ANC visit	27.0 (4.4)	25.8 (4.9)	0.166
Freq of ANC visits at enrollment	3.0 (1.3)	3.2 (1.8)	0.484

Wks= weeks; ANC= antenatal clinic

APPENDIX 14: MATERNAL INFANT FEEDING PRACTICES IN THE FIRST WEEK AFTER BIRTH NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING PRACTICES

Maternal infant feeding practices in the first week after birth and exclusive breastfeeding practice

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
1 Month:			
Breastfeeding within 1 hr	30 (12.3)	1 (12.5)	0.975
Breastmilk 1st feed	79 (32.5)	19 (33.9)	0.839
2 Months:			
Breastfeeding within 1 hr	5 (7.1)	4 (16.0)	0.216
Breastmilk 1st feed	29 (41.4)	8 (32.0)	0.403
3 Months:			
Breastfeeding within 1 hr	13 (9.9)	20 (14.5)	0.252
Breastmilk 1st feed	45 (34.4)	39 (28.3)	0.281
4 Months:			
Breastfeeding within 1 hr	4 (8.3)	6 (15.4)	0.306
Breastmilk 1st feed	22 (45.8)	14 (35.9)	0.281
5 Months:			
Breastfeeding within 1 hr	1 (2.9)	6 (12.8)	0.091
Breastmilk 1st feed	14 (40.4)	17 (36.2)	0.732
6 Months:			
Breastfeeding within 1 hr	3 (8.8)	27 (11.7)	0.612
Breastmilk 1st feed	14 (41.2)	67 (29.0)	0.160

APPENDIX 15: MATERNAL MORBIDITY AND BREASTFEEDING COMPLICATIONS NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING

Maternal morbidity and breastfeeding complications not associated with exclusive breastfeeding practices [N; (%)]

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
1 Month:			
Inadequate breastmilk	1 (0.4)	2 (3.6)	0.068
Pain in the breast	3 (1.2)	1 (1.8)	0.755
Maternal illness	39 (16.0)	7 (12.5)	0.498
2 Months:			
Pain in the breast	1 (1.4)	0 (0.0)	0.433
Maternal illness	9 (13.0)	3 (12.0)	0.893
4 Months:			
Pain in the breast	0 (0.0)	1 (2.6)	0.203
Maternal illness	5 (10.4)	8 (20.5)	0.190
5 Months:			
Pain in the breast	0 (0.0)	1 (2.1)	0.289
Maternal illness	3 (8.6)	4 (8.5)	0.992
6 Months:			
Pain in the breast	1 (2.9)	2 (0.9)	0.357
Breastfeeding complications	3 (8.8)	29 (12.6)	0.513
Maternal illness	5 (14.7)	38 (16.5)	0.705
Inadequate breastmilk	31 (91.2)	204 (88.2)	0.612

APPENDIX 16: CONTEXTUAL ISSUES NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING

Contextual issues not associated with exclusive breastfeeding practices [N; (%)]

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
1 Month:			
Place of delivery			
Health facility	146 (60.1)	30 (53.6)	0.596
Home	95 (39.1)	25 (44.6)	
Type of health facility			
Public	100 (68.5)	17 (56.7)	0.218
Private	46 (31.5)	13 (43.3)	
Type of delivery			
Normal (vaginal)	136 (93.8)	31 (100.0)	0.058
Caesarian	9 (6.2)	0 (0.0)	
2 Months:			
Place of delivery			
Health facility	32 (50.0)	14 (58.3)	0.448
Home	30 (46.9)	10 (41.7)	
Type of health facility			
Public	19 (59.4)	6 (42.9)	0.301
Private	13 (40.6)	8 (57.1)	
Type of delivery			
Normal (vaginal)	31 (96.9)	14 (100.0)	0.391
Caesarian	1 (3.1)	0 (0.0)	
3 Months:			
Place of delivery			
Health facility	73 (58.9)	76 (58.0)	0.798
Home	49 (39.5)	54 (41.2)	
Type of health facility			
Public	49 (67.1)	53 (69.7)	0.731
Private	24 (32.9)	23 (30.3)	
Type of delivery			
Normal (vaginal)	67 (91.8)	75 (97.4)	0.118
Caesarian	6 (8.2)	2 (2.6)	

Contextual issues not associated with exclusive breastfeeding practices [N; (%)] (cont)

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
4 Months:			
Place of delivery			
Health facility	22 (48.9)	21 (55.3)	0.269
Home	21 (46.7)	17 (44.7)	
Type of health facility			
Public	15 (68.2)	9 (42.9)	0.093
Private	7 (31.8)	12 (57.1)	
Type of delivery			
Normal (vaginal)	21 (95.5)	21 (100.0)	0.243
Caesarian	1 (4.5)	0 (0)	
5 Months:			
Place of delivery			
Health facility	20 (58.8)	13 (38.2)	0.764
Home	22 (51.2)	20 (46.5)	
Type of health facility			
Public	12 (60.0)	11 (50.0)	0.515
Private	8 (40.0)	11 (50.0)	
Type of delivery			
Normal (vaginal)	19 (95.0)	22 (100.0)	0.219
Caesarian	1 (5.0)	0 (0.0)	
6 Months:			
Place of delivery			
Health facility	19 (55.9)	129 (59.7)	0.652
Home	14 (41.2)	85 (39.4)	
Type of health facility			
Public	14 (73.7)	85 (65.9)	0.493
Private	5 (26.3)	44 (34.1)	
Type of delivery			
Normal (vaginal)	19 (84.2)	123 (95.3)	0.098
Caesarian	3 (15.8)	6 (4.7)	

APPENDIX 17: INFANT MORBIDITY NOT ASSOCIATED WITH EXCLUSIVE BREASTFEEDING

Infant morbidity not associated with exclusive breastfeeding practices [N; (%)] (cont)

	Exclusively breastfeeding *N;* (%)	Not exclusively breastfeeding N; (%)	Chi-square test; p
I Month:	*N=243*	*N=56*	
Fever	11 (4.5)	2 (3.6)	0.746
Diarrhoea	2 (0.8)	1 (1.8)	0.546
Vomiting	0 (0.0)	1 (1.8)	0.067
Cough	6 (2.5)	1(1.8)	0.753
2 Months:	*N=70*	*N=25*	
Fever	3 (4.3)	3 (12.0)	0.200
Cold	17 (24.3)	8 (32.0)	0.458
Malaria	1 (1.4)	1 (4.0)	0.471
Cough	7 (10.0)	3 (12.0)	0.780
3 Months:	*N=131*	*N=138*	
Cold	27 (20.6)	26 (18.8)	0.715
Cough	13 (9.9)	18 (13.0)	0.422
4 Months:	*N= 48*	*N=39*	
Fever	4 (8.3)	3 (7.7)	0.913
Cold	9 (18.8)	6 (15.4)	0.678
Diarrhoea	2 (4.2)	2 (5.1)	0.832
Vomiting	2 (4.2)	0 (0.0)	0.120
Cough	4 (8.3)	4 (10.3)	0.758
5 Months:	*N=35*	*N=47*	
Fever	2 (5.7)	6 (12.8)	0.267
Diarrhoea	3 (8.6)	6 (12.8)	0.543
Vomiting	1 (2.9)	4 (8.5)	0.269
Cough	1 (2.9)	5 (10.6)	0.158
6 Months:	*N=34*	*N=231*	
Fever	4 (11.8)	30 (13.0)	0.841
Diarrhoea	3 (8.8)	22 (9.5)	0.895
Vomiting	2 (5.9)	16 (6.9)	0.818
Cough	7 (20.6)	24 (10.4)	0.108