AN EVALUATION OF THE EFFECT OF ESSENTIAL NEWBORN CARE GROUP MOTIVATIONAL INTERVIEWING HEALTH EDUCATION DELIVERED IN A MATERNITY WAITING HOME SETTING ON THE MOTHERS' KNOWLEDGE AND PRACTICE AND ON EARLY NEONATAL MORBIDITY IN RURAL EASTERN PROVINCE OF ZAMBIA

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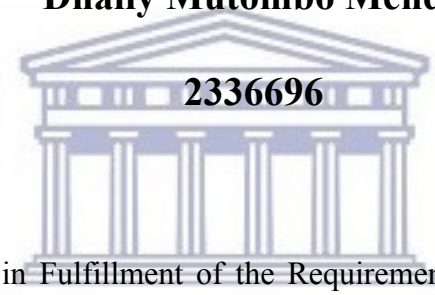

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KEY WORDS

1. Motivational Interviewing
2. Essential Newborn Care
3. Maternity Waiting Home
4. Early neonatal morbidity
5. Waiters and their Caregivers
6. Safe Motherhood Action Group
7. Transtheoretical Model of Change
8. Health Education
9. Behaviour Change
10. Rural Zambia

ABSTRACT

Introduction

The study assesses the effect of the Essential Newborn Care family package health education messages delivered to pregnant mothers and their caregivers by the Safe Motherhood Action Groups members (SMAGs) in a Maternity Waiting Home (MWH) setting, using a client centered education methodology that uses the Group Motivational Interviewing philosophy, on the mothers' Essential Newborn Care (ENC) knowledge, mothers' ENC practice, and early neonatal morbidity. The study also explored the prevailing newborn care practices in the mothers' communities, and the mothers' level of satisfaction of the Essential Newborn Care Group Motivational Interviewing Health Education (ENCGMI HE) sessions.

Conceptual Framework

We derived the study's conceptual framework from the Intervention Causation and Action Based Motivational Interviewing Model, in view of identifying the newborn care behaviours being practiced by mothers and their caregivers, to facilitate the delivery of the Essential Newborn Care health education using the Group Motivational Interviewing (GMI) to both the pregnant mothers and their caregivers, both housed in the maternity waiting home (MWH). It is hoped that the mothers, their caregivers and the SMAGs will diffuse and disseminate the ENC messages received during the ENCGMI HE through their social networks; and that the health workers would build mechanisms to sustain and institutionalize the new behaviours.

Methodology

Our research was a cluster randomized unblinded controlled trial based on 1,182 pregnant mothers who were followed up prospectively from the time of their admission to the MWH to an average of 4 weeks after delivery by interview. We conducted this study to assess the effect of ENCGMI HE messages given to pregnant mothers admitted to the health facilities' maternity waiting homes on the three outcome variables, namely the mothers' ENC knowledge, mothers' ENC practice, and early neonatal morbidity. The research also explored the existing newborn care practices, and the health care seeking behaviour of mothers whose newborn fell sick during the first seven days of life.

Our study was carried out in four districts of the Eastern Province of Zambia, namely Petauke, Sinda, Chipata and Lundazi, in MWHs own by Churches Health Institutions (CHIs) affiliated to the `Churches Health Association of Zambia (CHAZ). A total of 1,182 pregnant mothers admitted to the MWHs, who were accompany by their caregivers, participated in the mixed methods study. The qualitative research was first conducted in the MWH, and each mother-caregiver pair participating in nine (9) group discussions (translating into 131-group discussion) and one (1) face-to-face discussion with the SMAGs; and was later on followed by in-depth interviews with the mothers from their home. The quantitative component of the study explored the mothers' ENC knowledge both on admission and discharge from the health facility, the mothers' ENC practices, and early newborn morbidity.

To conduct the analyses, we used SPSS 24.0 and ATLAS.ti 7.5. We used univariate and multivariate logistic regression exploratory modeling to examine the effect of essential newborn care health education on the mothers' ENC knowledge, newborn care, and newborn morbidity; and to identify their determinants. We included predictors with a p-value greater than 0.25 in the multivariate logistic regression models and reported crude odds ratios (ORs) and adjusted ORs (aORs) with the corresponding 95% confidence intervals (CIs).

Findings

A total of 1,182 pregnant mothers, with an age mean of 24.7±7.591 years, participated in this study. The majority of the mothers, 62% (64.5% intervention and 59.5% control), had attained primary school education, 91.3% (90.8% intervention and 91.7% control) were married, and 82.9% (83.6% intervention and 82.1% control) were living with their husbands. Thirty four point four percent (34.4%) (40.6% intervention and 28.2% control) of mothers were Catholic, 31.9% (10.3% intervention and 53.5% control) of Chewa ethnic group (the majority of mothers in the intervention arm were of Ngoni ethnic group), and residing in 47% (49.0% intervention and 45.0% control) within 5 Km to their nearest health facility. More than forty six percent (51.5% intervention and 41.3% control) of mothers were housewives. In 72.5% (67.0% intervention and 78.0% control) of cases, they belonged to the lowest socio-economic index of wealth. Mothers in the study, 98.4% (98.1% intervention and 98.7% control) did not smoke, in 90.9% (91.3% intervention and 90.4% control) did not drink any local or commercial beers.

The majority of mothers in this study, 47.0% (47.0% intervention and 47.0% control) had a low total fertility rate of 3.5, and had had 2 or more pregnancies in 68.0% (65.8% intervention and 70.3% control). In 90.0% (89.7% intervention and 90.2% control), the mothers attended at least 3 or more ANC services during their current pregnancy, and had a normal delivery in 86.5% (83.9% intervention and 89% control). In 77.4% (80.9% intervention and 73.9% control), the mothers read newspapers, did not watch television in 71.0% (77.8% intervention and 64.1% control) and used the radio as main source of information on general matters in 62.3% (50.3% intervention and 74.4% control). In 54.9%, the mothers in the study attended the ENCGMI HE sessions, facilitated by the SMAGs. The rest of the mothers (45.1%) attended the routine ENC health education (RENC HE) sessions delivered by health workers.

Our study found that the mothers' **satisfactory ENC knowledge** was significantly associated with attendance to RENC HE sessions (OR= 3.024; 95% CI: 1.888, 4.844,). The study also found that mothers were more likely to have a satisfactory

ENC knowledge when residing beyond 5 Km of the nearest health facility (OR=2.927; 95% CI: 1.581, 5.416), being a housewife (OR= 1.854; 95% CI: 1.196, 2.875), and being unemployed or looking for a job (OR= 3.249; 95% CI: 1.567, 6.738). In contrast, mothers were less likely to have a satisfactory ENC knowledge when widowed (OR= 0.124; 95% CI: 0.027, 0.561), belonging to the Tumbuka ethnic group (OR= 0.794; 95% CI: 0.341, 1.843), smoking during pregnancy (OR= 0.250; 95% CI: 0.088, 0.711), and when reading the newspaper almost everyday (OR= 0.257; 95% CI: 0.139, 0.475). The study also showed that there was a very significantly larger knowledge gain (+4.5) among mothers who attended the ENCGMI HE ($p<0.001$).

The study also found that **the good care given to the newborns during the first 7 days of life** was not significantly associated with the type of ENC health education their mothers attended ($p=0.151$). The study also found that newborns were more likely to receive good care when their mothers were wealthy (aOR= 1.925; 95% CI: 1.067, 3.473). In contrast, newborns were less likely to receive good care when their mothers belonged to the Ngoni (OR= 0.816; 95% CI: 0.445, 1.495), Nsenga (OR= 0.389; 95% CI: 0.230, 0.658), and Tumbuka (OR= 0.416; 95% CI: 0.239, 0.722) ethnic groups.

The study found that **newborns were less likely to fall sick** when their mothers attended the routine ENC health education sessions (OR= 0.675; 95% CI: 0.480, 0.949). The study also found that newborns were less likely to fall sick when their mothers were residing beyond 5 Km from their nearest health facility (OR= 0.306; 95% CI: 0.177, 0.527), had 1 child (OR= 0.446; 95% CI: 0.259, 0.777), and had 2-5 children (OR= 0.551; 95% CI: 0.341, 0.888). In contrast, the study found that newborns were more likely to fall sick when their mothers were younger than 20 years (OR= 1.625; 95% CI: 1.080, 2.441), older than 30 years (OR= 1.568; 95% CI: 1.008, 2.438), were living with their children (OR= 4.930; 95% CI: 1.305, 18.613), belonged to the Ngoni (OR= 4.407; 95% CI: 2.698, 7.197) and Nsenga (OR= 1.992; 95% CI: 1.170, 3.394) ethnic groups, and had attended at least 1 ANC clinic (OR= 3.373; 95% CI: 1.569, 7.249).

Finally, our study showed that the **commonest barriers in the practice of ENC** were in relation to (1) cord care, with the application of all sorts of substances on the newborns' umbilical cord stumps, ranging from castor oil to the rats' droppings; (2) skin care, with the early bathing being administered to the newborn for the purpose of removing the vernix caseosa and the mothers' blood from the newborns skin; and (3) breastfeeding, with the mothers' avoidance of early breastfeeding until their breast be treated with herbal medication to prevent the death of the baby. Of particular interest is the ceremony found only among the Tumbuka called '*ku bweza mwana ku mpasa*', which is expected to immunize the newborns from evil spirits, bad people and respiratory tract infections.

Conclusions and Programmatic Implications

In a context of a very slow pace in the reduction of the early neonatal mortality, mainly incriminated on the persistent practice of harmful newborn care at the family level, a good understanding of the effects of the health education messages using different delivery methodologies on the mothers' ENC knowledge, practice and newborns' health status is paramount. Though the ENCGMI HE delivered by SMAGs in MWHs has not showed a significant superiority to RENC HE, it has nevertheless proved to be inclusive, sustainable, effective in the delivery of respectful, tailored, and culturally sensitive ENC messages, to both the pregnant mothers and their caregivers, and complementary to the RENC HE model.

As highlighted in the previous paragraphs, our study found that (1) the attendance to ENCGMI HE sessions is significantly less likely to generate mothers' satisfactory ENC knowledge, does not significantly predict good newborn care, and is significantly less likely to result in morbidity free newborns.

Our study brings new knowledge to the existing early neonatal health's body of knowledge by demonstrating that the approach used in the delivery of ENC health education messages impacts on the mothers' ENC knowledge, practice of ENC family package, and newborns' health. This study has also contributed with new

insight in newborns health programming by showing that SMAGs are capable of delivering effective and culturally sensitive ENC HE; that caregivers, who are the generators, transmitters and custodian of the traditional newborn care, play a very important role in the care being given to the newborn during the first 7 days of life, hence should not be left out when providing ENC HE to the pregnant woman. This study has also shown the importance of MWHs, which are currently being underutilized, as strategic platform which could allow the health workers and the community based volunteers deliver ENC HE messages to the pregnant mother-caregiver pair.

Lastly, based on our study findings, we recommend (1) the recognition of the place of culture and beliefs in the delivery of ENC HE, (2) the utilization of the Intervention-Causation and Action-Based Motivational Interviewing Framework in the delivery of ENC HE, (3) the involvement of SMAGs in the delivery of ENC HE Sessions, (4) the targeting of pregnant mothers and their caregivers housed in the MWs in the delivery of ENC HE, and (5) for more attention to be paid to the mothers' obstetric history and distance to their nearest health facility, in view of reducing newborn morbidity.

DECLARATION

I hereby declare that this dissertation represents my own work and has not been presented either wholly or in part for a degree at the University of Western Cape or any other university.

Student: **Dhally Mutombo Menda**

Signature

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The moment I enrolled for my Masters of Public Health at the Western Cape University, I began to think about doing a PhD. For my beloved wife Christine, the Masters was not the end of my academic road; and she kept on pushing me, assisted by David and Rebecca, and she kept on repeating to my ears: "you must continue and do your PhD!" There you are! **Christine Nabeba Mwasiti Menda**, this is the fruit of your tireless counseling and encouragements, as I walked this lonely and stony academic road.

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DEDICATION

I dedicate this thesis to my dearests ones

Christine Nabeba Mwasiti Menda,

The ‘great woman’ of II King 4:8-10

David Kazadi Menda

Rebecca Mwasiti Menda

My life’s mentors

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LIST OF ABREVIATIONS AND ACRONYMS

aOR	:	Adjusted Odd Ratio
ANC	:	Antenatal Care
CHAZ	:	Churches Health Association of Zambia
CHI	:	Church Health Institution
EmOC	:	Emergency Obstetric Care
EmONC	:	Emergency Obstetric and Neonatal Care
eMTCT		Elimination of Mother-to-Child Transmission
ENC	:	Essential Newborn Care
ENCGMI	:	Essential Newborn Care Group Motivational Interviewing
ENCGMI HE	:	Essential Newborn Care Group Motivational Interviewing Health Education
FA	:	Field Assistant
GMI		Group Motional Interviewing
HE	:	Health Education
KMC	:	Kangaroo Mother Care
MCDMNH	:	Ministry of Community Development Mother and Child Health
MDG	:	Millennium Development Goals
MI	:	Motivational Interviewing
MNCH	:	Maternal Newborn and Child Health

MWH	:	Maternity Waiting Home
NH	:	Neighbourhood
NMR	:	Neonatal Mortality Rate
OR	:	Odds Ratio
OPV		Oral Polio Vaccine
RENC HE		Routine Essential Newborn Care Health Education
SCT	:	Social Cognitive Theory
SMAG	:	Safe Motherhood Action Groups
SSA	:	Sub Saharan Africa
TFR	:	Total Fertility Rate
TTM	:	Transtheoretical Model of Change
TTBA	:	Trained Traditional Birth Attendant
TWG	:	Technical Working Group
WHO	:	World Health Organization

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DEFINITION OF TERMS

Motivational Interviewing (MI):

Miller and Rollnick (2013), in their book 'Motivational Interviewing, Helping People to Change', propose three definitions of Motivational Interviewing:

> ***'Layperson's Definition:*** Motivational Interviewing is a collaborative conversation style for strengthening a person's own motivation and commitment to change' (p.42).
>
> ***'Practitioner's Definition:*** Motivational Interviewing is a person centered counseling style for addressing the common problem of ambivalence about change' (p.42).
>
> ***'Technical Definition:*** Motivational Interviewing is a collaborative, goal oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion' (p.42).

Essential Newborn Care (ENC):

Refers to a package of interventions to be practiced at home/in the family, and comprising of:

a. basic preventive newborn care such as cord stump care, skin care, eye care, temperature maintenance, early exclusive breastfeeding, and immunization (p.4);
b. early detection of problems or danger signs and appropriate referral and care seeking (p.5) (WHO, 1996).

Antenatal Care Services (ANC):

Refers to the care that a woman receives during pregnancy and helps to ensure healthy outcomes for women and newborns (WHO/UNICEF 2003). Antenatal care services are the starting point for a pregnant woman to receive a broad range of health promotion and prevention services, such as nutritional education and prevention and treatment of anemia; prevention, detection and treatment of malaria, tuberculosis and sexually transmitted infections (STIs); testing for HIV and initiation of treatment for HIV positive mothers in view of preventing the transmission of HIV from the mother to the baby; Presumptive treatment for hookworm; Protection against vitamin A and/or iodine deficiency; and tetanus toxoid immunization. Antenatal care services are also an opportunity for the promotion of the benefits of skilled birth attendance and encouragement for the women to attend postpartum care for themselves in terms of family planning and for their newborns in relation to basic Essential Newborn Care. These ANC services are provided both at the health facility, the health post, the community and the household levels. This household-to-hospital continuum of care facilitates the collaboration between health workers and the community based volunteers (WHO/UNICEF, 2003).

Maternity Waiting Home (MWH):

Refers to a residential facility, located near a qualified medical facility, where women defined as "high risk" can await their delivery and be transferred to a nearby medical facility shortly before delivery, or earlier should complications arise" (WHO, 2006).

Safe Motherhood Action Group Member (SMAG):

Refers to female or male volunteer trained over a period of 5 days, to sensitize the community on health issues of reproductive health and referral of identified newborn case to health facilities for management (MoH Zambia, 2010).

Waiter:

Refers to a pregnant woman admitted to the maternity waiting home, and who is waiting for a health facility based skilled delivery. Prior to the delivery, this woman will be referred too as 'waiter' or 'pregnant mother' interchangeably. After delivery, the woman will be referred to as 'mother'.

Caregiver:

Refers to pregnant woman's mother or mothers-in-law or grandmother or sister or sister-in-law or any other person who accompanies her and stayes with her in the maternity waiting home, and who may be a key influencer or decision maker or supporter or transmitter or practitioner of traditional newborn care practices.

Actors:

Refers to the waiters/pregnant women and their caregivers.

Essential Newborn Care Group Motivational Interviewing – ENCGMI:

This is the group peer-to-peer Essential Newborn Care health education delivered by SMAGs to the pregnant mothers and their accompanying caregivers admitted to the maternity waiting home, using Group Motivational Interviewing.

Ambivalence:

Refers to simultaneously wanting and not wanting something, or wanting both of two incompatible things. In this research, it is likened to having a committee inside ones' mind, with members who disagree on the proper course of action (p. 17) (Miller et al, 2013).

Live Birth:

Refers to 'the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born' (WHO, 2004).

Neonatal Period:

Refers to the period that begins with the birth and ends 28 complete days after birth (WHO, 2006).

Early Neonatal Period:

Refers to the period that corresponds to the first seven completed days of life (day 0 to 6) (WHO, 2011).

Neonatal Death:

Refers to the death of a live born infant occurring during the first 28 completed days of life (0-27) (WHO, 2006).

Neonatal Mortality Rate (NMR):

Refers to the number of neonatal deaths during the first 28 completed days of life per one thousand live births in a given year or other period (WHO, 2011).

Early Neonatal Morbidities:

Refers to specific morbidities that occur during the first seven completed days of life (day 0 to 6), such as poor suckling; hypothermia; fever; fast and difficult breathing, with intercostal retraction; irritability or lethargy; vomiting, diarrhoea and distended abdomen; conjunctivitis; pustules, and redness of skin around the cord, and foul smelling discharge.

Morbidity-free Neonates:

Refers to the number of neonates who did not present any morbidity during the period that corresponds to the first seven completed days of life (day 0 to 6).

Church Health Institution (CHI):

Health facility belonging and managed by a Churches Health Association of Zambia's (CHAZ) affiliate Church, e.g. health center, level 1 hospital, level 2 hospital.

OUTLINE OF THE THESIS

This thesis is subdivided into seven chapters.

Chapter 1 is the introduction to the study, and covers the study background, the rationale for the study, the Zambia profile, the profile of the Churches Health Institutions where the research took place, and the management of the maternity waiting homes. This section also covers the research question and hypothesis, aim objectives, and theoretical framework. The section ends with a conclusion.

Chapter 2 is the literature review, which is subdivided into three sections, namely (1) the essential newborn care family package; WHO recommended ENC, delivery of ENC health education messages, newborn care practices patterns, and the determinant of newborn care practices; (2) Motivational Interviewing as a change catalyst: Transtheoretical Model of Behaviour Change and Motivational Interviewing; (3) maternity waiting homes: definition, history, elements and their effectiveness; and neonatal mortality: magnitude, strategies to improve it, and a conclusion.

Chapter 3 is the methodology which provides the methodologies used in the study and its ethical considerations, and includes the study design, recruitment of study participants, the ENCGMI training package, intervention package, the delivery of the routine ENC health education messages, consent procedures and ethical considerations, the survey instruments and data collection, data validity and reliability, variable definition and data analysis. A brief description of the methodologies used in the research is given: the qualitative component consisting of focus group discussions with pregnant mothers and their caregivers and the quantitative component consisting of a mothers' survey.

Chapter 4 covers the study results' profiles of the mothers who took part in the study, and looks at their socio-demographic and economic characteristics, their obstetric history, their exposure to media, their attendance to ENC health education, and their knowledge of ENC on admission.

Chapter 5 highlights the effect of the ENC HE sessions, both the ENCGMI HE and RENC HE, on the mothers' ENC knowledge, the newborn care practices during the first 7 days of life, and the early neonatal morbidity, by looking at their prevalence and key determinants. The chapter also looks at the prevailing newborn practices and the mothers' opinion of the ENCGMI HE sessions. This chapter addresses the study's primary objective 1 and the secondary objectives 1, 2 and 3.

Chapter 6 consists of the discussion in which the results of chapter 4 and 5 are interpreted in the context of the research literature, to examine the extent to which the research question has been addressed.

Chapter 7 presents the study's overview, the key findings, the significance of the study, and recommendations, and proposes ideas for further research. The chapter ends with the dissemination plan and a conclusion.

CHAPTER 1: INTRODUCTION

1.1 Background

Newborn mortality is highest in the first 24 hours after birth, and stands at 30-50% of all neonatal deaths. In addition, three quarters (3/4) of global neonatal deaths happen in the first week after birth (Lawn et al, 2005). Yet birth and the first seven (7) days of life are the very points along the continuum of care when coverage of neonatal care interventions is lowest (Lawn et al, 2005). Despite the availability of simple and highly cost-effective packages of interventions, which when implemented at high coverage, could avert 72% of neonatal deaths in resource poor settings, much has not happened and newborns continue to die (Table 1.1) (Lawn et al, 2005).

There is an urgency to prevent early neonatal morbidity and mortality in developing countries, such as Zambia. In Zambia, the neonatal mortality rate (NMR) stands at 24 per 1,000 live births (CSO et al, 2013-14), with the Eastern Province having the highest rates of neonatal and early neonatal deaths standing at 35 and 42 respectively per 1,000 live births (CSO et al, 2013-14). Of these neonatal deaths, up to 40% occur in the immediate postnatal period, with sepsis, prematurity and asphyxia representing 80% of the causes (MCDMCH, 2013).

In Zambia, midwives and community volunteers are supposed to offer health education (HE) during the antenatal care clinics, using the World Health Organization (WHO) recommended Essential Newborn Care (ENC) family package. The delivered package comprises of: (1) clean cord care (cutting and tying of the umbilical cord with sterilized instrument and thread), (2) skin care, (3) thermal care (drying and wrapping the newborn immediately after delivery and delaying the newborn's first bath for at least six hours or several days to reduce hypothermia risk), and (4) initiating early and exclusive breastfeeding (within the first hour of birth and to last six months), (5) eye care, (6) immunization and (7) early identification of danger signs and management of

newborn illness (WHO, 1996). Unfortunately, however, postnatal care receives very little emphasis in maternal and newborn health programming, with only 16% of newborns receiving their postnatal checkup within the critical first two days after birth (CSO et al, 2013-14). The gap is even deeper for newborns delivered outside of a health facility, who are 85% less likely to receive a postnatal checkup within the first week after birth, as opposed to 72% among those delivered in a health facility (CSO et al, 2013-14). Evidence shows that the implementation of the ENC package in poor settings is still inadequate; with striking variations from place to place in the patterns of care and interventions that neonates receive, especially in SSA countries (WHO, 1996).

Table 1.1: Evidence Based Cost Effective Newborn Care Interventions Packages: Associated Behavioural Prerequisites for Effectiveness.

Period	**Nature of the Intervention**	**Reduction in All Cause Neonatal Mortality**	**Associated Behavioural Prerequisites for Effectiveness**
Antenatal/ Intrapartum/ Postnatal	**Family Care:** Clean home delivery, Hygienic Cord care, Thermal Care, Breastfeeding Promotion	10-50%	Discarding existing high-risk practices and adopting improved newborn care practices by the birth attendant and primary care givers of the newborn.
Postnatal	Extra care for Low birth weight infants: Extra warmth, Hygiene, Feeding	20%-40%	Weighing of infants, Discarding existing high-risk practices and Adoption of improved newborn care practices by primary care givers of newborn
	Case Management for Pneumonia	10-35%	Adherence to advice on referral, and treatment
	Emergency Neonatal Care: Management of serious illness (Infections, Asphyxia, Prematurity, Jaundice)	15-50%	Timely recognition and care-seeking for complications from appropriate health providers, Adherence to treatment

Adapted from Kumar et al, 2008.

1.2 Rationale for the Study

Traditional behaviours and practices in the care of newborns are strongly entrenched in women's culture, tradition and beliefs, and many of them are aware that such practices are harmful for their babies (MCDMCH, 2013; MCDMCH & MoH, 2013; Save the Children, 2013). However, changing these harmful behaviours to the ideal ones is not easily done in practice. This is mainly attributed to the health professionals' poor consideration of the social context that shapes behaviours, while treating individual health behaviours as stand-alone entities (Kumar et al 2008, Kumar et al, 2010). The Health professionals aim only at educating and communicating desired ENC behaviours and their benefits through generic messages that are disconnected from local contexts, while assuming that mothers, such as those staying in maternity waiting homes (waiters) and their caregivers (mothers, mothers-in-law, grandmothers, etc.), are 'empty cups' that are made to be filled by experts (Kumar et al, 2010). Health workers largely disregard the existence of preconceptions, attitudes, choices, and traditional know-how of the mothers and their caregivers (Kumar et al, 2010) in relation to the newborn care. Besides this, health workers deliver ENC as experts, not bearing in mind that mothers are their own experts, when it comes to the way they plan to care for their newborns (Miller et al, 2013) and that they are at different stages in the Trans Theoretical Model of Change wheel of change (Miller et al, 2013).

The current design and delivery of the ENC messages both in the health facilities and in the community, through outreach services, is leaving out key influencers, decision makers, supporters, transmitters, and practitioners of ENC family packages and normative behaviours within the community (Kumar et al, 2008). Despite the acquisition of ENC family package messages by the mothers during antenatal care health education, they often find it very difficult to practice these newborn care practices in their home set up because of the traditional position and power relations with the caregivers. Research suggests that the caregivers' knowledge and beliefs have a strong influence on the health care of the infant (Cleland & van Ginneken, 1998). Studies have shown that the health workers' practice of giving health education information with direct persuasion, is expected

to achieve only 5-10% change in the newborn ENC practice (Kottle et al, 1998), showing that changing risky behaviours is difficult and requires time and a considerable amount of effort and motivation (Britt et al, 2004).

Harmful newborn care behaviours and practices have continued to be practiced in Zambia and to negatively impact on newborn survival, despite the health workers' and Safe Motherhood Action groups (SMAGs)' sensitization during antenatal care health education (MCDMCH, 2013; MCDMCH & MoH, 2013; Rahman et al, 2012).

In rural areas, umbilical cords continue to be cut using razor blades and tied with cotton knitting wood or pieces of *chitenge* (traditional fabric wrap) during home deliveries (Herlihy et al, 2013). A myriad of substances are still being applied in the cord stumps, varying from lubricating agents to drying agents such as cooking oil, motor oil, charcoal, herbs hence increasing the chances of infection (Herlihy et al, 2013). Keeping the newborn warm after birth is still not a common practice in rural Zambia. Not knowing if the baby to be born will be alive or not, mothers are scared to buy in advance the clothes of the baby, and prefer to look for clothes only after birth and often they do not have warm clothes ready at the time of delivery. The newborn is kept naked or covered with a thin piece of wrapper until the placenta is delivered (Tuladhar, 2010). Besides this, newborns continue to be bathed soon after birth and at least three times per day, to remove the vernix caseosa which is considered dirty and impure (Tuladhar, 2010). Soaps, cleansers, powders and other substances continue to be indiscriminately applied on the newborn's skin, particularly on the baby's buttocks or sore flexures, and buttocks soiled with meconium (Sacks et al, 2015; Stalder, 2011). This practice makes the newborn vulnerable to hypothermia (WHO, 1996). The recommendation is that mothers breastfeed their babies soon after delivery, at least within one hour. However, breastfeeding is being delayed, with only 66% of the Zambian newborns being breastfed within one hour of birth (WHO, 1996). In only 43% of cases, children born at home start breastfeeding within one hour of birth, as colostrum continues to be regarded as unclean and is not fed to the newborn (CSO et al, 2013-14). Though taking their babies for immunization, mothers still

harbour beliefs that certain traditional practices protect their babies from infectious and non-infectious diseases.

Overall, the current Zambian newborn care practices related to cord care, skin care, thermal care, immediate and exclusive breastfeeding, danger signs recognition and health seeking behaviour, and immunization are not satisfactory, and have led to illnesses and deaths among newborns (MCDMCH, 2013).

The "one-size-fits-all" approach in newborn care health education has not allowed the mothers to acquire sufficient newborn care knowledge and self-efficacy to be able to adequately care for their newborn babies, as pregnant mothers attending antenatal care services (ANC) are at different stages of behaviour and/or practice in relation to the provision of essential newborn care (Miller et al, 2013). There is urgent need to come up with a country specific analysis of the determinants of elements of the ENC family package practices, with the view of developing appropriate strategies, as literature shows that the determinants of the implementation of its individual components have not been consistently identified in earlier studies (Akter et al, 2016). These regional differences clearly demonstrate that factors affecting the implementation of the WHO recommended ENC practices may differ from one country to another, and within the same country, from one region to another (Akter et al, 2016). This situation is being complicated by the fact that generally 60% of medical information discussed in an encounter is forgotten (Britt et al, 2004; Haynes et al, 1981) and only 5-10% is applied (Kottle et al, 1998).

These findings justify the need for the development of a participatory process of respectful engagement with the community, to lead the mothers and their families from the current high-risk traditional newborn care practices, causing disease and death, towards improved ones, through a path of least social, cultural, economic, and spiritual resistance to change (Kumar et al, 2008). This calls for more effective ways of conveying the ENC messages, not only to the waiters (mothers), but also to their caregivers. To achieve this, our study has identified the maternity waiting homes, frequented by the mothers and their accompanying caregivers (mothers, grand-mothers, in-laws, etc.), as the best platform to interact with the

mother-caregiver pair, using Group Motivational Interviewing to negotiate newborn care family package behaviour change. This study is the first in its kind, to apply Motivational Interviewing in the simultaneous delivery of the full ENC package to both the pregnant mothers and their caregivers in a MWH setting.

Motivational Interviewing, a client-centered counseling method, has shown its effectiveness in reducing addictive behaviours in smokers, drinkers and overweight people (Britt et al, 2004; Haynes et al, 1981; Kottke et al, 1998). It has also been shown in home visiting by community health workers to increase exclusive breastfeeding (Wilhelm, 2006), but Motivational Interviewing has never been tried in the maternity waiting home environment, using the SMAGs to deliver group motivational interviewing. Our study is the first in facilitating essential newborn care behaviour change by helping mothers and their caregivers to explore and resolve their ambivalence about the harmful ENC practices.

To adequately deliver this package, SMAGs were trained in what the researcher calls 'Essential Newborn Care Group Motivational Interviewing (ENCGMI)', to equip them with knowledge and skills on how to deliver the package, reduce their righting reflex in the delivery of the sessions, roll with resistance when getting feedback and create discrepancy in the mothers and caregivers' current traditional essential newborn care practices and facilitate their evocation as they prepare for behaviour change.

This study first undid the SMAGs' traditional way of delivering ENC messages by utilizing key Motivational Interviewing concepts. On the clients' side, this new approach in delivering health education aimed at increasing the pregnant mothers and their caregivers' knowledge of the recommended ENC family package; self-efficacy and motivation in the expected way of caring for the baby, while reducing their ambivalence in relation to the newborn care.

The study's findings, through the promotion of ENC health education using the Essential Newborn Care Group Motivational Interviewing "ENCGMI" – are expected to guide targeted and cost-effective strategies to facilitate behaviour change and subsequently reduce early neonatal morbidity and mortality linked to the traditional harmful neonatal care practices and behaviours. Recommendations

from this study could be applied to rollout the ENCGMI's concept in Zambia and other developing countries experiencing the same challenges of high early newborn morbidity and mortality.

1.3 Zambia Profile

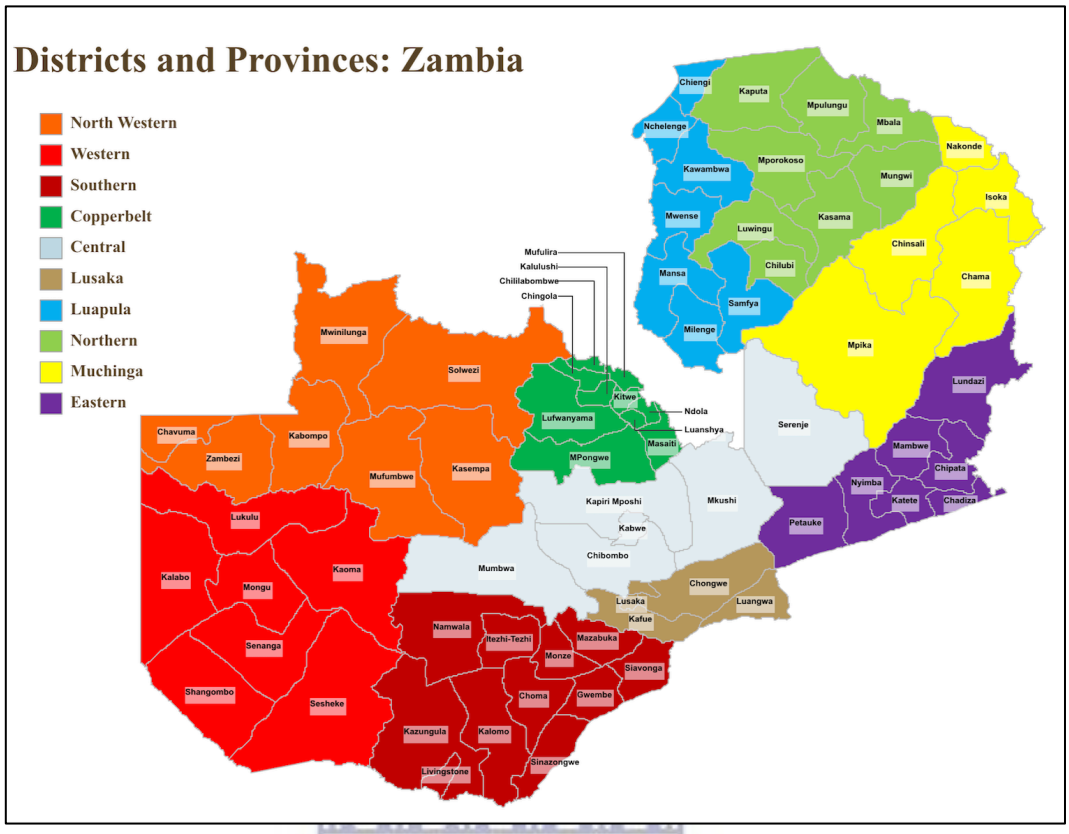
1.3.1 Country Context

1.3.1.1 Zambia Geography

Covering a land area of 752,612 Km^2 and administratively divided into 10 provinces and 103 districts, Zambia is a landlocked country situated in Southern Africa, which shares borders with 8 countries, namely the Democratic Republic of Congo to the North, Tanzania to the North-East, Malawi to the East, Mozambique, Zimbabwe, Botswana and Namibia to the South, and Angola to the West (see Diagram 1.1). Apart from Lusaka and Copperbelt, which are predominantly urban, the rest of the country is predominantly rural, with only about 4 out of 10 Zambians living in urban areas (CSO et al, 2013-14). The Eastern Province is divided into 9 districts (Chadiza, Chama, Chipata, Katete Lundazi, Mambwe, Nyimba, Petauke, Sinda), and is home to the Luangwa National Park.

1.3.1.2 The Population and the People

The country has a total population of 15,473,905 of which 7,818,236 are women and 7,655,669 are men (CSO, 2013). The country has 72 ethnic groups or tribes dispersed in its 10 provinces, and the following main languages: Bemba, Kaonde, Lozi, Lunda, Luvale, Nyanja and Tonga. English is the nation's official language (CSO, 2013). With a total fertility rate of 5.3 births per woman (CSO et al, 2013-14), the country has a growth rate of 2.7 % per annum (CSO, 2013), a population density of 17.3 per Km^2 (Ministry of Finance, 2011), and a life expectancy at birth standing at 49 years for males and 53 years for females (CSO et al, 2013-14).



Map 1.1: Map of Zambia. Source: MoH

1.3.1.3 The Economy

As a Lower Middle Income country, with a GDP per capita of US $1,500, Zambia has a mixed economy consisting of a modern urban sector and a rural agricultural sector (CSO et al, 2013-14). The mining and agriculture sectors remain the mainstays of the Zambian economy. Since the 1980s, there has been a general economic decline following a sharp decline in copper prices (CSO et al, 2013-14). Currently, around 60% of Zambians are classified as poor (78% rural and 28% urban), with 57.7% of extreme poverty being concentrated in rural areas (CSO et al, 2013-14). With education being a powerful tool for economic development of an individual and nation, the country, in its Sixth National Development Plan (SNDP) has identified education, training, science and technology as prime movers of Zambia's development (CSO, 2013). The Government has in the past decade embarked on a number of initiatives to ensure universal access to

education, through the upgrading and construction of basic schools (Grade 1-9) and high schools (Grade 10-12), which resulted into high enrolment levels of both girls and boys at primary, basic and high school levels (CSO, 2013).

1.3.2 Health Sector Organization

In view of providing health services to its population in the 10 administrative regions and 113 districts, the Zambian Government has organized its services delivery structure in six different levels, comprising of: community, heath posts, health centres, 1st level hospitals (district), 2nd level hospitals (general), and 3rd level hospitals (central) (MoH, 2012) (see Table 1.2). Apart from the third level hospitals, which are solely owned by the Government, the other others are owned either by the Government, the Churches Health Associations of Zambia, or the private sector (MoH, 2012).

This system is characterized by an inadequate and inequitable distribution of health infrastructure across the country, with 46% of rural families living outside a radius of 5 km from a health facility, as opposed to 1% in urban areas, where congestion and long waiting times remain a big challenge (MoH, 2012). To improve the quality of life for all Zambians, the government, since 1991, has been restructuring its health system by decentralizing primary health care and providing efficient and cost-effective quality basic health care services for common illnesses as close to the family as possible (MoH, 2012).

Table 1.2: Zambian Health Facilities Characteristics

Level of Care	**Population to be Served**	**Services Provided**	**Accessibility**
Health Post (HP) The Health Post is the lowest level facility	In Rural Areas: 500 households (3,500 people) In Urban Areas: 1,000 households (7,000 people)	Community based primary health care	Should be within a 5 Km radius for sparsely populated areas.

Health Centre (HC) The Health Centre is the next level facility	In Rural Areas: Catchment area of a 29 Km radius or a population target of about 10,000 people. In Urban Areas: 30,000 to 50,000 people	Basic primary health care	The HC should be within a 29 Km radius. The country has a total of 2,087 HCs.
Level 1 Hospitals The Level 1 Hospital is the next level facility	, Between 80,000 and 200,000 people.	Medical, surgical, obstetric and diagnostic services, including all clinical services to support HC referrals.	Most of the 113 Districts have a level 1 or a District Hospital. The country has a total of 123 Level 1 Hospitals.
Level 2 Hospitals The Level 2 Hospital or General Hospital is the •	Between 200,000 to 800,000 people.	Internal medicine, general surgery, paediatrics, obstetrics and gynaecology, dental, psychiatry and intensive care services. These hospitals also function as referral centres for the first level hospitals, including the provision of technical back up and training functions.	Most of the Provinces have a General Hospital. The country has a total of 21 Level 2 Hospitals.
Level 3 Hospitals The Level 3 Hospital or Central Hospital is the final level facility	800,000 people and above.	These facilities are referral centres for level 2 hospitals and have sub-specializations in internal medicine, surgery, paediatrics, obstetrics, gynaecology, intensive care, psychiatry, training and research.	Some of the 10 Provinces have a level 2 or a General Hospital. The country has a total of 6 Level 3 Hospitals.

1.3.3 The Impact of HIV and AIDS and TB in Zambia

Over the past decades, the HIV epidemic reversed most on the gains made by the country at all levels, from the life expectancy of its population to their quality of life and disposable income. Thanks to Governments effort and commitment in the fight against HIV and AIDS and Tuberculosis, the country has managed to halt and began to reverse the epidemic; seeing the number of new HIV infections

falling by 29.4% (from 85,000 in 2004 to 60,000 in 2015) (UNAIDS, 2016) and the Tuberculosis incidence falling by 40% (from 650/100,000 population in 2003, to 391/100,000 population in 2015) (WHO, 2005; WHO, 2016).

The country has an estimated 1.2 million people living with HIV (UNAIDS, 2016), to increase to 1.3 million by the 2020 (Zambia CCM, 2017). The HIV prevalence among the adult population has steadily decreased over time, from 15.6% in 2001-2002, to 14.3% in 2007, to 13.3% in 2013-2014 (CSO, 2013-14), and 11.3% in 2015-2016 (ZAMPHIA, 2016). Despite this progress, there remain distinct gender and age related disparities in HIV burden, with the HIV prevalence among women being 14.5%, against 8.6% among men. This disparity is most pronounced among young people aged 20-24, where HIV prevalence is more than four times higher among women (8.6%) as compared to their male peers (2.1%) (ZAMPHIA, 2016).

1.3.4 National Maternal and Newborn Care Programme

By endorsing and adapting to the country context a range of global and regional initiatives, e.g. the Sustainable Development Goals (SDGs), Campaign on Accelerated Reduction of Maternal Mortality in Africa (CARMMA), the Maputo Plan of Action, and the Ouagadougou Declaration, and by designing its national health strategic plan, the country strives to improve the health and wellbeing of the mothers and their children. Guided by a strong legal and policy framework and national guidelines, e.g. the Roadmap for Accelerating Reduction of Maternal, Newborn and Child Mortality 2013-2016, these initiatives are being used by both the Ministry of Health and its partners, as a platform to provide strategic direction and facilitate the implementation and scale up of evidence based maternal and newborn activities. Despite these efforts, only 67% of mothers deliver in health facilities (89% urban and 56% rural), while 31% deliver at home. Delivery in a health facility is most common among births to mothers less than age 20 (74%) and first-order births (81%), is strongly associated with the mother's education and wealth. In Eastern Province, 64% of mothers delivered in the health facilities, while 27.2% delivered at home because of long distances to the health facility (26.6%) and short labour (25.4%) (CSO et al, 2013-14).

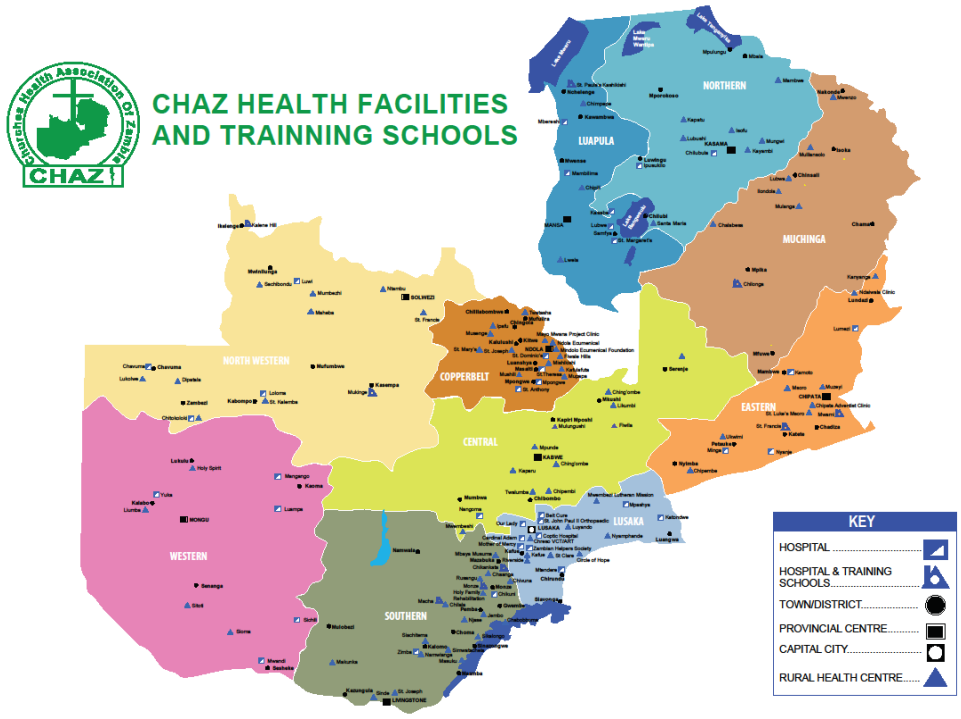
Despite the main child health interventions currently being implemented, e.g. the Expanded Programme on Immunization (EPI), the Integrated Management of Childhood Illnesses (IMCI), the elimination of Mother-to-Child Transmission (eMTCT) of HIV, and nutrition programmes, the coverage for mother-baby essential services is still low and morbidity and mortality among the newborns is still high (CSO et al, 2013-14; MOH, 2011). The country continues to experience a high disease burden, which is compounded by the high prevalence of HIV, high poverty levels, and the poor macroeconomic situation.

In spite of the notable progress in many health indicators, the health sector continues to face several challenges such as: resource allocation to the health sector, the delivery, demand and utilization of quality health services, the training, recruitment and posting of skilled health care providers, and the provision of adequate infrastructure and availability of commodities, particularly in the remotest districts and areas. Public and mission health facilities in rural and remote areas continue to have the lowest number of health workers, compared to urban areas, with 70 clinical health care workers per 100,000 population as opposed to 159 per 100,000 in urban areas (MOH, 2011). This challenge has resulted in inadequacies in the provision of maternal and newborn health services.

1.4 Churches Health Institutions Profiles

The study was carried out in six Church Health Institutions affiliated to the Churches Health Association of Zambia (CHAZ), an interdenominational non-governmental umbrella organization of Zambian churches health institutions (CHIs), representing 16 different denominations, both Catholic and Protestants (CHAZ, 2015). The Churches Health Association of Zambia, technical wing of the church in health, was formed in 1970 to complement Government's efforts in the delivery of health care services. Through its 152 affiliate member hospitals, health centers and community based organizations, with a majority of them based in rural areas of Zambia, CHAZ provides compassionate holistic health care services mainly to the rural communities, using a family centered approach

(CHAZ, 2015). Together, these institutions are responsible for 50% of formal health services in the rural areas of Zambia and about 30% of health care in the country as a whole (See Map 1.2) (CHAZ, 2015). The paragraphs below give a short profile of the six CHIs where the study took place. These health facilities are very far away from each other, and there was no danger of contamination: Minga Mission Hospital (intervention) is situated at 91.8 Km away from Nyanje Mission Hospital (control); Mwami Mission Hospital (intervention) is situated at 53.5 Km from Muzeyi Mission Health Center; and Lumezi Mission Hospital (intervention) is situated at 80 Km from Kanyanga Mission Health Center (control).



Map 1.2: Churches Health Institutions per Province. Source (CHAZ, 2015)

1.4.1 Minga Mission Hospital (Intervention Site)

Belonging to the Catholic Church, Minga mission hospital is a first level hospital situated in Eastern Province, Petauke District. The hospital has a 175-bed capacity, of which 18 are in the maternity ward. It has a Maternity Waiting Home (MWH), housed in one of the old medical wards, with a bed capacity of 15. The hospital, which has a total of 13 health workers (2 doctors, 2 clinical officers, 3

midwives, 5 nurses, and 1 laboratory technician), provides primary health care to a catchment population of 100,449. It also provides comprehensive emergency obstetric care to women of childbearing age, antenatal care services (one static and five (5) mobile clinics). In carrying out its community based health services, the facility works in partnership with community-based volunteers, mainly the 26 SMAGs trained under this study.

1.4.2 Mwami Mission Hospital (Intervention Site)

Belonging to Seventh Day Adventist Church, Mwami Mission Hospital is a first level hospital situated in Eastern Province, Chipata District. The hospital has a 210-bed capacity, of which 28 are in the maternity ward. It has a MWH, located outside the hospital premises, with a bed capacity of 15. The hospital, which has a total of 25 health workers (3 doctors, 5 clinical officers, 7 midwives, 5 nurses, 4 laboratory technicians, and 1 pharmacist), provides primary health care to a catchment population of 86,546. It also provides comprehensive emergency obstetric care to women of childbearing age, antenatal care services (one static and eight mobile clinics). In carrying out its community based health services, the facility works in partnership with community-based volunteers, e.g. 26 SMAGs, 8 Trained Traditional Birth Attendants, and 8 Community Health Workers.

1.4.3 Lumezi Mission Hospital (Intervention Site)

Belonging to the Catholic Church, Lumezi Mission Hospital is a first level hospital situated in Eastern Province, Lundazi District. Lumezi, which was a Zonal Health Centre at the inception of this study, and was upgraded in 2015 to the status of first level hospital. It has a bed capacity of 156, with 35 beds in the maternity ward. It has a newly constructed MWH located outside the main hospital complex, with a bed capacity of 30. The hospital, which has a total of 20 health workers (1 doctor, 3 clinical officers, 7 midwives, 7 nurses, 1 laboratory technician, and 1 pharmacy technologist), provides primary health care to a catchment population of 31,963. It also provides comprehensive emergency obstetric care to women of childbearing age, antenatal care services (one static

and eight mobile clinics). In carrying out its community based health services, the facility works in partnership with community-based volunteers, e.g. 26 SMAGs, 6 Trained Traditional Birth Attendants, and 1 Community Health Worker.

1.4.4 Nyanje Mission Hospital (Control Site)

Belonging to the Reformed Church of Zambia, Nyanje Mission Hospital is a first level hospital situated in Eastern Province, Sinda District (formally part of Petauke District). The hospital has a 120-bed capacity, of which 50 are in the maternity ward. It has a MWH, located outside the hospital premises, with a bed capacity of 50. The hospital, which has a total of 19 health workers (1 doctors, 4 clinical officers, 2 midwives, 9 nurses, 1 laboratory technician, and 2 pharmacy technicians), provides primary health care to a catchment population of 80,000. It also provides comprehensive emergency obstetric care to women of childbearing age, antenatal care services (one static and eight mobile clinics). In carrying out its community based health services, the facility works in partnership with community-based volunteers, e.g. 20 Trained Traditional Birth Attendants, 14 Community Health Workers and 22 Community Based Distributors.

1.4.5 Muzeyi Mission Zonal Health Center (Control Site)

Belonging to the Catholic Church, Muzeyi Mission Zonal Health Center is situated in Eastern Province, Chipata District. The hospital has a 50-bed capacity, of which 8 are in the maternity ward. It has a MWH, located within the hospital premises, with a bed capacity of 17. The centre, which has a total of 12 health workers (2 clinical officers, 3 midwives, 5 nurses, and 1 laboratory technician), provides basic emergency obstetric care to women of childbearing age, antenatal care services (one static and nine (9) mobile clinics). In carrying out its community based health services, the facility works in partnership with community-based volunteers, e.g. 24 Trained Traditional Birth Attendants, 16 Community Health Workers and 40 Community Based Distributors.

1.4.6 Kanyanga Mission Zonal Health Centre (Control Site)

Belonging to the Catholic Church, Kanyanga Mission Zonal Health Center is situated in Eastern Province, Chipata District. The hospital has a 76-bed capacity, of which 20 are in the maternity ward. It has a MWH, located within the hospital premises, with a bed capacity of 42. The centre, which has a total of 20 health workers (1 doctor, 3 clinical officers, 7 midwives, 7 nurses, 1 laboratory technician and 1 pharmacy technologist), provides basic emergency obstetric care to women of childbearing age, antenatal care services (one (1) static and four (4) mobile clinics). In carrying out its community based health services, the facility works in partnership with community-based volunteers, e.g. 35 SMAGs, 16 Trained Traditional Birth Attendants, 24 Community Health Workers and 13 Community Based Distributors.

1.5 Management of the Maternity Waiting Homes

As highlighted in the above section, all study sites are located in the rural Zambia, where the majority of pregnant women have limited access to emergency obstetric care services. To ensure a continuum of care and reduce adverse outcomes of pregnancy, CHIs embarked on the construction and utilization of Maternity Waiting Homes, long before the government run public health institutions. Established in partnership with the local communities, most mission MWHs are simple buildings constituted of two or more rooms, and located near the main CHIs' buildings.

The MWHs are managed by the health facilities, with the support of their communities. The CHIs provide to the pregnant mothers housed in the MWHs a sleeping place (reed mats or mattresses), beddings and long lasting mosquito nets. Their caregivers share the same facilities throughout the woman's stay. The following are given priority for admission to the MWHs: pregnant mothers who have been identified as high-risk pregnancies and those living in remote areas or areas with access limitation, regardless of the presence or not of risk factors. These women, referred or self-referred to the MWH, are usually accompanied by

a caregiver (grand-mother, mother, mother-in-law, sister, etc.), who assist them in securing and cooking food, washing clothes and dishes, etc. From their villages, these women bring mealie-meal, foodstuff, firewood and pots, which are stored in a kitchen, mostly located next to the main MWH building. Using this infrastructure, they cook their own meals and eat in a group with the other pregnant mothers and caregivers. The MWHs' activities are coordinated by an elected longest staying caregiver, who allocates tasks, e.g. cleaning of the MWH and its surrounding, watering of the garden, cleaning of the toilets, etc. and assigns responsibility to both caregivers and pregnant mothers, for the smooth running of the facility. When short of foodstuff, most pregnant mothers and their caregiver engage themselves in piecework, mainly within the CHIs' compound, to raise money for the replenishment of the stocked out commodities. At times, this is done during the time allocated for the delivery of ANC services, making pregnant mothers miss their ANC appointments.

The reporting time to the MWH is around 2-3 weeks before labour, but some of them report even 2-3 months before the due date, so that they could rest and escape the routine daily home chores. For pregnant women and their caregivers, the stay in the MWH is very enjoyable and they have ample time to interact, walk around the compound, do some piece work, socialize and sing traditional songs, etc. During their stay in the MWH, health workers deliver to the pregnant women a whole range of services ranging prenatal care, referral to the maternity ward in the health facility for skilled care during childbirth and immediate postnatal, and recreational activities. Those needing special attention are transferred to the main health facility, for the health workers' attention. On onset of labour, the pregnant women are transferred to the maternity ward, for skilled delivery.

1.6 Research Question and Hypothesis:

One research question guided this study, and was answered by using one hypothesis:

1.6.1 Research Question:

Will the Essential Newborn Care Group Motivational Interviewing health education (ENCGMI HE) messages delivered by SMAGs, in the Maternity Waiting Home set up, to the pregnant mothers and their caregivers be translated into higher mothers' ENC knowledge, good practice of ENC, and reduce early neonatal morbidity?

In order to guide the study, the central research question has been specified into the following three sub-research questions:

1. To what extent has the ENCGMI HE messages influenced the mothers' ENC knowledge and knowledge gain?

The purpose of the first sub-research question was to evaluate the effect of the ENCGMI HE messages on the mothers' ENC knowledge and knowledge acquisition, through the assessment of their ENC knowledge and the evaluation of their knowledge gain on discharge from the health facility. This question also identified the main barriers of healthy postnatal newborn care practices.

2. To what extent has the ENCGMI HE messages influenced the mothers' practice of ENC during their newborns' first seven days of life?

The purpose of the second sub-research question was to analyze the reported essential newborn care given to the newborns during their first seven days. This question also examined the health care seeking behaviour of mothers whose babies had fallen sick during the first seven days of life.

3. To what extent has the ENCGMI HE messages contributed to the avoidance of newborn morbidity during the first seven days of life?

The purpose of the third sub-research question was to evaluate the effect of the ENCGMI HE messages in averting early neonatal morbidity.

1.6.2 Hypothesis:

Mothers who attended the ENCGMI HE sessions will have significantly higher ENC knowledge, will practice recommended ENC family package components, and will have lower rates of early neonatal morbidities, when compared to their counterparts who participated in the routine ENC health education (RENC HE) sessions.

1.7 Research Aim

The aim of this study is to assess the effect of the Essential Newborn Care family package health education messages delivered to pregnant mothers and their caregivers by the Safe Motherhood Action Groups members in a Maternity Waiting Home set up, using a client centered education methodology that uses the Group Motivational Interviewing philosophy, on the mothers' ENC knowledge and practice, and the newborns' morbidity during the first seven days of life.

1.8 Study Objectives

This study has one main primary objective and two secondary objectives, as highlighted in the paragraphs below.

1.8.1 Primary Objective:

1. To evaluate the effect of Essential Newborn Care Group Motivational Interviewing health education (ENCGMI HE) messages delivered by

SMAGs, in the Maternity Waiting Home set up to the pregnant women and their caregivers, on the:

a. Mothers' Essential Newborn Care knowledge;
b. Mothers' practice of Essential Newborn Care, and the prevailing barriers; and
c. Incidence of early neonatal morbidities.

1.8.2 Secondary Objectives:

1. To explore the prevailing newborn care practices in the mothers' communities;
2. To determine key factors associated with the mothers' ENC knowledge, the mothers' practices of ENC, and newborn morbidity;
3. To assess the mothers' level of satisfaction of the ENCGMI HE sessions.

1.9 Study Theoretical Framework

This study is based on Kumar's (2010) Intervention-Causation Model, and Miller (1991) Action-Based Motivational Interviewing Plan theoretical frameworks (Diagram 1.1), which consists of five stages, namely:

1. Identification of the targeted newborn care behaviours;
2. Identification of the targeted groups for the newborn care behavioural intervention;
3. Implementation of the ENCGMI for the waiters and their caregivers;
4. Leveraging of the social networks influence to expedite newborn care behaviour change;
5. Building of mechanisms to sustain and institutionalize the new behaviours.

Stage 1: Identification of the targeted newborn care behaviours

Using the first session of the ENCGMI intervention, *Relationship Establishment,* which aims at unearthing the prevailing traditional newborn care practices

(covering all the six components of the ENC package) among mothers and their caregivers: beliefs, traditions and practices associated with newborn care are also identified.

Gathered newborn care behaviours are then classified into three categories, namely: desirable, harmful and non-existent. The desirable ones, beneficial for the newborn, were re-enforced and the harmful ones were targeted for change through the ENCGMI's *Contemplation Creation* sessions facilitated by the SMAGs. The non-existent newborn behaviours are shared with the target groups. The identification of these risk-enhancing and risk-reducing newborn care behaviours that are directly linked to the Eastern Province newborns' morbidity and mortality was a pre-requisite for the expected predictable outcomes of behaviour change among the waiters and their caregivers.

Stage 2: Identification of the targeted groups for the behavioural intervention

The waiters and their caregivers play a key role in the overall pathway to improved newborn survival. They are both the end points on the intervention pathway (implementers of the newborn care behaviour) and the starting points in the causation pathway.

Health behaviours have multiple levels of influences, e.g. individual, family, community, and the involvement of all the key players in an educative activity increases the likelihood of newborn care behaviour change (Cleland & van Ginneken, 1998). This study took advantage of the fact that waiters, are in the maternity waiting homes (MWH) most of the time, and are being accompanied by caregivers during the whole period of their stay in the MWH to target both the waiters and their caregivers with the ENCGMI intervention. The waiters were targeted because they are the ones who "acquire" the newborn behaviour and implement it on their babies; while the caregivers were targeted because they are the "transmitters, propagators and influencers" of the traditional newborn care behaviours.

Stage 3: Implementation of the ENCGMI for the waiters and their caregivers

Motivational Interviewing is potentially an ideal behaviour change transaction to effectively change the waiters and their caregivers' traditional newborn care behaviours. Using the MWH as a platform, SMAGs utilized the four (4) sessions of the ENCGMI intervention, namely (1) relationship establishment, (2) contemplation creation, preparation for change, and wrap up, to deliver the ENC family package, through a series of group discussions with the actors.

The ENCGMI intervention is based on the Transtheoretical Model of Behaviour Change (TTM) - providing a framework for understanding the change process itself with Motivational Interviewing (MI) providing a means of facilitating it (Britt et al, 2004; Shinitzky et al, 2001).

The MI's general principles (Table 1.2) facilitate the movement across the 5 stages of TTM (Miller, 1991; Miller, 2002). The delivery of the ENCGMI intervention using MI aims at altering how the actors see, feel about, and mean to respond to the problematic newborn care behaviours; with a focus on Contemplation to Preparation and Preparation to Action stage transitions (Diagram 1.1). Upon the identification of the actors' stage of change, the agents of change (SMAGs, nurses) implement skills that helped facilitate the actors' progression and movement along the continuum.

Motivational Interviewing is built on the foundation of understanding that the role of SMAGs is to assist the actors to move toward a state of action that leads to improved neonates' health status outcomes. Motivational Interviewing is comprised of two equally important phases, namely building a therapeutic rapport and commitment, and facilitating the movement through decisional analysis and behaviour change. The created *ambivalence* is then seen as key to this, and is resolved by focusing on the actors' wants, expectations, beliefs, fears and hopes.

Using MI, the SMAGs increase the waiters and their caregivers' readiness for change, and tailor the discussions to suit the degree of readiness for change. The created partnership between the SMAGs and the actors (waiters and caregivers) helps minimize resistance and improves the effectiveness of the intervention.

This intervention is in agreement with Bandura's Social Cognitive Theory (SCT), and focuses on three constructs, namely (1) the actors' expectations about the consequences of engaging in the traditional newborn care behaviour; (2) the influence of the actors' perception of personal control over the behaviour, and (3) the social context of behaviour (Bandura et al, 2005; Blencowe et al. 2011; Evans, 2013; Kumar et al, 2010). The intervention, through the *self-efficacy* it generates, helps increase the waiters and their caregivers' belief in their ability to change their traditional newborn care behaviour.

Table 1.3: The Five General Principles of Motivational Interviewing

Principles	Attitude
Principle 1: Express Empathy	a. Acceptance facilitate change b. Skillful reflective listening is fundamental. c. Ambivalence is normal.
Principle 2: Develop Discrepancy	a. Awareness of consequences is important b. Engage in a discussion between present behaviour and valued goals c. Client driven rational for change
Principle 3: Avoid Argumentation	a. Arguments are counterproductive b. Judging (why?) breeds defensiveness c. Resistance is a signal to change therapeutic strategies d. Labeling is unnecessary
Principle 4: Roll with Resistance	a. Avoid arguing for change. b. Resistance is not directly opposed. c. The client is a primary resource in finding answers and solutions. d. Resistance is a signal to respond differently.
Principle 5: Support Self-efficacy	a. Hope is motivating b. Patient is responsible for choosing and initiating c. There is hope in the range of alternatives d. Knowledge that certain behaviours lead to desired outcomes e. Possession of those behaviour

Source: Miller, 2002.

In its final stage, ENCGMI focuses on the context in which the newborn care behaviour is expected to take place, by preparing the actors and discussing the fundamental determinants of the newborn care at the household level. Prior to their exit from the MWH, SMAGs and actors contextualize the information;

explore the actors' motivation, both intrinsic, extrinsic or in combination; discuss behavioural skills and self-efficacy; and the enabling environment and support system.

This is done in the preparation stage. The lines below briefly explain the preparation sessions:

- *Contextualized information*: This is the information which is aligned with the target groups' existing socio-cultural paradigm.
- *Motivation*: Intrinsic or extrinsic, this involves negotiation of perceived barriers to behaviour change, and includes perceived risks associated with changes in behaviour, and reinforcement of perceived opportunities and benefits of recommended ENC behaviours.
- *Behavioural skills and self-efficacy*: This refers to the essential skills which are provided to the waiters, for them to move from existing traditional ENC behaviours to the recommended ones, and negotiate the new behaviours with the other influencers and transmitters.
- *Enabling environment and support systems*: This includes, firstly, the social support for acquiring, maintaining and reinforcing the WHO recommended newborn care behaviour. For the waiter, this social support is extremely important and social cohesion is highly valued. Secondly, it includes the institutional support systems and mechanisms that are expected to help overcome the perceived barriers, through health facility and community based interventions.

Stage 4: Leveraging of the social networks influence to expedite newborn care behaviour change

The social networks refer to the waiters' webs of relationships in the community where they live. The leveraging is expected to be done through two main mechanisms, namely *diffusion* and *dissemination*.

- *Diffusion*: Through this process, the new newborn care behaviour and practices are expected, over time, to be passively spread within and

between communities. This process will be accelerated through the utilization of influential target groups as agents of behaviour change, e.g. SMAGS, Community Health Workers, Traditional Birth Attendants, community leaders, and women and caregivers who underwent the ENCGMI sessions.

- *Dissemination*: This includes activities carried out to persuade target groups to adopt the new behaviour.

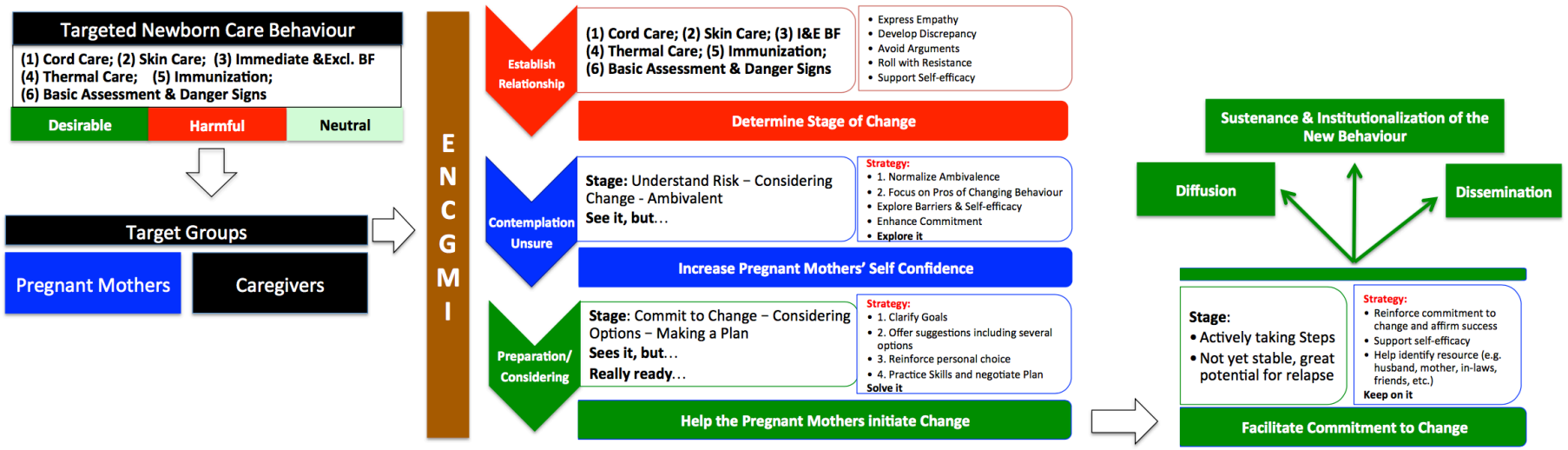


Diagram 1.1: Research Theoretical Framework: Intervention- Causation and Action-Based Motivational Interviewing Model – Adapted from Kumar, V. 2010 and Miller, W.R. 1991

Stage 5: Building of mechanisms to sustain and institutionalize the new behaviours

The sustenance of the new newborn care behaviour is to be achieved through its embedment in the socio-cultural framework, while its institutionalization will be done through community awareness and sensitization through drama performance, mass media, coordinated by the health care system.

1.10 Conclusion

This chapter has highlighted the newborn's programme context and its implementation issues, in terms of available knowledge and programmatic gaps. After giving the country context and the newborn care programme overview, the section highlighted the study aim, objectives and significance. As theoretical framework, this study uses Kumar's (2010) *Intervention-Causation Model, and* combines the Transtheoretical Model of Change and Motivational Interviewing in the implementation of the ENCGMI. The chapter ends with an outline of the thesis, which comprises of nine chapters.

The next chapter will discuss in more details the situation of newborn health (global, regional and national), the challenges being faced in their care, and interventions being used to improve the delivery of health promotion and education message to the mothers.

CHAPTER 2: LITERATURE REVIEW

This chapter, which highlights the current knowledge in relation to Essential Newborn Care (ENC) family package's health education, Motivational Interviewing and newborn health, is subdivided into three sections. The first section looks at the ENC family package and its related health education and practices; the second section examines the concept of maternity waiting homes, and the third section analyzes the magnitude of the neonatal morbidity and mortality. The chapter ends with a conclusion, summarizing the main findings from literature

2.1. Essential Newborn Care Family Package

2.1.1 The WHO Recommended Essential Newborn Care Family Package

Implemented at high coverage, simple, inexpensive, available and cost-effective preventive interventions are able to avert neonatal death in resource poor settings (Kumar et al, 2010) (see Annex 1). In 1994, WHO had convened a Technical Working Group (TWG) to define the essential newborn care (ENC) at three different levels, namely at home/in the family, at the health centre, and at the first referral level/district hospital (WHO, 1996). This meeting was necessitated by the fact that newborns received totally different patterns of care and interventions, depending of the place where they were born. The TWG settled on a total of eight interventions, called essential newborn care (ENC) to be implemented from delivery to the post-natal period, and classified them into basic and special care interventions (WHO, 1996). The ENC family package is a strategy comprised of interventions designed to improve the newborn health and support mothers to care for their babies; and includes cord care, skin care, thermal protection, early and exclusive breastfeeding, eye care, immunization, and management of newborn illness (WHO, 1996), as highlighted in the paragraphs below.

2.1.1.1 Cord Care:

To prevent infections, e.g. tetanus and sepsis, both the health workers and mothers need to ensure that deliveries and cord care are clean. Mothers at home need to insure that the cord stump is left uncovered to dry and to mummify. To achieve this, the stump should be exposed to the air without any dressing, binding or bandaging; and kept clean by protecting it with clean clothes and keeping it from urine soiling. If soiled, the cord should be washed with clean water and dried up with clean cotton or gauze.

2.1.1.2 Skin Care

The newborn skin is different from the adult one, and is susceptible to trauma and infections and requires special care. Mothers need accurate knowledge on how to gently cleanse the newborn, hydrate the newborn and moisturize his/her skin, while preventing friction and maceration in body folds, and protection from irritants and bright sunlight. The initial bath has to be delayed as much as possible in the first week and all soaps, and cleansers should be used infrequently during the neonatal period and should be limited to the groins, axillae and napkin areas.

2.1.1.3 Thermal Protection

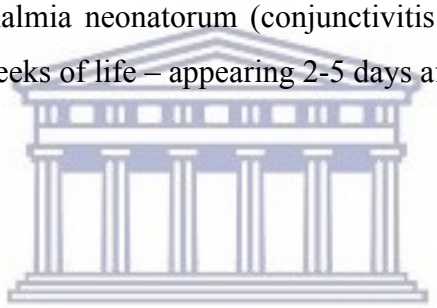
This involves the regulation of the newborn body's temperature, to maintain it at the normal 36.5 – 37.5^{o} Celsius, and avoidance of loss of body warmth. A large body surface area, a poor thermal insulation, a small body mass to produce and conserve heat, and a little ability to conserve heat by changing posture characterize newborns. To prevent hypothermia, and subsequent death of the newborn, mothers are made aware that practices such as delayed bathing, immediate drying and wrapping of the baby in loose layers of light but warm material, and skin-to-skin contact with the mother, provide not only a protection against hypothermia, but also warmth and, enable early breast-feeding.

2.1.1.4 Early and Exclusive Breastfeeding

Breastfeeding provides optimal nutrition and promotes the newborn's growth, development and immunity through the colostrum. To ensure these gains, mothers are educated to put the baby to the breast within one hour of birth, using a correct position that enables good attachment and frequent feeds. No pre-lacteal feeds or other supplements are to be given to the baby for six months.

2.1.1.5 Eye Care

Eye care involves the cleaning of the newborn eyes immediately after birth and applying either silver nitrate drops or tetracycline ointment within the first hour of birth, to prevent opthalmia neonatorum (conjunctivitis with discharge occurring during the first two weeks of life – appearing 2-5 days after birth).



2.1.1.6 Immunization

After delivery, mothers are encouraged to take their babies to the health facility for BCG. The other vaccines recommended by WHO are Oral Polio Vaccine (OPV) and Hepatitis B.

2.1.1.7 Management of Newborn Illness

The world Health Organization has defined seven signs/symptoms as danger signs for the newborn, namely: poor suckling; hypothermia; fever; fast and difficult breathing, with intercostal retraction; irritability or lethargy; vomiting, diarrhoea and distended abdomen; conjunctivitis; pustules, and redness of skin around the cord, and foul smelling discharge. If the newborn presents any one of these signs, he/she needs to be taken to the health facility. The focus of the management of

newborn illnesses, is for the mother to be able to recognize these signs and take the newborn to the health facility for the health workers' attention.

These ENC health education lectures, which are provided through static and mobile clinics, constitute the main point of interaction between the health workers, the community based volunteers and the mothers, in matters related to the newborns' postnatal care at home (Mathole et al, 2004; WHO/UNICEF, 2003). Unfortunately, the shared knowledge is not always being translated into practice.

2.1.2 Delivery of Essential Newborn Care Health Education Messages

In a context of human resource in health crisis, the utilization of community-based volunteers such as the Safe Motherhood Action Groups (SMAGs) for the delivery of ENC family package to mothers attending the ANC services has become common (Mathole et al, 2005; MoH, 2010; WHO/UNICEF 2003; WHO, 1996). These education sessions, delivered through a top down approach, do not take into account the women's stages of change (Annex 1) and mainly focus on women, leaving out their caregivers, e.g. husbands, sisters, mothers, mothers-in-law, grandmothers, etc. (Kumar et al, 2010).

Despite the ENC family package knowledge acquired by mothers, newborns continue to die, because that information is not being fully translated into action/practice by the mothers (Kumar et al, 2010). This undesired outcome is a consequence of service providers' non-adherence to the following key health promotion's principles, namely (1) the active involvement of the pregnant mothers and their caregivers in everyday life settings; (2) the dependence on public participation; and (3) the role of health professionals in nurturing health promotion (Bedworth et al, 2010).

Despite the knowledge that settings have a positive or negative impact on mothers' health, the ENC messages are disconnected from the mothers' preconceptions, attitudes, choices and traditional know-how (Bedworth et al, 2010; Kumar et al, 2010; Mathole, 2005). Besides this, ENC health education

providers have not fully involved pregnant mothers in newborn care programming for the reduction of early newborn mortality and mortality, ignoring the fact that they are part of communities that have shared living needs, shared values, interests, cultural patterns and social problems (Kumar et al, 2010). The inappropriate delivery of the ENC messages constitutes the final programmatic gap. Health workers and SMAGs, who are trained to be experts, deliver generic ENC messages using a top-down approach (Bedworth et al, 2010; Kumar et al, 2010). Assuming that one message will be equally applicable to all the women attending ANC clinics, they do not take into account the fact that the women are at different levels on the Transtheoretical Model wheel of change (Kumar et al, 2010). The omission of a '*tailored-to-stage'* ENC messages delivery has resulted in a limited number of women actually modifying their behaviour in the way they care for their newborn at home, resulting in high morbidity and mortality, and disappointments for the health workers (Kreuter & Skinner, 2000).

2.1.3 Newborn Care Practices Patterns

In the developing countries, newborns are cared for by their mothers, or/and caregivers, using different behaviours and practices, which can be beneficial, harmful or neutral (MCDMCH, 2013; MCDMCH & MoH, 2013; Rahman et al, 2012). The pattern of these practices and their impact on the survival of the newborn are determined by nine main factors, namely: (1) socio-demographic factors (mother's age at birth, parity, tribe, and education level), (2) socio-economic factors, (3) use of maternal health services, (4) birth preparedness, (5) mothers' knowledge, (6) health system factors, (7) health workers' counselling, (8) exposure to media (health information), and (9) cultural factors (Anderson, 1995; Cleland & van Ginneken, 1998; Kumar et al, 2010; Mosley, 1984).

The socio-demographic factors, such as the mother's age, parity and education are predisposing factors and do not have a direct impact on the newborn care practices. These indirect socio-demographic factors are mediated by intermediate factors such as the mothers' knowledge, their socio-economic status, exposure to media (e.g. radio, television, newspapers, etc.), the health education delivered by

health workers and/or SMAGs, the health system factors (type of health facility providing the services and its geographic access), and the utilization of maternal health services and birth preparedness. These intermediary factors can either enhance the good newborn care behaviour or impede it, thus resulting in poor newborn care practices and newborn morbidity and/or mortality (Anderson, 1995; Kumar et al, 2010; Mosley, 1984). The traditional newborn care practices have the advantage of being culturally acceptable, affordable, and relevant to the tradition prevailing in the community where the mothers live, and influence the mothers and their caregivers' newborn care practices, as highlighted in the below paragraphs (Anderson, 1995; Kumar et al, 2010; Mosley, 1984).

2.1.3.1 Newborn Umbilical Cord Practices

Each year, approximately 1 million newborns worldwide die of infection caused by bacteria that enter the body through the umbilical cord, representing 47% of infections among infants hospitalized with sepsis (Vural & Gulsen, 2006). Studies conducted in Ethiopia, Sri Lanka and other parts of the developing countries showed that mothers' knowledge levels of the care of the newborn umbilical cord vary (Misgna et al, 2014; Senarah et al, 2007) and that it is correlated to the cord care practice (Chaudhary et al, 2013; Senarath et al, 2007; Sharan, 2004).

In caring for the newborn cord, mothers and their relatives apply various substances on the cord and the peri-umbilical area, at a rate ranging from 33% in rural Kamataka (Kesterton et al, 2009) to 74% in Karachi Pakistan (Gul et al, 2014). These substances varied according to the regions: coconut oil, mustard oil, ghee (purified butter), olive oil, surma (kohl), turmeric and machine oil, in Pakistan (Gul et al, 2014); mustard oil, coconut oil, warm ghee, boric powder and talcum powder in Bangladesh and India (Moran et al, 2009; Agarwal et al, 2007); salty water, powder, Vaseline, spirit, normal saline, ripe banana (gonja), sap, soot, ash, saliva, and herbs in Uganda (Kayom et al, 2015); raisins, plants known as puffballs, mutton tallow or castor oil, and olive oil; a mixture of coconut oil and fragrant flowers. (USA) (Perry, 1982); a combination of ashes and fresh colostrum is applied directly to the newly cut cord (Kenya) (Levine & Levine, 1963); shea

butter (Ghana) (Saaka & Iddrisu, 2014). In rural Karnataka, mothers burn the tip of the cord with castor oil lamp (Kesterton et al, 2009). The reason for applying various substances to the cord stump was the belief that they help dry the cord (Pakistan) (Gul et al, 2014), and to quicken the healing (Uganda) (Kayom et al, 2015);

In a qualitative study conducted in the Southern Province of Zambia by Herlihy et al (2013), they found out that mothers and/or their caregivers applied different substances on the fresh cord, ranging from drying agents such as charcoal, baby powder, and dust, to lubricating agents such as petroleum jelly, cooking oil, and used motor oil. Breast milk, cow dung, and chicken feces were also applied on the newborn umbilical cords as medicinal or protective agents. These substances are often contaminated with bacteria and spores and thus increase the risk of infection, and the chances of neonatal infection (WHO, 1998).

Regardless of the type of cord care that the newborn receives, the general unhygienic conditions in the home where the newborn is being kept continue to be a big threat to his life. Considering the umbilical area as a vulnerable site, mothers protect it using strips of old pieces of clothes and adhesive tapes. Mothers feel that using such binders would protect the site from dust or possible injury, as well as provide a surface for the dried cord to stick to. At times, a coin is placed inside the cloth against the navel to ensure that the umbilicus was held down when the baby cried (Perry, 1992). In a study conducted by Agrawal et al (2012), to look at the correlation between clean cord care practices and neonatal mortality, they found that 30% of the studied mothers practices all the three clean cord care behaviours, meaning clean instruments for cord cutting, clean threads for cord tying and no application or only antiseptics on the cord. The study also found that neonatal Mortality Rate was significantly higher among those who applied indigenous substances on the cord, 54.3/1,000 live births (95% CI 46.6 to 63.0) vs 40.2/1,000 live births (95% CI 32.7 to 48.8) among those who avoided using indigenous substances or used antiseptics on the cord (Agrawal et al, 2012).

2.1.3.2 Newborn Skin Care Practices

The birth of the baby depicts a sudden transition from the intrauterine life to the external one and the baby is expected to adapt and maintain its own temperature. Anatomically, the skin of the newborn is different of that of the adult, in the sense that the newborn has a higher skin surface area (700cm^2/kg vs 250 cm^2/kg for the adult), the connection between the dermis and the epidermis is less strong; the skin is thinner and less elastic; the permeability of the stratum corneum is higher and the epidermal barrier is not well developed (Sarkar et al, 2010).

The skin of the newborn is susceptible and sensitive to trauma and infection and requires a special care by both the mother and the health workers (Stalder, 2011). Unfortunately soaps and harsh surfactants continue to be indiscriminately applied on the newborn skin, despite the fact that they play an important role in facilitating skin barrier deterioration and triggering atopic dermatitis onset (Danby & Cork, 2011). Babies are being bathed regularly with soap and water from the start; eyes lids are swabbed with dry wool/clothes; creams, petroleum jelly, cooking oil are applied on the body; powders are applied routinely, particularly on the baby's buttocks or flexures seemed sore; and buttocks soiled with meconium or faeces are swabbed with clothes (Danby & Cork, 2011; Sacks et al, 2015; Stalder, 2011; Sarkar et al, 2010). Some of these practices have led into complications/infections such as blisters, increased trans-epidermal water loss, and irritations of the skin (Danby & Cork, 2011; Sarkar et al, 2010).

2.1.3.3 Newborn Thermal Care Practices

Hypothermia, mainly caused by the maternal inadequate knowledge, practices and attitudes can put the life of newborn at risk through the consequences such as delayed foetal-to-newborn circulation adjustment, acidosis, infections, etc., and lack of understanding that every second of exposure to the outside environment causes heat loss for the newborn (Byaruhanga et al, 2006; Sobel et al, 2011). Keeping the newborn warm after birth is still not a common practice, and simple preventive techniques such as the skin-to-skin contact remains underutilized in some poor resource setting, mainly as a result of cultural practices and negative

perceptions of the mother, the community and even the health workers (Byaruhanga et al, 2006).

The majority of studies from Africa and Asia report that the majority of newborns were bathed within 24 hours of birth (Barnett et al, 2006; Darmstad et al, 2007; Devkota & Bhatta, 2012; Fatima et al, 2005; Fikree et al, 2005; Gul et al, 2014; Gupta et al, 2010; Kirkwood et al, 2013; Moran et al, 2009; Shamba et al, 2014; Sreeramareddy et al, 2006), apart from two studies in Chitwan district in Nepal and Dyads in Urban Uganda, in which most babies were bathed after 24 hours (Chaudhary et al, 2013; Kayom et al, 2015). In rural Tanzania's studies, mothers used cold water to bath their babies, to help them cry and make them strong (Penfold et al, 2010; Shamba et al, 2014), while in Urban Uganda, mothers bathed their babies in herbal medicine "ekyogero," a mixture of various herbs including leaves, roots, and tree barks, to prevent and treat skin rashes (locally called "nnoga"), treat abdominal colic, and give the baby good luck (Kayom et al, 2015)

Reviewed studies shows that the most common reasons given for early bathing included were similar across the African and Asian countries. In Asia the following were the major reason: the baby is napaak (polluted) therefore the Azan (Prayer call) cannot be said in its ear unless it is bathed (a tradition among Muslims), elders cannot hold the newborn until bathed, so that they can say their prayers, to remove the dirty vernix caseosa (Gul et al, 2014);

In Africa, the following were the main reasons for bathing early the babies: the baby is dirty after undergoing a dirty birth process; to remove the vernix caseosa, thought to be sperm –hence dirty, and implying that the mother was having sex when she was in the final months of her pregnancy (Shamba et al, 2014; Tuladhar, 2010). This practice makes the newborns vulnerable to hypothermia and also interferes with their suckling ability (Tuladhar, 2010). In this Tanzania study, the desire to remove the vernix caseosa from the baby was related to social pressure, because if left and seen by outsiders, the mother may be considered sexualized (Shamba et al, 2014). Surprisingly, in rural Karnataka, India, babies were bathed early for concerns about the baby looking dirty, combined with the ritual pollution associated with giving birth. In this area, the white layer of vernix was being

considered as food that the mother had eaten incorrectly during pregnancy, hence must be removed (Kesterton et al, 2009). In Ghana and some parts of India, early bathing is performed as a need to make the baby clean and presentable (Hill et al, 2010; Iyengar et al, 2008; Baqui et al, 2007).

Thermal protection in various communities in Africa and Asia seems to vary mainly due to cultural differences. The belief that it was important to adequately cover the newborn and not to bath him with cold water was found in both Africa and Asia (Darmstadt et al, 2006; Hill et al, 2010; Iyengar et al, 2008; Kesterton et al, 2009; Khadduri et al, 2008; Osrin et al, 2002; Sreeramareddy et al, 2006; Winch et al, 2005). A study in rural Eastern Uganda reported that only 42% of the newborns received adequate thermal protection (Waiswa et al, 2010), while in urban Uganda; 77% of mothers had no knowledge of skin to skin care as a way of keeping babies warm, with only 28% of those with preterm babies practiced skin to skin care (Kayom et al, 2015). In their Tanzanian study, Shamba et al (2014) conclude that the reasons why newborns are being given sub-optimal thermal care practices were mainly anchored in traditional or culturally held beliefs, and also the poor support that the mothers get during delivery. The study also reported mothers knew that wrapping the baby well and keeping the head covered was important for keeping the baby warm, particularly if the weather was cold or the baby was being taken outside the house. But their main reason of covering the newborn's head was to hide the first hair and protect the baby from harmful intentions, based on a belief that if the baby is not well covered in the first months of life, bad people can hurt it through witchcraft (Shamba et al, 2014).

2.1.3.4 Newborn Breastfeeding Practices

Breastfeeding knowledge studies carried out in Africa and Asia showed high mothers' knowledge about the initiation of breastfeeding, breastfeeding on demand and the advantages of colostrum, and the duration of exclusive breastfeeding (Misgna et al, 2014; Senarah et al, 2007; Pant & Chothia, 1990).

The timing for the initiation of breastfeeding, the frequency and the giving of colostrum to the newborn varied from one place to another. Studies from

Bangladesh, Nepal, and Pakistan showed early breastfeeding initiation rates of more than 90%, 91%, and 73 % respectively (Holman & Grimes, 2001; Osrin et al, 2002; Fikree et al, 2005), while in Pakistan, Egypt and Uganda, breastfeeding was initiated late at the rate of 48%, 50% and 60.7% respectively (Gul et al, 2014; Darmstadt et al, 2007; Koyam et al, 2015). Be it in India, South Asia or Africa, women who delay breastfeeding usually wait for several days after birth to avoid giving colostrum (Sharma, 2010; Huffman et al, 2001), based in the mother-in-law's advice or their own perception that colostrum is harmful for the baby (Gul et al, 2014; Kesterton et al, 2009). Pakistani studies have reported a higher rate of discarding colostrum among the mothers (Fatima et al, 2005; Fikree et al, 2005), while in Gulomekada District, East Ethiopia, 98.3 % mothers of fed colostrum for their final baby (Misgna et al, 2014).

Prelacteal feeds also vary across countries, with the mostly given feeds being, honey (given to the newborn by putting it on a fingertip), green tea, aniseed water, sugared water, sugarcane juice, and gripe water, formula milk and goat's milk (Gul et al, 2014; Kayom et al, 2015; Shah et al, 2013).

2.1.3.5 Newborn Health Seeking Practices

Studies in Africa and Asia have shown that mothers face several barriers in seeking neonatal-care, which include knowledge barriers; cultural, traditional beliefs and practices; financial challenges; peer influence of choice of care; service delivery gaps and some provider related factors (Shah & Dwivedi, 2013). Studies done on the newborn health seeking behaviour have also shown that inappropriate domiciliary newborn care practices and suboptimal care seeking are the major causes of neonatal deaths among deliveries (Awasthi et al, 2009). Among the factors explaining the delay in care seeking for sick children, behavioural modifiable factors are being incriminated, e.g. poor recognition of neonatal danger signs, local illness beliefs, use of traditional or home remedies and inability of mothers to identify appropriate health care providers (Awasthi et al, 2008).

A meta-analysis conducted by Syed et al (2008) on newborn care practices in poor and rural districts of Bangladesh, Nepal and Pakistan revealed that common delays in receiving appropriate care for serious newborn complications were mainly ascribed to delays in recognition, delays in transport and access, and delays in delivery of quality care by practitioners.

The analysis found that in Bangladesh, routine checkup for the baby were perceived as of little value and the opposition from the mothers-in-law and the lack of health workers were found to be the main barriers. When the newborn is sick, the family consults first with an unqualified practitioner such as the traditional healers and homeopathic doctors. In Nepal, the traditional belief that the mother and the baby were 'polluted' during the postnatal period and that no one should touch or come in contact with them was the main barrier. Family members showed reluctance in touching the baby, even when presenting danger signs (Syed et al, 2008). Among those surveyed, the knowledge of newborn danger signs was generally poor and women were more knowledgeable than men. Care seeking for the newborn was the prerogative of the male head of the household and the mother-in-law. Hence the major barriers to care seeking were the lack of knowledge, family traditions, cost and lack of transportation to inaccessible facilities (Syed et al, 2008).

Using lessons from behavioural science and social psychology, evidence has shown that interpersonal interactions, rather than mass communications were critical to effective promotion of life saving newborn care behaviours (Kumar et al, 2010), which could reduce the above mentioned harmful newborn care behaviours and practices. This implies that interventions have to be adapted to the women's stage of change, rather than assuming that one message will be equally applicable to all. This is being referred to as *tailoring* (Kreuter & Skinner, 2000). Several studies in different fields have shown that *tailored-to-stage* interventions are more effective than interventions that disregard the stages and /or use the 'one-size-fits-all' approach (Kreuter & Skinner, 2000). In their meta-analysis of 57 studies in the fields of smoking cessation, diet, mammography screening, exercise, vaccination/immunization, pap test, safer sex, passive cancer detection, seatbelt use, colorectal cancer screening, injury prevention, routine medical

appointments, diet and exercise, Noar et al. (2007), have found that tailored messages have been effective in stimulating health behaviour change.

2.1.4 Determinants of Newborn Care Practices

Though a few studies have examined the relationships between newborn care practices and socio-demographic factors and service utilization, there is still a need to study the other predictors of newborn care practices and the interrelationships that influence newborn survival. There is little literature on the determinants of newborn care practices, and the examined available literature has shown that the following nine factors were the main possible determinants of newborn care practices: (1) socio-demographic factors (mother's age at birth, parity, tribe, and education level), (2) socio-economic factors, (3) use of maternal health services, (4) birth preparedness, (5) mothers' knowledge, (6) health system factors, (7) health workers' counselling, (8) exposure to media (health information), and (9) cultural factors. Evidence on the influence of these factors is highlighted in the below conceptual framework (Diagram 1.2).

To help understand the determinants of newborn care practices by the mothers, the researcher combined and adapted the Mosley and Chen's child survival framework for developing countries (Mosley, 1984), the Andersen's behavioural model of health service utilization (Anderson, 1995), and the Kumar intervention-causation model (Kumar et al, 2010). This framework conceptualises good newborn care practices as the result of interaction between various factors, some of which are directly related to good newborn care while others are intermediate in nature (Diagram 2.1).

Socio-demographic factors such as the mother's age, parity and education are predisposing factors and do not have a direct impact on the newborn care behaviours. These indirect socio-demographic factors are mediated by intermediate factors such as the mothers' knowledge, the socio-economic status, the exposure to media (e.g. radio, television, newspapers, etc.), the health education by delivered by health workers and/or community based volunteers, the

health system factors (type of health facility providing the services and its geographic access), and the utilization of maternal health services and birth preparedness. The above listed intermediary factors can either enhance the good newborn care behaviour or impend it, thus resulting in poor newborn care practices and newborn morbidity and/or mortality.

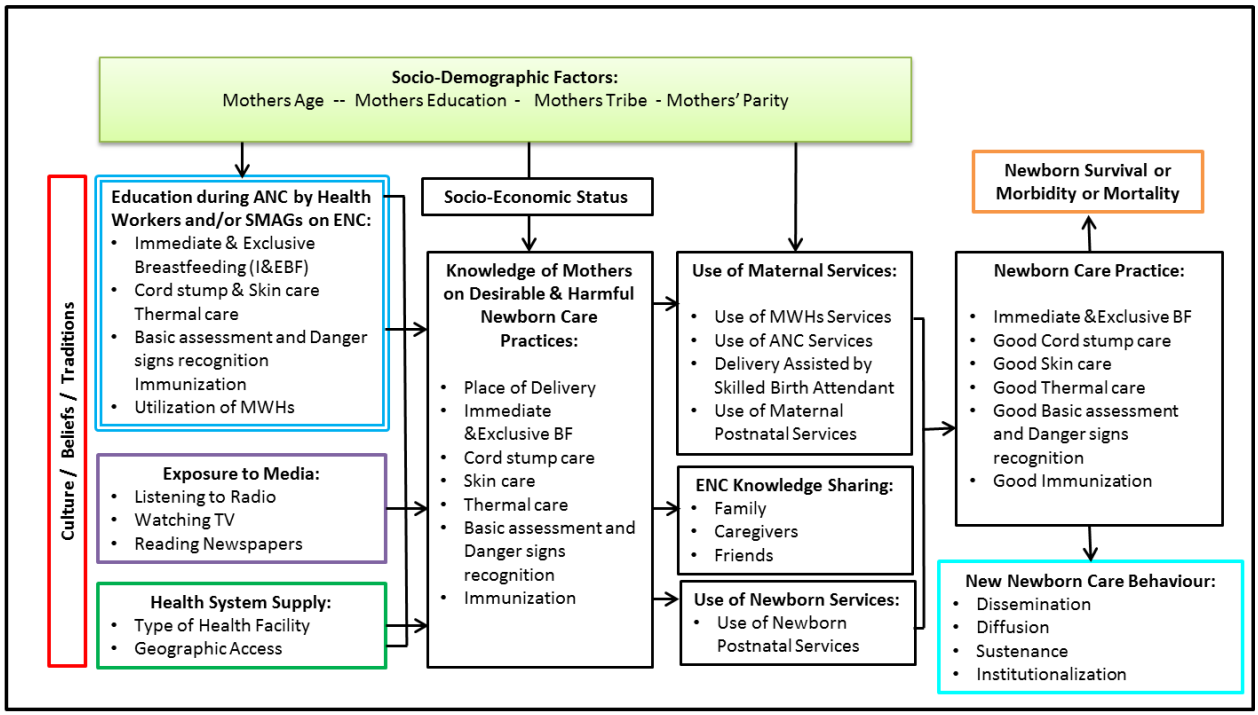


Diagram 2.1: Determinants of Newborn Care Practices Theoretical Framework - Adapted from Tuladhar, S. (2010)

Both the indirect and intermediary factors are under the influence of culture, beliefs and tradition prevailing in the community where the mothers live, and which also influence the mothers and their caregivers' newborn care practices.

The ultimate outcome of this conceptual framework, which is determined by the adoption of good or harmful newborn care practices by the mother or/an caregiver is the newborn's survival or morbidity/mortality.

The followings are the major variables of a mother practicing various newborn care behaviours:

1. ***Socio-demographic Factors***:

   These factors include the mother's age, parity, education, and tribe. Socio-demographic factors have been identified as an important

determinant of good newborn care practices, based on studies which found a correlation between the mother's socio-demographic factors and the newborn care practices, e.g. delivery practices and breastfeed (Holman & Grimes, 2001; Sharan, 2004).

2. ***Socio-economic Factors:***

These factors include the mother's household wealth index. Research has shown an association between economic status and cord care practices. Mothers belonging to higher economic status are better exposed to health care information and services, thus are more likely to demonstrate safer newborn care practices (Sharan, 2004).

3. ***Utilization of Maternal and Newborn Health Services****:*

These services include the utilization of ANC services, skilled delivery; maternal postnatal services and newborn postnatal services. Sharan (2004) in his study has shown that there was a positive association between ANC attendance and cord care and early breastfeeding. This finding shows that if a pregnant woman receives ANC services, she is likely to get information on ENC and later on adopt good cord care and breastfeeding practices. Similarly, delivering in health facility and attending postnatal care services are also likely to provide women with information that might help them to demonstrate safe newborn care practices.

4. ***Level of Knowledge****:*

The mother's level of knowledge is related to the ENC family package. The mother's level of knowledge is an important intermediate factor that facilitates other factors to demonstrate good newborn care practices. While the mother's knowledge will push her to use health services, hence practice safe newborn care behaviours; on the other hand the utilization of health services increases a mother's knowledge and ability to practise safe newborn care behaviours (Sharan, 2004).

5. ***Education during ANC by Health Workers and/or SMAGs**:*

The key areas of focus in the delivery of the health education are: immediate and exclusive breastfeeding, cord stump care; skin care; thermal care; basic assessment, danger signs recognition and health seeking behaviour and Immunization. A study by Baqui et al. (2006) found a positive impact of antenatal health education provided by health workers and/or community based volunteers on clean cord care, thermal care and early breastfeeding.

6. ***Exposure to Media**:*

The exposure to media includes listening to radio at least once a week, watching television at least once a week, and reading a newspaper at least once a week. Although, studies have not examined the association of newborn care practices with radio listening and television viewing, it is expected that mothers having access to radio and television receive health information and thus will be more inclined towards demonstrating safe newborn care practices.

7. ***Health System:***

The health system factors is related to the distance between the woman's house and the health facility. Kumar et al (1997) in their study show that women living in a catchment area with higher level health facilities (health centres, hospitals) are more likely to use services than women living in one with limited service facilities such as health posts. Therefore, it is expected that the supply system factors, including the level of the health institution and the geographic accessibility, could have influence on the service utilisation and thus, newborn care practices.

8. ***Cultural Factors:***

Cultural factors include the mother's cultures, beliefs and traditions concerning newborn care practices at home. In the Zambian communities, especially in the rural areas, beliefs in supernatural powers, culture and

traditions are widely spread and have a deep impact on newborn care practices.

2.2 Motivational Interviewing (MI) as a Change Catalyst

To address the above-mentioned programmatic gaps in the delivery of ENC family package, prevent and halt harmful newborn care behaviours and practices, and improve newborn survival, this study is proposing the delivery of tailored ENC messages using the Transtheoretical Model of Behaviour Change (TTM) as a framework for understanding the change process among women and their caregivers, and Motivational Interviewing (MI) as a means of facilitating ENC behaviour change.

2..2.1 Transtheoretical Model of Behaviour Change (TTM)

The TTM is a health behaviour change theory that postulates that individual's progress through five stages of change (Diagram 2.2) on their way toward adopting a desired healthy behaviour, namely: (1) pre-contemplation, (2) contemplation, (3) preparation, (4) action, and (5) maintenance (Bedworth et al, 2010; Prochaska et al, 1994; Prochaska and Velicer, 1997). The TTM describes the change process as a multi-step cyclical process, rather than linear, as individuals may move forward through stages, go backward, and then forward through the stages of change (Prochaska and Velicer, 1997). The particular attention that this model pays to the process of change for each stage and their determinants, helps understand when particular shifts in attitudes, intentions and behaviour occur, and how these shifts occur (Bedworth et al, 2010; Noar et al, 2007; Prochaska et al, 1994). The relationship between stages, processes and determinants is illustrated in Annex 2 (Bedworth et al, 2010; Shinitzki et al, 2001).

Because individuals' attitudes, strategies, and skills differ according to their stages of the change process, the TTM recommends that a particular attention be

paid to where individuals are in the change process, prior to the tailoring of the messages, as a best way of moving individuals forward through the stages of change (Kreuter & Skinner, 2000; Noar et al, 2007). Based on these facts, this study used the stages of change model in which the stages were combined with the Motivational Interviewing concept.

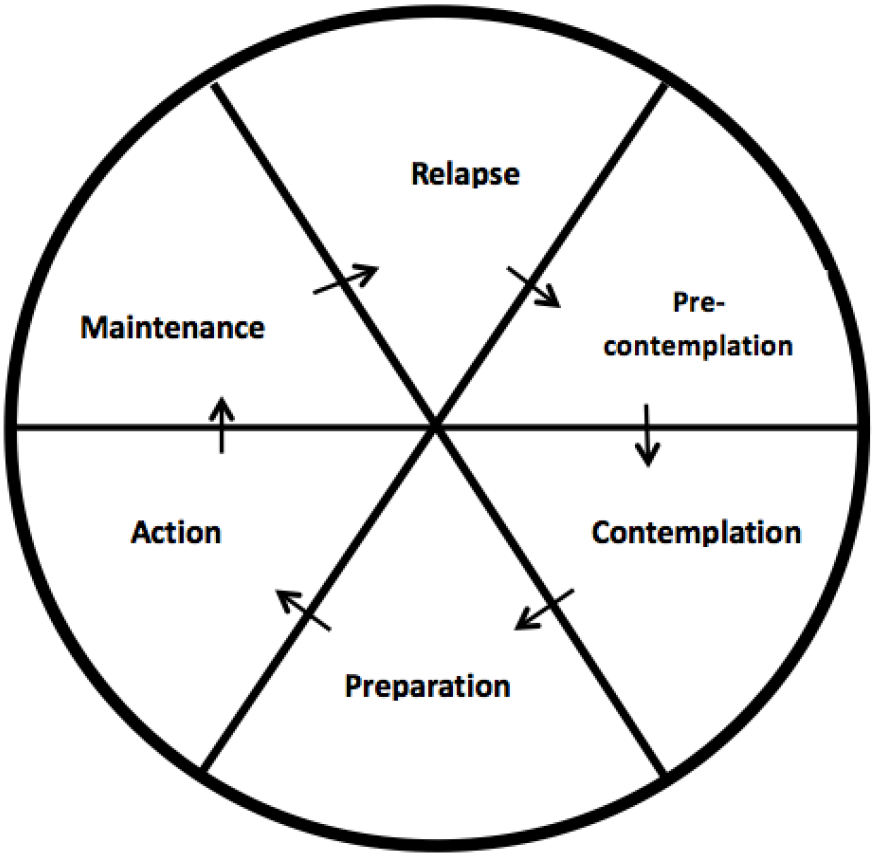


Diagram 2.2: TTM stages of change. Adapted from Prochaska et al, 1994

2.2.2 Motivational Interviewing

Motivational Interviewing, which is both a treatment philosophy and a set of methods employed to help clients in increasing their intrinsic motivation by exploring and resolving ambivalence about behavioural change (Miller & Rollnick, 2002), is broadly based on Carl Rogers' client-centered therapy and uses

active cognitive and behavioural strategies (Diclemente et al, 2009**;** Miller & Rollnick, 2002; Rollnick et al, 2007).

Motivational Interviewing was developed in 1983 by William Miller, and was used in psychotherapy to assist people change their substance abuse behaviours (Rollnick & Miller, 2013). In 1991, Miller, in collaboration with Stephen Rollnick, further elaborated it and defined it in their latest book as

> "a collaborative, goal oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion" (Rollnick & Miller, 2013). (p.42).

Motivational Interviewing, as a client-centered approach, is rooted in client-centered therapy, and despite its reflective listening and nondirective counseling approaches; the counselor still directs the discussion, leading the client towards ambivalence resolution. It allows the client to build his or her own motivation and resolve toward changing a negative behaviour. Motivational Interviewing is based on *four basic principles*, which are (1) expressing empathy, (2) developing discrepancy, (3) rolling with resistance, and (4) supporting self-efficacy (Miller & Rollnick, 2002; Rollnick et al, 2007). Motivational interviewing assumes that behaviour change is affected more by motivation than information. The core MI *interviewing skills* are asking, informing, and listening (Rollnick & Miller, 2013; Rollnick et al, 2005) and they were used in this study, through the predesigned SMAGs' ENCGMI flowcharts.

As a skilful clinical style for stimulating from clients their own good motivations for making behaviour changes in the interest of their health or that of their babies, MI, involves guiding more than directing, dancing rather than wrestling, listening at least as much as telling, as it has been described as collaborative, evocative, compassionate and honouring of clients' autonomy (Miller & Rollnick, 2013). Motivational Interviewing is implemented using the *MI spirit*, which is the underlying perspective with which one practices MI, the set of heart and mind

with which one enters into practice of MI. There are four key interrelated *elements of the spirit of MI*, namely: Partnership, Acceptance, Compassion, and Evocation (Miller & Rollnick, 2013).

Because MI attempts to increase patient awareness, it can be very effective at promoting healthy behaviours, changing unhealthy behaviours, and sustaining desirable behaviours (Miller & Rollnick, 2013). The change is accomplished in two phases. The first phase consists in increasing the motivation for change and second one consists of consolidating commitment to change. For the client, the readiness to change is determined by two main factors, namely: (1) the importance of the change and (2) the confidence that he or she has in successfully making the change (Miller & Rollnick, 2013).

Motivational interviewing, which has been used in psychotherapy, medicine, addictions, public health and other disciplines, helps understand one essential component of the behavioural change process, namely: motivation (Lundahal & Burke, 2009). To fully understand the novelty that MI has brought to the process of understanding and influencing behavioural change, Lundahal et al. (2009) propose the following mathematical equation (Box 2.1), after an analysis of 119 studies that had used MI:

$$\text{Change} = \frac{\text{Knowledge x Motivation}}{\text{Resistance}}$$

Box 2.1: Lundahal Mathematical Equation of Change

In their meta-analysis, Lundahal & Burke (2009) argue that the supply of *knowledge* alone is not sufficient to produce behaviour change. Despite the fact that clients are equipped with very good advice from the health practitioners on what they should do and how they should do it, they have not managed to engage individuals and communities into healthy behaviours (Lundahal & Burke, 2009). What has been lacking in public health programming, they argue, is the *motivation* to apply the acquired knowledge (Lundahal & Burke, 2009; Miller &

Rollnick, 2013). Though motivation is an essential ingredient to the process, research has shown that a client's motivation to change is significantly influenced by the practitioner's relational style, which determines the client's noncompliance with the proposed change suggestions (Horvath & Luborsky, 1993; Lundahal & Burke, 2009; Miller & Rollnick, 2013). This meta-analysis concluded that (Lundahal & Burke, 2009):

- When contrasted with active treatment, MI was consistently and significantly better than weak alternatives and about equal to –though in some cases better than – strong alternative treatments. The analysis concluded that in cognitive-behavioural therapy and other steps programmes, MI is likely to confer at least 10% advantages in success rate versus weak or no treatment and to fare as well as other established treatments, possibly in less time.

- Motivational Interviewing, which was initially used in the treatment of substance use disorders in the 1980s, has also been successfully applied to a number of other problem areas, e.g. tobacco, risky behaviours, increase healthy behaviours, diet/exercise, social functioning, treatment compliance, increased motivation, gambling, eating disorders, emotional well-being, to mention but a few. When it comes to the promotion of healthy behaviours, such as increased exercise or better eating habits, the meta-analysis suggests that MI is an effective, promising method.
- Delivered through group sessions, MI was not less effective than combining group-delivered sessions with individually delivered ones.
- Motivational Interviewing requires an average of 100 minutes less time face-to-face time with clients, compared with treatment as usual programmes. This makes MI to be more cost efficient, especially in environments characterized by a shortage of staff or services.
- The meta-analysis showed that MI works with clients of both sexes and of various ages, ranging from adolescents to geriatric; and that its outcomes appear durable up to 1 year post treatment. Being a cognitive based

intervention requiring some formal or abstract reasoning ability, MI is not recommended for very young children or cognitively impaired individuals.

- When tested to find out whether the degree and profession of the practitioner affected client outcomes, it was fund that the training level does not significantly influence MI outcomes. This finding suggests that MI can be learned and effectively applied by practitioners with a wide range of backgrounds.
- MI is learnable via a 2-day interactive workshop, followed by ongoing supervision and coaching.

In light of the above findings, the researcher decided to harness the essential elements of individually based motivational interviewing and apply them within a group setting, for the delivery of ENC health education to pregnant mothers and their caregivers in a maternity waiting home setting. A review of literature shows that Group Motivational Interviewing (GMI) has been tried in the treatment of alcohol dependence and in health behaviours (Miller & Rollnick, 2002). In their article on Group Motivational Interviewing (GMI), Foote et al (1999) highlight that GMI helps create an "autonomy supportive" environment that strengthens participants' autonomous or intrinsic reasons for seeking and initiating change, which may result in longer term maintenance of change. The utilization of GMI, which is less expensive and serves more people with fewer providers, (1) provides the participants with additional opportunities for role playing and social support (Miller & Rollnick, 2002); (2) lowers participants' resistance; (3) allows participants to arrive at their own decisions about the severity of their problem and possible need for change; and (4) consistently deliver the desired message that participants are free to decide about working towards change (Foote et al, 1999).

2.3 Maternity Waiting Homes (MWH)

The transition from foetal to neonatal life is usually very smooth in full term newborns who are born through a normal uncomplicated vaginal delivery. However, this process can be easily disturbed, and translated into neonatal

morbidity or mortality, by a number of factors emanating from the mother, the foetus itself, the placenta, the environment or the different procedures at birth (Rhaman et al, 2012). To ensure the continuum of care and reduce adverse outcomes of pregnancy, many developing countries have embarked on the utilization of MWHs (Van Lonkhuijzen et al, 2012; WHO, 1996b).

2.3.1 Definition of Maternity Waiting Homes

The existing literature gives a whole range of definitions of what constitutes a Maternity Waiting Home, depending on the countries utilizing them (WHO, 2006). The World Health Organization (WHO, 2006) defines the MWH as "Residential facilities, located near a qualified medical facility, where women defined as "high risk" can await their delivery and be transferred to a nearby medical facility shortly before delivery, or earlier should complications arise". With time, this concept has broadened to now include women expecting their first delivery, women with many previous births, very young women, older women, and women suffering from conditions such as high blood pressure during pregnancy (WHO, 2006). Used with the purpose of reducing maternal and perinatal mortality through improved access to skilled birth attendance and emergency obstetrical care, MWHs have become a method to "bridge the geographical gap" in obstetric care in rural areas, with poor access to health facilities with essential obstetric facilities (WHO, 2006).

2.3.2 History of Maternity Waiting Homes

The concept of having a place where women living in remote geographic areas could have access to obstetrical services may have started in the early 20th century. Countries in Northern Europe, Canada and the United States used waiting homes to facilitate access to maternal and child services (WHO, 2006). With time, the concept of waiting homes spread to African and other developing countries. Based on various countries' experiences, the maternity village concept was seen as a very important development which health facilities situated in rural areas with

poor communication and referral system could emulate. These shelters, adjacent to the health facilities, are now being constructed in view of reducing maternal and child mortality (Poovan et al, 1990; WHO, 2006).

2.3.3 Elements of a Maternity Waiting Home

Maternity Waiting Homes, which are established by health facilities, Non-Governmental Organizations, and even by the Government or community groups, are physical infrastructures dedicated to address women's specific needs during the pregnancy life cycle, and can fully function only when linked to the larger chain of comprehensive maternity care (Blencowe et al, 2011; WHO, 2006).

Varying over time, MWH are housed in different types of infrastructures, ranging from huts to modern houses with toilet, bathroom and kitchen facilities; and old hospital wards. These facilities are administered by the health facility's management and the services are provided by the health facility's midwives or doctors, with the assistance of Community Based Health Workers such as the Traditional Birth Attendants and Safe Motherhood Action Groups (WHO, 2006; Wilson et al, 1997).

From the community where they live, women are referred within the health care system to a MWH, which serves as a link between the community and the health system, by Community Based Health Workers and/or health workers, in the last month of their pregnancy. Beside this, women do "refer themselves" based on the messages received during ANC clinics, and the credibility that the women and their families perceive on the MWH (WHO, 2006).

Initially admitted based on the likeliness of developing complications and need for skilled obstetric care, women are now being admitted in MWHs based on a combination of distance, socioeconomic and medical risk factors. This paradigm shift is justified by the fact that many obstetric complications are unpredictable and that most complications that do occur are among women with no apparent risk factors (WHO, 2006). Nevertheless, health workers admitting women in the MWH base their admission criteria on locally defined obstetric risks and

identifiable conditions, predictive of complications. Such conditions include, but not limited to, age (extremes of youth or age), low stature, malnutrition, poor obstetric history (previous stillbirths, caesarian section), high parity, anaemia, high blood pressure, mal-presentation, etc. Other factors might include distance and transportation to qualified obstetric care, and other socioeconomic and cultural conditions such as religious beliefs, and limited education (WHO, 2006).

Women spend 2 to 6 weeks or more weeks in the MWH (WHO, 2006). The referral or reporting time depends on many factors such as the woman's satisfaction of services, the family's support to the woman during her stay in the MWH, and the community support of the MWH (WHO, 2006). During their stay in the MWH, women receive a whole range of services ranging from Health Educational and Promotion to Antenatal Cares services. While waiting for labour to start, women are also involved in activities such as knitting, sewing, gardening and helping with the maintenance of the MWH and its surroundings (Wild, 2009). In their Nyanje study on the use of MWH in rural Zambia, Van Lonkhuijzen at al. (2003), describe the profile of pregnant mothers staying in the MWH as women with an average age of 23 years, educated, residing 22Km to the hospital, often nulliparous, with a history of previous caesarean section and having maternal risk in 83% of cases. Breech and transverse presentations occurred more frequently in the waiters, however, in 78% of cases they had no antenatal risk factors, and in 77% no intrapartum risk factors. In 86% of cases, they had a spontaneous vertex delivery, with babies weighing an average of 2,857g, and no difference was found in perinatal mortality between the waiters and the non-waiters (van Lonkhuijzen et al, 2003).

2.3.4 Effectiveness of a Maternity Waiting Home

In their meta-analysis study on MWH to examine their acceptability to women, and their effects on maternal and perinatal health, Van Lonkhuijzen et al (2012) highlighted that MWHs were found to be increasing the number of women accessing skilled delivery; and improving the outcomes for women, infants, or both. No firm conclusion could be made on the effectiveness of MWHs on

maternal and child outcome because all the reviewed studies had high risk of selection bias (van Lonkhuijzen et al, 2012).

2.4 Neonatal Mortality

The neonatal period, extra uterine continuum of intrauterine foetal life separated by birth, is the most vulnerable and high-risk time in the human life, because it has the highest morbidity and mortality incidence (Rhaman et al, 2012). This section of the literature review gives a highlight of the newborn mortality at the global, regional, Sub Saharan Africa (SSA) and Zambian levels.

2.4.1 Magnitude of Neonatal Mortality

Globally, 74% of neonatal deaths happen in the first week after birth (Poovan et al, 1990; Thaddeus & Maine, 1994; WHO, 2007), with the first 28 days of the newborn life being the most vulnerable and high-risk time in the human life (Rahman et al, 2012). Worldwide, there are 141 million annual live births, with a vast majority of births (127 million or 90%) occurring in developing countries, where the neonatal mortality rate (NMR) stands at 39 per 1000 live births (5.6 times higher than that of the developed countries). The consequence is that 5 million deaths or 98% of world's total occur in developing countries, while only 0.1 million deaths or 2% occur in developed countries (Oestergaard et al, 2011). In an analysis carried out by Lawn et al. (2005), mortality was the highest in the first 24 hours after birth, and stood at 25-45% of all neonatal deaths. Globally some three quarters (3/4) of neonatal deaths happen in the first week after birth (Diagram 2.3) (Lawn et al, 2005; Tomlinson et al, 2011).

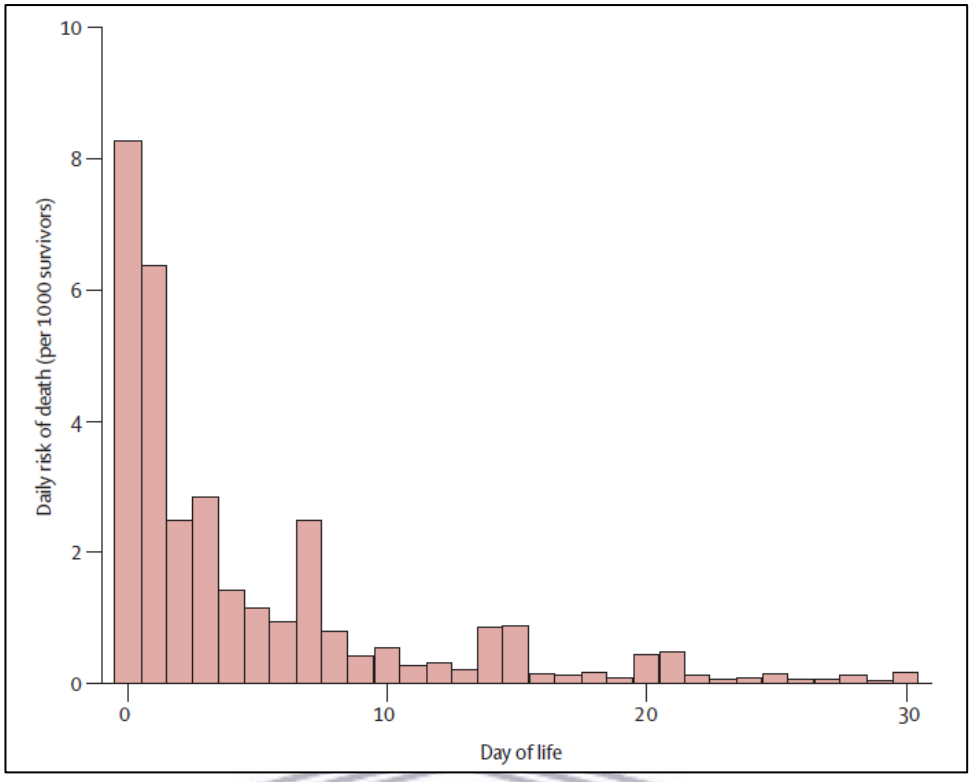


Diagram 2.3: Daily risk of death during first month of life based on analysis of 47 DHS datasets (1995-2003) with 10,048 neonatal deaths. Deaths in first 24h recorded as occurring on day 0, or possibly day 1. Source: Lawn et al, 2005.

2.4.1.2 Neonatal Mortality in Africa

Sub Saharan Africa has the highest African NMR, as well as the highest number of live births in the African region. The SSA region, which accounts for 11% of the world's population, has half of the world's maternal, newborn and child deaths, and every year 4.4 million children, including 1.2 million newborns, die (Blencowe et al., 2011). The three main causes of newborn deaths accounting for 88% of newborn deaths in the region, are: (1) infections (including sepsis/pneumonia, tetanus, and diarrhea); (2) intra-partum-related conditions (birth asphyxia); and (3) preterm births (Kelly et al, 2010). An increasing proportion of child deaths are now in the neonatal period, and a 2001 estimate showed that 38% of all deaths in children younger than 5 years happen in the first month of life, with 75% of neonatal deaths occur during the first week of life, and the majority in the first 48 hours (Lawn et al, 2005).

2.4.1.3 Neonatal Mortality in Zambia

Despite the fact that all countries, according to the Child Survival Call to Action modeling, have the potential to lower child mortality rates to 20 or fewer deaths per 1,000 live births by 2035, the Zambia neonatal mortality remains high (MCDMCH & MOH, 2013). The NMR (per 1,000 live births) has fluctuated from 43 in 1992 to 35 in 1996, to 37 in 2001-02, to minimally decline to 34 in 2007, and finally to 24 in 2014 (CSO et al, 2013-14), representing 32% of under 5 mortality (CSO et al, 2013-14). Of these neonatal deaths, up to 40% occur in the immediate postnatal period, and birth asphyxia, neonatal sepsis, or infection, being the major causes, and these are affected by poor quality health care at birth and lack of access to skilled birth attendants at delivery (CSO et al, 2013-14).

The Eastern Province of Zambia, place of the implementation of this study, has a NMR of 35 per 1,000 live births and an early NMR of 42 per 1,000 live births – the highest in Zambia - in a population of 1,758 pregnancies with duration of seven months or more (CSO et al, 2013-14). This very high newborn mortality is caused by direct and indirect causes, with behaviour factors being at the center, as a cross cutting element (CSO et al, 2013-14).

2.4.2 Strategies to Improve Neonatal Mortality Rate

To optimize pregnancy outcomes and improve the situation of newborns, pregnant women need to be assisted by a competent health care professional or skilled attendant. This strategy is referred to as "Skilled Birth Attendance" has three main components, mainly (1) the Skilled Health Worker; (2) an Enabling Environment, which is able to provide BEmOC or CEmOC; and (3) the Mother and her family's factors, e.g. demographic and social-economic (Gabrysch et al, 2011). The effectiveness of the ENC interventions are summarized in Annex 1.

2.5 Conclusion

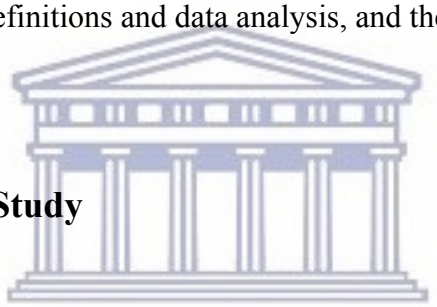
In conclusion, the trends in the research literature indicate that newborns are cared for by their mothers or/and family members, e.g. mothers, mothers-in-law, sisters, etc., using different behaviours and practices which can be beneficial, harmful or neutral; and that the pattern of these practices and their impact on the survival of the newborns are determined by multiple factors ranging from socio-demographic and economic, obstetric, health systems, and cultural.

The literature suggests overall that the traditional newborn care practices have the advantage of being culturally acceptable, affordable and relevant to the traditions prevailing in the communities where the mothers live, and the behaviour being practices. The literature also demonstrate the need to adapting the ANC interventions to the mothers' stage of change, and tailoring the health education messages, as opposed to the current one-size-fits-all approach. The current study is, therefore, essential because it tests ENCGMI as an effective way of conveying the ENC messages, not only to the pregnant mothers, but also to their caregivers, using a participatory process of respectful engagement with the mothers and their caregivers, taking into account the stages of change.

The next chapter describes the methodology utilized in the study and its ethical considerations.

CHAPTER 3: METHODOLOGY AND ETHICAL CONSIDERATIONS

This chapter, methodology and ethical considerations comprises of nine sections. In the first three sections, the chapter will cover the study design, the recruitment of the study participants, and the ENCGMI training package. In the fourth section, the chapter will highlight the study intervention package. In the fifth section, the chapter will discuss the delivery of the routine ENC health education messages. In the sixth, seventh and eighth sections, the consent procedures and ethical considerations, the survey instruments and data collection, validity and reliability are respectively discussed. Finally, the ninth and tenth sections the chapter will discuss the variable definitions and data analysis, and the conclusion.



3.1 Design of the Study

3.1.1 Study Design

This is a cluster randomized unblinded controlled trial[1] based on 1,182 pregnant mothers who were followed up prospectively from the time of their admission to the MWH to an average of 4 weeks after delivery by interview. This comparative study was performed in the rural areas in the Eastern Province of Zambia, and compared intervention sites (where ENCGMI HE was delivered to pregnant mothers and their caregivers) with control sites (where no intervention was implemented), with regards to mothers' ENC knowledge, mothers' ENC practice, and early neonatal morbidity.

The Church Health Institution having a MWH constituted the unit of randomization or cluster. Clusters of pregnant women were allocated to the intervention arms of the trial using a randomly generated allocation sequence. In

[1] This trial was not registered in a WHO accredited trial registry

the intervention CHIs, the ENC HE sessions were delivered in the MWHs by SMAGs using ENCGMI, and under the supervision of trained supervisors. Both the SMAGs and the supervisors were not blinded. In the control CHIs, health workers (nurses) delivered the RENC HE to the pregnant women admitted in their MWHs, as per the national guidelines.

In both the intervention and control arms, trained Field Assistants (FAs) filled in the study questionnaires on admission of the pregnant mother to the MWH, after delivery of a live baby in the postnatal ward, and during the six weeks follow up home visit in the community. For mothers whose babies died within the 7 days of delivery, at least two weeks grieving period was given to them, prior to the administration of the Newborn Verbal Autopsy, which is not analyzed in this study.

3.1.2 Study Setting

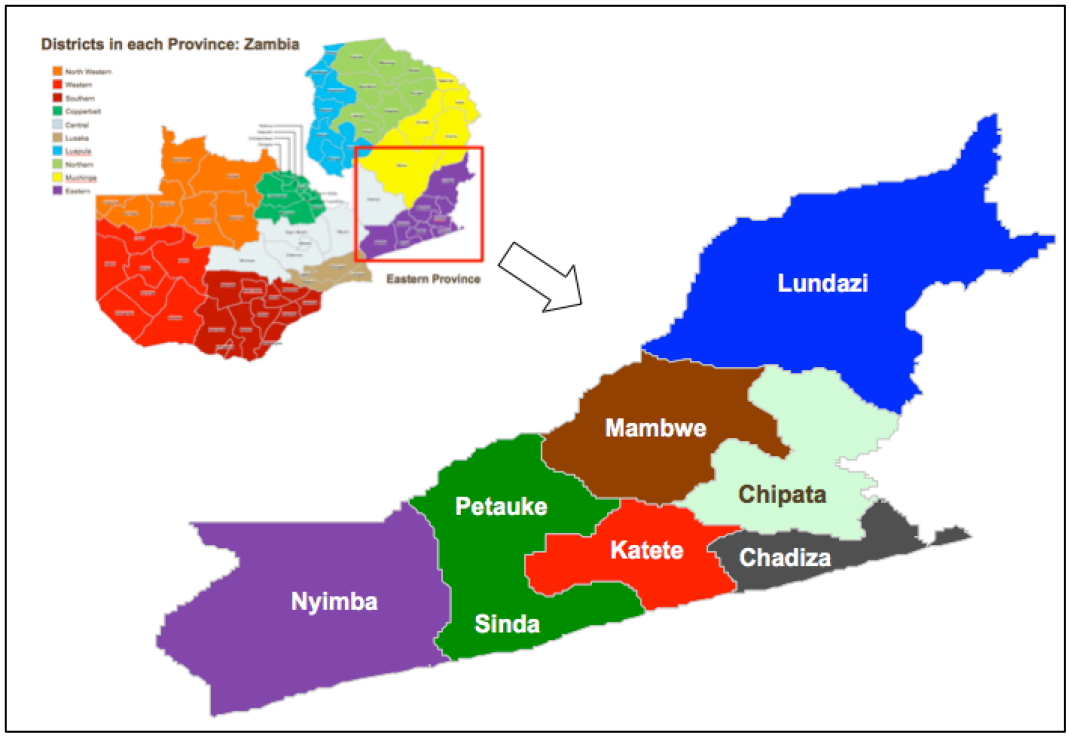
3.1.2.1 Districts and Church Health Institutions

The study was carried out in four districts of the Eastern Province of Zambia (Map 3.1), namely Petauke, Sinda (formally part of Petauke), Chipata and Lundazi districts. All these four districts are rural, and share similar socio-cultural, economic, demographic, and health system characteristics; and account for 65% of the Eastern Province population of 1,707,731 people. The study was implemented in six CHIs, which provide free primary health care services, serving a total catchment population of 403,815, of which 88,839 (22%) are women in childbearing age, and offering free health care services (Annex 2). The population of areas being serviced by these health facilities is mainly constituted of peasant farmers of Nsenga, Ngoni and Tumbuka ethnic groups (CHAZ, 2012). The distances between these catchment areas were big enough to prevent contamination between the intervention and control sites. The study was carefully designed to minimize the coefficient of variation among the clusters.

The Eastern Province of Zambia, which has the highest early neonatal mortality rate in Zambia, standing at 42 per 1,000 live births (CSO et al, 2014), has a formal

health care system operated by both the Government (public) and Churches (mission), consisting of health posts, health centers, primary and secondary levels hospitals. Primary health care is free in both rural and urban areas. Health service providers, health management and support workers manage the day-to-day activities in these facilities, while at the community level, the health workers are being assisted by trained community based volunteers, such as the SMAGs, Community Health Workers (CHWs), Malaria Agents, TB Treatment Supporters, Adherence Support Workers, etc.

This study was conducted in mission health facilities only, also called Church Health Institutions (CHIs), because they all have very well managed and maintained maternity waiting homes, as opposed to the public institutions.



Map 3.1: Study Location. Source MoH 2015

3.1.3 Study Population

The study population comprised of all pregnant mothers admitted into the selected CHIs' MWHs and their newborns. The eligibility and exclusion criteria highlighted below were applied to the pregnant mothers:

3.1.3.1 Participants' Eligibility Criteria

Pregnant mothers meeting all the below listed criteria were included in this study:

1. Having a gestation period of at least 36 weeks;
2. Being admitted to a MWH managed by a CHI;
3. Delivering a live baby in the CHI's maternity ward;
4. Willingness to participate in the study.

3.1.3.2 Participants' Exclusion Criteria

Were excluded from this study, any pregnant mother:

1. Who absconded from the designated MWH before delivery;
2. Who fell sick and required hospitalization during the last 3 weeks of gestation?

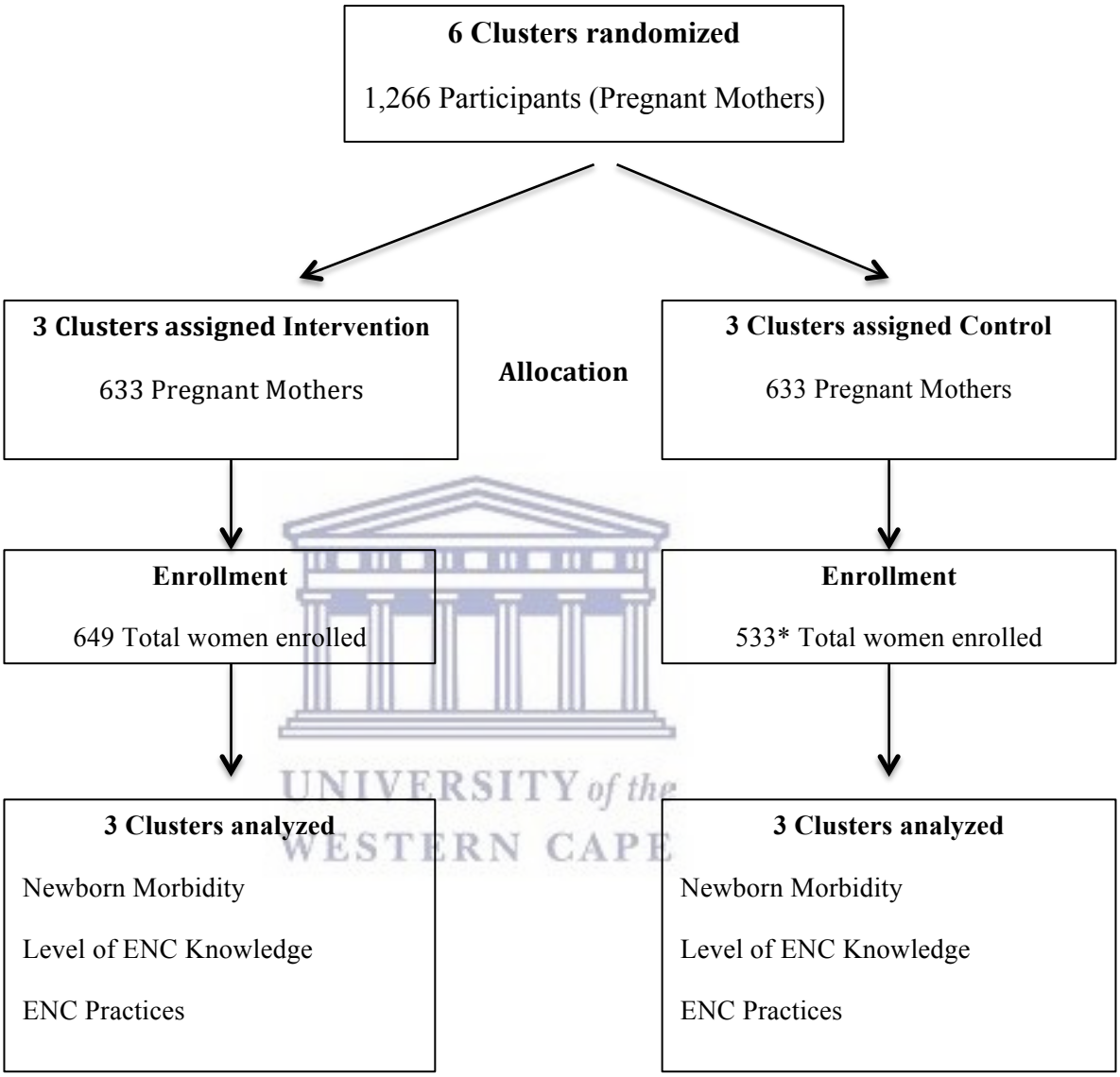
3.1.3.3 Withdrawal Criteria:

Withdrawn from the study, any pregnant woman who:

1. Was discharged from the MWH prior to delivery;
2. Delivered prior to completing all the ENGMI sessions;
3. Delivered outside the CHI maternity ward.

In the course of the implementation of the study, no pregnant mother withdrew or was excluded from the study.

3.1.4 Survey Screening and Enrollment Algorithm



Algorithm 3.1: Survey Screening and Enrolment Algorithm

* Kanyanga Health Centre did not enroll the require number of pregnant women in its MWH, during the study period. Its total enrollment stood at 111 pregnant women.

3.1.5 Sampling Objective and Special considerations

The main objective of the sampling was to draw a provincial wide representative sample of health facilities within the Eastern Province of Zambia, to provide national-level estimates of the effect of ENCGMI HE on the mothers' knowledge, practice and newborn morbidity in mission health facilities having a MWH. Health facilities that do not have maternity waiting homes (mainly public health facilities) were excluded from the sampling frame. The sampling design was therefore stratified by the provision of ENC HE (ENCGMI vs. RENC).

3.1.6 Sampling Frame and Approach

The following parameters of a stratified cluster sampling were defined:

3.1.6.1 Strata:

- Providing ENCGMI Health Education.
- Providing RENC Health Education.

3.1.6.2 Primary Sampling Units:

Church Health Institutions having a functional maternity waiting home.

3.1.6.3 Final Sampling Units:

Mother – baby pair.

The sampling frame for the primary sampling units included a list of all mission health facilities located in the Eastern Province of Zambia and having: (1) a catchment area population linked to the CHI; (2) a well-established and functional MWH able to house at least 200 pregnant women per year; (3) the ability to offer Basic or Comprehensive Emergency Obstetrical Care (BEmOC or CEmOC)

signal functions; and (4) recorded a high early neonatal morbidity and/or mortality.

Out of a total number of 9 CHIs having a MWH, only 6 met the set criteria. Kamoto hospital and Saint Luke Health Center were excluded from the study, because of a poor yearly volume of pregnant mothers being admitted in their MWHs; while Saint Francis Hospital, despite the fact that it receives a lot of pregnant mothers in its MWH, was excluded from the study because it has no catchment area, by virtue of being a second level hospital, and its clients come from all over Zambia. The following CHIs were selected for the study: 4 hospitals: Minga (Petauke District)), Nyanje (Sinda District: was in Petauke District when the proposal was accepted), Mwami (Chipata District) and Lumezi (Lundazi District: was a Zonal Health Center when the proposal was submitted for approval); and 2 Health Centers: Muzeyi (Chipata District) and Kanyanga (Lundazi District).

The probability proportional to size sampling methodology was used to randomly sample Mission Health Facilities within each stratum, using the detailed information of the sampling frame. The following was the final result:

(1) Intervention Arm:

- Minga Mission Hospital,
- Mwami Mission Hospital, and
- Lumezi Mission Hospital.

(2) Control Arm:

- Nyanje Mission Hospital,
- Muzeyi Health Center, and
- Kanyanga Mission Health Center,

All pregnant mothers from the sampled Mission Health Facilities who were admitted to the maternity waiting home were screened for enrollment.

3.1.7 Sample Size and Sampling Weights Calculations

To determine the sample size for each Church Health Institution, the researcher estimated the mothers' access to maternal and newborn health services rates based on the data from the Zambia Demographic Health Survey 2013-2014 (CSO et al, 2014).

We assume a MTCT rate of 8%, with 2% precision, for sites providing PMTCT services, compared to 25% with 5% precision for non- PMTCT sites.

The researcher assumed a maternal and newborn health services' access rate of 12%, with 2% precision, for the sites admitting pregnant mothers to the MWHs without community mobilization, compared to 25%, with 10% precision for sites admitting pregnant mothers to the MWHs and a community based community sensitization and awareness programmes, carried out by SMAGs, highlighting the benefits of utilizing MWHs. The researcher applied a design effect of two to determine the number of mother-baby pairs required (see Table 3.1).

Table 3.1: Parameters for Estimated Sample Size

Parameters	ENCGMI HE Sites	RENC HE Sites	Total (n)
Mothers' access to maternal and newborn health services rate (Precision)	25% (±10.0%)	25% (±10.0%)	
Number of Mothers expected to beadmitted in the MWH	633	633	1,266
Number of months to complete field data collection	12 months	12 months	12 months
Number of expected CHIs	3 (50%)	3(50%)	6

With an expected mothers' access to maternal and newborn health services rate of 30%, a 90% power, a confidence limit of 5%, a design effect of 2.0, a confidence level of 95%, and using Epi info 7.1.2.0, the study sample size was calculated. The study needed a total of 1,152, out of population of 88,839 women in childbearing age. Taking into account an approximated mothers' defaulter rate

from the MWH of 10%, the study was to recruit a total of 1,266 pregnant mothers, with an allocation 633 mothers per study arm, and 211 per selected CHI.

The sample weights were calculated in three steps:

1. The researcher first computed the weights based on the probability of being admitted to the maternity waiting home (proportionate to the number pregnant mothers who were admitted to the maternity waiting home in the past, by stratum).

2. The research then computed the weights based on sample realization (number of pregnant mothers admitted to the maternity waiting home vs. number of pregnant mothers expected).

3. The research finally computed the final weight by allocating a weight of one, since all the study sites (intervention and control) were expected to be part of the study.

3.2 Recruitment of Study Participants

3.2.1 Recruitment of Pregnant Mothers

The study objectives and recruitment procedures were clearly explained to the CHIs' administrators and nurses responsible for the ENC health education. The recruitment of waiters, which was done by the midwives on duty, took place over a period of almost 13 months, starting on Tuesday 05th May 2015 and ending on Monday 27th June 2016. A total of 1,182 pregnant mothers (93.4%) out of the expected 1,266 pregnant mothers were recruited and participated in the study, with a 100% response rate. On admission to the MWH, the waiters were informed about the study, using the research Information Sheet (Annex 3), and those willing to participate in the study were recruited after giving a written consent (Annex 4). Once recruited, their names were then entered in the MWH study register.

Within 24 hours of their admission, waiters, in both the intervention and control arms, were subjected to a structured ENC pre-test questionnaire, to establish their ENC baseline knowledge. On discharge from the postnatal ward, they were given the same questionnaire on ENC, to establish their level of ENC knowledge acquisition. A final questionnaire was administered to the mothers at their homes, within 6 weeks of delivery.

3.2.2 Recruitment of Study Implementers

3.2.2.1 Recruitment of Nurse Supervisors

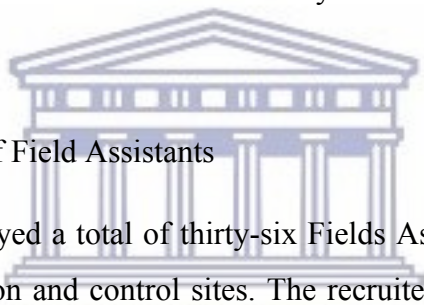
The study recruited and oriented a total of 12 nurses (2 per site) already trained in Emergency Obstetric and Neonatal Care, to act as study coordinators in both the control and intervention sites. In the intervention sites, the oriented nurses also received a five days training in ENCGMI, using the ENCGMI training manual developed by the researcher. This training, which was organized in Lusaka, was delivered through class (lectures and video screening) and practical sessions using dummy waiters selected among the participants. On completion of the training, the nurses were empowered with sufficient knowledge and skills to co-facilitate during the SMAGs' training and oversee and supervise the ENCGMI sessions taking place in the MWHs. The nurses' supervision consisted in overseeing the delivery of ENCGMI HE sessions by the SMAGs, and the chairing of the weekly and monthly SMAGs' meetings, during which work plans, progress made, challenges, lessons learnt in conducting the ENCGMI HE sessions were discussed. The supervisors also assessed the SMAGs performance, based on the agreed upon work plans. Besides the study coordination orientation, nurses in the control group did not receive any other training.

3.2.2.2 Recruitment of SMAGs Members

The midwives in the intervention sites, in collaboration with their traditional leaders, recruited a total of 78 trained SMAGs (26 per site), in both the intervention and control sites. As recruitment criteria, the selected SMAGs

needed to be male or female, already involved in community health related activities, have at least 7 years education, be proficient communicators in the areas' local languages, and be committed towards their communities' welfare. The selected SMAGs were informed about the study and those willing to be part of it were enrolled, after giving written consents (Annex 5), and trained in ENCGMI.

In the intervention sites, the recruited SMAGs operated from both the MWH and the community, according to an agreed upon schedule. At any given time, one group of SMAGs was mobilizing pregnant women in the community, encouraging them to utilize the services of the MWHs, while the other one was providing ENCGMI HE sessions in the MWHs. In the control sites, the SMAGs did not operate from the MWHs, but carried out their activities in the community, mobilizing pregnant women and encouraging them to utilize the Maternity Waiting Homes and deliver in the health facility maternity.



3.2.2.3 Recruitment of Field Assistants

The study also employed a total of thirty-six Fields Assistants (FAs) (6 per site), in both the intervention and control sites. The recruited FAs had at least a grade 12-education level, were proficient communicators in English and in their area's local language, and had good reasoning skills. The recruited FAs were informed about the study and those willing to be part of it were enrolled, after giving written consents (Annex 5), and trained in data collection.

3.2.2.4 SMAGs' Retention

To ensure retention and commitment of the SMAGs, in both the intervention and control sites, a monthly allowance of 60.00 dollar was paid throughout the study duration.

3.3 The ENCGMI Training Package

3.3.1 The ENCGMI Training Manuals Design

The researcher developed the ENCGMI HE training manuals (Trainer of Trainers and Trainee) with the technical assistance from the University of the Western Cape faculty members. These manuals were an adaptation of highly cited community MI training manuals used in the United States.[2]

The design of the ENCGMI HE trainee manual was motivated by the ineffectiveness of the current ANC curriculum being utilized by the health workers in the delivery of ENC health educations messages. The current ANC curriculum has failed to produce the expected outcomes, for both the provider and the client, because it has not put in place the following three elements: (i) the development of a personal bond, made up of reciprocal positive feelings, (ii) an agreement on the goals of the counseling, and (iii) an agreement on the tasks (Bordin, 1979; Lustig et al, 2002; McCarthy, 2013). The utilization of Motivational Interviewing in the delivery of ENC messages had a threefold purpose, namely (i) to create a bond between the SMAGs and the mothers and their caregivers (trust and emotional closeness), (ii) help them share goals (application of the ENC behaviour) and (iii) allocate tasks (method that both the SMAGs and the mothers and caregivers use to achieve the goals) (Bordin, 1979; Horvath & Luborsky, 1993; Lustig et al, 2002; McCarthy, 2013). To ensure this therapeutic alliance, and minimize resistance to change on the part of the mothers and their caregivers, the researcher saw it worthy to develop a training manual, whose content would be delivered using the MI approach.

The ENCGMI HE trainee training manual was packaged on the basis that it takes two entities, namely the provider and the client, to effect behaviour change, and

[2] The following set of MI training manuals were adapted and combined to develop the ENCGMI training manuals: (1) Fuller, 2008; (2) Tomlin, n.d. a; (3) Tomlin, n.d; and (4) Venner, 2006.

each one of them is called to meet their respective prerequisites for change in regards to the main components of Motivational Interviewing's, namely (i) core skills, (ii) process, and (iii) fundamental strategies and their parameters (see Annex 7).

The SMAGs' training manual, aiming at reinforcing the mother/caregiver – SMAGs partnership, contained modules covering empathic partnership and trust creation with the mothers and their caregivers, and influencing them in the prescribed newborn's care and improving the newborn's health outcome during the first seven days of life. This trainee manual was printed, binded and distributed to each nurse supervisor and each SMAGs involved in the study, for utilization and consultation, both during the training and during the delivery of ENCGMI HE sessions in the MWHs. Guidelines concerning the care of the newborn during the first 7 days of life were printed and laminated for easy utilization during the ENCGMI HE sessions.

Based on the fact that MI implementation, even by highly skilled practitioners, has shown varied adherence to MI (Allsop, 2007) and to ensure fidelity in the delivery of ENCGMI HE messages, the researcher developed, printed and laminated ENCGMI flowcharts having on one side the sequence of activities for each one of the ENC and on the other side the key elements of how the newborn had to be cared for at home during the first 7 days of life (see Diagrams 3.1 to 3.10 in the Annexes). Motivational Interviewing rulers (Miller et al., 2005) were also designed, laminated and given to SMAGs to ensure fidelity in the delivery of ENCGMI HE messages. The SMAGs were also given a handbook containing all the details of the activities they were expected to carry out in the MWHs.

3.3.2 Training of SMAGs

3.3.2.1 Training Methodology

The researcher, with the assistance of a research assistant and the trained nurse supervisors, locally trained the selected SMAGs in the intervention sites in ENCGMI. The trainees did not take a written test at the completion of their three

days training, but underwent practical assessments in the delivery of the ENCGMI HE sessions.

The aim of this training was to help the SMAGs understand the conceptual framework underpinning Motivational Interviewing and to teach them the utilization of MI as a tool to be used for the delivery of ENC health education. The training was very interactive and used Power Point presentations lectures, videos, role-playing and practical sessions. To facilitate the assimilation of the training module contents, the different elements of the TTC, and MI concepts were simplified and adapted to the local context. For example, instead of using the Monte Roberts horse whispering video, the researcher had to shoot a video in Mwami area (one of the intervention sites), showing the training of oxen for field plowing. On completion of the training, the SMAGs members were equipped with knowledge and skills on how to (1) reduce their '*righting reflex'*, (2) how to '*roll with resistance'* when getting feedback from the waiters and their caregivers, on (3) how to create '*discrepancy'* in the waiters and their caregivers' state of ENC knowledge and practices and (4) facilitate their '*evocation'*.

The SMAGs were also equipped with strategies, which when applied the ENCGMI sessions, would (1) increase the waiters and caregivers' '*knowledge'* of ENC; (2) increase their '*self-efficacy'* and (3) '*motivation'*, in the way they would be expected to utilize their knowledge; (4) while reducing their '*ambivalence'*.

3.3.2.2 Training Sessions

To enhance the SMAGs' adoption of this new way of delivering the ENC health education, the study employed a practical skill-building approach using role-play and mock ENCGMI sessions, using waiters and caregivers who did not meet the selection criteria, to deliver the below four (4) health education sessions.

Session 1: Relationship Establishment.

Using ENCGMI Flowchart 1 (Annex 8), this session focused on welcoming waiters and their caregivers, and setting an ENCGMI tone to the meeting. SMAGs were coached on how to encourage the waiters and their caregivers to talk about

their traditional way of caring for their newborn at home, in terms of cord care, skin care, temperature care, breastfeeding, immunization and health seeking behaviour for sick babies. During this session, the SMAGs were also trained on how to encourage the waiters and their caregivers to talk about what they had heard from the health workers about the way the newborn should be cared for at home (WHO recommended ENC). By the end of this session, SMAGs were able, using the wheel of change, to determine the stage at which the waiters and their caregivers were, and establish a relationship SMAGs-waiters-caregivers.

Session 2: Contemplation Creation.

This session has 6 sub-sessions and used the ENCGMI Flowcharts 2.1 to 2.6 (Annex 8), to deliver the 6 components of the WHO ENC family package educational messages. SMAGs members were trained and coached to help the waiters and their caregivers understand the risk of certain newborn care practices, to create ambivalence and to help them consider the change. The SMAGs were also trained to explore with the group members the pros and cons of their current traditional newborn care practices (with a focus on the pros), the barriers and waiters' self-efficacy; and were equipped with skills to introduce to the waiters and their caregivers the TTM concept, and to present the stages individuals go through before making any change in behaviour.

During the mock ENCGMI sessions, SMAGs asked the actors to identify their current stage on the TTM cycle, in relation to the ENC package. The actors were encouraged to consider what thoughts could help them move from one stage to the next; and what factors might motivate them to move from their current stage to the next, and what factors may cause movement backwards, and how confident they were in implementing the change. This process was done using the MI Ruler (Diagram 3.9), which were glued on the classroom's wall.

Session 3: Preparation for change.

During this session, SMAGs were trained and coached, using the ENCGMI Flowchart 3 (Annex 8) to engage the actors to participate in a decisional balance

exercise and brainstorm on all possible options of ENC. The options included the continuation of the current harmful ENC practices, no action, and a variety of choices generated by the group, designed to change the harmful behaviour. SMAGs also requested their mock waiters to share their own past successes in changing life risky practices, they could have encountered.

Besides this, SMAGs also practiced the actors and SMAGs one-to-one session. Through this session, the SMAGs were trained to guide the waiters in imagining the future of their babies, if they continued with the harmful practices versus if they dropped them. SMAGs were also trained to help waiters formulate a detailed action plan, anticipate barriers to accomplishing the plan, and strategize ways to overcome barriers. Self-efficacy for change was enhanced, by asking the waiter about past personal successes and personal characteristics that contribute to an ability to change.

Session 4: Wrap-up.

For the delivery of the wrap-up session (final), which is unstructured, SMAGs members were trained and coached to answer actors' queries and concerns. During this session, the SMAGs were trained on how to (1) reintroduce the stages of change to the waiters and caregivers and on how to ask them to share where they identified themselves with regards to the WHO recommended ENC, (2) help the waiters share their decisions about whether they wanted to adopt the new ENC behaviours, and also (3) evaluate the group sessions they have been attending. In view of sustaining the attention of the actors during the ENCGMI, SMAGs were also trained in how to engage their audience, by stimulating them into singing and experiences sharing.

Throughout the training sessions, each SMAG received an individual coaching support, which involved positive reinforcement of learning materials, trouble-shooting in the utilization of the ENCGMI flowcharts and rulers, and on request clarification of ENCGMI concepts.

3.3.3 Training of Field Assistants

The researcher and the CHAZ Monitoring and Evaluation Senior Programme Officer conducted a two days training for the recruited Field Assistants. The training covered basic research methodology, research ethics, administration of the informed consent and study questionnaires and follow up of the mothers at home.

3.4 Study Intervention Package

The study intervention package comprised a combination of the recruitment and training of nurses and volunteer SMAGs, and their training in ENCGMI, the delivery of ENCGMI HE under the supervision of the nurse supervisors. The major intervention of this study was the SMAGs' delivery of ENCGMI HE to pregnant mothers and their caregivers using Group Motivational Interviewing, in a MWH setting (Annex 6). The paragraphs below highlight the manner in which the ENCGMI sessions were conducted.

3.4.1 The ENCGMI HE Package

The ENCGMI package is built on the national and WHO ENC Family Package guidelines and comprises of the following six (6) elements: (1) Cord stump care; (2) Skin care; (3) Thermal care; (4) Immediate and exclusive breastfeeding; (5) Immunization; and (6) Basic assessment, danger signs recognition and health seeking behaviour. This package, which is delivered through normal group discussions coordinated by the SMAGs, is designed to be administered at the same time to the waiters and their caregivers.

3.4.2 ENCGMI Flowcharts

The ENCGMI health education sessions were grounded on the motivational elements proposed by Miller and Sanchez (1994), summarized by the acronym

FRAMES. These elements, namely:

F= Feedback: Individualized mothers and caregivers' feedback about the consequences of harmful newborn care traditional practices use is provided, based on the actors' report rather than generic educational feedback. It is through this tailored feedback that the SMAGs created a discrepancy between the pregnant mothers' goals and their current reality.

R= Responsibility: This element stresses the pregnant mother's freedom of choice and personal responsibility in deciding to make changes, in relation to the care of the newborn during the first seven days of life. Living the responsibility to choose between the WHO recommended ENC and the traditional practices to the pregnant mother, helps reduce resistance and increase the likelihood of follow-through.

A= Advice: Given by SMAGs to the actors, in a clear, nondirective and non-coercive fashion, advice is a very helpful for behaviour change.

M= Menu: The SMAGs were provided with flowcharts (menus) (Annex 8). These flowcharts were developed by the researcher, based on a model developed by Wilhelm, et al (2006) in their study on promoting breastfeeding and sustained breastfeeding using Motivational Interviewing, and helped ensure fidelity in the delivery of ENCGMI health education. These flowcharts summarize the main steps of each session and the desired care of the newborn, and helped the SMAGs, as they facilitated the sessions, adhere to the below listed components of the TTM and MI principles, and WHO recommended ENC.

E= Empathy: This counseling style is marked by supportive, reflective listening and accurate understanding of the actors' presentation.

S= Self-Efficacy: This refers to the encouragement and development in the actors of the belief that they can accomplish a specific goal, such as a good care of the newborn during the first seven days of life. This interactional element also includes the SMAGs optimism that change is possible (Miller & Sanchez, 1994).

3.4.3 Delivery of the ENCGMI HE Sessions

The ENCGMI consists of four structured sessions delivered in ten encounters, lasting an average of 2 hours each, to small groups (maximum 20 members). The sessions were flowchart-driven, designed as a "loop tape," meaning that pregnant mothers and their caregivers could enter at any point in the cycle and not have missed prerequisite earlier material, as long as the took the first session with the facilitating SMAGs. All the sessions took place in the mornings, in accordance with a weekly schedule drawn by the SMAGs and their supervisors. Sessions 1 and 2 were facilitated by a team of three (3) SMAGs, of which one was leading the discussions, one taking notes of the key issues and one coordinating the activities. Session 3 was facilitated by twenty (20) SMAGs, who had concomitant one-to-one interactions with the actors (Diagram 3.1). Each one of the 1,182 pregnant mothers and their caregivers participated in a total of ten (10) group discussions and one (1) one-to-one session. Supervising nurses and the researcher provided the supervision and mentoring to the SMAGs, to ensure adherence to the facilitation protocols.

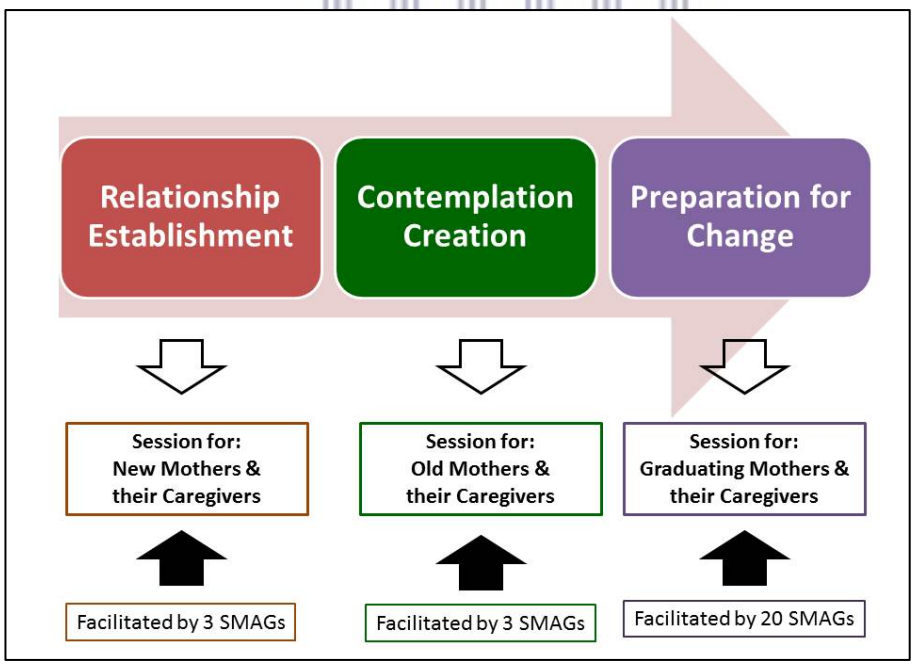


Diagram 3.1: ENCGMI Implementation Guide

Materials developed by the researcher, namely the SMAGs' ENCGMI training manual describing the theoretical background for the approach and the SMAGs' session guide, in the form of flowcharts, were used by the SMAGs in the delivery of each of the four sessions. The manual and flowcharts provided detailed instructions ENC family package, including the MI philosophy, and guidance in implementing the FRAMES. The four sessions of ENCGMI HE are:

1. Session 1: Relationship Establishment. Earmarked for newly enrolled actors and given in one encounter.
2. Session 2: Contemplation Creation. Earmarked for already enrolled actors and given in six encounters, one per day, and covering:
    a. Cord stump care,
    b. Skin care,
    c. Thermal care,
    d. Immediate and exclusive breastfeeding,
    e. Immunization, and
    f. Basic assessment, danger signs recognition and health seeking behaviour;
3. Session 3: Preparation for Change. Earmarked for graduating actors and given in two encounters, one per day, and covering:
    a. Decisional balance exercise;
    b. Waiter-caregiver and SMAGs one-to-one session; and
4. Session 4: Wrap up session, given in one encounter, was the final and last session.

3.4.3.1 Sitting Arrangement

For the delivery of ENCGMI sessions, the actors and the SMAGs sat in a circle on the MWH's floor (on reed mats), so that everyone could see everyone else easily. Once seated, the SMAGs began by introducing themselves and the FAs, and also by indicating the village they were coming from and their role in the delivery of the ENCGMI HE sessions. After the introductions, the SMAGs then

asked the actors to introduce themselves, by mentioning their names and the village they were coming from.

3.4.3.2 ENCGMI Sessions' Contents

In the paragraphs bellow, the researcher highlights the manner in which the ENCGMI sessions were delivered to the actors, in the MWHs.

3.4.3.2.1 Session 1: Relationship Establishment.

Using ENCGMI Flowchart 1 (Annex 8), this session was facilitated by 3 SMAGs and focused on welcoming actors and setting an ENCGMI tone to the group discussion. This session was earmarked for all new actors being admitted to the MWH. The SMAG introduced the session by briefly talking about the ENC Package (listing, without elaborating, the components of the ENC package).

The actors, seated in a circle, were requested by the SMAGs to count off 1, 2, 3; 1, 2, 3; 1, 2,3, etc. All the participants who called: "1" were asked to stand on one side of the room, and formed group 1, those who called "2" were asked to stand in another corner and formed group 2, and finally those who called "3" were also asked to go in the third corner and formed group 3.

Group 1 discussion: Group 1 members were asked to remember the past 4-5 months in their family and community, and also to remember all the experiences with their husbands, sisters, mothers, mothers-in-law, grand-mothers, friends, etc. and then answer the following question: **"What do you know about what should be done to a newborn within the first 7 days of life, in relation to: breastfeeding, cord care, skin care, thermal care, basic assessment, and immunization?"** The discussions within the group lasted 20-30 minutes on average. The SMAGs then asked the group members to share their experiences with the rest of the groups.

Group 2 discussion: Group 2 members were asked to remember the past 4-5 months in their family and community, and also remember all the experiences

with their husbands, sisters, mothers, mothers-in-law, grand-mothers, friends, etc. and then answer the following question: "**What have you been told by the hospital, concerning what should be done to a newborn within the first 7 days of life, in relation to: breastfeeding, cord care, skin care, thermal care, basic assessment, and immunization?"** The discussions within the group lasted 20-30 minutes on average.

Group 3 discussion: Group 3 members were asked to remember their past experience and that of their family members, and answer the following question: **"How do you care for the newborn within the first 7 days of life, in relation to: breastfeeding, cord care, skin care, thermal care, basic assessment, and immunization?"** The discussions within the group lasted 20-30 minutes on average.

Upon completion of the individual group discussions, the SMAGs asked volunteers (both mothers and caregivers) from each group to share their experiences as a group, about:

- What they know,
- What they have been told by the hospital and
- What they do,

for each component of the ENC package. Actors were allocated 15-20 minutes to share their experiences. As the discussions went on, the third SMAGs took note in their hard cover copybooks, of the main points, using the below template (Table 3.2). Waiters or caregivers sharing their opinions were allowed to do so without disturbance, under the watch of the SMAG, while those who were shy or not confidant, were encouraged to speak. During the sessions, the SMAGs ensured that no few people dominate the whole discussion.

Table 3.2: Session 1 submissions' recoding template

Breastfeeding	Cord care	Skin care	Thermal Care	Basic Assessment	Immunization
Group 1					
1.					
Group 2					
1.					
Group 3					
1.					

When summing up all the submissions from the actors, the SMAGs 'added chili'[3] to groups 1 and 2 submissions; while for group 3, they 'added salt'[4]. At the end of the session, the SMAGs closed the session by thanking the actors and asking them if they wanted to receive more information on the ENC package. For those who responded affirmatively, they were asked what they were going to do with the information.

Through this session, the SMAGs were able to establish a relationship with the actors, determine the stage at which they were on the wheel of change, and put everyone in the audience at the '*contemplation stage*' on the wheel of change, in preparation for the subsequent sessions.

3.4.3.2.2 Session 2: Contemplation and Ambivalence Creation.

The Contemplation and Ambivalence Creation session was conducted in six sub-sessions. Over a period of six days, all the components of the WHO ENC package were discussed, one component per day, and each sub-session lasting an average of 2 hours (see ENCGMI Flowcharts 2.3 to 2.6 in Annex 8).

[3] '*Added chili'*: When summarizing the submissions, SMAGs dramatized and insisted on the negative effects of the harmful newborn care practices, with the aim of letting the actors realize the dangers of the practices.
[4] '*Adding salt'*: When summarizing the submission, SMAGs expanded and complemented every WHO recommended newborn care practice mentioned by the group, with the aim of promoting good ENC practices.

During session 2, the SMAGs focused on creating ambivalence among the actors, in relation to the newborn care during the first 7 days of life, by exploring their pros and cons of current newborn care practices (with a focus on the pros), the barriers they encounter and their self-efficacy. The TTM concept was also introduced to the actors, who were being encouraged to consider what thoughts could help them move from one stage of change to the next; and what factors might motivate them to move from their current stage to the next, and what factors may have caused a movement backwards, and how confident they were in implementing the change. This process was done using the MI Ruler, comprising of four levels of importance of change, namely: (1) level 1: 0-2: not important; (2) level 2: 3-5: unsure; (3) level 3: 6-8: a little important; and (4) level 4: 9-10: very important (Diagram 3.2).

Measuring the Importance of Change

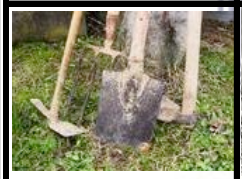
Not Important	Unsure	A Little Important	Very Important
0…1…2	3…4…5	6…7…8	9…10
			
I have not prepared the ground for planting	A seed is in the soil, but has not been watered	My plant just broke through the soil	My plant is ready to be harvested
It is not important to make a change	I am unsure about making a change	It is little important to make change	It is important to me to make change

Diagram 3.2: ENCGMI Importance Measurement Ruler

During this exercise, the SMAGs used the strategies highlighted in Box 3.1.

Box 3.1: Strategies used by SMAGs in the implementation of ENCGMI Session 2
Most Useful Strategies used by the SMAGs
• Explore the reasons not to change as well as the reasons to change – Ambivalence • Explore the problem • What are the most important things in their lives? • Reflect the gap/discrepancy between long-term and present behaviour • Explore confidence to change • Identify barriers to change and strength to overcome these • Reflect back statements of desire and confidence to start.

Source: ENCGMI, SMAGs Trainee Manual by Menda, 2015 (adapted from Tomlin, K. (n.d.))

In the paragraphs below, the researcher highlights the questions that the SMAGs asked the actors, in relation to the six ENC practices. During these sessions, the SMAGs discussed the ENC practices, took note of any good and/or harmful practices, and made a summary at the end of each sub-session.

For each sub-session, the actors performed two sets of activities, as highlighted below.

Activity 1: In activity 1 (Box 3.2), the SMAGs discussed with the actors about the importance of changing the traditional way of caring for the newborn during the first 7 days of life, in relation to each one of the six ENC components, by asking this question: *"How important is it for you to change the traditional way of .... [Specific ENC practice]?"*

Box 3.2: SMAGs' guide for the implementation of activity 1
ENCGMI Ruler Line-up
• Stick the number (0 to 10) on the MWH walls. There should be a considerable distance between the numbers, of at least 50 cm. • Ask actor to stand under the number that corresponds to their current level (importance of changing).
Area of Focus
• Focus on the actors standing on the **Low Numbers**. • Do this activity with actors, randomly picked from the lowest numbers. The others can regain their initial siting positions. • At the end of the exercise, ask the actors who were standing to go back to their

seats.

Source: ENCGMI SMAGs Trainee Manual by Menda, 2015.

In assessing the importance of changing the traditional way of…. [Specific ENC practice], the SMAGs asked the actors the following questions:

1. "On a scale of 0 – 10, where **0** is not at all important and **10** is extremely important, how important is it for you to change the traditional way of…. [Specific ENC practice] newborn babies now?"

2. "What makes you choose …… (*number actor chose*) rather than a 0?"
3. "What would it take to take you up a few notches to …… (*Choose a number 2 or 3 higher than originally given*)?"
4. Listen carefully.

Using the guide outlined in Table 3.3, the SMAGs recorded the essential of the plenary, and later on summarized the main points at the end of the sub-session.

Table 3.3: SMAGs summary table of the decision balance for activity 1. Source: Menda, 2015.

1. Pros of traditional way of …. (specific ENC practice): What are the **advantages** of caring for the newborn in the traditional way?	**2. Cons of traditional way of …. (specific ENC practice):** What are the **disadvantages** of caring for the newborn in the traditional way?
1. 2.	1. 2.
3. Pros of changing: What are the **advantages** of changing?	**4. Cons of changing:** What are the **disadvantages** of changing?
1. 2.	1. 2.
Order of Summary: 1, then 4, then 2, then 3	

At the end of the summary, the SMAGs asked the actors the following four (4) questions:

1. "Did I miss anything?" After actors' responses, they then asked:
2. "Where does that leave you now?"
3. "Do you want to change the positioning?" [Allow actors to change their initial positions].
4. "Tell me: Why did you change the position?" [For actors who changed their initial position].

Activity 2: In activity 2 (Box 3.3), the SMAGs measured the actors' **confidence** to make a change in the traditional way of…. [Specific ENC practice], using the confidence to make change ruler. This ruler comprised of four levels of confidence to make the change: (1) level 1: 0-2: not confident; (2) level 2: 3-5: unsure; (3) level 3: 6-8: a little confident; and (4) level 4: 9-10: very confident (Diagram 3.3).

The actors were asked the following question:

"How confident are you that you could make a change in the Traditional way of .... [specific ENC practice], babies?"

Box 3.3: SMAGs' guide for the implementation of activity 2
Ruler Line-Up
Ask clients to stand under the number that corresponds to their current level (confidence to make the change). Use the Measuring Confidence ruler to make a Change.
Area of Focus
• Focus on the clients standing on the **Low Numbers**. • Do this activity with randomly picked from the lowest numbers. The others can regain their initial sits. • At the end of the exercise, ask the actors who were standing to go back to their seats.

Source: ENCGMI SMAGs Trainee Manual by Menda, 2015

Measuring the Confidence to make a Change			
Not Confident	**Unsure**	**A Little Confident**	**Very Confident**
0……...1…..…..2	**3……...4…..…..5**	**6……...7…..…..8**	**9……...10**

Diagram 3.3: ENCGMI Confidence Measurement Ruler

When assessing the **confidence** of changing the traditional way of…. [Specific ENC practice], the SMAGs asked the actors the following questions:

1. "On a scale of 0 – 10, where **0** is not at all confident and **10** is extremely confident, how confident are you that you could make a change in the traditional way of…. [specific ENC practice] newborn babies now?" (Diagram 3.4).
2. "Why are you at … (number client chose) and not 0?" (or a lower number)
3. "What would it take for you to go from…to [a higher number]? (Choose a number 2 or 3 higher than originally given)
4. How might I help you go from…to [a higher number]?

As the actors respond to the questions, the SMAGs listened carefully and used reflection and small summaries to paraphrase them.

At the end of the summary of the interactions, the SMAGs asked the actors the following four (4) questions, noting all that the actors had said:

1. "Did I miss anything?" After actors responses, SMAGs asked:
2. "Where does that leave you now?"
3. "Do you want to change the positioning?"
4. "Tell me: why did you change the position" [For clients who changed their initial position].

In closing the session, the SMAGs asked the actors if they would like to receive more information on the next component of the ENC package, and later on found out what they will do with the information they were about to give them (in the next session). To end the session, the SMAGs thanked the actors. See ENCGMI Flowcharts which were used by SMAGs in Annex 8.

3.4.3.2.3 Session 3: Preparation for Change

This session was conducted in 2 sub-sessions, using ENCGMI Flowchart 3 (Annex 8).

The first sub-session was a group session, during which the actors participated in a decisional balance exercise. Actors were asked to brainstorm on all possible options of ENC practices, namely: (1) the continuation of the current harmful ENC practices, (2) no action, and (3) a variety of choices generated by the group, designed to change the harmful practices.

Using ENCGMI strategies (Box 3.4), actors were also requested to share their own past successes in changing harmful practices.

Box 3.4: SMAGs' most useful strategies
Most Useful Strategies
• Check if there are both vertical and non-vertical expression of desire to change • Explore confidence to change • Clarify joint goals • Explore opinions to achieve goals • Explore consequences of opinions • Select an opinion • Identify small steps • Identify barriers and how to overcome • Identify who will help • Plan to monitor and reward success • Visualize success.

Using a guide (Box 3.5), the SMAGs assess the waiters' readiness to change, by asking them the following question:

"How ready are you to change the traditional practices of newborn care?"

In assessing the actors' likeliness of readiness to change the traditional practices of newborn care, the SMAGs asked them the following four (4) questions, while listening carefully:

1. "On a scale of 0 – 7, where **0** is extremely unlikely and **7** is extremely likely, how would you rate your readiness to change the traditional practices of newborn care?"
2. "What makes you choose …… (*number client chose*) rather than a 0?"
3. "What would it take to take you up a few notches to …… (*Choose a number 2 or 3 higher than originally given*)?"

Box 3.5: SMAGs' guide for the implementation of activity 1
Ruler Line-Up
Ask clients to stand next or under the number that corresponds to their current level (importance of changing). • Use the laminated A4 papers having on each one of them numbers written from 0 to 10. • Spread the numbers out on the floor or stick them on the wall of the MWH. • There should be a considerable distance between the numbers, of at least 50 cm. Ask actor to stand next or under the number that corresponds to their current level (importance of changing). Use the Measuring Confidence ruler to make a Change
Area of Focus
• Focus on the clients standing on the **Low Numbers**. • Do this activity with 5-10 clients, randomly picked from the lowest numbers. The others can regain their initial sits. • At the end of the exercise, ask the actors who were standing to go back to their sits.

At the end of the activity, the SMAGs summarized the interactions, noting all that the actors had said, using the guide outlined in Table 3.4.

Table 3.4: Summary table of the Decisional Balance

1. Pros of Readiness to change the traditional practices of newborn care? What are the **Advantages** of Readiness to change the traditional practices of newborn care?	**2. Cons of Readiness to change the traditional practices of newborn care:** What are the **Disadvantages** of Readiness to change the traditional practices of newborn care?
1. 2.	1. 2.
3. Pros of Changing: What are the **Advantages** of Changing?	**4. Cons of Changing:** What are the Disadvantages of Changing?
1. 2.	1. 2.
Order of Summary: 1, 4, 2, and 3	

At the end of the summary of the interactions, the SMAGs asked the actors the following four (4) questions, noting all that the actors had said:

1. "Did I miss anything?" After participants responds, ask:
2. "Where does that leave you now?"
3. "Do you want to change the positioning?"
4. "Tell me: why did you change the position" [For clients who changed their initial position].

The second sub-session was a one-to-one session between the individual waiter-caregiver and the SMAGs. A total of 20 SMAGs were allocated to carry out this session, in view of meeting the load of actors graduating from the planned sessions. During this one-to-one session and using a guide (Box 3.6), the SMAGs led the waiter in imagining the future of her baby, if she continued with the harmful practices discussed during the ENCGMI HE sessions versus if she agreed to dropped or not practice them.

Box 3.6: SMAGs' Guide for ENCGMI Session 3:

One-to-one Meeting

Agree with individual waiter and caregiver for a one-to-one meeting in a quiet place, outside the MWH. Discuss the following questions:

Creating an Action Plan

It is recommended to work on the Action Plan upon the completion of the Group Sessions and when you feel that your client has expressed a commitment to make a change.

Once your client is ready to make a change, here is one way to think about helping her plan for that change.

1. **Draw the goal from the waiter.**
   - What are you thinking that you will do now?
   - What is the change that you would like to make?
   - Where would you like to go from here?

2. **Explore options.**
   - What ideas do you have about how to reach that goal? (short term and long term)
   - What kind of lifestyle changes have you been successful with in the past? What helped you successfully make that change? How do you think you might be able to apply those skills to this situation? (Helps build waiter's confidence in making a new change).
   - Would you be interested in hearing about things that have worked for other people? What do you think about those? What fits for you?
   - How will you know if the plan is or is not working? What will you do?

3. **If you used the confidence rulers and found your client's confidence level to be below 8, encourage a change in the plan to ensure confidence. A few ideas for your consideration are:**
   - You might help build confidence by asking the client about previous successful changes
   - Discuss adding more support from family and friends
   - Exploring thoughts about avoiding "risky" situations.

4. **Summarize the plan. Include the main reasons for the change and the details of the plan.**

5. **Ask about commitment** – *Is this what you are going to do?*
   - Remember that some waiters are more likely to agree with you only because they do not want to disagree with you or disappoint you. While it is very important to trust what the waiter says, it may be important to pay attention to your own feelings that the waiter may be trying to please you more than express what is true for herself.
   - You may want to share your feeling with the waiter in a supportive and gentle way.
     For example: *"I hear what you are saying and I would like to share a concern with you. Sometimes people agree with their counselors to be polite or because they like them and that's nice but might not be the best way for client's to reach their goals. If you aren't sure about something I*

say or suggest, I hope you would feel comfortable telling me. I really want what's best for you."

6. **If you hear commitment, then reinforce it. If you do not hear commitment, you might ask your client if the plan needs any changes or ask what would help them feel more committed to change.**

The purpose of this one-to-one activity, the SMAGs helped the waiter and her caregiver formulate a detailed action plan, anticipate barriers to accomplishing the plan, and strategize ways to overcome barriers (Box 3.7). Self-efficacy for change was enhanced, by asking the waiter about past personal successes and personal characteristics that contributed to an ability to change. This activity consisted of the change negotiation with the individual waiter and her caregiver.

When closing this session, the SMAGs express confidence, to encourage the actors, by saying:

- Wow, we've accomplished a lot today.
- You have developed a good plan with a backup if it doesn't work.
- You have had successes in the past and have a lot of strengths and skills to use to adequately care for you newborn.
- And my experience with clients similar to you is that once the decision has been made, they have found a way that works for them.
- I'm here to help in any way I can.

After that, the SMAGs showed appreciation and thanked the actors for all their hard work.

Box 3.7: Waiter-Caregiver Change Plan Discussion Guide

1. **The changes I want to make are (tick those which are applicable):**
   - Immediate and Exclusive Breastfeeding
   - Cord Stump Care
   - Skin Care
   - Thermal Care
   - Basic Assessment, danger signs recognition and health seeking behaviour
   - Immunization

2. **The reasons I want to make these changes are:**

_____
_____

3. **I plan to do these things to reach my goals: (List plan of action and when it will be done.)**

_____
_____

4. **The first steps I plan to take in changing are:**

_____
_____

5. **Some things that could interfere with my plan are:**

_____
_____

6. **The ways other people could help me in changing are:** (List of persons and possible ways they could help.)

Person	Possible Ways they could help
1.	……
2.	……

7. **Some things that could interfere with my plan are:**

_____
_____

8. **My back up Plans are:**

_____
_____

9. **Ask how confident the waiter is, that she can reach the goals:**

_____
_____

3.4.3.2.4 Session 4: Wrap-up

The wrap-up session, final one, was delivered in an unstructured fashion. During this session, the SMAGs reintroduced the stages of change to the actors, asking them to share where they identified themselves with regards to the WHO recommended ENCC and their future plans. An opportunity was also given to the actors to ask questions on any issue which was covered during the ENCGMI HE sessions. Waiters were then called to share their decisions about whether they

wanted to adopt the WHO ENC behaviours. This session allowed the SMAGs to evaluate the group sessions that they had been facilitating.

3.5 Delivery of the Routine ENC HE Messages

The RENC HE sessions implemented in the control sites consisted of weekly structured morning sessions, lasting an average of 1 hour each, delivered by midwives to all pregnant women admitted in the MWHs. The sessions took place in the MWHs. The topics covered during these sessions were similar to those of the intervention sites, apart from the fact that they were being delivered using a top down approach to the mothers, without their caregivers. No SMAG member took part in these health education sessions.

3.6 Consent Procedures and Ethical Considerations

3.6.1 Ethical Approval

Approval of the research proposal and research administrative clearance was obtained from the Senate Research Committee of the University of the Western Cape (Annex 9), the University of Zambia Biomedical Research Ethics Committee (UNZABREC) (Annex 10), and the Zambian Ministry of Health (Annex 11).

3.6.2 Participants' Informed Consent

Study participants were informed about the purpose of the study, its benefits and their right to participate, decline participation or withdraw from the study, using the study information sheet and consent form (Annex 3). No waiter declined to participate in this study. The information collected through this study was analyzed, presented anonymously and was accessible only to the study team.

3.7 Survey Instruments and Data Collection

3.7.1 Questionnaire Development and Testing

Quantitative and qualitative questionnaires were developed and pre-tested among 5 waiters of different educational levels at Namgoma Mission Hospital's MWH, for quality, understandability and simplicity of questions. The outcomes of the piloting helped make few adjustments to the tool (Annex 12). The content of the questionnaires was also appraised for validity, in relation to the Zambian and WHO newborn care guidelines.

3.7.2 Data Collection

For the collection of data, six Field Assistants and two supervisors were mobilized to collect information in the MWH, in the postnatal ward, and at home. All the Field Assistants received a two days training in conducting field research. The nurse supervisors divided the Field assistants into three groups, one collecting data in the MWH, one collecting data in the postnatal ward, and one in the community. On the mothers' admission to the MWH, the Field Assistants administered, within 24 hours of admission to the MWH, the structured pre-test questionnaire to the mothers, while the post-test questionnaire was administered in the postnatal ward, prior to the mothers' discharge from the hospital. Within 2 to 6 weeks after delivery, the Field Assistant made a follow up in the community to administer a structured questionnaire on the care of the newborn during the first seven days of life to the mothers at their homes. As for the ENCGMI data, they were captured in the ENCGMI HE study book, during the different sessions, as the mothers, their caregivers and the SMAGs interacted during the sessions.

Quantitative and qualitative methods using individual interviews, conducted in the local languages, were used to collect data from all the mothers who participated in the study, regardless of the fact that their baby died or not during the first 7 days of live. Structured interviews with mothers were conducted in the MWH, the postnatal ward and at home, to better understand their profile, level of knowledge, feedback on the ENCGMI HE sessions (intervention only) and care of the

newborn during the first 7 days of life; and to audit the causes of early neonatal mortality. The analysis of the verbal autopsy data from the 11 newborns who had died is not included in this study, which focuses only on morbidity. Data from the group 131 discussions which took place during the ENCGMI HE sessions were recorded and analyzed, to identify the prevailing newborn care practices, their pros and cons, the barriers faced by the waiters, the enablers and to explore possible behaviours for effective newborn care.

3.7.3 Data Management

At different points in time of the study, the trained FAs collected data on the mothers and their newborns. Logical, missing data and other checks were performed, to minimize data entry error. To ensure the quality of the collected data, different FAs repeated some of the interviews, and the obtained variables were compared. To ensure the quality of the newborn care data, all questionnaires were administered within 6 weeks of delivery, using the local languages.

3.8 Data Validity and Reliability

3.8.1 Validity

The study questionnaire was developed based on the validated essential newborn care studies, conducted in Africa and Asia, pilot tested and administered in the local languages, *Chinyanza* and *Chitumbuka*. To ensure consistency in the study enrollment procedures and quality completion of the questionnaires, in both the intervention and control sites, all the FAs were trained by the same trainers and using the same curriculum and tools.

The quality control of the waiters' enrollment procedures and completion of the questionnaire was done on a weekly basis by the trained nurse supervisors. To enhance the likelihood that waiters answering the questions gave a true account, the FAs ensured that waiters were interviewed in their privacy.

3.8.2 Reliability

Reliability (repeatability) refers to the possibility to replicate (repeat) the observations and is related to the precision of the instrument used for scientific observations (Varkevisser et al, 2003). To ensure the reliability, the study instrument was designed in a very clear way, which will not necessitate explanations for the mothers, their caregivers and the implementers.

3.9 Variables Definition and Data Analysis

Data processing and analysis was initiated in the field, with checks for completeness of the data and sorting the data by instrument used. The explanatory variables included socio-demographic, the socio-economic characteristics, the obstetric history characteristics, the exposure to media, and attendance to the ENC health education sessions. Quantitative data from the interviews were analyzed using SPSS version 24.00. Qualitative data were collected from the ENCGMI HE sessions (group discussions) taking place in the MWHs, and also from the in-depth interviews, which took place in the community, through home visits, 2 to 6 weeks after the mothers' discharge from the health facility. The SMAGs and Field Assistants recorded, in English, in the study's hard cover copybooks the data from the ENCGMI HE sessions and in-depth interviews which were delivered in the local language. Framework Analysis was used to analyze the qualitative data. Categories and themes were identified, and a framework analysis employed.

3.9.1 Definition of Variables

The following are the definitions of the variables, as computed in the study's database:

3.9.1.1 Outcome Variables

In the paragraphs below, I highlight the three main outcome variables of this study, namely (1) level of mothers' ENC knowledge on discharge from the health facility, (2) the type of newborn care the mothers gave during the first 7 days of life, and (3) the health of the newborns during the first 7 days of life

(1) *The level of mothers' ENC knowledge on discharge from the health facility*

The assessment of the mothers' ENC knowledge on their discharge from the health facility was based their ability to provide the correct answers to the ENC true or false questions. A dichotomous variable was created to measure their level of knowledge. For every correct answer, the mother was allocated a score of 1 point, giving a maximum total score of 59. For every incorrect answer and an unknown response, the mother was allocated a score of 0. A score of "1" represented the preferred newborn care practice.

To identify the determinants of mothers' knowledge, in both the intervention and control sites, the overall mothers' ENC knowledge score was dichotomized as "*satisfactory knowledge*" or "*poor knowledge*", by using the median score of the distribution, which is 30. The knowledge was considered satisfactory, when the mother scored 30 and above, and it was considered poor, when she scored below 30.

(2) The type of newborn care the mothers gave during the first 7 days of life

The assessment of the type care the mothers gave to their newborns at home, during the first 7 days of life, was based on their ability to provide the correct responses to the series of questions summarizing the recommended care that the newborn is expected to receive at home. To measure the type of care that the newborn received, a score of 1 point was allocated for each positive attitude and/or good practice, giving a maximum possible score for individual mothers of 10. Negative attitudes and/or risky practices received a score of 0 point. A score of '1' represented the preferred practice.

For the mothers' care of their newborns at home, in both intervention and control, the overall score was dichotomized as "*good care*" or "*bad care*" by an arbitrary cut-off level of 6. The care was considered good, when the mother scored 6 and above, and it was considered bad, when the score was below 6.

(3) The health of the newborns during the first 7 days of life

The assessment of maternal perception of the newborn illness was based on their ability to provide responses to "yes" or "no" type questions, which were decoded for the definition of the early neonatal illnesses. For any question, an affirmative response (yes) was interpreted as a sign that the newborn fell sick during the first 7 days of life.

For the mothers' perception of the newborn illness, in both intervention and control, the overall newborn health score was dichotomized as "*morbidity free newborn*" or "*sick newborn*". The newborn was considered "morbidity free" if the mother did not report any sign or symptom of illness during the 7 days of life, and he or she was considered "sick" if he or she did.

For mothers who attended the ENCGMI HE sessions, their level of satisfaction with the ENCGMI sessions was assessed in relation to the: i) care for the newborn at home; ii) newborn's breast-Feeding; iii) cord stump and skin's care; iv) thermal care; v) basic assessment, danger signs recognition and health care seeking behaviour; vi) immunization; vii) preparation for change; and viii) one-to-one session. The rating was based on a scale of 0 to 10, in which the responses were grouped in four main categories, namely: (i) very satisfied (score of 9-10), (ii) satisfied (score of 6-8), (iii) dissatisfied (score of 3-5), and (iv) very dissatisfied (score of 0-2). For this study, a score of "6-10" represented the preferred level of satisfaction. Overall, mothers who scored 0-5 were classified as dissatisfied, while those who scored 6-10 were considered as satisfied,

3.9.1.2 Determinant Variables

The mothers' level of ENC knowledge on discharge from the health facility, the newborn care practices, and the newborns' health of the newborns during their first 7 days of life were cross-tabulated against the below listed 20 explanatory variables of interest. These variables are subdivided into the mothers' (1) socio-demographic characteristics, (2) socio-economic characteristics, (3) obstetric

history, (4) exposure to media, and (5) attendance to ENC Health Education Sessions.

1. The mothers' socio-demographic characteristics:

(1) *Mother's Age:* Indicates the mothers' age, categorized into: <20 years, 20-30 years, and >30 years.

(2) *Educational Level:* Indicates the level of education attained by the mothers, and is categorized into five groups, namely: no-education, pre-school, primary, secondary, and higher.

(3) *Marital Status:* Indicates one of the following four categories, namely: married, divorced, widow, and single.

(4) *Living Arrangement:* Indicates the person(s) the mothers are living with, and is categorized into five groups, namely living: alone, with husband, with parents, with in-laws, and with children.

(5) *Religion:* Indicates the religious denomination to which to mothers are affiliated to, and is categorized into five groups, namely: Catholic, Reformed Church of Zambia, Pentecostal, Muslim, and others.

(6) *Tribe:* Indicates the ethnic group to which the mothers belong, and is categorized into five groups, namely: Chewa, Ngoni, Nsenga, Tumbuka and others.

(7) *Distance to the nearest Health facility:* Indicates, in kilometers, the distance between the mothers' house and the nearest health facility offering safe motherhood services, and is categorized into two groups, namely: within 5 Km, and beyond 5 Km.

2. The mothers' socio- economic characteristics:

(8) *Employment Status:* Indicates the most consistent source of money for the mothers, and is categorized into five groups, namely: employed, housewife, looking for a job, self-employed, and unemployed.

(9) *Household Wealth Index:* Indicates the number of durable assets owned at the household level. This indicator serves as a proxy of the household's socio-economic status. The following items were assessed: electricity availability, radio, television, mobile phone, non-

mobile phone, refrigerator, oxcart, car/truck, and piped water. The score is computed on a scale of 0 (no assets) to 9 (9 assets) based on the total number of items owned by the mother. This variable is grouped according to three categories: 0 for no assets, 1-4 for the ownership of 1-4 assets, and 5-9 for ownership of 5-9 assets.

(10) *Substance Use:* Indicates the mothers' utilization of substances, cigarettes and alcohol, during the current pregnancy, and is categorized into two groups, namely: (1) smoking: smoking or not smoking; and (2) drinking: drinking local and/or commercial beers, or not drinking.

3. The mothers' obstetric history:

(11) *Gravidity:* Indicates the number of pregnancies that the mothers have had, and is categorized into two groups, namely: 0-1 pregnancies, and 2 or more pregnancies.

(12) *Parity:* Indicates the number of delivered children that the mothers have had, and is categorized into three groups, namely: 1 child, 2-5 children, and 6 or more children.

(13) *Antenatal Care Services Attendance:* Indicates the number of times the mothers attended the ANC clinic during her last pregnancy. This variable is categorized into four groups, namely: 0 visit, at least 1 visit, at least 2 visits, and 3 or more visits.

(14) *Delivery Mode:* Indicates the mode of delivery for the current pregnancy, and is categorized into three groups, namely: spontaneous delivery, assisted delivery, and caesarean section delivery.

(15) *The Newborn Sex:* Indicates the sex of the newborns being cared for by the mothers, and is categorized into two groups, namely: male and female.

4. Exposure to Media

(16) *Reading the Newspapers:* Indicates the mothers' source of information on general matters, including newborns care issues, and is categorized into two groups, namely: read newspapers (when the

mother read newspapers at least once a week) and did not read (when the mother did not read newspapers at least once a week).

(17) *Watching Television*: Indicates the mothers' source of information on general matters, including newborns care issues, and was categorized into two groups, namely: watched television (when the mother watched television at least once a week) and did not watch television (when the mother did not watch television at least once a week).

(18) *Listening to the radio*: Indicates the mothers' source of information on general matters, including newborns care issues, and was categorized into two groups, namely: listened to radio (when the mother listened to radio at least once a week) and did not listen to radio (when the mother did not listened to radio at least once a week).

5. Attendance to ENC Health Education Sessions

(19) *Attending ENCGMI HE Sessions:* Indicates the mothers' attendance to the ENCGMI HE sessions facilitated by SMAGS in the intervention arm.

(20) *Attending Routine ENC HE Sessions:* Indicates the mothers' attendance to the RENC HE sessions facilitated by health workers in the control arm.

3.9.2 Data Analysis

In view of meeting the study objectives and responding to the study central question, the researcher used, when analyzing the data, three main methods of analysis, namely: framework analysis, univariate, and cross tabulation.

3.9.2.1 Qualitative Data Analysis

Data analysis used a 'framework approach', as described by Pope, Ziebland and Mays (2000), developed for applied qualitative research where the objectives are

developed in advance; and ATLAS.ti software package version 7.5 was used to organize the data. Themes primarily focused on the ENC components, but also allowed for additional themes emerging from the data collected through the group discussions.

To identify major and minor themes that explain the newborn care patterns, the researcher did an analysis of the group discussions and the in-depth interviews transcripts. The process of eliciting themes involved: (1) familiarization through careful reading of group discussions transcripts and the in-depth interviews, noting emergent themes; (2) performing open coding in which codes were created based on identified themes, codes were assigned to specific sections of transcripts, and double-coding was conducted on a sample of data to promote inter-coder reliability; (3) developing a codebook; (4) performing data reduction in which an inventory was taken of what was related to the given code, capturing the variation or richness of each theme and noting differences between the actors; (5) data display using matrices and tables; and, (6) interpretation in which the researcher searched for relationships among themes or concepts identified and developed diagrams in order to map out relationships in the data. Particular attention was paid to the rationale for how themes were grouped, and to the types of messages grouped together.

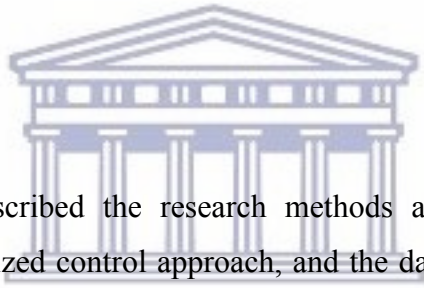
3.9.2.2 Univariate and multivariate Data Analysis

To describe the baseline characteristics of our study population (the pregnant mothers) across different study arms and maternal covariates, we computed the weighted estimates of either the median (for continuous variables) or the proportion (for categorical variables) and reported the 95% confidence intervals (CIs), using the statistical software package Statistical Package for Social Sciences (SPSS) version 24.00.

For the analysis of the effect of the ENCGMI HE, we used logistic regression modeling and reported the crude odd ratio (OR) of the association between the mothers' ENC knowledge, mothers' ENC practices, and newborn morbidity (outcome of interest) and the main predictor (attendance to ENCGMI HE sessions). We then explored the relation between other covariates (maternal

covariates) and the outcomes of interest and included significant covariates in a multivariate logistic regression model. We considered possible gains in model precision by forcing into the model potential covariates, which narrows the 95% CI of our adjusted OR.

To further determine key predictors of the outcome variables, we used univariate logistic regression and defined the transformed variables (the mothers' ENC knowledge, mothers' ENC practices, and newborn morbidity) as the outcomes of interest. We reported the crude odds ratios (ORs) and 95% CIs with Wald chi-squared statistics (p-values). We included in the multivariate logistic regression model, predictors with a p-value greater than 0.25 in the univariate analysis and we report adjusted ORs (aORs) with respective 95% CI. We consider predictors to be significant if the 95% CI does not contain the value 1.



3.10 Conclusion

This chapter has described the research methods and ethical considerations, including the randomized control approach, and the data collection methods, and the ethical considerations. The nature of the data analysis has been explored, with a focus on the univariate and multivariate data analysis. The chapter also describes the content of the ENCGMI training package, which was delivered to the SMAGs members and their supervisors, in view of facilitating the delivery of ENCGMI HE in the MWH setting, and the tools and flowcharts used in the different sessions of the group discussions. Finally, the chapter looked at the study work plan and timeline.

The next chapter is the first of two chapters dealing with the findings of this research, and it explores characteristics of the mothers who participated in the study.

CHAPTER 4: RESULTS: CHARACTERISTICS OF THE MOTHERS ADMITTED TO THE MATERNITY WAITING HOMES

This chapter of the study results profiles the mothers who took part in the study, by looking at their socio-demographic, socio-economic characteristics, their obstetric history, their exposure to media, their attendance to ENC health education sessions, and their knowledge of ENC on admission to the maternity waiting homes.

4.1 Sample Size Realization

Out of the 6 Church Health Institutions having an organized MWH planned for data collection, all the 6 (100%) took part in the study. A total of 1,182 pregnant mothers in their third trimester who were admitted to the MWHs were screened for eligibility (Figure 4.1). The consent of eligible pregnant mothers was sought for participation in the study. A total of 1,182 eligible pregnant mothers agreed to take part in the study.

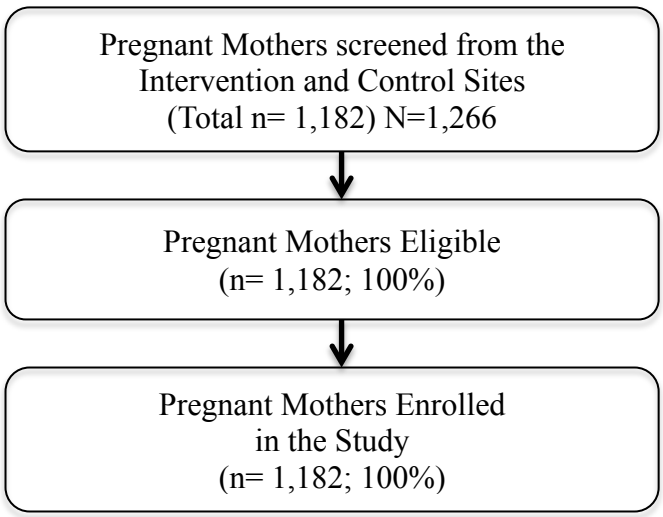


Figure 4.1: Study Profile

This sample was 93.4% of the desired sample of 1,266 pregnant mothers. (Table 4.1). We recorded 100% sample realization for the health facilities. In relation to the pregnant mothers, we recorded an oversampling in the intervention sites and an under sampling in the control sites. One control site, Kanyanga Rural Health Center, did not reach its allocated target within the stipulated study period. However, this limitation was mediated by the fact that the study sample was inclusive of an additional 10% allocation (114 mothers), to cater for any eventual defaulting mothers in the course of the study implementation, looking at the fact that there were no defaulters and that the study enrolled a total of 1,182, out of a actual needed sample of 1,152.

Table 4.1: Sample Size Realization

	Church Health Institution by Startum			Pregnant Mothers by Stratum		
Characteristics	**Expected (n)**	**Observed (n)**	**%**	**Expected (n)**	**Observed (n)**	**%**
Intervention sites	3	3	100%	633	649	102%
Control sites	3	3	100%	633	533	84.2%
Total	6	6	100%	1,266	1,182	93.4%

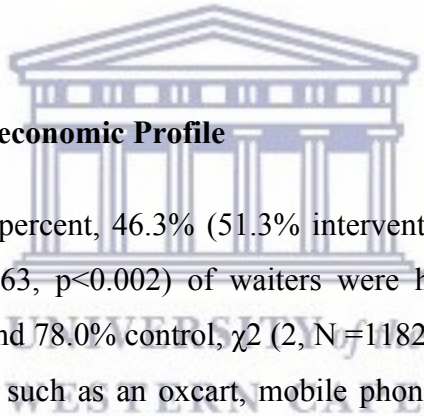
4.2 Characteristics of the Study Population

The below paragraphs highlight the study population's main socio-demographic, socio-economic, obstetric, exposure to media, and attendance to ENC HE sessions characteristics (Table 4.2).

4.2.1 Waiters' Socio-demographic Profile

The waiters' mean age was 24.7 ± 7.591 years and 49.4% (50.3% intervention and 48.6% control) of them were aged 20-30 years. The majority of the waiters, 62% (64.5% intervention and 59.5% control, $\chi 2$ (4, N = 1167) = 6.601, p<0.159) had

attained primary school level, 91.3% (90.8% intervention and 91.7% control, $\chi 2$ (4, N = 1161) = 2.874, p<0.579) were married, and 82.9% (83.6% intervention and 82.1% control, $\chi 2$ (4, N =1172) = 7.956, p<0.093) were living with their husbands. Thirty four point four percent, 34.4 % (40.6% intervention and 28.2% control, $\chi 2$ (4, N =1029) = 37.894, p<0.001) of waiters were Catholics, 31.9% (10.3% intervention and 53.5% control, $\chi 2$ (15, N =1182) = 305.468, p<0.001) of Chewa ethnic group, and residing in 47% (49.0% intervention and 45.0% control, $\chi 2$ (2, N =1074) = 1.616, p=0.446) within 5 Km of their nearest health facility. The comparison between the two arms' percentage points difference (I-C) shows a statistically significant difference between the mothers' religion (p<0.001) and tribe (p<0.001). The mothers' age, educational level, marital status, and distance to the nearest health facility's percentage point differences were not statistically significant.

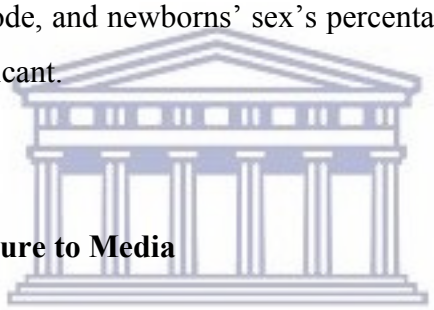


4.2.2 Waiters' Socio-economic Profile

Forty six point three percent, 46.3% (51.3% intervention and 41.3% control, $\chi 2$ (4, N =1158) = 17.463, p<0.002) of waiters were housewives, and in 72.5% (67.0% intervention and 78.0% control, $\chi 2$ (2, N =1182) = 3.403, p=0.182) owned 1-4 household assets, such as an oxcart, mobile phone, radio, television, etc. In 98.4% (98.1% intervention and 98.7% control, $\chi 2$ (1, N =1151) = 0.659, p=0.283) and 90.9% (91.3% intervention and 90.4% control, $\chi 2$ (1, N =1152) = 0.28, p=0.332), the waiters did not smoke and did not drink commercial and/or local beers respectively. The comparison between the two arms' percentage points difference (I-C) shows a statistically significant difference between the mothers' employment status (p=0.002). The mothers' household wealth index, smoking status and drinking status' percentage point differences were not statistically significant.

4.2.3 Waiters' Obstetric History

Sixty eight percent, 68.0%, (65.8% intervention and 70.3% control, $\chi 2$ (11, N =990) = 14.511, p<0.206) of waiters had had two (2) or more pregnancies, 47.0% (47.0% intervention and 47.0% control, $\chi 2$ (11, N =978) = 50.247, p<0.001) had 2-5 children, and 90.0% (89.7% intervention and 90.2% control, $\chi 2$ (9, N =1072) = 49.565, p<0.001) attended at least 3 or more ANC services during their current pregnancy. Eighty six point five percent, 86.5% (83.9% intervention and 89.0% control, $\chi 2$ (3, N =1110) = 19.943, p<0.001) of the waiters' current pregnancy ended in a normal delivery and in 50.5% (51.2% intervention and 49.4% control) they delivered a female baby. The comparison between the two arms' percentage points difference (I-C) shows a statistically significant difference between the mothers' parity (p<0.001) and ANC attendance (p<0.001). The mothers' gravidity, delivery mode, and newborns' sex's percentage points differences were not statistically significant.



4.2.4 Waiters' Exposure to Media

Waiters in 77.4% (80.9% intervention and 73.9% control, $\chi 2$ (3, N =1163) did not read newspapers, while in 71.0% (77.8% intervention and 64.1% control, $\chi 2$ (3, N =1159) = 35.245, p<0.001) they did not watch television. In 62.3% (50.3% intervention and 74.4% control, $\chi 2$ (3, N =1153) = 74.459, p<0.001) waiters used to the radio as source of information on general matters, including newborn care. The comparison between the two arms' percentage point difference (I-C) shows a statistically significant difference between the mothers' reading of the newspaper (p<0.001), watching of television (p< 0.001), and listening to the radio (p< 0.001).

4.2.5 Waiters' Attendance to ENC Health Education Sessions

Among the 1,182 waiters who participated in this study and were admitted to the MWH, 649 (54.9%) attended the ENCGMI sessions in the intervention sites, while 533 (45.1%) attended the RENC HE sessions in the control sites.

Table 4.2: Waiters' Characteristics

Waiters' Explanatory Characteristics	Overall		Intervention		Control		Percentage Points Difference (I-C)
	n	%	n	%	n	%	
1. Waiters' socio-demographic characteristics:							
Age:							
<20 years,	303	28.1%	170	29.1%	133	27.1%	2.0%
20-30 years	532	49.4%	294	50.3%	238	48.6%	1.7%
>30 years	240	22.5%	121	20.6%	119	24.3%	-3.6%
Educational Level:							
No-education	190	16.3%	101	15.9%	89	16.7%	-0.8%
Pre-school	17	1.4%	11	1.7%	6	1.1%	0.6%
Primary	726	62.0%	409	64.5%	317	59.5%	5.0%
Secondary	222	19.2%	109	17.3%	113	21.2%	-4.0%
Higher	12	1.1%	4	0.6%	8	1.5%	-0.9%
Marital Status							
Married	1059	91.3%	574	90.8%	485	91.7%	-0.9%
Divorced	12	1.0%	7	1.1%	5	0.9%	0.2%
Widow	7	0.5%	6	0.9%	1	0.2%	0.7%
Single	81	7.0%	44	7.0%	37	7.0%	0.0%
Others	2	0.2%	1	0.2%	1	0.2%	0.0%
Living Arrangement							
Living alone	26	2.2%	12	1.9%	14	2.6%	-0.7%
Living with husband,	972	82.9%	535	83.6%	437	82.1%	1.5%
Living with parents,	145	12.4%	83	13.0%	62	11.8%	1.3%
Living with in-laws,	17	1.5%	4	0.6%	13	2.4%	-1.8%
Living with children.	12	1.0%	6	0.9%	6	1.1%	-0.2%
Religion**							
Catholic	361	34.4%	232	40.6%	129	28.2%	12.4%
Reformed Church of Zambia	186	18.6%	80	14.0%	106	23.1%	-9.1%
Pentecostal	103	10.4%	40	7.0%	63	13.8%	-6.8%
Muslim	20	1.9%	15	2.7%	5	1.1%	1.5%
Others	359	34.7%	204	35.7%	155	33.8%	1.9%
Tribe**							
Chewa	352	31.9%	67	10.3%	285	53.5%	-43.2%
Ngoni	238	19.0%	200	30.8%	38	7.1%	23.7%
Nsenga	280	23.0%	194	29.9%	86	16.1%	13.8%
Tumbuka	217	18.2%	127	19.6%	90	16.9%	2.7%
Others	95	7.9%	61	9.4%	34	6.4%	3.0%
Distance to the nearest Health facility							
Within 5 Km	508	47.0%	288	49.0%	220	45.0%	4.0%
Beyond 5 Km	277	25.5%	144	24.0%	133	27.0%	-3.0%
Do not know	291	25.5%	158	24.0%	133	27.0%	-3.0%
2. Waiters' socio-economic characteristics							
Employment Status*							
Employed	12	1.0%	7	1.1%	5	0.9%	0.2%
Housewife	541	46.3%	323	51.3%	218	41.3%	10.0%

Looking for a job	9	0.8%	5	0.8%	4	0.8%	0.0%
Self-employed	393	34.0%	208	33.0%	185	35.0%	-2.0%
Unemployed	203	17.9%	87	13.8%	116	22.0%	-8.2%
Household Wealth Index							
0 (for no assets)	306	25.5%	193	30.0%	113	21.0%	9.0%
1-4 assets	845	72.5%	430	67.0%	415	78.0%	-11.0%
5-9 assets	22	2.0%	18	3.0%	4	1.0%	2.0%
Smoking Status							
Not Smoking	1132	98.4%	609	98.1%	523	98.7%	-0.6%
Smoking	19	1.6%	12	1.9%	7	1.3%	0.6%
Drinking Status							
Not Drinking local and/or commercial beers	1047	90.9%	567	91.3%	480	90.4%	0.9%
Drinking local and/or commercial beers	105	9.0%	54	8.7%	51	9.6%	-0.9%
3. Waiters' obstetric history							
Gravidity							
0-1 pregnancies	316	32.0%	166	34.2%	150	29.7%	4.5%
2 or more pregnancies	674	68.0%	319	65.8%	355	70.3%	-4.5%
Parity**							0.0%
0 child	147	14.9%	39	8.2%	108	21.6%	-13.4%
1 child	274	28.1%	158	33.1%	116	23.2%	9.9%
2-5 children	460	47.0%	224	47.0%	236	47.0%	-0.1%
6 or more children	97	10.0%	56	11.7%	41	8.2%	3.5%
Antenatal Care Services Attendance**							
At least 1	34	3.1%	18	3.3%	16	3.1%	0.2%
At least 2	74	6.9%	39	7.0%	35	6.7%	0.4%
3 or more	964	90.0%	496	89.7%	468	90.2%	-0.5%
Delivery Mode							
Normal delivery	957	86.5%	494	83.9%	463	89.0%	-5.1%
Assisted delivery with forceps or vacuum	34	3.2%	14	2.4%	20	4.0%	-1.6%
Caesarean section	100	8.9%	63	10.7%	37	7.0%	3.7%
Other	19	1.5%	18	3.0%	1	0.0%	3.1%
The newborns' sex							0.0%
Male	818	49.7%	273	48.8%	545	50.6%	-1.8%
Female	819	50.5%	287	51.2%	532	49.4%	1.9%
4. Waiters' exposure to media							
Reading the Newspaper**							
Read newspapers	121	9.6%	121	19.1%	259	26.1%	-2.8%
Did not read	904	77.4%	513	80.9%	391	73.9%	7.0%
Watching Television**							
Watched television	329	29.0%	140	22.2%	189	35.9%	-13.7%
Did not watch television	830	71.0%	492	77.8%	338	64.1%	13.7%
Listening to Radio**							
Listened to radio	708	62.3%	313	50.3%	395	74.4%	-24.1%

Did not listen to radio	445	37.7%	309	49.7%	136	25.6%	24.1%
5. Attendance to ENC Health Education Sessions							
ENCGMI Health Education	649	54.9%	649	54.9%	0	0%	9.8%
Routine ENC Health Education	533	45.1%	0	0%	533	45.1%	-9.8%

* p<0.002; **p<0.001

4.3 Waiters' Baseline ENC Knowledge

4.3.1 Overall Waiters' ENC Knowledge

On their admission to the MWH, the waiters' baseline ENC knowledge was assessed through the administration of 59 questions, to which they were expected to respond by "Yes", "No" or "I do not know". The ENC knowledge assessed in this study included umbilical cord and skin care, thermal protection, immediate and exclusive breastfeeding, BCG immunization, danger signs recognition, and non danger signs recognition. On some of the questions, the waiters did not give any answer, hence the changes in the total number of respondents the different knowledge items. The study shows that 78.8% (76.7% intervention and 81.2% control), of waiters had good ENC knowledge on their admission to the MWH (Table 4.3), with the knowledge of newborns' danger signs that need the healthcare provider's urgent attention scoring the highest with 92.9% (88.8% intervention and 97.7% control), while only 57.2% (54.2% intervention and 60.8% control), had a good knowledge of the newborn's none danger signs.

Table 4.3: Proportion of Waiter with Good ENC Knowledge on Admission: Intervention and Control

Knowledge Areas	**n**	**Proportion of waiters having good ENC knowledge (%)**	**Intervention Proportion of waiters having good ENC knowledge (%)**	**Control Proportion of waiters having good ENC knowledge (%)**
Care of the Umbilical Cord and the Skin	767	65.5%	66.2%	64.6%
Care of the Temperature	957	81.7%	78.9%	85.1%
Immediate and Exclusive Breastfeeding	974	82.9%	81.4%	84.6%
BCG Immunization	1088	92.5%	90.8%	94.6%
Signs that need urgent attention of healthcare provider	1090	92.9%	88.8%	97.7%
Signs that do not need attention of a healthcare provider	670	57.2%	54.2%	60.8%
Average		**78.8%**	**76.7%**	**81.2%**

4.3.2 Specific Waiters' ENC Baseline's Knowledge

This section of the results highlights the waiters' specific ENC baseline knowledge and compares it between the two study arms, namely the intervention and control groups (see Table 4.4).

4.3.2.1 Care of the Umbilical Cord and Skin

Few waiters, 51.3% (61.4% intervention and 39.2% control), knew that the umbilical stump has to be left uncovered without any dressing, and the difference between the two study arms was statistically very significant ($p<0.001$). The majority of waiters, 55.1% (39.2% intervention and 41.1% control) said that they would apply herbal medication to protect the umbilical cord. The difference between the two study arms was not statistically significant ($p=0.376$). The majority of the waiters, 86.7% (86.5% intervention and 86.8% control) knew that a soiled umbilical stump has to be washed with water, and the difference between the two study arms was not statistically significant ($p= 0.539$). In 83.3% (80.1% intervention and 87.2% control) waiters knew that the cord stump has to be thoroughly dried after bathing, and the difference between the two study arms was statistically very significant ($p=0.004$). In regards to application of substances on the umbilical cord, 66.1% (63.8% intervention and 68.9% control) of waiters knew that "surgical spirit" should not be applied on the cord stump, and the difference between the two study arms was not statistically significant ($p=0.160$).

4.3.2.2 Thermal Protection

The majority of waiters, 76.7% (73.4% intervention and 80.7% control), knew that the newborn baby needed to be wiped within 30 minutes of birth, and the difference between the two study arms was statistically very significant ($p=0.002$). The majority of waiters, 85.4% (85.0% intervention and 85.9% control) knew that the baby had to be wrapped, and the difference between the two study arms was statistically significant ($p=0.025$). About 85% (81.2% intervention and 89.8% control) of waiters knew that the first bath should be

delayed by at least 24 hours, and the difference between the two study arms was statistically very significant (p<0.001). In 79.6% (75.9% intervention and 84.0% control), waiters knew that the skin-to-skin care had to be done within the first 24 hours of delivery, and the difference between the two study arms was statistically very significant (p<0.001).

4.3.2.3 Breastfeeding Practices

Most of the waiters, 88.6% (85.8% intervention and 91.9% control), knew that breastfeeding had to be initiated within one hour after delivery, and the difference between the two study arms was statistically very significant (p=0.001). In 93.0% (89.7% intervention and 97.0% control), waiters knew that only breast milk and nothing else had to be given during the first 6 months, and the difference between the two study arms was statistically very significant (p<0.001). The majority of waiters, 90.6% (90.5% intervention and 90.6% control), knew that colostrum was nutritious, but the difference between the two study arms was not statistically significant (p=0.749); while only 88.7% (88.8% intervention and 88.6% control) knew that it was protective for the baby, with a slight difference between the two study arms which was not statistically significant (p=0.941).

4.3.2.4 Immunization

The majority of the waiters, 92.9% (91.6% intervention and 94.6% control), knew that the BCG vaccine protects the baby from tuberculosis, and the difference between the two study arms was statistically very significant (p<0.001). In 92.2% (90.7% intervention and 94.0% control), waiters knew that they are expected to inform the health workers if the scar is not formed at the BCG injection site after about 8 weeks, and the difference between the two study arms was statistically very significant (p<0.001).

4.3.2.5 Danger and Non danger Signs Recognition

On their admission to the MWH, waiters had the desired knowledge, in relation to signs that necessitate the healthcare provider's attention. The majority of waiters, 88.5% (85.5% intervention and 92.1% control), knew that a baby's skin, which is too cold to touch, is a danger sign, and the difference between the two study arms was statistically very significant ($p<0.001$). In 94.3% (90.0% intervention and 99.4% control), waiters knew that yellowish skin or eyes require immediate consultation with the health facility, and the difference between the two study arms was statistically very significant ($p<0.001$). For the other danger signs, waiters in the control arm had a higher knowledge, as compared to their counterparts in the intervention arm, and the differences were all statistically very significant with a p-value of $p<0.001$.

On the contrary, waiters did not have the desired knowledge, in relation to non danger signs, and the majority did not know that the following signs do not necessitate the healthcare provider's attention: foul smell from the umbilical stump without any pus or redness, 57.9% (56.2% intervention and 59.8% control), and the difference between these two arms was not statistically significant ($p=0.362$); getting hiccup, 57.8% (55.5% intervention and 60.6% control), and the difference between these two arms was statistically significant ($p=0.015$); falling into sleep during breastfeeds, 61.2% (62.9% intervention and 59.1% control) and the difference between these two arms was not statistically significant ($p=0.314$); baby bleeding few drops from the vagina, 47.2% (38.1% intervention and 58.0% control) and the difference between these two arms was statistically very significant ($p<0.001$); and failure to retract the foreskin 51.5% (48.2% intervention and 55.5% control) and the difference between these two arms was statistically very significant ($p<0.001$).

Table 4.4: Proportion of Waiters' with good and bad ENC Knowledge on Admission: Intervention and Control

Knowledge Item	Overall		Intervention						Control						p-Value
			Yes		No		Don't Know		Yes		No		Don't Know		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Care of the Umbilical Cord and the Skin	**802**	**68.5%**													
The umbilical stump should be left uncovered without any dressing	601	51.3%	392	61.4%	210	32.9%	36	5.6%	209	39.2%	279	52.3%	45	8.4%	0.000
If the umbilical stump is soiled with baby's urine or faeces, I would wash it with water	1013	86.7%	552	86.5%	53	8.3%	33	5.2%	461	86.8%	37	7.0%	33	6.2%	0.539
The cord stump should be dried thoroughly after bathing	976	83.3%	512	80.1%	86	13.5%	41	6.4%	464	87.2%	43	8.1%	25	4.7%	0.004
"Surgical spirit" (70% isopropyl alcohol) should not be applied on the cord stump.	774	66.1%	409	63.8%	179	27.9%	53	8.3%	365	68.9%	123	23.2%	42	7.9%	0.160
I will apply herbal medication on the baby's skin to protect it	646	55.1%	251	39.2%	353	55.2%	36	5.6%	219	41.1%	293	55.0%	21	3.9%	0.376
Care of the Temperature	**957**	**81.7%**													
A newborn baby should be wiped within 30 minutes of birth	900	76.7%	470	73.4%	132	20.6%	38	5.9%	430	80.7%	69	12.9%	34	6.4%	0.002
A newborn baby should be wrapped within 30 minutes of birth	1000	85.4%	542	85.0%	60	9.4%	36	5.6%	458	85.9%	61	11.4%	14	2.6%	0.025
The first bath should be delayed by at least 24 hours	996	85.1%	519	81.2%	75	11.7%	45	7.0%	477	89.8%	24	4.5%	30	5.6%	0.000
Skin-to-skin care should be done within the first 24 hours	931	79.6%	484	75.9%	109	17.1%	45	7.1%	447	84.0%	30	5.6%	55	10.3 %	0.000
Immediate and Exclusive Breastfeeding	**974**	**82.9%**													
Breast feeding should be initiated within one hour after delivery	1041	88.6%	551	85.8%	67	10.4%	24	3.7%	490	91.9%	25	4.7%	18	3.4%	0.001
The baby should be breastfed on demand rather than according to a timetable.	1054	89.9%	570	89.1%	54	8.4%	16	2.5%	484	90.8%	37	6.9%	12	2.3%	.603

Only breast milk and nothing else should be given during the first 6 months	1091	93.0%	574	89.7%	55	8.6%	11	1.7%	517	97.0%	13	2.4%	3	.6%	0.000
The baby should be breastfed during the nights too.	1096	93.5%	575	89.7%	48	7.5%	18	2.8%	521	98.1%	5	0.9%	5	.9%	0.000
The baby is protected from infections by giving “colostrum” (thick yellowish foremilk) to the baby.	1041	88.7%	569	88.8%	41	6.4%	31	4.8%	472	88.6%	33	6.2%	28	5.3%	0.941
Foods in addition to the breast milk should be introduced from 4-6 months of age	641	54.7%	385	60.3%	235	36.8%	19	3.0%	256	48.0%	254	47.7%	23	4.3%	0.000
Passing urine less than 6 times a day is an indication that the baby receives insufficient milk	967	82.4%	502	78.2%	82	12.8%	58	9.0%	465	87.4%	38	7.1%	29	5.5%	0.000
Giving herbal preparations during the period of exclusive breastfeeding is not beneficial to a healthy baby.	912	77.7%	492	76.6%	116	18.1%	34	5.3%	420	78.9%	92	17.3%	20	3.8%	0.408
If I experience a sore nipple I would apply a little breast milk on the nipple and expose it to air to heal the wound	499	42.5%	285	44.4%	231	36.0%	126	19.6 %	214	40.2%	260	48.8%	59	11.1 %	0.000
Breast size is not related to amount of breast milk	863	73.4%	520	80.9%	102	15.9%	21	3.3%	343	64.4%	175	32.8%	15	2.8%	0.000
Colostrum is nutritious for the baby	1064	90.6%	581	90.5%	42	6.5%	19	3.0%	483	90.6%	31	5.8%	19	3.6%	0.749
The position of the infant during breast feeding is important	1126	95.9%	606	94.4%	29	4.5%	7	1.1%	520	97.7%	4	0.8%	8	1.5%	0.000
Increased calories are required by breast feeding mothers	1048	89.1%	538	83.7%	59	9.2%	46	7.2%	510	95.7%	15	2.8%	8	1.5%	0.000
Breast feeding should not be stopped if infant gets diarrhoea	1080	91.8%	580	90.2%	45	7.0%	18	2.8%	500	93.8%	24	4.5%	9	1.7%	0.079
Breastfeeding produces decreased stool frequency	838	71.3%	465	72.4%	138	21.5%	39	6.1%	373	70.0%	126	23.6%	34	6.4%	0.643
Breast fed infants’ stool is loose	1015	86.2%	511	79.3%	116	18.0%	17	2.6%	504	94.6%	15	2.8%	14	2.6%	0.000
Breast suckling increases breast milk	1048	89.1%	548	85.2%	75	11.7%	20	3.1%	500	93.8%	21	3.9%	12	2.3%	0.000
Breast feeding is OK during pregnancy	748	63.6%	424	65.8%	190	29.5%	30	4.7%	324	60.9%	186	35.0%	22	4.1%	.135

Breast feeding is OK during menstruation	1039	88.3%	544	84.5%	70	10.9%	30	4.7%	495	92.9%	20	3.8%	18	3.4%	0.000
Formula is not as nutritious as breast milk	1018	86.5%	520	80.7%	104	16.1%	20	3.1%	498	93.4%	24	4.5%	11	2.1%	0.000
Breast feeding protects against infection	1081	91.9%	575	89.4%	47	7.3%	21	3.3%	506	94.9%	14	2.6%	13	2.4%	0.001
Breast feeding helps bonding between the mother and the baby	1110	94.8%	590	92.0%	38	5.9%	13	2.0%	520	98.1%	5	0.9%	5	.9%	0.000
BCG Immunization	**1088**	**92.5%**													
BCG vaccine will protect the baby from tuberculosis.	1093	92.9%	589	91.6%	31	4.8%	23	3.6%	504	94.6%	3	0.6%	26	4.9%	0.000
There will be redness and swelling at the site of BCG injection followed by rupture after about 6-8 weeks.	1088	92.4%	580	90.1%	43	6.7%	21	3.3%	508	95.3%	5	0.9%	20	3.8%	0.000
If a scar is not formed at the BCG injection site about 8 weeks, I would inform a health worker	1084	92.2%	583	90.7%	45	7.0%	15	2.3%	501	94.0%	11	2.1%	21	3.9%	0.000
Signs that need urgent attention of healthcare provider	**1090**	**92.9%**													
Baby who previously sucked well stops sucking.	1101	93.7%	580	90.3%	57	8.9%	5	.8%	521	97.7%	11	2.1%	1	.2%	0.000
Getting abnormal jerky movements (fits) in limbs	1085	92.3%	560	87.2%	74	11.5%	8	1.2%	525	98.5%	8	1.5%	0	.0%	0.000
Continuous rapid breathing	1091	92.9%	569	88.6%	65	10.1%	8	1.2%	522	97.9%	8	1.5%	3	.6%	0.000
Baby's eyes become red with excessive pus like discharge	1095	93.2%	570	88.8%	65	10.1%	7	1.1%	525	98.5%	6	1.1%	2	.4%	.000
Baby's skin is cold to touch	1040	88.5%	549	85.5%	87	13.6%	6	0.9%	491	92.1%	31	5.8%	11	2.1%	0.000
Having a hot body (fever)	1099	93.7%	575	89.7%	64	10.0%	2	0.3%	524	98.5%	7	1.3%	1	.2%	0.000
Baby who was previously active becomes lazy	1085	92.4%	563	87.8%	70	10.9%	8	1.2%	522	97.9%	9	1.7%	2	.4%	0.000
Yellowish vomitus	1104	94.0%	576	89.9%	60	9.4%	5	0.8%	528	99.1%	4	0.8%	1	.2%	.000

Passing watery, liquid motions 3 or more times or > 9 motions of normal consistency in 24 hours or blood in liquid stool	1100	93.7%	575	89.7%	60	9.4%	6	0.9%	525	98.5%	6	1.1%	2	.4%	0.000
Skin or eyes yellow	1108	94.3%	578	90.0%	59	9.2%	5	0.8%	530	99.4%	3	0.6%	0	.0%	0.000
Skin around the umbilicus is red and thick	1095	93.4%	572	89.5%	60	9.4%	7	1.1%	523	98.1%	7	1.3%	3	.6%	0.000
Pus coming out from the cord stump	1094	93.4%	571	89.4%	63	9.9%	5	0.8%	523	98.3%	8	1.5%	1	.2%	0.000
Absence of testis in the scrotum in a full term baby boy	1075	91.8%	563	88.1%	68	10.6%	8	1.3%	512	96.2%	13	2.4%	7	1.3%	0.000
Signs that do not need attention of a healthcare provider	**670**	**57.2%**													
Falls into sleep during breastfeeds	719	61.2%	404	62.9%	221	34.4%	17	2.6%	315	59.1%	206	38.6%	12	2.3%	0.314
A noise (snuffling) generating from the nostrils while sleeping	705	60.0%	389	60.6%	248	38.6%	5	0.8%	316	59.3%	207	38.8%	10	1.9%	0.243
Sneezing	728	62.0%	374	58.3%	248	38.6%	20	3.1%	354	66.4%	177	33.2%	2	.4%	0.000
Getting hiccups	679	57.8%	356	55.5%	262	40.8%	24	3.7%	323	60.6%	203	38.1%	7	1.3%	0.015
Twisting the body	688	58.6%	371	57.8%	253	39.4%	18	2.8%	317	59.5%	214	40.2%	2	.4%	0.006
Salivating of milk following a feed	706	60.1%	379	59.0%	234	36.4%	29	4.5%	327	61.5%	202	38.0%	3	.6%	0.000
Passes stools once in 4-5 days	706	60.3%	374	58.6%	246	38.6%	18	2.8%	332	62.3%	195	36.6%	6	1.1%	0.081
Foul smell from the umbilical stump without any pus or redness	675	57.9%	356	56.2%	263	41.5%	14	2.2%	319	59.8%	206	38.6%	8	1.5%	0.362
Failure to retract the foreskin of the penis in a newborn boy	601	51.5%	306	48.2%	289	45.5%	40	6.3%	295	55.5%	227	42.7%	10	1.9%	0.000
Bleeding few drops of blood from the vagina of a newborn girl	551	47.2%	242	38.1%	371	58.4%	22	3.5%	309	58.0%	217	40.7%	7	1.3%	.000

Whitish discharge from vagina of a newborn girl	647	55.4%	294	46.3%	304	47.9%	37	5.8%	353	66.2%	164	30.8%	16	3.0%	0.000
A nodule in the breast, with a little milky discharge from newborn's nipple	638	54.7%	311	49.1%	265	41.8%	58	9.1%	327	61.5%	186	35.0%	19	3.6%	.000 0.000

CHAPTER 5: RESULTS: PATTERN OF THE STUDY OUTCOME BEHAVIOURS

This chapter of the study results highlights the effect of the ENC HE sessions, both the ENCGMI HE and RENC HE, on the study outcome behaviours, the mothers' ENC knowledge on discharge, the newborn care practices during the first 7 days of life, and the early neonatal morbidity, by looking at their prevalence and key determinants. The chapter also looks at the prevailing newborn practices, in the communities where the mothers lived, and the mothers' opinion of the ENCGMI HE sessions. The results presented in this chapter will help answer the study's primary objective 1 and the secondary objectives 1, 2 and 3.

5.1 Mothers' ENC Knowledge on Discharge

This section of the results examines the mothers' ENC knowledge on their discharge from the postnatal ward in the two study arms, and also compares their ENC knowledge acquisition on discharge. The qualitative data in this section was collected during the discussions which the actors had in their first ENCGMI HE session, when discussing what they knew, what they had been told, and what they had done, in relation to umbilical cord and skin care, thermal protection, immediate and exclusive breastfeeding, BCG immunization, danger signs recognition, and non-danger signs recognition. From those discussions, ENC practices barriers were also gathered. This section addresses the primary study objective 1.a, and the secondary objectives 1 and 2.

5.1.1 Overall Mothers' ENC Knowledge

5.1.1.1 Mothers' Level of ENC Knowledge

Among the 1,182 mothers who were interviewed on the recommended ENC practices, 1,077 (91.1%) had a satisfactory ENC knowledge at their discharge. Mothers who attended the RENC HE sessions had a significantly greater satisfactory ENC knowledge (87.5% intervention and 95.5% control).

5.1.1.2 Determinants of Mothers' Satisfactory ENC Knowledge

According to the univariate analysis, mothers were more likely to have a satisfactory ENC knowledge when attending RENC HE sessions (OR= 3.024; 95% CI: 1.888, 4.844,), residing beyond 5 Km of the nearest health facility (OR=2.927; 95% CI: 1.581, 5.416), being a house wife (OR= 1.854; 95% CI: 1.196, 2.875), and being unemployed or looking for a job (OR= 3.249; 95% CI: 1.567, 6.738) (Table 5.1). In contrast, mothers were less likely to have a satisfactory ENC knowledge when widowed (OR= 0.124; 95% CI: 0.027, 0.561), belonging to the Tumbuka ethnic group (OR= 0.794; 95% CI: 0.341, 1.843), smoking during pregnancy (OR= 0.250; 95% CI: 0.088, 0.711), and when reading the newspaper almost everyday (OR= 0.257; 95% CI: 0.139, 0.475) (Table 5.1).

According to the multivariate analysis, mothers were more likely to have a satisfactory ENC knowledge when attending the RENC HE sessions (aOR= 2.339; 95% CI: 1.112, 4.920), belonging to the Ngoni ethnic group (aOR= 5.086; 95% CI: 0.968, 26.728), residing beyond 5 Km of the nearest health facility (aOR= 3.304; 95% CI: 1.544, 6.744), being a housewife (aOR= 3.457; 95% CI: 1.760, 6.789), and being unemployed or looking for a job (aOR= 3.825; 95% CI: 1.263, 11.586) (Table 5.1). In contrast, mothers were less likely to have a satisfactory ENC knowledge when belonging to the Nsenga ethnic group (aOR= 0.208; 95% CI: 0.084, 0.514), and smoking during pregnancy (aOR= 0.135; 95% CI: 0.024, 0.761).

Table 5.1: Characteristics, unadjusted and adjusted odds ratios for attendance to ENC HE, socio-demographic, socio-economic, and exposure to media factors associated with the mothers' satisfactory ENC knowledge

Mothers' Explanatory Characteristics	N	Unadjusted		Adjusted	
		OR	95% CI	OR	95% CI
Attendance to ENC HE					
Attendance to RENC HE Sessions	533	3.024**	1.888-4.844	2.339*	1.112-4.920
Attendance to ENCGMI HE Sessions (Reference)	649				
Marital Status					
Other	2	0.999			
Divorced	12	0.464	0.100-2.152	1.175E8	
Widow	7	0.124**	0.027-0.561	0.382	0.017-8.351
Single	81	2.415	0.747-7.805	1.829	0.366-9.142
Married (Reference)					
Tribe:					
Others	22	0.383	0.081-1.816	0.293	0.052-1.640
Ngoni	238	1.787	0.628-5.080	5.086	0.968-26.728
Nsenga	280	0.153	0.081-0.287	0.208**	0.084-0.514
Tumbuka	217	0.794**	0.341-1.843	1.490	0.363-7.072
Chewa (Reference)	352				
Distance to the nearest Health facility					
Beyond 5 Km	277	2.927**	1.581-5.416	3.304**	1.544-6.744
Within 5 Km (Reference)	508				
Employment Status					
Housewife	541	1.854**	1.196-2.875	3.457**	1.760-6.789
Unemployed/looking for a job	212	3.249**	1.567-6.738	3.825*	1.263-11.586
Employed/Self-employed	405				

Smoking Status:					
Smoking	19	0.250**	0.088-0.711	0.135*	0.024-0.761
Not Smoking (Reference)	1132				
Reading the Newspaper					
Almost everyday	65	0.257**	0.139-0.475	0.883	0.327 – 2.381
At least once a week	148	0.951	0.502-1.802	0.661	0.263-1.660
Less than once a week	46	1.203	0.364-3.976	1.551	0.313-7.687
Not at all (Reference)	904				

*p< 0.05, **p< 0.01,

5.1.1.3 Proportions of Mothers giving Correct Answers to ENC questions

On their discharge from the postnatal ward, 84.4% (84.5% intervention and 84.4% control) of mothers gave a correct answer to the ENC family package questions posed to them (Table 5.2). Correct answers on BCG immunization topped the list, with 97.8% (97.8% intervention and 97.8% control) of mothers giving a correct answer on the newborns' BCG immunization practices, while the recognition of the newborns' none danger signs had the lowest number of correct answers, with only 59.1% (60.8% intervention and 57.4% control) of mothers giving correct answers on newborns' none danger signs questions.

Table 5.2: Proportion of Mothers giving a correct answer to ENC questions on Discharge: Intervention and Control

ENC Questions Items	Overall		Intervention	Control
			Proportion of mothers giving a correct answer on discharge	Proportion of mothers giving a correct answer on discharge
	n	%	%	%
Care of the Umbilical Cord and the Skin	872	76.3%	78.6%	74.0%
Care of the Temperature	1040	91.5%	91.3%	91.6%
Immediate and Exclusive Breastfeeding	1010	88.8%	89%	88.5%
BCG Immunization	1107	97.8%	97.8%	97.8%
Signs that need urgent attention of healthcare provider	1057	93.2%	89.2%	97.2%
Signs that do not need attention of a healthcare provider	673	59.1%	60.8%	57.4%
Average		**84.45%**	**84.5%**	**84.4%**

5.1.2 Specific Mothers' ENC Knowledge

This section of the results highlights the mothers' specific ENC knowledge on their discharge from the postnatal ward, and compares it between the two study arms, namely the intervention and control (see Table 5.3). It also highlights their opinions in relation to umbilical cord and skin care, thermal protection, immediate and exclusive breastfeeding, BCG immunization, danger signs recognition, and non-danger signs recognition.

5.1.2.1 Care of the Umbilical Cord and Skin

Few mothers, 66.3% (80.3% intervention and 49.3% control), knew that the umbilical stump has to be left uncovered without any dressing, and the huge difference between the two study arms was statistically very significant ($p<0.001$). The majority of mothers, 57.5% (60.5% intervention and 54.1% control), said that they would apply herbal medication to protect the umbilical

cord. The difference between the two study arms was not statistically significant (p=0.061). The majority of the mothers, 93.8% (93.3% intervention and 94.4% control), knew that a soiled umbilical stump has to be washed with water, and the difference between the two study arms was not statistically significant (p= 0.054). In 90.2% (87.4% intervention and 93.4% control), mothers knew that the cord stump has to be thoroughly dried after bathing, and the difference between the two study arms was statistically very significant (p=0.003). In regards to application of substances on the umbilical cord, 74.7% (71.4% intervention and 78.7% control) of mothers knew that "surgical spirit" should not be applied on the cord stump, and the difference between the two study arms was statistically very significant (p<0.001).

The qualitative data gathered during the first ENCGMI HE session called '*Relationship Establishment'*, substantiates the mothers' knowledge levels in relation to substance application and dressing on the umbilical cord.

The majority of actors (mothers and caregivers) reported that substances are being applied on the umbilical cord to quicken its healing and prevent infections. For some of the actors, this practice has been learnt from their parents, and passed on from one generation to the other, while for others, it is learnt through diffusions, as their interact in the community. The commonly used substances, which are being applied by mothers, or the grandmother, or the mother-in-law, etc., are *Moono'*[5]*, Cigamu'*[6], crushed rat or goat's droppings, cow dung, breast milk, cooking oil, baby powder, *Chinthembwe*[7], *Cimwayi'*[8]. In some cases, the substances were applied several times on the umbilical cord, and instances of multiple substances applications were also recorded.

> A caregiver said during the ENCGMI HE Session 1: *"We do not just put the rats' dropping on the mkombo (umbilical cord stump). Let me explain what*

[5] *Moono*: This is oil that is obtained by pressing the castor beans or seeds of the Castor-oil-plant or Ricinus communis. This seeds contain *ricin,* a poison that is extremely toxic to humans.
[6] *Cigamu*: This is a black powder made from corncobs' ashes, which can be mixed with Vaseline or not.
[7] *Chinthembwe:* Fluid extracted from the Aloe Vera leaves.
[8] *Cimwayi*: This is a powder made from clay placed by termites unto the grass of thatched houses. The blackish clay is collected from the kitchen's grass roof, grinded to powder, and then applied to the baby's cord stump.

we do. The mother or any other person gathers the rats' dropping from the house, since most houses harbour rats. The collected droppings are then put on a raffia empty bag or carrier plastic bag to dry under the sun. We usually put them on top, on the house roof. Once dried, the droppings are crushed or grinded with a stone, until they become powder like. The powder is then transferred in a small bottle that we keep in the house. We bottles to conserve the power…it can be a Coca Cola bottle, a small Whisky bottle, a drug bottle, as long as it has a lid."

Another caregiver said during the ENCGMI HE Session 1: *"In our village, we use 'Moono'. We have a lot of castor-oil-plants in our village. They grow almost everywhere and produce fruits that are covered with prickles. So we harvest the fruits, get the seeds and dry them under the sun. When dried, we press them and extract its oil, which we keep in a small bottle. When the baby is born, we apply the oil on the cord stump after every bath. This oil is good and makes the stump to dry."*

Waiter said during the ENCGMI HE Session 1: *"For me, I have been using 'Cigamu'. My mother told me that she had applied it on all of us. I tried it on my first two children and their cord stump healed nicely. After the harvest season and after selling the maize, I keep some dried corncob in the nkokwe (maize store). To make the 'Cigamu', I first burn the dry corncob and later on grind it into powder. The powder is then put into a bottle. Every time I bath the baby, I also apply the 'Cigamu' on the cord stump."*

Caregiver said during the ENCGMI HE Session 1: *"For my children, I tried several things. I have applied the rat droppings and the 'Moono'. But my neighbour has been using the 'Chinthembwe'. I have seen her coming to my house, requesting for some leaves of the Aloe Vera growing in my yard. She told me that, when rubbed on the baby's cord stump, the fluid coming from the Aloe Vera leaf helps it to dry fast. But I have never tried it."*

The majority of actors reported that their tradition requires that umbilical cord be dressed with an old wrapper (chitenge), to prevent it from falling between the newborn's thighs (on the genitalia), and make the baby impotent (for males) or

infertile (for females). This wrapping is done after every bath, and continues until the cord stump completely dries off. Once dried and detached from the abdomen, the cord stump, which is secured by the *chitenge*, is then 'harvested' by the mother and kept in a secured place. The family then informs the maternal baby's grandmother, one of the people allowed to dispose of the stump, for its disposal. The grandmother will then perform some rituals, by adding some herbs to the dried stump, and then bury it in a secret place, under a tree.

> Caregiver said during the ENCGMI HE Session 1: *"This is life! Letting the cord stump falling between the baby's legs is unacceptable. Despite what the nurses teach us at the hospital, we cannot stop wrapping the chitenge on the cord! It is our responsibility as parents to secure the reproductive future of our children."*

5.1.2.2 Thermal Protection

The majority of mothers, 85.3% (83.2% intervention and 87.8% control), knew that the newborn baby needed to be wiped within 30 minutes of birth, and the difference between the two study arms was not statistically significant (p=0.054). The majority of mothers, 92.8% (94.9% intervention and 90.3% control), knew that the baby had to be wrapped, and the difference between the two study arms was statistically very significant (p<0.001). About 94.9% (95.0% intervention and 94.8% control) of mothers knew that the first bath should be delayed by at least 24 hours, and the difference between the two study arms was not statistically significant (p=0.814). In 92.8% (92.1% intervention and 93.5% control), mothers knew that the skin-to-skin care had to be done within the first 24 hours of delivery, and the difference between the two study arms was not statistically significant (p=0.522).

In the qualitative data, actors reported on the importance of administering early baths to the newborn and the reasons for the poor newborns' thermal protection. The discussions revealed that mothers administer early baths to their newborns, mainly based on misconceptions around the presence of vernix caseosa and mother's blood on the baby's skin, and also to protect the baby against evil spirits.

Examples of these misconceptions are reflected in the paragraphs and quotes below.

5.1.2.2.1 Vernix caseosa mistaken for semen (mpanvu ya chimuna)

The actors revealed that tradition has it that babies should be bathed immediately after birth, to remove the vernix caseosa, which is mistaken for the man's ejaculates ('*mpavu ya chimuna*'), that the man could have left on the skin of the baby, while having sex with his partner during the last days of her pregnancy. Culturally, for a woman to have sex prior to delivery is taboo. Therefore, a baby whose skin is covered with vernix caseosa has to be immediately bathed, to avoid embarrassment, especially from family members and visitors.

> Caregiver said during the ENCGMI HE Session 1: *"Ye! Ye! Ye! It is not acceptable not to bath a baby born with 'mpavu ya chimuna'! You have to quickly bath him after birth and rub his body with a sponge and soap, to remove all the 'mpavu ya chimuna' from his body."*

> Caregiver said during the ENCGMI HE Session 1: *"The marriage can be over! If the visiting mother-in-law finds the baby covered with these whitish things, she can call off the marriage! She will blame the man for not being merciful to his wife and for continuing having sex with her until delivery."*

5.1.2.2.2 Blood from the Mother's Womb is Impure

The actors also highlighted the fact that a baby who is covered with the mother's blood is unclean. If not immediately removed, the mother's blood could cause all sorts of diseases and even the death of the baby. This belief justifies the early timing for the baby's first bath, as highlighted in the quote below.

> Caregiver said during the ENCGMI HE Session 1: *"The blood from the womb is not pure, and should be removed. A delay in removing that blood can make the baby sick, even kill him."*

5.1.2.2.3 Baby needs Protection.

The discussions revealed that it is imperative for parents to protect their babies against visitors' charms and evil spirits, by bathing them in herbal medicated water. Trees' roots, leaves and *lupoko*[9] are commonly used in the protection of the baby. The bathing is initiated on the first day and continues for one month.

> Caregiver said during the ENCGMI HE Session 1: *"When the baby is born, we immediately bath him to remove the dirt from the womb. For his protection, we go in the bush, get some roots and soak them in water. We use that water to bath the baby, sprinkle the umbilical cord and make the baby drink. The bathing is done very early in the morning, before the spirits start moving in the village."*

5.1.2.2.4 The Babywear is not prepared

As revealed by the discussions, the tradition does not allow mothers to buy the babywear prior to the birth of the baby, except for the head sock and the socks. To keep their babies warm, mothers wrap them in a *chitenge* (wrapper) and place them near the fire or brazier.

> Caregiver said during the ENCGMI HE Session 1: *"No! No! No! We do not buy babywear for an unborn child, because if he dies during delivery, what are we going to do with the clothes? It is very difficult to dispose of the clothes of a dead person."*

5.1.2.3 Breastfeeding Practices

Most of the mothers, 94.8% (93.8% intervention and 96.1% control), knew that breastfeeding had to be initiated within one hour after delivery, and the difference between the two study arms was not statistically significant (p=0.155). In 96.8%

[9] Lupoko: Millet that is pounded for some minutes (on average 30 minutes).

(95.5% intervention and 98.5% control), mothers knew that only breast milk and nothing else had to be given during the first 6 months, and the difference between the two study arms was statistically significant ($p<0.013$). The majority of mothers, 95.0% (94.7% intervention and 95.3% control), knew that colostrum was nutritious, but the difference between the two study arms was not statistically significant ($p=0.666$); while 95.0% (94.7% intervention and 95.4% control) knew that it was protective for the baby, with a slight difference between the two study arms which was not statistically significant ($p=0.193$).

Despite this high knowledge levels among the mothers, the discussions revealed strong beliefs and misconceptions around the initiation of breastfeeding, discard of colostrum, and pre-lacteal feeds. The initiation of the first breastfeeding is often delayed; colostrum, considered dirty, is not given to the baby; and a mixture of water and sugar (*Zigi* or *Chikoloki*) is fed to the baby while waiting for the milk to become 'white'. Breastfeeding delays were also reported for reasons of safety of the newborns. The death of the previous baby requires the cleansing of the mother's breasts with some herbs, before putting the newborn to her breast, or else the baby will die. Herbal medication was also applied on the breasts, prior to the initial breastfeeding, to remove all the bad omen and evil spirits from the breasts.

> Caregiver said during the ENCGMI HE Session 1: *"Us mothers are not supposed to give to the baby the dirty milk which comes first. We squeeze the breasts until the 'dirty milk' finishes, then start breastfeeding the baby. If you give the baby the 'dirty milk', it will fall sick."*

> Waiter said during the ENCGMI HE Session 1: *"We do not immediately breastfeed the baby after birth. We wait for some days, until the 'white milk' starts flowing. Meanwhile, for the baby not to die of hunger, we give it 'chikoloki.'"*

5.1.2.4 Immunization

The majority of the mothers, 98.6% (98.9% intervention and 98.3% control), knew that the BCG vaccine protects the baby from tuberculosis, and the difference between the two study arms was not statistically significant (p=0.164). In 96.8% (96.4% intervention and 97.3% control), mothers knew that they are expected to inform the health workers if the scar is not formed at the BCG injection site after about 8 weeks, and the difference between the two study arms was not statistically significant (p=0.606).

The qualitative data showed that, beside the recommended BCG vaccination, the newborns, also receive traditional immunization to protect them against evil spirits and diseases, and to make them strong. Bathing babies in water treated with herbal medication and making them drink the water are the mostly practiced means of protection. But in Lundazi area, among the Tumbuka, the actors revealed a practice which was not found among the other ethnic groups.

To protect their babies and prevent diseases, mainly '*chifuba'* or respiratory tract infections, couples in Lundazi area perform a ritual called '*ku bweza mwana ku mpasa*', as highlighted by the quote below.

> Caregiver said during the ENCGMI HE Session 1: *"...Let me explain what we do…. During the first sexual intercourse after delivery, which takes place around 04 or 05 hours, the baby's father puts the naked baby on the mother's chest, as she rests on her back. During the sexual act, the mother is asked not to respond to the sexual stimulations. She has to remain still and not move at all! When the father nears ejaculation, he withdraws his penis from the vagina and ejaculates in the palms of his hands, if the baby is male, or in the wife's palms, if the baby is female. The collected semen[10] is then smeared and applied on the baby's chest, and the rest of the body, who is still resting on the mother's chest. Once that is done, the mother then stands to cook a light porridge for the baby. The porridge is fed to the baby, using the fingers of the hand that had applied the semen on the baby. The*

[10] The semen is believed to have strength (*mpanvu*) in it.

one feeding the baby should not wash his or her hands, after applying the semen.

After feeding the baby, the couple then gets a brazier with burning charcoals, and places it between them, while facing each other. They then burn some herbs on the fire, to make smoke. Once the room is filled with smoke, the couple then starts passing the baby to one another several times, and across the brazier, through the smoke. This is done to the baby against evil forces and 'chifuba'. Once done, the couple has to leave the house, before the sunrise. The baby, covered with the man's semen, then has to be taken the man's mother, mandated by tradition to bath the baby. By bathing the baby with cold water, the mother-in-law then evidences that the ceremony was done."

Caregiver said during the ENCGMI HE Session 1: *"...Only the paternal grandmother is allowed bath the baby after the ceremony... In the morning, the mother has to take the baby (covered with dried semen) to its paternal grandmother for bathing. This allows her to certify that the couple had protected their baby against the evil spirits and diseases."*

5.1.2.5 Danger and Non danger Signs Recognition

The majority of mothers, 89.8% (86.7% intervention and 93.6% control), knew that a baby's skin, which is too cold to touch, is a danger sign, and the difference between the two study arms was statistically very significant ($p<0.001$). In 94.4% (91.0% intervention and 98.4% control), mothers knew that yellowish skin or eyes require immediate consultation with the health facility, and the difference between the two study arms was statistically very significant ($p<0.001$). For the other danger signs, mothers in the control arm had a higher knowledge, as compared to their counterparts in the intervention arm, and the differences were all statistically very significant with a p-value of $p<0.001$.

On the contrary, mothers did not have the desired knowledge, in relation to non danger signs, and the majority, as shown below, did not know that the following

signs do not necessitate the healthcare provider's attention: foul smell from the umbilical stump without any pus or redness, 57.4% (60.4% intervention and 53.9% control), and the difference between these two arms was statistically significant (p=0.024); getting hiccup, 63.4% (65.7% intervention and 60.7% control), and the difference between these two arms was statistically very significant (p<0.001); falling into sleep during breastfeeds, 69.2% (73.2% intervention and 64.3% control) and the difference between these two arms was not statistically very significant (p=0.005); baby bleeding few drops from the vagina, 43.2% (40.6% intervention and 46.3% control) and the difference between these two arms was not statistically significant (p=0.121); and failure to retract the foreskin 49.6% (54.1% intervention and 44.3% control) and the difference between these two arms was statistically very significant (p<0.004).

The qualitative data revealed that the baby's fever, vomiting, body rash, crying and refusal to suck, were the main signs necessitating mothers to consult with the health facilities. Some of the actors said, despite the knowledge of the danger signs and the risks to which the newborn is exposed, they first treat the sick newborn with herbal medication, and only resolve to sick medical assistance when the condition of the bay does not improve.

Table 5.3: Proportions of Mothers with good ENC specific Knowledge on Discharge: Intervention & Control

ENC Knowledge Items	Overall		Intervention		Control		p-Value
			Proportion of mothers giving a correct answer		Proportion of mothers giving a correct answer		
	n	%	n	%	n	%	
Care of the Umbilical Cord and the Skin							
The umbilical stump should be left uncovered without any dressing	758	66.3%	502	80.3%	256	49.3%	0.000
If the umbilical stump is soiled with baby's urine or faeces, I would wash it with water	1070	93.8%	582	93.3%	488	94.4%	0.054
The cord stump should be dried thoroughly after bathing	1026	90.2%	543	87.4%	483	93.4%	0.003
"Surgical spirit" (70% isopropyl alcohol) should not be applied on the cord stump.	848	74.7%	441	71.4%	407	78.7%	0.000
I will apply herbal medication on the baby's skin to protect it	656	57.5%	377	60.5%	279	54.1%	0.061
Care of the Temperature							
A newborn baby should be wiped within 30 minutes of birth	973	85.3%	519	83.2%	454	87.8%	0.054
A newborn baby should be wrapped within 30 minutes of birth	1057	92.8%	591	94.9%	466	90.3%	0.000
The first bath should be delayed by at least 24 hours	1080	94.9%	591	95.0%	489	94.8%	0.814
Skin-to-skin care should be done within the first 24 hours.	1050	92.8%	572	92.1%	478	93.5%	0.522
Immediate and Exclusive Breastfeeding							
Breast feeding should be initiated within one hour after delivery	1082	94.8%	585	93.8%	497	96.1%	0.155

The baby should be breastfed on demand rather than according to a timetable.	1102	96.8%	608	97.6%	494	95.7%	0.213
Only breast milk and nothing else should be given during the first 6 months	1105	96.8%	596	95.5%	509	98.5%	0.013
The baby should be breastfed during the nights too.	1119	98.2%	608	97.6%	511	98.8%	0.008
The baby is protected from infections by giving “colostrum” (thick yellowish foremilk) to the baby.	1082	95.0%	589	94.7%	493	95.4%	0.193
Foods in addition to the breast milk should be introduced from 4-6 months of age	698	61.4%	421	67.9%	277	53.7%	0.000
Passing urine less than 6 times a day is an indication that the baby receives insufficient milk	1018	89.7%	537	86.5%	481	93.6%	0.000
Giving herbal preparations during the period of exclusive breastfeeding is not beneficial to a healthy baby.	1000	88.0%	551	88.7%	449	87.0%	0.025
If I experience a sore nipple I would apply a little breast milk on the nipple and expose it to air to heal the wound	563	49.6%	346	55.7%	217	42.2%	0.000
Breast size is not related to amount of breast milk	933	82.1%	568	91.5%	365	70.7%	0.000
Colostrum is nutritious for the baby	1079	95.0%	588	94.7%	491	95.3%	0.666
The position of the infant during breast feeding is important	1107	97.4%	599	96.5%	508	98.4%	0.082
Increased calories are required by breast feeding mothers	1063	93.5%	567	91.30%	496	96.1%	0.002
Breast feeding should not be stopped if infant gets diarrhea	1077	94.7%	585	94.2%	492	95.3%	0.670
Breastfeeding produces decreased stool frequency	929	81.7%	517	83.1%	412	80.0%	0.353
Breast fed infants’ stool is loose	1016	89.3%	535	86.0%	481	93.2%	0.000
Breast suckling increases breast milk	1046	91.9%	558	89.7%	488	94.6%	0.006
Breast feeding is OK during pregnancy	908	79.8%	503	80.9%	405	78.5%	0.132
Breast feeding is OK during menstruation	1053	92.7%	561	90.3%	492	95.5%	0.002

Formula is not as nutritious as breast milk	1038	91.5%	548	88.7%	490	95.0%	0.001
Breast feeding protects against infection	1089	95.8%	591	95.2%	498	96.5%	0.476
Breast feeding helps bonding between the mother and the baby	1106	97.4%	601	96.9%	505	97.9%	0.579
BCG Immunization							
BCG vaccine will protect the baby from tuberculosis.	1121	98.6%	614	98.9%	507	98.3%	0.164
There will be redness and swelling at the site of BCG injection followed by rupture after about 6-8 weeks.	1114	98.0%	609	98.1%	505	97.9%	0.802
If a scar is not formed at the BCG injection site about 8 weeks, I would inform a health worker	1087	96.8%	586	96.4%	501	97.3%	0.606
Signs that need urgent attention of healthcare provider							
Baby who previously sucked well stops sucking.	1065	93.5%	563	90.4%	502	97.3%	0.000
Getting abnormal jerky movements (fits) in limbs	1054	92.6%	552	88.7%	502	97.3%	0.000
Continuous rapid breathing	1044	91.7%	543	87.2%	501	97.1%	0.000
Baby's eyes become red with excessive pus like discharge	1062	93.2%	561	90.0%	501	97.1%	0.000
Baby's skin is cold to touch	1022	89.8%	540	86.7%	482	93.6%	0.000
Having a hot body (fever)	1064	93.5%	561	90.0%	503	97.7%	0.000
Baby who was previously active becomes lazy	1044	91.7%	544	87.3%	500	96.9%	0.000
Yellowish vomitus	1065	93.5%	560	89.9%	505	97.9%	0.000
Passing watery, liquid motions 3 or more times or > 9 motions of normal consistency in 24 hours or blood in liquid stool	1067	93.8%	558	89.6%	509	98.8%	0.000

Skin or eyes yellow	1075	94.4%	567	91.0%	508	98.4%	0.000
Skin around the umbilicus is red and thick	1066	93.6%	560	89.9%	506	98.1%	0.000
Pus coming out from the cord stump	1064	93.5%	561	90.2%	503	97.5%	0.000
Absence of testis in the scrotum in a full term baby boy	1045	92.0%	552	88.9%	493	95.7%	0.000
Signs that do not need attention of a healthcare provider							
Falls into sleep during breastfeeds	787	69.2%	455	73.2%	332	64.3%	0.005
A noise (snuffling) generating from the nostrils while Sleeping	752	66.1%	433	69.7%	319	61.8%	0.011
Sneezing	698	61.4%	380	61.2%	318	61.6%	0.116
Getting hiccups	721	63.4%	408	65.7%	313	60.7%	0.010
Twisting the body	708	62.3%	399	64.4%	309	59.9%	0.043
Salivating of milk following a feed	762	67.2%	440	71.2%	322	62.4%	0.001
Passes stools once in 4-5 days	639	56.5%	348	56.4%	291	56.6%	0.996
Foul smell from the umbilical stump without any pus or redness	651	57.4%	373	60.4%	278	53.9%	0.024
Failure to retract the foreskin of the penis in a newborn boy	562	49.6%	334	54.1%	228	44.3%	0.004
Bleeding few drops of blood from the vagina of a newborn girl	491	43.2%	252	40.6%	239	46.3%	0.121
Whitish discharge from vagina of a newborn girl	664	58.5%	361	58.3%	303	58.7%	0.615
A nodule in the breast, with a little milky discharge from newborn's nipple	641 641	56.5% 56.5%	338	54.6%	303	58.7%	0.118

5.2 Mothers' ENC Knowledge Gain on Discharge

This section of the results compares the mothers' ENC knowledge on their admission to the MWH and on their discharge from the postnatal ward, to find out if the ENC health education they had received from the SMAGs (intervention) and the health workers (control) during their stay in the MWH, had helped them gain ENC knowledge. The study found that mothers in the intervention group had the highest acquisition of ENC knowledge, an average gain of 7.2%, as compared to their counterparts in the control group who had only a 2.7% average ENC knowledge gain (Table 5.4). Besides this, the results also show that mothers in the control group had even lost some knowledge in relation to the recognition of danger signs (-0.5%) and that of none danger signs (-3.4%)(Table 5.4).

The study also showed that in the control group, the difference between the mothers' knowledge on admission to the MWH and on their discharge from the postnatal ward was 0.295 (Table 5.5). In the intervention group, the same difference was 0.698. So the difference-in-differences is 0.403, with a standard error of 0.075, leading to a p-value <0.001. The difference in gained ENC knowledge among mothers who attended ENCGMI HE sessions compared to those who attended RENC HE stood at + 4.5, (Figure 5.1), showing a significantly larger change among mothers in the intervention, on their discharge from the postnatal ward.

Fig. 5.1: Mothers' ENC Knowledge Gain

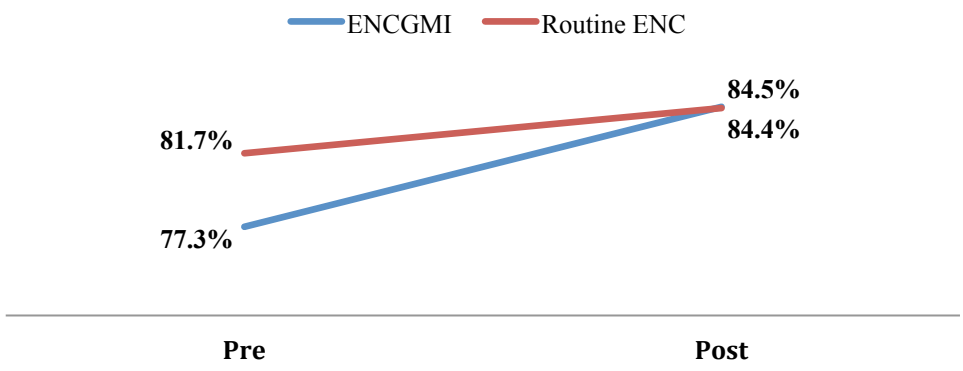


Table 5.4: Proportion of Mothers with Good ENC Knowledge on Admission and at Discharge: Intervention and Control

Knowledge Items	Intervention			Control		
	Proportion of mothers with good knowledge on Admission (Pre)	Proportion of mothers with good knowledge on Discharge (Post)	Percentage Difference (Post - Pre)	Proportion of mothers with good knowledge on Admission (Pre)	Proportion of mothers with good knowledge on Discharge (Post)	Percentage Difference (Post - Pre)
	%	%	%	%	%	%
Care of the Umbilical Cord and the Skin	69.4%	78.6%	9.2%	67.4%	74.0%	6.6%
Care of the Temperature	78.9%	91.3%	12.4%	85.1%	91.6%	6.5%
Immediate and Exclusive Breastfeeding	81.4%	89.0%	7.6%	84.6%	88.5%	3.9%
BCG Immunization	90.8%	97.8%	7.0%	94.6%	97.8%	3.2%
Signs that need urgent attention of healthcare provider	88.8%	89.2%	0.4%	97.7%	97.2%	-0.5%
Signs that do not need attention of a healthcare provider	54.2%	60.8%	6.6%	60.8%	57.4%	-3.4%
Total Average	**77.3%**	**84.45%**	**7.2%**	**81.7%**	**84.4%**	**2.7%**

Table 5.5: Difference-in-Difference Estimation Results for ENC Knowledge

Outcome Variable	Y	S. Err.	t	p>t
Control				
Pre-Test	1.667			
Post-Test	1.962			
Difference (Post-Pre)	0.295	0.068	4.31	0.000***
Intervention				
Pre-Test	1.246			
Post-Test	1.943			
Difference (Post-Pre)	0.698	0.032	22.14	0.000***
Difference-in-Difference	**0.403**	**0.075**	**5.35**	**0.000*** **

* Means and Standard Errors are estimated by linear regression
**Inference: *** p<0.01

5.3 Newborn Care Practices during the First 7 Days of Life

Through home follow up visits, mothers, in the two study arms, intervention and control, were asked a series of questions, to investigate on the type of care they had given to their babies during the early neonatal period. The below paragraphs highlight the main findings in the care provided to the newborns and the main barriers faced by the mothers in their practice. This section of the results addresses the primary study objective 1.b and secondary objective 2.

5.3.1 Type of Care given to the Newborn

5.3.1.1 Quality of Care given to the Newborn

Among the 1,120 mothers who were interviewed on the type of care they had given to their babies during the first seven days of life, 987 (88%) practiced good newborn care, while the remaining 133 (12%) did not.

5.3.1.2 Determinants of Mothers' Good Newborn Care

According to the univariate analysis, newborns were more likely to receive good care when their mothers were wealthy (aOR= 1.925; 95% CI: 1.067, 3.473). In contrast, newborns were less likely to receive good care when their mothers

belonged to the Ngoni (OR= 0.816; 95% CI: 0.445, 1.495), Nsenga (OR= 0.389; 95% CI: 0.230, 0.658), and Tumbuka (OR= 0.416; 95% CI: 0.239, 0.722) ethnic groups (Table 5.6).

According to the multivariate analysis, newborns were more likely to receive good care when their mothers were wealthy (aOR= 1.965; 95% CI: 1.058, 3.649). In contrast, newborns were less likely to receive good care when their mothers belonged to the Nsenga (aOR= 0.386; 95% CI: 0.228, 0.655), and Tumbuka (aOR= 0.411; 95% CI: 0.236, 0.716) ethnic groups.

Table 5.6: Characteristics, unadjusted and adjusted odds ratios (ORs) for socio-demographic factors associated with good newborn care practices

Mothers' Explanatory Characteristics	N (%)	Unadjusted		Adjusted	
		OR	95% CI	OR	95% CI
Tribe:					
Others	21	0.253*	0.085-0.750	0.236*	0.079-0.707
Ngoni	237	0.816	0.445-1.495	0.791	0.431-1.453
Nsenga	248	0.389**	0.230-0.658	0.386**	0.228-0.655
Tumbuka	206	0.416**	0.239-0.722	0.411**	0.236-0.716
Chewa (Reference)	340				
Household Wealth Index:					
5-9 assets	203	1.925*	1.067-3.473	1.965*	1.058-3.649
1-4 assets	260	0.859	0.565-1.305	0.813	0.528-1.250
No assets (Reference)	657				

*p< 0.05, **p< 0.01

5.3.2 Cord Care Practices

In accordance with the national ENC guidelines, the cord stump should be left uncovered to dry and to mummify. To achieve this, the stump should be exposed to the air without any dressing, bound or bandaged; and kept clean by protecting it with clean clothes and keeping it from urine soiling. To assess the cord care practices among mothers who participated in the study, questions were asked to

find out if they had applied any substance on their newborns' umbilical cords. In the event where a substance was applied on the umbilical cord stump, probing questions were ask to find out what type of substance was applied, who applied it, and how many times it was applied.

5.3.2.1 Application of Substance on the Umbilical cord Stump

In 90.9% (89.9% intervention and 91.9% control), mothers reported that nothing was applied on their babies' umbilical cord stump, and the difference between the two study arms, was statistically significant (p=0.032) (Table 5.7). When asked why they decided not to apply any substance on their newborn's umbilical cord stump, mothers give a variety of responses.

In the intervention arm, most mothers (55.4%) refrained from applying a substance on their newborns' umbilical cord stumps because they had understood very well the message given to them by the SMAGs during the ENCGMI HE sessions, which advised that the cord should be kept from urine soiling, and if soiled, it had to be cleaned with clean water and dried up with clean cotton or gauze. The interactive way of delivering the ENCGMI HE messages may had helped the mothers internalize and practiced the received messages. Preventing infections, was the second most common reason given by mothers for applying substance which may have been contaminated with pathogens (26.7%).

Table 5.7: Substance application on the Newborn's Umbilical Cord Stump: Intervention and Control

	Intervention (I)		Control (C)		% Points Difference (I-C)	p-Value
Care of the Umbilical Cord and the Skin	**n**	**%**	**n**	**%**		
Nothing was applied on the cord stump in the first 7 days of life	498	89.9%	478	91.9%	-2.0%	0.032
Something was applied on the cord stump in the first 7 days of life	49	8.8%	42	8.1%	0.7%	0.032

Mother said during a home visit: "*I understood very well the message that the SMAGs gave us on the care of the umbilical cord. It is not good to put herbs on the baby's cord.*"

Mother said during a home visit: "*Nothing was applied on the cord, because I did not want to cause diseases in my baby"*

Besides these main reasons, mothers in the intervention group also gave reasons, such as the cord will heal on its own, substances are harmful for the baby, to keep the cord clean and maintain hygiene, and not interested in herbal medication and does not know anything about them.

On the other hand, preventing infection of the cord (28.8%) and obeying the directive from the nurses of not putting any thing on the cord (27.0%) were the major reasons advanced by mothers in the control group, for not applying substance on the newborn's umbilical cord stump.

Mother said during a home visit: *"Nurses prohibited us from putting any substance on the baby's cord"*

Mothers in the control group also advanced reasons such as, substances are harmful for the baby and that it was not normal to apply a substance on the cord, for not applying any substance on their newborns' umbilical cord stump.

This high percentage of mothers refraining from applying harmful substances on their newborns' umbilical cord stump is a clear indication that mothers do receive and accept the message being shared during the ENC health education sessions.

Despite the fact that the majority of mothers did not apply any substance on their baby's umbilical cord, 8.5% (8.8% intervention and 8.1% control) reported that something was applied on their newborns' umbilical cord stump, and the difference between the two study arms was statistically significant (p=0.032) (Table 5.7). In the below paragraphs discuss the details pertaining to the substances application.

5.3.2.2 Person applying the Substance on the Newborn's Umbilical Cord Stump

Five different categories of people were reported to have applied a substance on the newborns' umbilical cord stumps (Table 5.8). In the intervention group, the newborns' mothers (72.3%), the mothers-in-law (10.6%), and the women's

mothers (8.5%) were reported to have applied a substance on the newborns' umbilical cord stumps. On the other hand, mothers in the control group reported that they themselves (44.4%), their mothers (38.9%) and their mothers-in-law (16.7%) had applied a substance on the newborns' umbilical cord stumps. As opposed to the control arm where no newborns' fathers applied a substance the umbilical cord stump, in the intervention group, 6.4% of the newborns' fathers were reported to have done it. The differences between the two study arms, in relation to the person who had applied the substance are all statistically very significant (p=0.005).

Table 5.8: Person reported to have applied a Substance on the Newborn's Umbilical Cord Stump: Intervention and Control

Care of the Umbilical Cord and the Skin	Intervention (I)		Control (C)		% Points Difference (I-C)	p-Value
	n	%	n	%		
The mother applied something on the cord stump	34	72.3%	16	44.4%	27.9%	0.005
The husband applied something on the cord stump	3	6.4%	0	0.0%	6.4%	0.005
The mother-in-law applied something on the cord stump	5	10.6%	6	16.7%	-6.1%	0.005
The woman's mother applied something on the cord stump	4	8.5%	14	38.9%	-30.4%	0.005
The grand-mother applied something on the cord stump	1	2.1%	0	0.0%	2.1%	0.005
The substance was applied on the cord stump to accelerate healing	21	53.8%	32	88.9%	-35.1%	0.001
The substance was applied on the cord stump to prevent infection	17	43.6%	2	5.6%	38.0%	0.001
The substance was applied on the cord stump for other reasons	1	2.6%	2	5.6%	-3.0%	0.001

5.3.2.3 Types of Substances applied on the Newborn's Umbilical Cord Stump

Even if this was done by a small percentage of mothers, it is important to look at the types of substances that were applied on the newborns' umbilical cord, and see if there was any difference in the harmfulness of the substances applied. Mothers in the study reported that different types of substances were applied on the newborns' umbilical cords, ranging from baby powder, breast milk, to homemade traditional substances such as *Moono*[11], *Cigamu*[12], crushed rat or goat's droppings, *Chinthembwe*[13], and *Cimwayi*[14] (Table 5.9). In the intervention

[11] *Moono*: This is oil that is obtained by pressing the castor beans or seeds of the Castor-oil-plant or Ricinus communis. This seeds contain *ricin,* a poison that is extremely toxic to humans.
[12] *Cigamu*: This is a black powder made from corncobs' ashes.
[13] *Chinthembwe:* Fluid extracted from the Aloe Vera leaves.

arm, baby power was the main substance that was applied on the umbilical cord stump (65.3%). But one mother applied *moono* on her newborn's umbilical cord stump. *Moono* is oil that mothers extract from the castor bean, and which contains about 40% oil, 1–5% ricin, and 0.3–0.8% ricinine. This oil may expose the newborn to ricin poisoning, and even death, when applied on the umbilical wound. The oil may cause hemolysis following intravenous administration (application on the umbilical wound), because of the glycoprotein lectin, ricin communis agglutinin it contains (Donald, 2008). It is worthy to note that ricin is several hundred times more toxic when administered parenterally than by ingestion, with an estimated lethal dose of ricin in humans of about 1–10 mg/kg. The parenteral administration of ricin causes serious toxicity, with clinical effects similar to septic shock, e.g. fever, multisystem failure, cardiovascular collapse (Donald, 2008).

As opposed to their counterparts in the intervention arm, mothers in the control arm, applied more harmful substances on the umbilical cord, such as *Cimawi* (31%), goats' dropping (7.1%) and rats' droppings (4.8%), hence exposing to newborns to infectious diseases and tetanus. With 17.8% of Eastern Province of Zambia's mothers whose last birth was not protected against neonatal tetanus (CSO, 2014), newborns born of such mothers and whose umbilical wounds are contaminated with rats' droppings, goats' droppings, *cimwayi*, and *cigamu*, may be exposed to neonatal tetanus. This may result into the umbilical wound becoming contaminated with the spores of *Clostridium tetani*, the anaerobic Gram-positive bacilli found in the soil and animals' droppings (Bennett et al, 1999).

Despite the fact that mothers in the intervention arm reported the application of a substance on their newborns' umbilical cords, of which they did themselves in the majority of cases, it is important to note that they applied substances that were not as potentially harmful for their babies, possibly because of the awareness they got during the ENCGMI HE sessions.

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[14] *Cimwayi*: This is a powder made from clay placed by termites unto the grass of thatched houses. The blackish clay is collected from the kitchen's grass roof, grinded to powder, and then applied to the baby's cord stump.

Table 5.9: Substances that were applied on the Newborn's Umbilical Cord Stump: Intervention and Control

Applied Substance	Intervention		Control	
	n	%	n	%
Baby Powder	32	65.3%	3	7.1%
Breast Milk	0	0.0%	3	7.1%
Chinthembwe	0	0.0%	1	2.4%
Cigamu	0	0.0%	2	4.8%
Cimwayi	1	2.0%	13	31.0%
Glycerin	1	2.0%	0	0.0%
Goat's Faeces	0	0.0%	3	7.1%
Good Days	0	0.0%	1	2.4%
Herbs	0	0.0%	3	7.1%
Moono	1	2.0%	0	0.0%
Rat droppings	0	0.0%	2	4.8%
Vaseline	0	0.0%	1	2.4%
Ulongolongo	0	0.0%	1	2.4%
Don't Know	14	28.6%	9	21.5%
Total	49	100.%	42	100.0%

5.3.2.4 Frequency at which the Substance was applied on the Cord

When asked how many times the substances were applied on their newborns' umbilical cord stumps, mothers reported that the application frequency ranged from 1 to 21 times (Table 5.10). Most mothers (53.1% intervention and 26.2% control) reported that substances were applied three times. One mother in the intervention group reported a 21 times application of a substance.

Table 5.10: Number of Times Substances were applied on the Newborn's Umbilical Cord Stump: Intervention and Control

Number of Times Substances were applied	Intervention		Control	
	n	%	n	%
1x	4	8.2%	6	14.3%
2x	4	8.2%	7	16.7%
3x	26	53.1%	11	26.2%
4x	1	2.0%	3	7.1%
5x	0	0.0%	2	4.8%
7x	1	2.0%	6	14.3%
21x	1	2.0%	0	0.0%
Don't Know	12	24.5%	7	16.7%
Total	49	100.0%	42	100.0%

5.3.2.5 Motives for Applying the Substance

In both the intervention and control groups, the main motive for the application of the substances was to accelerate the healing of the umbilical cord stump (42.9% and 76.2% respectively), followed by the prevention of infection (Table 5.11).

Table 5.11: Motives for the Application of the Substances: Intervention and Control

Motives for applying the substance	Intervention		Control	
	n	%	n	%
To accelerate healing	21	42.9%	32	76.2%
To prevent infection	17	34.7%	2	4.8%
Other motives	1	2.0%	2	4.8%
No reason given	10	20.4%	6	14.3%
Total	49	100.0%	42	100.0%

Culture and traditions have made the mothers to strongly believe that if nothing is applied on the newborn's umbilical cord, the cord will not heal fast and that the newborn may develop a number of illnesses.

> Mother in the intervention group 24: who had applied a substance on her newborn's cord said: "*We were taught that applying something on the baby's mkombo is dangerous… but I could not just leave him like that! I*

applied a bit of powder on the mkombo to keep the 'todoyo' (germs) away from it.

Mother in the control group, 25, who had applied a substance on her newborn's cord said: "*I had applied rat droppings on her mkombo (umbilical cord stump) for it to dry fast*."

5.3.3 Thermal Care Practices

To prevent hypothermia, the national guidelines/WHO recommends that mothers delay their newborns' bathing, immediately dry and wrap them in loose layers of light but warm material, practice skin-to-skin contact and, enable early breast-feeding. Bathing of the newborn should be delayed until after the first 24 hours of birth, to prevent the risks of hypothermia. To assess thermal care practices among mothers who participated in the study, questions were asked to find out when they bathed their babies for the first time, how they kept them warm and if they did practice skin-to-skin care. The paragraphs below highlight the mothers' responses.

5.3.3.1 Timing of the Newborns' First Bath

Sixty one point three percent, 61.3% (62.7% intervention and 59.9% control) of mothers reported that their newborns received their first bath only until after 24 hours, and the difference between the two study arms was statistically very significant ($p<0.001$) (Table 5.12). This clearly shows that, either the mothers' knowledge on the timing of the newborns' first bath was not translated into behaviour, or that somebody else, who may not have had the said knowledge, bathed the newborns, the their knowledge on admission on the fact that newborns' first bath have to be delayed by at least 24 hours, was very high and stood at in 94.9% (95% intervention and 94.8% control) (Table 5.4).

In 1.5% of cases, mothers reported that their newborns were bathed immediately after birth, and the difference between the two study arms (1.7% intervention and 1.2% control) was statistically very significant ($p<0.001$); while 4.6% (8.0%

intervention and 1.2% control) the newborns were bathed 2 hours after birth, and the difference between the two study arms was statistically very significant ($p<0.001$).

Table 5.12: Timing of the Newborn's First Bath

Timing of the Newborn's First Bath	Overall		Intervention		Control		Percentage Points Difference (I-C)	p-Value
	n	%	n	%	n	%		
The baby was bathed for the first time immediately after birth	16	1.5%	10	1.7%	6	1.2%	0.5%	0.000
The baby was bathed for the first time within 2 hours after birth	52	4.6%	46	8.0%	6	1.2%	6.8%	0.000
The baby was bathed for the first time within 2-4 hours after birth	21	1.9%	15	2.6%	6	1.2%	1.4%	0.000
The baby was bathed for the first time within 5-24 hours after birth	294	27.4%	117	20.3%	177	34.4%	-14.1%	0.000
The baby was bathed for the first time after 1 or more days after birth	670	61.3%	362	62.7%	308	59.9%	2.8%	0.000
The baby was bathed for the first time 1 week after birth	8	0.7%	8	1.4%	0	0.0%	1.4%	0.000

5.3.3.2 The Person Administering the First Bath

In 59% (64.8% intervention and 53.3% control) of cases, mothers reported that their newborns' first bath was administered by a caregiver (e.g. own mothers, their mothers-in-law, and their grandmothers), and the difference between the two study arms was statistically very significant (p=0.006) (Table 5.13). Mothers reported to have bathed their newborns in only 41% (35.2% intervention and 46.7% control), and the difference between the two study arms was statistically very significant (p=0.006). Despite the fact that 47.1% (47.0% intervention and 47.0% control) of the mothers in this study had had 2-5 children, hence expected to have had acquired some experiences in bathing their newborns, the Eastern Province tradition has it that a family member assists the nursing mother during the neonatal period. Among the caregivers who had helped the mothers in administering their baby's first bath, the women's own mothers did it in 37% (41.5% intervention and 32.5% control).

5.3.3.3 Reasons for Bathing

Motives behind the administration of the newborns' first baths were categorized in the following six key thematic areas: to clean the baby (mainly for the removal of the vernix caseosa and the maternal blood), for the sake of hygiene, to cool a crying newborn, to freshen the baby, to learn how to bath the newborn, and apply what the SMAGs taught the mothers.

Most mothers in the intervention group (53%) reported that their newborns received their first bathed for the simple reason of 'cleaning them' or removing the vernix caseosa and/or maternal blood from their body, as opposed to 17% in the control group. Despite the fact that the mothers and their caregivers fully participated in the ENCGMI HE sessions, during which it was emphasized that the vernix caseosa was not harmful, but beneficial to the newborn, and that maternal blood was not harmful for the newborn, most mothers in the intervention group opted for their tradition and observed their culture.

Most tribes in the Eastern Province of Zambia forbid pregnant mothers to have sexually intercourse towards the end on their pregnancy, as doing so may be harmful for the baby to be born. To ascertain that the couple did not have sexual intercourse prior to the baby's delivery, family members, mainly elderly women, check the newborn's skin. In the event where the newborn is covered with vernix caseosa, mistaken for the man's semen and called '*mpavu ya chimuna*', family members immediately conclude that the mother had had sexual intercourse, hence bring disgrace to the whole family. Not removing the vernix caseosa may lead to the mother being withdrawn from her matrimonial house. To avoid embarrassment, tradition requires that the newborn be bathed the soonest, before any external person sees the baby. The tradition may explain why 35.4% of newborns in this study were reported to have been bathed within 24 hours of birth, with 1.5% bathed immediately after birth (Table 5.11).

Mother in the intervention group said during the home visit: "*I bathed my baby to wash out the dirt from the womb".*

In relation to the traces of maternal blood on the newborn's skin, the same tradition has it that babies stained with their mothers' blood are unclean. If not immediately removed, the blood could cause all sorts of diseases and even the death of the baby. This too, justifies the early bathing of the newborns in this study.

Mother in the intervention group said during the home visit: "*I bathed my baby to refresh his body and remove the remaining blood from the womb".*

Table 5.13: Person Administering the Newborn's First Bath

Person who administered the first Newborn's Bath	Overall		Intervention		Control		Percentage Points Difference (I-C)	p-Value
	n	%	n	%	n	%		
The mother bathed the baby for the first time	428	41.0%	191	35.2%	237	46.7%	-11.5%	0.006
The woman's mother bathed the baby for the first time	390	37.0%	225	41.5%	165	32.5%	9.0%	0.006
The mother-in-law bathed the baby for the first time	139	13.3%	72	13.3%	67	13.2%	0.1%	0.006
The grand-mother bathed the baby for the first time	88	8.4%	52	9.6%	36	7.1%	2.5%	0.006
Other people bathed the baby for the first time	5	0.5%	2	0.4%	3	0.6%	-0.2%	0.006

5.3.3.4 Keeping the Newborn Warm

In 98.5% (97.8% in the intervention group and 99.2% in the control group), mothers reported to have kept their babies warm by using several methods, e.g. skin-to-skin care, frequent breastfeeding, massage, heating the room, and delaying bathing, and the difference between the two study arms was statistically very significant ($p<0.006$) (Table 5.14). Despite the fact that most mothers in the Eastern Province of Zambia do not buy the baby's layette, until the baby is born and survives the delivery, 91.8% (86.4% intervention and 97.1% control) of mothers reported to have wrapped their newborns in warm cloths to keep them warm; the difference between the two study arms was statistically very significant ($p<0.001$). Very few mothers, 39.9% (26.5% intervention and 53.3% control) practiced the skin-to-skin care, where the baby was put in an upright position, and the difference between the two study arms was statistically very significant ($p<0.001$). In regards to delaying the newborns' bath for few days to keep them warm, only 33.5% (46.7% intervention and 20.3% control) of mothers did it, and the difference between the two study arms was statistically very significant ($p<0.001$).

When asked why they had kept their newborns warm, most mothers reported that they did not want their babies to catch a cold, while others reported that it was a way of preventing their babies from getting an infection, mainly respiratory tract infections such as pneumonia.

Table 5.14: Keeping the Newborn Warm and reported Ways of doing it

Ways of Keeping the Newborn Warm	Overall		Intervention		Control		Percentage Points Difference (I-C)	p-Value
	n	%	n	%	n	%		
Keeping the Newborn Warm								
The mother kept the baby warm	1052	98.5%	546	97.8%	506	99.2%	-1.4%	0.056
Means of keeping the newborn Warm								
The mother delayed bath for few days to keep the baby warm	323	33.5%	226	46.7%	97	20.3%	26.4%	0.000
The mother used Skin to Skin Care to keep the baby warm	590	60.2%	213	44.4%	377	76.0%	-31.6%	0.000
The mother wrapped the baby in a warm cloth to keep the baby warm	995	91.8%	497	86.4%	498	97.1%	-10.7%	0.000
The mother kept the room heated to keep the baby warm	542	54.5%	215	44.0%	327	64.9%	-20.9%	0.000
The mother massaged the baby with oil to keep him/her warm	502	52.4%	205	42.4%	297	62.3%	-19.9%	0.000
The mother breastfed every 1-2 hours to keep the baby warm	531	53.9%	298	60.2%	233	47.5%	12.7%	0.000
The mother practiced Skin-to-skin care of the baby within the first 24 hours	838	78.6%	424	74.6%	414	82.6%	-8.0%	0.007
The mother did the skin-to-skin care by placing the naked baby firmly on her bare chest	624	67.4%	273	54.2%	351	80.5%	-26.3%	0.000
The mother did the skin-to-skin care by putting the baby in an upright position	345	39.9%	116	26.5%	229	53.3%	-26.8%	0.000
The mother did the skin-to-skin care by breastfeeding the baby frequently	653	71.7%	274	62.3%	379	81.0%	-18.7%	0.000
The mother did the skin-to-skin care by breastfeeding the								

5.3.4 Breastfeeding Practices

To ensure optimal nutrition and promote the newborn's growth, development and immunity through the colostrum, the WHO recommends that mothers put their babies to the breast within one hour of birth, using a correct position that enables good attachment, and frequent feeds. No pre-lacteal feeds or other supplements are to be given for six months. To assess the breastfeeding practices among mothers who participated in the study, questions were asked to find out when they initiated breastfeeding and how they breastfed their babies. The paragraphs below highlight the mothers' responses (Table 5.15).

5.3.4.1 Mothers' Practice of Breastfeeding

Despite their relatively lower general knowledge on immediate and exclusive breastfeeding, 88.8% (89% intervention and 88.6% control) on their discharge from the postnatal ward, 95.1% (96.7% intervention and 93.4% control) of mothers reported to have breastfed their babies during the first seven days after delivery. The difference between the two study arms was statistically significant (p=0.014).

In Zambia, breastfeeding is nearly universal, with 98.5% of children in Eastern Province being breastfed (CSO et al, 2014), slightly above our finding. The main challenge being faced is the initiation of breastfeeding within one hour of delivery, which is done by only 58.9% of mothers in Eastern Province (CSO et al, 2014).

5.3.4.2 Timing of the Initiation of Breastfeeding

On their discharge from the postnatal ward, mothers in the study knew in 94.8% (93.8% intervention and 96.1% control) that breastfeeding had to be initiated within one hour after delivery. Unfortunately, this knowledge was not translated into practice, as only 54.0% (32.3% intervention and 75.6% control) initiating breastfeeding within one hour after delivery. The difference between the two

study arms was statistically very significant (p<0.001). In 5.9% (5.8% intervention and 5.9% control), mothers had put their babies to the breast days after their birth; and the difference between the two study arms was statistically very significant (p<0.001). These low percentages of immediate breastfeeding may be explained by cultural beliefs, which encourage mothers not to breastfeed their newborn, until their breasts are 'treated' with herbal medications, to remove eventual evil spirits, especially when the previous baby who sucked the breasts had died, or if the male partner had sucked her breast while pregnant. Besides this, culturally, the mothers are also encouraged not to breastfeed, until the 'dirt milk' (colostrum) is totally expressed, and that the 'pure' and white milk start flowing.

5.3.4.3 Newborns' Pre-lacteal Feeding during the first seven days of Life

In 78.9% (80.4% intervention and 77.4% control), mothers did not give any pre-lacteal feeds to their newborns, and delaying bathing, and the difference between the two study arms was not statistically significant (p=0.242). Despite their high knowledge on discharge on the fact that only breast milk and nothing else had to be given to the newborn during the first 6 months, 21.1% (19.6% intervention and 22.6% control) of mothers still gave something to drink to their newborns, besides breast milk.

Mothers gave to their newborns a variety of fluids, such as *moono*[15], gripe water, *chikoloki*[16], water with herbal medication, cooking oil, and in few instances mothers gave goat's faeces, orange juice, and plain water. Most of these substances, mainly the *chikoloki*, are given to the newborn not to starve him/her, especially during the period when the mother is getting rid of the colostrum, which is believed to be harmful for the newborn. Only the mothers in the control group gave *Moono* and *goats faeces* to their newborns. The two substances, together with gripe water, are mainly given to a newborn who has abdominal pains, which are diagnosed by the mothers by the crying and excessive movements of the baby. Such substances may be toxic for the newborn and even

[15] Castor oil
[16] Mixture of water and sugar

cause gastroenteritis and even death. As discussed earlier on, the oral administration of *moono*, which contains about 40% oil, 1–5% ricin, and 0.3–0.8% ricinine, exposes the newborn to toxicity, which may resulting in severe gastroenteritis, with burning of the alimentary tract, nausea, vomiting, diarrhea, and colicky abdominal pain (Donald, 2008). In severe cases, these symptoms may progress to hemorrhagic gastritis, hypovolemia, and hypo- tension; may affect the newborn's kidney, liver, and pancreas, and later on death from prolonged dehydration, hypotension, and electrolyte imbalance (Donald, 2008).

Water mixed with herbal medication is usually used to protect the newborn against evil spirit and provide him/her with immunity. These concoctions are usually given when the newborn is being bathed, using water treated with herbs. Once the bathing is completed, the person bathing the newborn gathers some water from the basin in her palm and makes the baby to drink. This process is repeated every time the newborn receives a bath. During the practice of the ' *ku bweza mwana ku mpasa*' among the Tumbukas, ceremony aimed at protecting the newborn from diseases and evil spirits, the newborn is given both a concoction of herbal medication and porridge made of maize mealie meal

5.3.4.4 Mothers' Breastfeeding Schedule

Despite having a high knowledge on discharge, 96.8% (97.6% intervention and 98.5% control) on the fact that newborns need to breastfed on demand rather than according to a timetable, only 87.2% (81.3% intervention and 93.1% control) of mothers breastfed their newborns on demand rather than according to a timetable, and the difference between the two study arms was statistically very significant ($p<0.001$).

Among those who opted to breast their newborns according to a given time table, most mothers in the study said that they did not want to keep their babies hungry or thirsty. Besides this, mothers also gave a variety of reasons, such as: to ensure a proper growth of the babies, because the babies' inability to request for milk whenever hungry or thirsty, because babies depend on milk only and do not take any other food, because babies can fall sleep at any time, hence need to always be

full, for fear of the baby to become thin, for the baby to be healthy and free from infection, for the baby not to be crying, etc.

Mother aged 31 in the control group said: "*I cannot just sit there and wait for my baby to ask for milk! The baby does not know how to request for breast milk when it needs it. I just have to give it milk whenever I feel like giving*."

Table 5.15: Reported Mothers' Breastfeeding Practices during the First 7 Days of Life: Intervention and Control

Breastfeeding Practices	Overall		Intervention		Control		Percentage Points Difference (I-C)	p-Value
	n	%	n	%	n	%		
The mother breastfed her baby	976	95.1%	506	96.7%	470	93.4%	3.3%	0.014
The mother had put her baby to the breast immediately (<1 hour) after birth	504	54.0%	166	32.3%	338	75.6%	-43.3%	0.000
The mother had put her baby to the breast hours (<24 hours) after birth	355	35.5%	292	56.8%	63	14.1%	42.7%	0.000
The mother had put her baby to the breast days after birth	57	5.9%	30	5.8%	27	5.9%	-0.1%	0.000
The baby was not given something to drink other than milk, in the first seven days after delivery	767	78.9%	415	80.4%	352	77.4%	3.0%	0.242
The mother breastfed her baby on demand rather than according to a timetable.	866	87.2%	434	81.3%	432	93.1%	-11.8%	0.000
The mother breastfed her baby at night	870	99.0%	437	98.2%	433	99.8%	-1.6%	0.012

5.3.5 BCG Immunization Practices

After delivery, mothers are encouraged to take their babies to the health facility for BCG immunization. Most mothers, 96% (96.2% intervention and 95.8% control) reported to have taken their newborns for BCG immunization at their nearest health facility, and the difference between the two study arms was not statistically significant (p=0.955) (Table 5.16).

For mothers who did not take their babies for BCG immunization during the first seven days of life, they did it because they were concerned that their babies could contract tuberculosis or other infections, and even see their babies' growth being impaired. Other advanced the reason that the health facility was too far away, the baby was sick or had died, while others did not just want to go.

Mother aged 25 in the control group said: *"It is not law not to take the baby to the hospital for BCG."*

Table 5.16: Reported Mothers' BCG Immunization Practices during the First 7 Days of Life: Intervention and Control

Newborn Immunization Practices	Overall		Intervention		Control		Percentage Points Difference (I-C)	p-Value
	n	%	n	%	n	%		
The mother took her baby for BCG vaccination	1030	96.0%	551	96.2%	479	95.8%	0.4%	0.955

5.3.6 Attendance to the Newborns' Postnatal Care Services

When asked if they had taken their babies for the 6 days postnatal check-up at their nearest health facility, 92.9% (96.3% and 89.0% control) of mothers reported that they had done so, and the difference between the two study arms (Table 5.17) was statistically very significant ($p<0.001$).

The mothers' selection of the health facilities where to take the newborns was based on distance to the health facility, the type and quality of services being offered and the confidentiality mothers had in the service providers. Among the mothers who did not take their newborns for the 6 days postnatal check-up, they did so mainly because their newborns' umbilical cord stump had not yet fallen off and also because of the long distances between home and the health facility. Others advanced the fear of the baby contracting an infection in the health facility or being diagnosed with a condition was a disease which the mother was not aware of.

Table 5.17: Reported Mothers' Attendance to the Newborns' Postnatal Care Services: Intervention and Control

Attendance to 6 Days postnatal care	Overall		Intervention		Control		Percentage Points Difference (I-C)	p-Value
	n	%	n	%	n	%		
The mother took the baby for 6 weeks postnatal care services	1020	92.9%	565	96.3%	455	89.0%	7.3%	0.000

5.3.6 Barriers to the Practice of the ENC Family Package

In rural area, women in reproductive health age group challenges in regards to health facility delivery and newborn care, with only 56% delivering in health facilities. In this study, among all the mothers who delivered in the health facilities, an average of 14% transited through the MWHs. Despite the fact that 95.5% of mothers in Eastern Province receive antenatal care from skilled

providers, and are educated on ENC family package, harmful newborn care practices continue to be practiced. In view of mapping the existing traditional newborn care practices in the Eastern Province of Zambia and identify the barriers leading to the practice of harmful newborn care, mothers and their caregivers in the intervention arm were asked to discuss their practices. Table 5.18 highlights the prevailing newborn care beliefs and practices, whose practice represents a barrier to the practice of the WHO recommended ENC family package.

Table 5.18: Barriers to the WHO recommended ENC family package

WHO Recommended ENC Practices	Barriers (beliefs) to the recommended ENC Practices	Traditional Practices
Cord Care		
Leave the cord stump uncovered to dry and to mummify, by: • Exposing it to the air without any dressing, bound or bandaged; • Keeping it clean by protecting it with clean clothes; • Keeping it from urine soiling. If soiled, the cord should be washed with clean water and dried up with clean cotton or gauze.	• A cord stump cannot dry on its own, unless something is applied to it. • If the dried umbilical cord stump falls between the thighs (on the baby's genitalia), the baby will be impotent (male) or sterile (female).	Section 5.3.1.1 Section 5.3.1.2 Section 5.3.1.3 Section 5.3.1.4 Section 5.3.1.5
Skin Care		
The initial bath has to be delayed as much as possible in the first week and all soaps, and cleansers have to be used infrequently during the neonatal period and should be limited to the groins, axillae and napkin areas. Clean the newborn eyes immediately after birth and applying either silver nitrate drops or tetracycline ointment within the first hour of birth	• The whitish substance (vernix caseosa) which is on the newborn's skin at birth is the semen that his father left behind after the last sexual intercourse prior the delivery. • If the blood from the mother is not removed from the baby's skin, the baby will suffer from all sorts of disease and even die. • A newborn is very vulnerable to witch craft and needs to be protected from bad spells the soonest. • Breast milk helps prevent newborns' eyes infections.	Section 5.3.2.3

WHO Recommended ENC Practices	Barriers (beliefs) to the recommended ENC Practices	Traditional Practices
Thermal Protection		
Bathing should be delayed and the baby should be immediately dried and wrapped in loose layers of light but warm material after bathing. Practice skin-to-skin contact with the mother to provide baby's warmth, enable early breast-feeding, and protection against hypothermia.	• Newborn's clothes should not be bought before the baby is born, because if he dies, it will not be easy to dispose of those clothes. The clothes are able the cause the death of the subsequent baby. • Newborns' clothes should never be rinsed and be hanged under the sun, because doing so will make the baby not to grow well, sick, and even die. • Babies should be bathed frequently to make the clean.	Section 5.3.2.1 Section 5.3.2.2 Section 5.3.2.3 Section 5.3.2.4
Early and Exclusive Breastfeeding		
Mothers should put their babies to the breast within one hour of birth, using a correct position that enables good attachment, frequent feeds. No pre-lacteal feeds or other supplements should be given to the baby for six months.	• Colostrum is dirty and can make the baby sick, and even die. • Before giving the newborn the breast, the nipples need to be cleaned with herbal medicine, to remove all the bad omen and evil spirits from the breasts. • A newborn who sucks a breast which was sucked by a baby who had died, will also die. • Mothers who had a stillbirth should not breastfeed her baby until the nipples are treated with herbs. • A newborn who is breastfed in the presence of babies wearing herbal necklaces will develop diarrhoea and vomiting.	Section 5.3.3.1 Section 5.3.3.2 Section 5.3.3.3 Section 5.3.3.4

WHO Recommended ENC Practices	Barriers (beliefs) to the recommended ENC Practices	Traditional Practices
Immunization		
Mothers should take their babies to the health facility for BCG within the first week of life	• Newborns are exposed to a lot of diseases and can be easily attached by evil forces. • An age difference of 1 years between the newborn and the older sibling will cause the newborn to develop malnutrition. • BCG can make the baby suffer from tuberculosis or other diseases. • BCG vaccine impairs the baby's growth.	Section 5.3.4
Management of Newborn Illnesses		
Take the baby to the health facility if the baby presents with anyone of the following signs: poor suckling, hypothermia, fever, fast and difficult breathing with intercostal retraction, irritability or lethargy, vomiting, diarrhoea and distended abdomen; conjunctivitis, pustules, and redness of skin around the cord, and foul smelling discharge.	• Herbal medication is good for the prevention of all sorts of newborns' sickness. • Practicing '*ku bweza mwana ku mpasa*' protects babies from chest infection and other diseases.	Section 5.3.5

5.4 Early Neonatal Morbidity

Through a home follow up visit, mothers, in both the intervention and control sites, were asked a series of questions, to find out if their babies had developed, during the first 7 days of life, one or more of the following signs which are the commonest early neonatal illnesses (WHO, 1996): poor suckling; hypothermia; fever; fast and difficult breathing, with intercostal retraction; irritability or lethargy; vomiting, diarrhoea and distended abdomen; conjunctivitis; pustules, and redness of skin around the cord, and foul smelling discharge. This section looks at the occurrence of these signs among newborns whose mothers participated in the study, both in the intervention and control groups.

5.4.1 Incidence of Early Neonatal Morbidities

5.4.1.1 Newborns' Morbidity

In 15.3% (17.6% intervention and 12.6% control) mothers reported that their newborn babies had presented one or more of the following signs: poor suckling; hypothermia; fever; fast and difficult breathing, with intercostal retraction; irritability or lethargy; vomiting, diarrhoea and distended abdomen; conjunctivitis; pustules, and redness of skin around the cord, and foul smelling discharge, during the first seven completed days of life (day 0 to 6). The difference between the two study arms was statistically significant (p=0.023) (Table 5.19).

Table 5.19: Newborns' early morbidity during the first 7 days of life: Intervention and control

Newborns' Health Condition during the first 7 days	Overall Total		Intervention		Control		95% CI	df	p-Value
	n	%	n	%	n	%			
Baby fell sick	163	15.3%	99	17.6%	64	12.6%	1.043 - 1.866	1	0.023

5.4.1.2 Determinants of Newborns' Morbidity

According to the univariate analysis, newborns were more likely to fall sick when their mothers were younger that 20 years (OR= 1.625; 95% CI: 1.080, 2.441), older than 30 years (OR= 1.568; 95% CI: 1.008, 2.438), were living with their children (OR= 4.930; 95% CI: 1.305, 18.613), belonging to the Ngoni (OR= 4.407; 95% CI: 2.698, 7.197) and Nsenga (OR= 1.992; 95% CI: 1.170, 3.394) ethnic groups, and attended at least 1 ANC clinic (OR= 3.373; 95% CI: 1.569, 7.249). In contrast, newborns were less likely to fall sick when their mothers attended the RENC HE (OR= 0.675; 95% CI: 0.480, 0.949), resided beyond 5 Km from their nearest health facility (OR= 0.306; 95% CI: 0.177, 0.527), had 1 child (OR= 0.446; 95% CI: 0.259, 0.777), and had 2-5 children (OR= 0.551; 95% CI: 0.341, 0.888).

According to the multivariate analysis, newborns were more likely to fall sick when their mothers belonged to the Ngoni ethnic group (aOR= 3.756; 95% CI: 1.624, 8.685), and attended at least 1 ANC clinic (aOR= 3.113; 95% CI: 1.053, 9.199). In contrast, newborns were less likely to fall sick when their mothers were residing beyond 5 Km from their nearest health facility (aOR= 0.385; 95% CI: 0.202, 0.734), and had 1 child (aOR= 0.340; 95% CI: 0.139, 0.831) Table 5.20).

Table 5.20: Characteristics, unadjusted and adjusted odds ratios (ORs) for attendance to ENC HE, socio-demographic, socio-economic, and obstetric factors associated with newborn morbidity.

Mothers' Explanatory Characteristics	**N (%)**	**Unadjusted**		**Adjusted**	
		OR	**95% CI**	**OR**	**95% CI**
Attendance to ENC HE					
Attendance to RENC HE Sessions	506	0.675*	0.480-0.949	0.806	0.434-1.497
Attendance to ENCGMI HE Sessions (Reference)	561				
Mother's Age:					
<20 years,	271	1.625*	1.080-2.441	1.450	0.668-3.151
>30 years	212	1.568*	1.008-2.438	1.568	0.770-3.191
20-30 years (Reference)	499				

Living Arrangement					
Living alone	25	2.396	0.980-5.856	1.533	0.441-5.323
Living with parents,	129	1.408	0.869-2.282	.896	0.371-2.163
Living with in-laws,	14	1.680	0.462-6.110	1.569	0.139-17.637
Living with children	9	4.930*	1.305-18.613	3.344	0.479-23.341
Living with husband (Reference)	881				
Tribe:					
Other	20	4.904**	1.743-13.794	2.926**	0.656-13.043
Ngoni	223	4.407**	2.698-7.197	3.756*	1.624-8.685
Nsenga	236	1.992*	1.170-3.394	2.139	0.998-4.581
Tumbuka	190	1.654	0.925-2.959	1.628	0.655-4.047
Chewa (Reference)	336				
Distance to the nearest Health facility					
Beyond 5 Km	256	0.306**	0.177-0.527	0.385**	0.202-0.734
Within 5 Km (Reference)	456				
Gravidity					
0-1 pregnancy	299	1.205	0.829-1.750	0.596	0.201-1.765
2 or more pregnancies (Reference)	638				
Parity					
1 child	263	0.446**	0.259-0.777	0.340*	0.139-0.831
2-5 children	438	0.551*	0.341-0.888	0.335	0.098-1.147
6 or more children	89	0.847	0.442-1.625	0.477	0.115-1.981
No children (Reference)	139				
Antenatal Care Services Attendance					
At least 1	30	3.373**	1.569-7.249	3.113*	1.053-9.199
At least 2	71	1.431	0.775-2.641	2.092	0.874-5.008
3 or more (Reference)	908				

*p< 0.05, **p< 0.01

5.4.2 Commonest Reported Morbidities among Newborns

Umbilical cord inflammation/infection, 12.2% (17.3% intervention and 6.2% control) and stopping sucking, 7.7% (10.1% intervention and 5.0% control), were the commonest the commonest newborns' morbidities reported by the mothers in the study, and the differences between the two study arms were statistically very significant, $p<0.001$ and $p=0.005$ respectively (Table 5.21). The mothers of these newborns may have been among those who had a poor ENC knowledge on their discharge from the postnatal ward, as only 76.5% had a good knowledge on the care of the umbilical card and skin and 88.8% on immediate and exclusive breastfeeding; hence may have practiced harmful umbilical cord care and breastfeeding, when caring for their newborns. The other conditions were most common among newborns in the interventions arm (differences statistically very different, apart from those who had had fever).

Table 5.21: Incidence of reported Morbidities among Newborns during the First seven days of Life

Did the Newborn develop:	Overall						Intervention						Control						p-value
	Yes		No		DK		Yes		No		DK		Yes		No		DK		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Stopped sucking	85	7.7%	1011	91.7%	6	0.5%	59	10.1%	526	89.6%	2	0.3%	26	5.0%	485	94.2%	4	0.8%	0.005
Fits	69	6.3%	1029	93.5%	2	0.2%	51	8.7%	532	90.9%	2	0.3%	18	3.5%	497	96.5%	0	0.0%	0.001
Rapid Breathing	65	5.9%	1037	93.8%	3	0.3%	46	7.8%	538	91.7%	3	0.5%	19	3.7%	499	96.3%	0	0.0%	0.003
Eyes Infection	69	6.3%	1034	93.7%	1	0.1%	49	8.4%	536	91.5%	1	0.2%	20	3.9%	498	96.1%	0	0.0%	0.005
Cold Skin	58	5.2%	1046	94.7%	1	0.1%	45	7.7%	541	92.2%	1	0.2%	13	2.5%	505	97.5%	0	0.0%	0.000
Hot Body	78	7.1%	1025	92.8%	2	0.2%	50	8.5%	535	91.1%	2	0.3%	28	5.4%	490	94.6%	0	0.0%	0.052
Lazy Baby	57	5.2%	1044	94.5%	4	0.4%	45	7.7%	539	91.8%	3	0.5%	12	2.3%	505	97.5%	1	0.2%	0.000
Vomiting	65	5.9%	1039	94.0%	1	0.1%	47	8.0%	539	91.8%	1	0.2%	18	3.5%	500	96.5%	0	0.0%	0.004
Diarrhoea	67	6.1%	1033	93.8%	1	0.1%	53	9.1%	530	90.8%	1	0.2%	14	2.7%	503	97.3%	0	0.0%	0.000
Jaundice	61	5.5%	1043	94.3%	2	0.2%	47	8.0%	540	91.8%	1	0.2%	14	2.7%	503	97.1%	1	0.2%	0.001
Umbilical Cord Inflammation	68	6.2%	1037	93.8%	0	0.0%	51	8.7%	537	91.3%	0	0.0%	17	3.3%	500	96.7%	0	0.0%	0.000
Umbilical Cord Infection	66	6.0%	1037	93.6%	5	0.5%	51	8.6%	536	90.7%	4	0.7%	15	2.9%	501	96.9%	1	0.2%	0.000

5.4.3 Mothers' Health Seeking Behaviour for Early Neonatal Morbidities

Whenever a newborn presents with any one of these signs/symptoms: poor suckling; hypothermia; fever; fast and difficult breathing, with intercostal retraction; irritability or lethargy; vomiting, diarrhoea and distended abdomen; conjunctivitis; pustules, and redness of skin around the cord, and foul smelling discharge, WHO recommends that their mother seeks immediate health care. This section looks at the mothers' health seeking behaviour, whenever their newborns presented one or more of the above-mentioned signs and examines the level of health care that they consulted (Table 5.22).

5.4.3.1 Mothers' Health Seeking Behaviour

Among mothers whose newborns presented one or more danger signs, 15.5% (22.7% intervention and 7.2% control) reported to have sought medical attention, and the difference between the two study arms was statistically very significant ($p<0.001$) (Table 5.22).

5.4.3.2 Type of Health Care Services consulted for the babies' Illness

Among the mothers who reported to have sought medical attention, 57.0% (61.3% intervention and 44.6% control) consulted a health worker, and the difference between the two study arms was statistically very significant ($p=0.008$) (Table 5.22). Despite their good knowledge on discharge of signs that need urgent attention of healthcare provider, mothers in the control arm did not translate their knowledge into practice, as 55.4% (38.8% in the intervention) took their sick newborn to a community health worker operating in their community; and the difference between the two study arms was statistically very significant ($p=0.008$).

Table 5.22: Mothers' health seeking behaviour for their newborns during the first 7 days of life: Intervention and control

Mothers' Health Seeking Behaviour	Overall Total		Intervention		Control		95% CI	df	p-Value
	n	%	n	%	n	%			
Medical Attention Seeking Practice									
Mother sought medical Attention	165	15.5%	129	22.7%	36	7.2%	2.212 - 4.447	1	0.000
Mother did not seek medical attention	902	84.5%	440	77.3%	462	92.8%	0.792 - 0.877		
Healthcare provider consulted									
Health Worker	184	57.0%	147	61.3%	37	44.6%	1.059 - 1.782	1	0.008
Community Health Worker	139	43.0%	93	38.8%	46	55.4%	.544 - .898		

5.5 Early Neonatal Mortality

Mothers in the study reported that their newborns had died, 1.0% (0.7% intervention and 1.3% control) during the first 7 days after delivery, and the difference between the two study arms was not statistically significant (p=0.259) (Table 5.23). It is important to note that in 55.4%, mothers in the control arm reported that a community health worker attended to their sick newborns, during the first 7 days after delivery. Note this study was not powered to assess mortality.

Table 5.23: Newborn survival after seven days of life

Newborn Survival after 7 Days	Overall Total		Intervention		Control		95% CI	df	p-Value
	n	%	n	%	n	%			
Newborn Alive	1099	99.0%	587	99.3%	512	98.7%	0.995 - 1.019	1	0.259
Newborn Died	11	1.0%	4	0.7%	7	1.3%	0.148 - 1.705		

5.6 Mothers' Opinion of the ENCGMI HE Sessions

Mothers who attended the ENCGMI sessions were asked on their discharge from the postnatal ward to share their opinion on the ENCGMI HE sessions that they had attended while in the MWH, by answering to a set of questions. This section highlights the mothers' view in relation to their levels of satisfaction of the ENCGMI HE sessions, their levels of confidence in the SMAGs who facilitated the ENCGMI HE sessions, and their levels of understanding of the topics covered during the ENCGMI HE sessions.

5.6.1 Mothers' Level of Satisfaction with the ENCGMI Sessions

Among the mothers who participated in the ENCGMI HE sessions, 98.6% (86.7% very satisfied and 11.9% satisfied) were satisfied with all the ENCGMI sessions; while 1.3% (0.9% dissatisfied and 0.4% very dissatisfied) were not satisfied (Table 5.24). The mothers had the highest level of satisfaction for the breastfeeding (99.3%) and cord stump and skin care (99.3%) sessions (Table 5.24), despite the fact that their knowledge on these topics were not very high on their discharge from the postnatal ward (89% good knowledge on breastfeeding and 78.6% on cord stump and skin care).

When asked the reasons behind their general satisfaction with the sessions delivered during the ENCGMI HE sessions, mothers reported to have mostly appreciated the clarity with which the SMAGs were delivering the ENC messages, as they were easy to understand. The mothers highlighted the fact that the methodology used during the ENCGMI HE sessions was different from the one they were used to, as ENCGMI HE was more participatory and took into account their newborn care traditions and beliefs. Below are some of the responses given by the mothers to justify their levels of satisfaction.

> Mother aged 32 in the intervention group said: *"I really like the way the SMAGs were teaching us. They were very patient with us, polite and they understood our traditional way of caring for our babies."*

Mother aged 30 in the intervention group said: *"The SMAGs taught me a new method of caring for my baby, in a different way. This is not how the nurses have been teaching us. With the nurses, we do not tell them what we do in the community with our babies."*

Table 5.24: Mothers' general levels of satisfaction of the ENCGMI sessions

Areas of Assessment	Overall Total	Very Satisfied (9-10)		Satisfied (6-8)		Dissatisfied (3-5)		Very Dissatisfied (0-2)	
	N	n	%	n	%	n	%	n	%
General care of the newborn at home	375	353	94.1%	16	4.3%	1	0.3%	5	1.3%
Breastfeeding Session	582	551	94.7%	27	4.6%	1	0.2%	3	0.5%
Cord stump & skin care Sessions	581	531	91.4%	46	7.9%	1	0.2%	3	0.5%
Thermal care Session	572	473	82.7%	90	15.7%	7	1.2%	2	0.3%
Basic assessment, danger signs recognition and health care seeking behaviour	486	400	82.3%	78	16.0%	6	1.2%	2	0.4%
Immunization	579	509	87.9%	64	11.1%	4	0.7%	2	0.3%
Preparation for change	448	360	80.4%	80	17.9%	7	1.6%	1	0.2%
One-to-one session	448	360	80.4%	80	17.9%	7	1.6%	1	0.2%
Average			**86.7%**		**11.9%**		**0.9%**		**0.4%**

5.6.2 Mothers' Confidence Levels in the SMAGs

Mothers' level of confidence in the SMAGs who facilitated the ENCGMI HE sessions was grouped into two categorized, namely: (i) a lot of confidence, and (ii) a fair amount of confidence. Ninety one point three percent (91.3%) of the mothers who attended the ENCGMI HE sessions expressed a lot of confidence in the SMAGs who were facilitating the ENCGMI sessions (Table 5.25). This high level of confidence in the SMAGs may be explained by the fact that mothers consider the SMAGs as their peers, who, despite the fact that they have been trained in the WHO recommended ENC practices, they also understood, as community members, the traditional ENC practices. The mothers expressed high levels of confidence in the SMAGs because they took time in explaining issues, and that, in a very friendly manner.

Table 5.25: Mothers' confidence levels in the SMAGs

Confidence Levels in the SMAGs	Frequency N= 588	%
A lot of confidence	537	91.3%
A fair amount of confidence	47	8.0%
Don't Know	4	0.7%

Below are some of the responses that some mothers gave, when asked about the confidence they had in the SMAGs:

> Mother aged 20 in the intervention group said: *"SMAGs explained things in a very clear manner."*

5.6.3 Mothers' Level of understanding of the ENCGMI HE Sessions' Messages

This section examines the mothers' levels of understanding, in relation to the ENC sessions, the SMAGs' attitude vis-à-vis the mothers' background, values, and the way they have been carrying for their babies (Table 5.26).

5.6.3.1 Mothers' Level of understanding of the ENCGMI Sessions' Messages

When asked if they understood the ENC messages shared by the SMAGs during the ENCGMI sessions, 95.1% of mothers reported to have understood the lessons shared during the ENCGMI HE sessions. Mothers reported that what helped them understand the messages during the ENCGMI HE sessions was the fact that the SMAGs' explanations of the ENC family package components were very clear, and that the discussions that they had, in which the mothers themselves, their caregivers and the SMAGs participated, helped them have a good understanding of issues. Coupled to this, mothers also highlighted the fact that, the manner in which the SMAGs delivered the messages, politely, in a kind manner, and using their local languages, helped them grasp the messages. Below are some of the mothers' opinions on their understanding of the ENCGMI HE sessions' messages.

> Mother aged 20 in the intervention group said: *"I understood everything that was shared in the MWH, because the SMAGs were explaining things very well."*
>
> Mother aged 32 in the intervention group said: *"The teachings I received from the SMAGs were clear. Throughout the sessions, the SMAGs were interacting with us in a polite and kind manner, and that helped me understand things clearly."*

5.6.3.2 SMAGs' understanding of the Mothers' Background and Values

When asked if the SMAGs misunderstood their background and values during the delivery of ENCGMI HE sessions, 90.1% of mothers reported that there was no misunderstanding by the SMAGs, in relation to their background and values. The mothers reported that SMAGs respected them for whom they were and did not look down on them. The mothers reported that the SMAGs treated them as equals, since they were coming from the same communities.

5.6.3.3 SMAGs' understanding of the Mothers' way of Caring for the Baby

When asked if the SMAGs misunderstood their beliefs and practices, on the way they have been caring for their babies, 88% of mothers reported that there were no misunderstanding from the SMAGs, in relation to the way they have been caring for their babies in the community. Mothers reported that during the ENCGMI, the SMAGs never forced them to abandon their traditional newborn care practices. The following quote illustrates on the mothers' opinion.

> Mother aged 30 in the intervention group said: *"The SMAGs gave us time to ask questions. We freely participated in the discussions and were able to talk about the way we care for our babies in the village, without any condemnation from the SMAGs."*

Table 5.26: Mothers' Level of understanding of the ENCGMI HE sessions' messages

Opinions on Understanding	Frequency	Percentage
Level of understanding of the ENCGMI lessons: N=591		
Everything	478	80.9%
Most of it	84	14.2%
Some of it	21	3.6%
Only a fraction	3	0.5%
Nothing at all	1	0.2%
Don't Know	4	0.7%
SMAGs misunderstanding of the mothers background and values: N=586		
Strongly disagree	384	65.5%
Disagree	144	24.6%
Neither agree nor disagree	6	1.0%
Agree	32	5.5%
Strongly agree	18	3.1%
Don't know	2	0.3%
SMAGs misunderstanding mothers' beliefs on the care of the newborn: N=582		
Strongly disagree	374	64.3%
Disagree	138	23.7%
Neither agree nor disagree	7	1.2%
Agree	49	8.4%
Strongly agree	10	1.7%
Don't know	4	0.7%

5.6.4 Mothers' Opinions of the ENCGMI HE Sessions' Interactions

Mothers in the intervention group were also asked about their opinions on the way the ENCGMI sessions were delivered in the MWH, with a focus on the SMAGs' attitude vis-à-vis their lifestyle, their personal beliefs, and the consideration of their feelings. Generally, the mothers' opinions were favourable, with 86.9% of mothers reporting that the SMAGs did not look down on their lifestyle; 88.8% feeling that the SMAGs' advices did not conflict with their personal beliefs; 92.7% reporting that the SMAGs took into account their feelings during the discussions; and 92.8% felt that the SMAGs treated them as equals during the interactions (Table 5.27).

Table 5.27: Mothers' opinion of ENCGMI HE activities in the MWH

Mothers' Opinions of ENCGMI Activities	Frequency	Percentage
SMAGs looking down on the mothers' lifestyle: N=582		
Strongly disagree	371	63.7%
Disagree	135	23.2%
Neither agree nor disagree	10	1.7%
Agree	46	7.9%
Strongly agree	12	2.1%
Don't know	8	1.4%
SMAGs advice went against the mothers' personal beliefs: N= 567		
Strongly disagree	358	63.1%
Disagree	146	25.7%
Neither agree nor disagree	5	0.9%
Agree	39	6.9%
Strongly agree	14	2.5%
Don't know	5	0.9%
SMAGs not take mothers' feeling into account: N= 573		
Strongly disagree	365	63.7%
Disagree	166	29.0%
Neither agree nor disagree	6	1.0%
Agree	21	3.7%
Strongly agree	13	2.3%
Don't know	2	0.3%
SMAGs not treating mothers as equals: N= 569		
Strongly disagree	366	64.3%
Disagree	162	28.5%

Neither agree nor disagree	7	1.2%
Agree	19	3.3%
Strongly agree	14	2.5%
Don't know	1	0.2%

5.7 Conclusion

This chapter has explored the effect of the ENCGMI HE and RENC HE sessions on the mothers' ENC knowledge on discharge, the newborn care practices during the first 7 days of life, and the early neonatal morbidity, by looking at their prevalence and key determinants. The chapter has also explored the prevailing newborn practices, and the mothers' opinion of the ENCGMI HE sessions.

From this analysis, this chapter has shown that attendance to the RENC HE sessions is positively correlated with the mothers' satisfactory ENC knowledge and morbidity free newborns during the first 7 days of life; while the attendance to ENCGMI HE sessions was positively correlated with a higher ENC knowledge gain. The chapter has also shown that the mother's tribe is the only variable that has an effect on all the three study outcome variables.

With regards to the mothers' opinion of the ENCGMI HE sessions, most of them were satisfied with the message delivery methodology, had confidence in the SMAGs, and clearly understood the ENCGMI HE messages.

The next chapter will look at the discussions of the main study results.

CHAPTER 6: DISCUSSION

This chapter presents the discussion of my research on the provision of Essential Newborn Care health education using the Group Motivational Interviewing delivery approach. Chapters 4 to 5 addressed the central research question which guided the research, on whether the Essential Newborn Care Group Motivational Interviewing health education messages delivered by SMAGs, in the Maternity Waiting Home set up, to the pregnant mothers and their caregivers would be translated into higher mothers' ENC knowledge, good practice of ENC, and reduce early neonatal morbidity?

As developing countries, in both Africa and Asia, continue to experience challenges in the reduction of early neonatal morbidity and mortality (Lawn et al, 2005; WHO, 1996; WHO, 2006), to the best of our knowledge, our study provides the first Zambian in-depth analysis of a provincial coverage, uptake, and effect on the mothers' ENC knowledge, practice, and early neonatal morbidity, of the Essential Newborn Care health education intervention, following the implementation of the Essential Newborn Care Group Motivational Interviewing health education. This study, which was testing the hypothesis: "*Mothers who attended the ENCGMI HE sessions will have significantly higher ENC knowledge, will practice recommended ENC family package components, and will have lower rates of early neonatal morbidities, when compared to their counterparts who participated in the routine ENC health education (RENC HE) sessions*", suggests that the attendance to ENCGMI HE delivered by SMAGs to pregnant mothers and their caregivers in the MWHs is significantly less likely to generate satisfactory mothers' ENC knowledge in both univariate and multivariate analyses, does not significantly predict good newborn care in univariate analysis, and is significantly less likely to result in less newborns' morbidity in univariate analysis.

This study has showed that the tribe, which shapes the behaviour and attitude of the mothers and their care givers, is the only factor that is a predictor of all the study dependent factors, namely the mothers' satisfactory ENC knowledge, the good newborn care, and newborn morbidity s during the first seven days of life. In the delivery of the ENCGMI HE sessions, the SMAGs allowed the mothers and their caregivers to talk about what their culture has passed over to them, in relation to the care of the newborn. This insight in the mother-caregiver pair's tradition helped the SMAGs to reduce the actors' ambivalence and resistance to change, through the in-depth and open conversations and guidance, as they 'danced with' the actors. The importance of contextualized messages and its impact on the newborn survival is in line with findings from Asian studies by Kumar et al (2008; 2010).

6.1 Study's Sample Characteristics Discussion

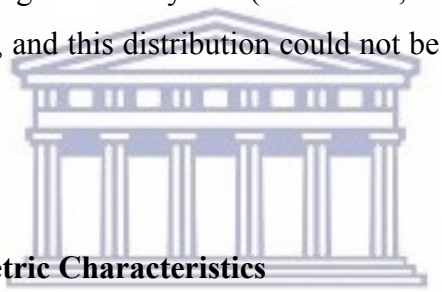
6.1.1 Mothers' Socio-demographic and Socio-economic Characteristics

A total of 1,182 pregnant mothers admitted in their third trimester to the six (6) CHIs' MWHs took part in this study. The mothers were randomly allocated the intervention sites - exposed to the ENCGMI HE sessions and control sites - attending the RENC HE.

In this study, the mothers' mean age was 24.7±7.591 years. The mean age is similar to that of studies conducted in Nepal, Sri Lanka, and Uganda (Chaudhary et al, 2013; Senarah et al, 2007; Kayom et al, 2015), but lower, compared to studies conducted in Ethiopia and Tanzania (Misgna et al, 2014; Shamba et al, 2014). In 49.4%, mothers were aged 20-30 years; a proportion higher than the national distribution of 35.4% among women aged 20-29 years (CSO et al, 2013-14). The majority of mothers in this study had primary school education, 62%; a distribution very high, compared to the national 46.8% of women aged 15-49 having primary school education (CSO et al, 2013-14). This level of education is lower compared to similar studies carried out in Bangladesh, Nepal, Sri Lanka, Pakistan and Ethiopia, where the majority of mothers had a secondary education

(Chowdhury et al, 2010; Chaudhary et al, 2013; Senarah et al, 2007; Gul et al, 2014; Nigatu et al, 2015). Ninety-one point three percent (91.3%) of mothers were married, and living with their husbands in 82.9%; a distribution higher than the national one, which stands at 59.5% of married women aged 15-49 years (CSO et al, 2013-14). The majority of mothers in the study, 72.5%, belonged to the lowest socio-economic index of wealth; a distribution very high, compared to the national 34.8% among rural women aged 15-49 (CSO et al, 2013-14).

In 47% of cases, mothers lived within 5 Km to their nearest health facility, were of Chewa ethnic group in 31.9%, and Catholic in 34.4%. The rate of unemployment in this study was very high, 46.3%, compared to the national 3.8% unemployment among married women aged 15-49 years (CSO et al, 2013-14). Mothers in the study, 98.4% did not smoke, findings similar to the national 98.2% among rural women aged 15-49 years (CSO et al, 2013-14). In 90.9%, these mothers did not drink, and this distribution could not be compared to any existing data.



6.1.2 Mothers' Obstetric Characteristics

The majority of mothers in this study, 47.1%, had a low total fertility rate of 3.5, compared to the national 6.6 (CSO et al, 2013-14). In 68.0%, they had had 2 or more pregnancies; and attended at least 3 or more ANC services during their current pregnancy in 89.9%. This distribution is higher than the national 40.2% of women aged 15-49 years who attended 2-3 ANC services in their last pregnancy (CSO et al, 2013-14). In 86.5% the mothers had a normal delivery, and delivered female babies in 50.3%. These obstetric characteristics are similar to those of similar studies carried out in Turkey and Uganda (Çapik & Çapik, 2014; Kayom et al, 2015).

6.1.3 Mothers' Exposure to Media and ENC Health Education Characteristics

In 62.3% of cases, mothers in the study used the radio as main source of information on general matters. This distribution is high, compared to the national rate of 43.4% among rural women aged 15-49 years (CSO et al, 2013-14). In 54.9% of cases, the mothers in the study attended the ENCGMI health education sessions, which were delivered by the SMAGs, in the MWHs. The rest of the mothers (45.1%) attended the RENC HE sessions delivered by health workers.

6.1.4 Mothers' ENC Knowledge Levels on Admission to the MWH

The overall ENC knowledge level among the mothers who participated in this study was good, and stood at 78.8% on their admission to the MWH. This high ENC knowledge level is similar to the findings of Misgna et al (2014), in their Ethiopia study. The high baseline ENC knowledge may be explained by the fact that the majority of mothers, 68.0%, had had 2 or more pregnancies, which probably exposed them to ENC health education messages, while attending ANC services.

6.2 Effect of ENCGMI HE on the Mothers' ENC Knowledge

Our findings suggest that mothers who attend the RENC HE sessions had higher odds of having satisfactory ENC knowledge (aOR= 2.339; 95% CI: 1.112, 4.920) when compared to their counterparts in the ENCGMI HE, at their discharge from the health facility. However, in the difference in difference analysis, mothers in the intervention arm started with at a much lower ENC knowledge level (77.3% intervention and 81.7% control) and after the intervention, they came up to the level of the control (84.45% intervention and 84.4% control), while the control arm did not show any material change.

Mothers in the intervention arm may have started at a lower knowledge because the majority had attained only the primary education level, and were more likely

to be widow, of Tumbuka ethnic group, and smoking, factors that are significantly linked to lower ENC knowledge. This may have negatively influenced the non-effect of ENCGMI HE on their ENC knowledge. On the contrary, the significantly larger knowledge gain (+4.5) among mothers who attended the ENCGMI HE, may be explained by the fact that ENCGMI HE being a client centered counseling method, may have paid a particular attention to where individual mothers were in the ENC change process, and brought them to the contemplation level prior to delivering of ENC messages. The participatory and respectful engagement approach used in ENCGMI HE (Bandura et al, 1997; Miller & Rollnick, 2013; Miller & Sanchez, 1994) may have helped the individual mothers acquire knowledge, and move forward through the ENC stages of change (Kreuter & Skinner, 2000; Noar et al, 2007). In addition, the friendly interactions pregnant mothers - SMAGs - caregivers may have created a good learning environment to mothers and facilitate the internalization of the ENC messages and facilitated the reduction of resistance among the actors, while strengthening their personal motivation for appropriate newborn care (Rollnick & Miller, 2013). Besides this, the group diffusion during the ENCGMI HE sessions may have led to the minimization of the individual (mother or caregiver) resistance to change, as the group automatically wins any debate by virtue of its superior numbers (Foot et al, 1999).

The poor ENC knowledge gain observed among mothers who attended the RENC HE may be explained by the fact that the acquired ENC knowledge during the HE sessions, may have been forgotten by the time they were being discharge from the health facility. Studies have shown that the delivery of 'one-size-fits-all' messages using a provider-centered approach, with direct persuasion, leads to 60% of the information being forgotten (Britt et, 2004; Haynes et al, 1981).

Among the significant predictors of ENC knowledge in both the univariate and multivariate analyses, the mothers' tribe had significantly contributed to the difference in the level of ENC knowledge between the two study arms. The relatively high proportion of mothers of Tumbuka (in the univariate analysis) and Nsenga (in the multivariate analysis) ethnic groups in the intervention arm may have negatively influenced their level of ENC knowledge. In these ethnic groups,

mothers seem to be passive and over dependent on their caregivers, hence the negative association in terms of having a satisfactory ENC knowledge. Our study is in agreement with studies, which have shown the importance of the mothers' ethnicity in relation to ENC knowledge (Senarah et al, 2007; Douglas et al., 2001; Nigatu et al, 2015), care (Kesterton et al, 2009; Kesterton et al, 2009) and survival of the newborn. The negative effect of the ethnic group's appurtenance in the intervention arm was counterbalanced by the adaptation of health education messages and practices to the local realities and concerns, during the group discussions, making them the local environment and socio-cultural needs (Kesterton et al, 2009), hence improving the mothers' knowledge gain.

Staying beyond 5 Km to the nearest health facility is another predictor, in both the univariate and multivariate analyses, which could have positively influenced the greater satisfactory ENC knowledge among mothers in the control arm, who were in higher proportion in the control arm. This may be explained by the fact that mothers who stayed far from the health facility could have been more mindful of the challenges which they could face in the care of their newborns, hence could have appreciated more the ENC messages and improve their knowledge. The knowledge of the fact that the mothers' house distance to the nearest health facility is a predictor of satisfactory ENC knowledge is very valuable for maternal and newborn health programmers. In contrast, the higher proportion of mothers in the intervention arm who resided within 5 Km of the nearest health facility may have made them not focus much on the ENC messages, knowing that they had easy access to maternal and child health services, resulting into inadequate ENC knowledge.

The fact that both arms had high proportions of mothers who were housewives and unemployed/looking for a job, may have significantly influenced their levels of ENC knowledge, as they have a positive effect on ENC knowledge, in both the univariate and multivariate analyses. This may be explained by the fact that being out of formal employment may have allowed the mothers to observe their ANC schedules (control) or decided to spend some time in the MWH (intervention), interact with other women and acquire knowledge. Our findings on the mothers' employment status are not in agreement with the Finnish and Sri Lanka studies,

which found that unemployed women had low ENC knowledge (Rautava, 1989; Senarah et al, 2007).

The intervention arm had a higher proportion of smoking mothers, and this may have negatively influenced their ENC knowledge, in both the univariate and multivariate analyses. This may be explained by the fact that smoking mothers could have been distracted and not have been concentrating during the ENC HE sessions, for fear of reprimand from the nurses, if the snuff tobacco was discovered by the attending nurse during the ANC examinations. On the other hand, the fact of smoking, mainly observed among older mothers, could be looked at as an expression of deep attachment to tradition, hence explaining the poor receptivity of ENC messages, resulting in unsatisfactory ENC knowledge. Tobacco is a cash crop that is widely cultivated in the Eastern part of Zambia, and the use of snuff among women is not uncommon and is part of the tradition. Women usually put the snuff in a piece of plastic and tie it to their wrappers; and inhale it into the nasal cavity several times a day. This odds of having low ENC knowledge among smoking mothers may be explained by the fact that smokers/tobacco users generally have overall poorer health behaviours (Levin, 1992; Warburton, 1992).

6.3 Effect of ENCGMI HE on the Mothers' Practice of ENC and the Prevailing Barriers

The attendance to ENC health education, be it RENC HE or ENCGMI HE, does not significantly predict good newborn care in either univariate or multivariate analyses. Very interestingly, our study also found that the provision of good newborn care during the early neonatal period was not correlated with the mothers' socio-economic, obstetric, and exposure to media, except for the mother's tribe and their household wealth index. The mothers' tribe in both univariate and multivariate analyses, has a significant negative influence on the quality of care that the newborns receive (Ngoni (OR= 0.816; 95% CI: 0.445, 1.495), Nsenga (OR= 0.389; 95% CI: 0.230, 0.658), and Tumbuka (OR= 0.416;

95% CI: 0.239, 0.722) ethnic groups), while their wealth has a positively significant influence on the newborn care (aOR= 1.925; 95% CI: 1.067, 3.473), in both univariate and multivariate analyses. As opposed to our findings, Misgna et al (2014) in their rural Ethiopian study found that the place of residence, occupational status, and the mothers' ENC knowledge status were significantly associated with mothers' practice of ENC; while studies conducted in Nepal and Bangladesh showed that mothers who knew about ENC and those highly educated were more likely to practice ENC (Chaudhary et al, 2013; Ranzu et al, 2011). The mothers' educational level has no significant influence on newborn care practices in this study. This may be explained by the fact that traditional practices related to newborn care are so deep-rooted in rural societies that it is not easy to change them merely by general education. However, targeted behaviour change communication has been found to influence healthy behaviour related to newborn care practices (Agrawal et al, 2012; Baqui et al. 2008; Kumar et al. 2008).

The fact of belonging to the Nsenga and Tumbuka ethnic groups is negatively associated with good newborn care may be explained by the fact that Nsenga and Tumbuka mothers tend to fall for their tradition, as a protective mechanism for their babies. Among many other harmful practices, which could easily cause morbidity and the death of the newborn, such as *Ku bweza mwana ku mpasa*, the tattooing and application of medication, the bathing of newborns in cold water, application of harmful substances on the umbilical cord stump; these ethnic groups protect the newborns by washing them with herbal water. These mothers soak roots and leaves in water, which can stay for a very long period of time to the extent of rotting, and is used as bathing and drinking water for the newborn. These two tribes are also characterized by the fact that family members, the in-laws among the patrilineal Tumbuka and the parents among the matrilineal Nsenga, have a strong upper hand in the care of the newborn, and are prone to abide by their culture and traditions, hence exposing the newborn to various dangers and diseases. Studies have shown that traditional practices have the advantage of being affordable, culturally acceptable and relevant to the local environment and socio-cultural needs, and can be used by most of the population (Kesterton et al, 2009). However, risky traditional practices that may have a

potentially harmful effect on the newborn have been found to be common. (Kesterton et al, 2009).

The knowledge of the fact that the mothers' tribe is a predictor of newborns' care is valuable for newborns health programmers, and calls for the development of tailored ENC health education messages, able to address the ethnic power issues and specific newborn care traditional practices. In view of mapping the culturally associated newborn care practices and their impact on the newborns' health during the first 7 days of life, and harmonizing the communication between the mothers and their caregivers, the adoption of the ENCGMI HE approach is paramount. Through this approach, health workers will be able to create ambivalence in regards to newborn care and help mothers and their caregivers develop a behaviour change plan which will help reduce the traditional versus modern newborn care and harmonize the collaboration mothers-caregivers, for the better health outcome of the newborns.

Through the findings of this study, it becomes very clear that, when encouraging and directing newborn care behaviour change, existing ethnic views need to be engaged respectfully, and health workers not to see the community as an empty vessels into which to impart ENC education. Messages needs be adapted so that proposed changes relate to existing health worries, for example building on the local concern about babies catching cold. (Kesterton et al, 2009).

In relation to wealth, wealthier mothers in our study were more likely to provide good newborn care they may have all it takes to adequately care for their newborns, in terms of housing environment, clothing and toiletries for the newborns, and even the nutritional needs for the mothers. The knowledge of the fact that the mothers' household wealth index is a predictor of newborn care, is valuable for newborns' survival, as it will help policy makers to holistically address the determinants of newborns' health, with a focus on wealth creation and economically empowering families, especially in the rural set ups.

With regards to the newborn care practices during the first seven days of life, our study showed that 90.9% of mothers did not apply any substance on the their newborn's umbilical cord stump. But in the event of a substance application,

mothers in the control groups tended to apply it several times, and that, more harmful substances to accelerate their healing, hence exposing them to infections.

Of interest, among the mothers who bathed their newborns within 24 hours of birth (62.7% intervention and 59.9% control), in most cases, they did it to remove the vernix caseosa (mistaken for the man's semen) and the maternal blood (consider to be impure and bring bad omen) from the baby, hence making the newborns more vulnerable to hypothermia and infection, which in turn influence the probability of neonatal mortality. The motives for the newborns' early baths were more pronounced among the mothers in the intervention arm (53% intervention and 17% control). This findings of this study is in accordance with those conducted in other African and Asian countries, where the vernix caseosa is considered as the man's semen (Darmstadt et al, 2007; Moran et al, 2009; Sarkar et al 2010; Shamba et al, 2014), apart from the rural Karnataka, where is it considered as food that the mother could have eaten incorrectly during pregnancy, hence it must be removed (Kesterton et al, 2009).

Our study found that immediate breastfeeding is still a challenge, as 54.0% of mothers initiated breastfeeding within one hour after delivery, for the reason that the breast needed to be treated with herbal medication to remove evil spirits or until the colostrum, which is consider dirty and harmful for the baby, is fully discarded. During that period, mothers would give prelacteal feeds, of some have a poisonous/infectious content, e.g. *moono*, goat faeces. Though mothers in the intervention arm (32.3% intervention and 75.6% control) did not breastfeed their newborns within one hour of their birth, they did not give as much harmful prelacteal substances to their newborns (e.g. Castor oil, goats' faeces), as their counter parts in the control arm. The discussions in the MWHs may have helped the mothers in the intervention arm to realize the harmfulness of substances such as Castor oil and faeces, and avoid them as prelacteal feeds. The study findings are similar to those of Gul et al (2014) in Pakistan, were only 48% of mothers initiated breastfeeding within 2 hours of delivery, while 43% discarded colostrum, considering it not to be good for the baby. The Pakistan study also showed that the use of prelacteal feeds were common among mothers, with 73% having given various substances such as market bought ghutti (traditional feed given to a

newborn as its first feed), honey, ark-e–gulab (rose water), chaar ark (a mixture prepared with four different herbs), green tea, saunf (aniseed) water, sugared water and gripe water. Studies conducted in Pakistan (Khadduri et al (2008) and Gujarat (Shah & Dwivedi, 2013) showed similar findings. As opposed to our findings, Kayom et al (2015) in their Uganda study, found that 60.7% of mothers initiated breastfeeding within the first hour of life, while only 29.6% of the used prelacteal feeds which included glucose solution, cow's milk, water, and tea. In agreement with our study, the Ugandan study did not find any significant correlation between the mothers' level of education, parity, and number of ANC attendances and the time to initiation of breastfeeding (Kayom et al, 2015)

Finally, our study showed a big difference in health seeking behaviour among the 15.3% of mothers of newborns who had fallen sick. Mothers who participated in ENCGMI HE sessions tended to consult more with health workers (61.3% intervention and 44.6% control), as compare to their counter parts who consulted more with the community based volunteers. This consultation behaviour could be a sign indicating that mothers in the intervention arm were more alert to the health of their newborns and any sign, which could have signal danger, made them to consult the health workers. But in the control arm, mothers consulted more the community-based volunteers, who could not have been able to fully manage the illnesses of the newborns; hence exposing them grave conditions and mortality. As opposed to our findings which found a significant correlation between the mothers' tribe and household wealth, studies conducted in Africa and India found that mothers' limited education may be a marker of poor health-seeking behaviour (Antai, 2011; Caldwell & McDonald, 1982), inability to discriminate among the many sources of health care available and give preference to sources with critical inadequacies in the care of sick young infants (De Zoysa et al, 1998), increased expenditure for seeking specialized health care. (Shah & Dwivedi, 2013).

6.4 Effect of ENCGMI HE on the Incidence of Early Neonatal Morbidities

Our findings suggest that mothers who attend the RENC HE sessions had lower odds of having newborns who fell sick during the first 7 days of life (OR= 0.675; 95% CI: 0.480, 0.949) when compared to their counterparts who attended the ENCGMI HE. The difference between the two arms (17.6% intervention, 12.6% control) was significant in the univariate analysis, but not in the multivariate analysis. The higher odd of having sick newborns among mothers who attended ENCGMI HE may be explained by the fact these mothers may have appeared to recognize potential danger signs and take their newborns to the health workers. Noting that this is an interpretation, it could be in fact that their newborns were sicker?

Among the significant predictors of newborns morbidity in both the univariate and multivariate analyses, the mothers' age, residence location, living condition, parity, tribe, and attendance to ANC services had a significantly contributed to the difference in the development of newborn morbidities between the two arms. The relatively high proportion of mothers in the control arm who stayed beyond 5 Km from their nearest health facility (OR= 0.306; 95% CI: 0.177, 0.527, univariate and multivariate analyses) and who were multiparous (univariate and multivariate for those with 1 child (OR= 0.446; 95% CI: 0.259, 0.777), and univariate for those with 2-5 children (OR= 0.551; 95% CI: 0.341, 0.888)), may have positively influenced the aversion of morbidities among their newborns. Having homes located very far away from the nearest point of care, these mothers may have been very mindful that their newborns' survival was in their hands, hence a particular attention in grasping the ENC messages and practicing their content while caring for their newborns. Our finding that the mothers' house location to the health facility significantly predicts newborns' morbidity is backed by a study by Gabrysch et al (2011) which recommends a scale up of health facility providing maternal and newborn health, in view of optimizing pregnancy outcomes and improving the situation of newborns. The knowledge of the fact that the mothers' housing location to the health facility is a predictor of newborns' morbidity, is valuable for the newborn survival, as it could help implementers to design

strategies which could help improve the health status of newborns of mothers staying within 5 km of the nearest health facility, as they are prone to have lower satisfactory ENC knowledge and higher newborns' morbidities.

The influence of the mothers' parity may be explained by the fact that these mothers could have been relatively young (for mothers having 1 child), and not yet fully exposed to the traditional newborn care knowledge and practices, and may have been an open and receptive to the WHO recommended ENC practices. But for those having 2-5 children the difference was not significant in the multivariate analysis, as the fact of having more children may have exposed them to traditional harmful practices and led them to practice. The knowledge of the fact that the mothers' parity is a predictor of newborns' morbidity is valuable in the sense that it call for the development of tailored ENC health education messages, and delivered using GMI in view of diluting the negative influence of caregivers in the care of the newborn.

In contrast, the relatively high proportion of mothers in the intervention arm who were younger than 20 years ((OR= 1.625; 95% CI: 1.080, 2.441), in univariate analysis) living with their children ((OR= 4.930; 95% CI: 1.305, 18.613), in univariate analysis) of Ngoni ((OR= 4.407; 95% CI: 2.698, 7.197), in both univariate and multivariate analyses) and Nsenga ((OR= 1.992; 95% CI: 1.170, 3.394), in univariate analysis) ethnic groups, attended at least 1 ANC clinic ((OR= 3.373; 95% CI: 1.569, 7.249), in both univariate and multivariate analyses), may have negatively influenced the incidence of newborn morbidities. Mothers aged below 20 years and those above 30 years have 1.5 and 1.6 fold respectively increase in the odds of having newborns' morbidity, as compared to mothers aged 20-30 years. This may be explained by the fact that younger mothers (<20 years) may extensively depend on their caregivers, who are relatively older and experienced in the traditional newborn care, for the care of their newborns. For elderly mothers (>30 years), the high newborn morbidity may be explained by the fact that those mothers, who are mostly multiparous, may heavily rely on their past experience in the care of their newborns, and continue to practice traditional newborn care behaviours which may have not translated into disease or death of their previous children. On the other hand, these mothers may have been

neglecting their newborns, hence their likeliness of having morbid newborns, as they divide their time between the care of the other children and house chores. Alternately older mothers with more experience may recognize morbidities more readily. The higher odds among mothers older than 30 years in having newborns' morbidity may be explained by their high social interactions and networking which may facilitate the acquisition of traditional newborn practices through diffusion, and by their gained experience through personal or friends' practices in the care of the newborns. Our finding that younger mothers tend to have morbid newborns is in disagreement with the findings of studies by Bhutta et al (2011), Caldwell (1984), Chomba et al (2017), and El-Hissi (2007) who found that young educated mothers tend to care better for their newborns, as maternal education plays an important role in determining child survival. The knowledge of the fact that the mothers' age is a predictor of newborns morbidity will help newborn health programmers to pay a special attention during the ANC services to these age groups, as their odds of having newborns morbidity is higher. Through discrepancy creation, evocation, and formulation of a change plan in the care of the newborn, health workers could raise awareness among these mothers on the consequences of high receptivity of traditional practices and about the why and how of their future actions, hence help reduce newborn morbidity.

Living with other people, e.g. children may be an indication of some instability in life, which may be induced by marital conflicts, economic hardship, etc. The fact of cohabiting with other people could have interfered with the ideal newborn care, as their mothers may have financially depended on their people housing them. The knowledge of the fact that the people the mothers live with is a predictor of newborns morbidity, is valuable for newborns health programmers, and calls for the active involvement of the mothers' family members, especially the parents and the in-laws, who are positively associated with newborns morbidity. As highlighted in this study, this could be achieved through the implementation of strategies that deliver ENC messages using Group Motivational Interviewing, and involving both the mothers and their caregivers.

The mothers' likelihood of having sick newborns was significantly higher among mothers of Ngoni and Nsenga ethnic groups. This finding may be explained by

the fact that Ngoni mothers are patrilineal and their in-laws may have had an upper hand in the care of their newborns. As such, Ngoni mothers' mothers-in-law, who usually dwell with them during this period, could have assisted them in the care of the newborns, hence exposing them to harmful traditional practices. Our finding that mothers' tribe significantly predicts newborns' morbidity shows the importance of embracing the pregnant mothers and their caregivers who are key influencers, decision makers, supporters, transmitters and practitioners of traditional newborn care. The inclusion of the caregivers in the delivery of ENC message is very important, if we have to address the power relations at the household level and reduce newborn morbidity and mortality (Bedworth et al, 2010; Kumar et al, 2010; Mathole, 2005). This is supported by studies' findings, which highlight the active role of the mothers' caregivers in relation to the application of substances on the newborns' umbilical cord, their breastfeeding, bathing and temperature care, attendance to postnatal care services and health seeking behaviour (Chaudhary et al, 2013; Cleland & van Ginneken, 1998; Kumar et al, 2010; MCDMCH, 2013; Misgna et al, 2014; Mosley, 1984; Ranzu et al, 2011; Tuadhar et al, 2010). The knowledge of the fact that the mothers' tribe is a predictor of newborns' morbidity is valuable for newborns' health programmers, and calls for the development of interactive (Group Motivational Interviewing) and tailored ENC health education messages, able to address the ethnic power issues and speak to specific newborn care traditional practices.

The mothers' likelihood of having sick newborns was significantly higher among mothers who attended antenatal care services once. This finding is explained by the fact that these mothers could not have had enough opportunities to be educated on ENC. The poor ENC knowledge, couple with the caregivers' power relations, could have led in the practice of harmful traditional practices, hence newborns morbidity. The knowledge of the fact that the mothers' attendance to ANC clinic is a predictor of morbidity free newborns is valuable in the sense that it will reinforce the call for early ANC bookings, to allow mothers receive a higher number of contacts with the ENC messages. Static and mobile ANC services sensitization and demand creation messages will help improve newborn survival, especially in the rural set up.

6.5 Mothers' Level of Satisfaction of the ENCGMI HE Sessions.

The descriptive results also show that 98.6% of mothers who participated in the ENCGMI sessions were satisfied with all the ENCGMI sessions, with the clarity of the messages and the methodology used. In 91.3% the mothers had confidence in the SMAGs, while 95.1% understood the lessons and 90.1% felt that their background and values were respected. These results may be explained by several factors, which are directly linked to the four elements of the spirit of MI, namely: partnership, acceptance, compassion, and evocation (Miller & Rollnick, 2013). During the ENCGMI sessions, SMAGs considered the mothers and their caregivers as partners, facilitated the discussions and transaction of newborn care knowledge in an atmosphere of acceptance, respect, compassion, and collaboration. The fact that the SMAGs guided more than directed, danced rather than wrestling with the actors, listened at least as much as telling (Miller & Rollnick, 2013), made the mothers fill respected and recognized, be satisfied with the sessions, clearly understand the messages, appreciated the counseling methodology and developed confidence in the SMAGs. This high level of ENCGMI acceptability and clarity of newborn care messages culminated in the reduction of resistance in relation to harmful newborn practices, especially among the caregivers, who are the generators, transmitters and custodians of the newborn care practices prevailing in the communities. The final one-to-one session between the SMAGs and the mother-caregiver pair could have helped reduce the mothers-caregivers resistance to change, and push the caregivers to support the mothers, thanks to the collectively developed ENC change plan, as they provided care to their newborns during the first seven day of life. Besides this, mothers could have also felt empowered, as the ENCGMI could have given them a voice, and recognition that they were not 'empty vessels', but expert in matters pertaining to the care of the newborn (Kumar et al, 2010; Miller et al, 2013).

6.6 Study Strengths

This study, which is a cluster randomized unblinded controlled trial looking at two different implementation strategies in the delivery of ENC family package health education to pregnant mothers, used a mixed methods approach, hence strong enough to help better understand the levels of mothers' ENC knowledge, the nature of care that newborns received in the home setting during their first 7 days of life, and the incidence of newborns morbidity. The freshness of the study topic, the utilization of a mixed-method, and the extensive coverage of important aspects of ENC constitute another strength, which shows that the study was able to reveal more on the subject.

This study, which looks at the utilization of Group Motivational Interviewing in the delivery of ENC family package in a MWH setting and with a follow up at the community level, helps to understand the type of care the newborns had received and their health outcomes in terms of morbidity. The study's sample was big enough to enable the researcher analyze the mothers' ENC knowledge, the care given to the newborns and the problem of early neonatal morbidity, using the univariate and multivariate logistic regression model and to meet the study aim and objectives and provide the essential elements in the understanding of the different factors that determine the mothers' ENC knowledge, the newborn care and the health of newborns during the first 7 days of life.

In a context of a shortage of human resource in health, especially in the rural settings, this study has utilized the services of trained SMAGs (women and men), to successfully deliver ENC HE messages to the pregnant mothers and their caregivers, after undergoing a 3 days training in ENCGMI HE. The strength of this study is the fact that it showed that the utilized human resources (SMAGs) which are part of the mothers-caregivers' communities, which is affordable, sustainable, and has produced almost similar results as health workers in relation to the outcome variables of interest.

This study has also managed to gather in one place (MWH), the pregnant mothers and their caregivers (who are the key influencers, decision makers, supporters,

transmitters and practitioners of traditional newborn care practices) and allow them to discuss the care of the newborn at home, and make them agree on change plan which would guide the care of the newborns at home. This is a very huge milestone towards newborn survival, as pregnant mothers who attend ANC are not, in most of the cases, given a chance by their caregivers to translate the acquired ENC knowledge into practice. This study has helped bridge the communication and collaboration gaps between the mothers and their caregivers.

The use of Group Motivational Interviewing (GMI) in this study provided a strong support system that assured the individual pregnant mother that she was not isolated in her desire to change, in relation to newborn care practices. Moreover, because of the group diffusion, there is added reason to think that individual resistance to change might have been minimized, as the group members' voice (composed of mothers and caregivers) automatically wins any debate by virtue of its superior numbers. The use of GMI also allowed SMAGs to respectfully engage mothers' existing ethnic views, when encouraging and directing them on newborn care behaviour change.

Besides the above listed strengths, the validity and reliability of the study process, piloting the study tools, the use of dedicated and adequately trained SMAGs in ENCGMI, and the very high response rate (100%), constitute another strength of this study.

The findings of this study and its recommendations, if adequately implemented and at a larger scale, could be a game changer in the delivery of a contextualized, inclusive, respectful, affordable, sustainable, effective, efficient and highly diffusible model, and cost effective ENC HE, which could translate in the increase of mothers' ENC knowledge gain, adequately carrying for the newborn, and reduction of newborn morbidity and mortality, hence ensuring newborn survival. This thesis has highlighted the newborns' situation across the world, and the care that they receive from their mothers and caregivers.

6.7 Study Limitations

There are a number of limitations to this study. The first limitation of this study was the fact that the targeted 1,266 pregnant mothers could not be enrolled in the study, because one control site, Kanyanga Health Centre could not reach its allocated target within the stipulated study period. However, this limitation was mediated by the fact that the study sample was inclusive of an additional 10% allocation (114 mothers), to cater for any eventual defaulting mothers in the course of the study implementation. Looking at the fact that there were no defaulters and that the study enrolled a total of 1,182, out of a actual needed sample of 1,152, the researcher can confidently say that the data collected in this study are rich and of good quality, and the results are a valid representation of the study population.

The second limitation is the fact that this study took place in a maternity waiting home set up, with a group of pregnant mothers and their caregivers who could have complex interactions, with potential for discrepancy diffusion, non-participation, and collective argumentation (in the intervention sites). The interpersonal pressure through the interactions with fellow actors and the SMAGs might have a pull on those less interested and less ready in changing the harmful newborn traditional practices towards a mutual group commitment. On the other hand, the opposite could have happened (resistance to change) if the group had a dominant or vocal group member who held the status quo and argued against change. Looking at the fact that the mother-caregiver pair, during the last ENCGMI HE session, discussed with the SMAG the change plan which highlighted their personal stand and which was going to guide their newborn's care at home, the researcher can confidently say that the data collected in this study are rich and of good quality.

The third limitation is that the exit information on the mothers' ENC knowledge was collected from mothers few hours after delivery, and prior to their discharge from the health facility. Hence, there could be some incoherence between the actual knowledge and the responses being given by the mothers, fact which may be influenced by the joy/excitement of having a baby or the pain of childbirth the

mothers could have gone through, or even concerns and worries on how to care for the newborn, especially for the first time mothers. This fact may have affected the quality of responses they could have given to the interviewers.

The fourth limitation is the fact that the information on the care of the newborn at home during the first 7 days of life was collected at home between 2 to 6 weeks after their discharge from the health facility. There could have been some recall bias that could have affected the quality of the data.

The fifth limitation is the fact that the questionnaire administered to the mothers included several components and various questions, making the questionnaire quite long. This could have caused fatigue in responding to the questions, hence compromising the quality of the data collected.

The sixth limitation is the fact that the study was a conducted in a maternity waiting home setting, and the mothers who received the health education were all staying in one place for a number of days. Hence the study findings may not be generalized to pregnant and postnatal mothers who were not admitted to the maternity waiting home.

The seventh limitation is the fact that the study did not include the caregivers' opinions on the care that the newborns received at home. Their views could have helped in understanding the nature of the care the newborns received, from caregivers' perspective and better understand the motivations justifying the said care.

The eighth limitation is that the study was not powered to examine newborn mortality.

The ninth limitation is the fact that the study had more participants and less number of clusters (health facilities having a MWH), and this may have negatively influenced to study outcomes between the intervention and control arms.

The above-mentioned limitations may have resulted in uncertainty regarding the interpretation of some of the data. Thus in the instances indicated, the interpretations provided are necessarily tentative.

6.8 Conclusion

This chapter has presented an examination of the correlation between the mothers' attendance to ENC HE and characteristics and the three outcome variables. The chapter highlighted the discussion of the results, on the background of the three sub-research questions emanating from the central research question, in the context of the prevailing ground situation and existing literature on the mothers' ENC knowledge, newborn care and morbidity, and the elements, which could have contributed to the main determinants of the outcome variables, after carrying out univariate and multivariate analyses.

The next chapter will look at study overview, key findings, significance of the study, and will make recommendations and propose ideas for further research.

CHAPTER 7: CONCLUSIONS

This final chapter highlights the study overview, the key findings, and the significance of the study, and makes recommendations, and proposes ideas for further research. The chapter ends with the dissemination plan and advocacy work to be done by the researcher, and a conclusion.

7.1 Study Overview

The aim of this study was to assess the effect of the ENC family package health education messages delivered to pregnant mothers and their caregivers by the Safe Motherhood Action Groups members in a Maternity Waiting Home set up, using a client centered education methodology that uses the Group Motivational Interviewing philosophy, on the mothers' ENC knowledge and practice, and the newborns' morbidity during the first seven days of life. The Intervention-Causation Model, and Action-Based Motivational Interviewing formed the theoretical framework of the research. In order to achieve the aim, the objectives were as follow:

Primary Objective:

1. To evaluate the effect of Essential Newborn Care Group Motivational Interviewing health education (ENCGMI HE) messages delivered by SMAGs, in the Maternity Waiting Home set up to the pregnant women and their caregivers, on the:
    a. Mothers' Essential Newborn Care knowledge;
    b. Mothers' practice of Essential Newborn Care, and the prevailing barriers; and
    c. Incidence of early neonatal morbidities.

Secondary Objectives:

1. To explore the prevailing newborn care practices in the mothers' communities;
2. To determine key factors associated with the mothers' ENC knowledge, the mothers' practices of ENC, and newborn morbidity;
3. To assess the mothers' level of satisfaction of the ENCGMI HE sessions.

The research aim and objectives translated into the following question, which framed and focused the research process:

Will the Essential Newborn Care Group Motivational Interviewing health education (ENCGMI HE) messages delivered by SMAGs, in the Maternity Waiting Home set up, to the pregnant mothers and their caregivers be translated into higher mothers' ENC knowledge, good practice of ENC, and reduce early neonatal morbidity?

In order to guide the study, the central research question was specified into the following three sub-research questions:

1. To what extent has the ENCGMI HE messages influenced the mothers' ENC knowledge and knowledge gain?
2. To what extent has the ENCGMI HE messages influenced the mothers' practice of ENC during their newborns' first seven days of life?
3. To what extent has the ENCGMI HE messages contributed to the avoidance of newborn morbidity during the first seven days of life?

A cluster randomized unblinded controlled trial with mixed-method design, with both quantitative and qualitative components, is used. The quantitative component consisted of a mothers' survey to explore their ENC knowledge both on admission and discharge from the health facility, their newborns care practices and newborns morbidity, and the factors that influence them. The qualitative component consisted of SMAGs, mothers and their caregivers group discussions, face-to-face discussions, and in-depth interviews (at home) to explore the traditional newborn care practices, the barriers in the practice of ENC, and the type of care given to the newborns in the first seven days of life. Content analysis

was used to analyze the data of the qualitative component. Both inferential and descriptive statistics were used to analyze the data. Finally, the research used the main findings the quantitative and qualitative components of the study to make recommendations for providing a maternity waiting home based ENC HE, using the services of SMAGs.

7.2 Key Findings

The below paragraphs highlight the key findings that emerged from this study, in relation to the type of ENC HE attended by the mothers, their ENC knowledge, the care given to the newborns during the first seven days of life, and the newborns morbidity, and their key predictors.

(1) **The attendance to ENCGMI HE sessions** is significantly less likely to generate satisfactory ENC knowledge in both univariate and multivariate analyses, however the ENCGMI HE participants saw a larger gain in ENC knowledge compared to RENC HE participants, suggesting lower baseline ENC knowledge in the intervention arm may have confounded the end-line results, or had more clusters (more health facilities) rather than more participants (waiters) were selected. The ENCGMI HE participation also does not significantly predict good newborn care in either univariate or multivariate analyses, and is significantly less likely to result in less newborns morbidity in univariate analysis, but this association was not significant in the multivariate analysis.

(2) **The attendance to RENC HE sessions** is significantly likely to generate mothers' satisfactory ENC knowledge in both univariate and multivariate analyses, and less likely to have newborns morbidity in univariate analysis.

(3) Socio-demographic, socio-economic, exposure to media, and obstetric characteristics are predictors of the mothers' ENC knowledge, newborns

care and newborns health status during the first 7 days of life, as highlighted in the table below (Table 7.1):

Table 7.1: Key Predictors of the mothers' ENC knowledge, newborns care and newborns health status

	Mothers satisfactory ENC knowledge	**Newborns Care**	**Newborns Mortality**
Socio-demographic Characteristics	Marital status Tribe Distance to the nearest health facility	Tribe	Mother's age Living arrangement Tribe Distance to the nearest health facility
Socio-economic Characteristics	Employment status Smoking status	Household wealth index	
Exposure to Media Characteristics	Newspaper reading		
Obstetric Characteristics			Parity ANC services attendance

7.3 Significance of the Study

This study adds to the body of maternal and newborn health knowledge by giving the pregnant mothers and their caregivers (generators, transmitters, custodian, and enforcers of traditional newborn practices) a voice in highlighting traditional newborn practices, and in the discussion regarding the provision of essential newborn care family package health education and will contribute to the current

debate around the feasibility, usefulness and effectiveness of providing maternity waiting home based essential newborn care health education using the services of trained Safe Motherhood Action Group members (SMAGs). This unique insight perspective is critical to understanding the pregnant mothers and their caregivers' worlds and to empower them to be part of the decision-making process in the design and implementation of programmes designed to provide health care to the newborns during the early neonatal period. The findings of this study will also contribute to research on the utilization of Group Motivational Interviewing (GMI) in the delivery of ENC health education, the utilization of SMAGs in the delivery of ENC family package health education in a maternity waiting home set up, by shedding light on the mothers' ENC knowledge, newborn care practices during the first seven days, and newborn morbidity and how the type of ENC health education received by the mothers, their socio-demographic, socio-economic and obstetric context influence them.

This study also contributes to the body of knowledge concerning the delivery of essential newborn care health education to pregnant mothers. There are very few studies that document the delivery of the full package of essential newborn care family package using Group Motivational Interviewing, so this study adds to the literature regarding the use of trained SMAGs in the delivery of ENCGMI HE to pregnant mothers and their caregivers in the maternity waiting home setting. This study also enlightens the key factors that influence the mothers' ENC knowledge, newborn care practices, and newborn morbidity in rural areas of low and middle income countries and contributes to the limited body of knowledge on Group Motivational Interviewing approaches to ENC family package provision.

This research provides the Zambian Ministry of Health, especially the Maternal and Newborn Department with an evidence-based approach to implementing ENC family package HE in maternity waiting homes, which is part of the Roadmap for Accelerating Reduction of Maternal, Newborn and Child Mortality, which is part of the Zambia National Health Strategic Plan for 2017-2021.

7.4 Recommendations

In this section, recommendations and their policy implications will be put forward, based on my study findings and literature review. The recommendations proposed in this section, which are not exhaustive, are intended for all stakeholders involved in the planning, design, implementation, monitoring, and evaluation of ENC HE services, including community based volunteers, health workers, policy makers, researchers, civil society organizations and government departments.

7.4.1 Recognizing the Place of Culture and Beliefs in the delivery of ENC HE

In low and middle income countries, mothers easily use traditional newborn practices because they have the advantage of being affordable, culturally acceptable and relevant to their local environment and socio-cultural needs (Kesterton et al, 2009). Therefore, maternal and newborn health programmers are called to seriously consider the local context, in view of designing and providing culturally sensitive ENC HE packages.

7.4.2 Utilizing the Intervention-Causation and Action-Based Motivational Interviewing Framework in the delivery of ENC HE

Health workers deliver one-size-fits-all ENC HE messages to pregnant mothers as experts, looking at pregnant mothers as 'empty cups' that are made to be filled , and ignoring the fact that pregnant mothers are at different stages of change when it comes to the care of the newborn (Miller et al, 2013). I recommend that ENC HE be delivered using the '*Intervention-Causation and Action-Based Motivational Interviewing Framework*' which takes into account the targeted behaviour, the target groups, the stages of behaviour change, and the Motivational Interviewing's FRAMES elements (Feedback, Responsibility, Advice, Menu, Empathy, Self-Efficacy).

7.4.3 Involving SMAGs in the delivery of ENC HE Sessions

In a context of human resource in health crisis, especially in the rural set up, I recommend the utilization of trained SMAGs in the delivery of ENC HE, as they tend not to disregard the pregnant mothers' beliefs, and treat them as equals. Fully empowering SMAGs in the delivery of ENC HE will be complementary to the services being provided by health workers, looking at the fact that SMAGs are 'siting on the fence' of the WHO recommended ENC practices and the traditional newborn care practices; attitude which will help reduce resistance to change, bridge the communities and the health facilities, and alleviate the human resource for health crisis. This combination of providers could guarantee the diffusion, dissemination and sustenance and institutionalization of the new newborn behaviours.

7.4.4 Targeting Pregnant Mothers and their Caregivers housed in the Maternity Waiting Homes in the Delivery of ENC HE

In many African and Asian countries, the mothers' caregivers, e.g. mothers, mothers-in-law, grandmothers and elders in the community, continue to decisions on the care to be given to the newborns, regardless of the mothers' opinion or opposition (Kesterton et al, 2009). Therefore, to prevent or minimize family tensions in the care of the newborn, I recommend that the ENC family package health education be delivered to both the pregnant mothers and their caregivers, using the maternity waiting homes setting.

7.4.5 Paying Attention to the Mothers' Obstetric History

Our study as shown that the mothers' parity and ANC services attendance is predictor of the newborns' health. I recommend that special attention be given to younger mothers and to the pregnant mothers' number of ANC visits during their pregnancy.

7.4.6 Considering Mothers living within Reach of Health Facilities

This study has clearly demonstrated that mothers staying within 5 Km of their nearest health facilities have the odds of having lower satisfactory ENC knowledge, and higher odds of having newborns morbidity. I recommend the audit and strengthening of the current ANC services being offered to pregnant mothers living within reach of their nearest health facility.

7.5 Suggestion for Further Research

Taking into account what we know about what remains to be studied, and the existing gaps in the delivery of ENC HE to pregnant mothers, the following are suggestions for further research:

1. The SMAGs' experience in the delivery of ENCGMI HE to pregnant mothers and their caregivers, in a MWH setting;
2. The impact of caregivers' participation in ENCGMI HE on their ENC knowledge, care of newborns during the first seven days of life, and newborn morbidity;
3. Strategies to improve the ENC knowledge and newborn morbidity among pregnant mothers staying within 5 Km to their nearest health facility.

7.6 Dissemination and Advocacy Work

Looking at the value of the information that this study has generated, it is critical that the research findings are disseminated to both the mothers and their caregivers, and all relevant interested stakeholders, to increase awareness on issues pertaining to the pregnant mothers' ENC knowledge, care of the newborn at home, newborn morbidity, and help influence newborns' health policy and programming. To achieve this, the researcher has developed a study dissemination plan, as highlighted below. During all these planned meetings, pamphlets and

summaries of the study findings and recommendations will be shared with all the relevant partners, through:

1. **Community Meetings:** Meetings will be organized in the six health facilities, which took part in the study, to share the findings and main recommendations of the study. Representatives of the mothers and their caregivers, community leaders, health workers, SMAGs, Field Assistants and the health facilities' managers will attend these meetings.

2. **Eastern Province Health Office Meeting:** A meeting will be organized at the Eastern Province Health Director's office, to share the findings and main recommendations of the study. Through the Provincial Health Office, the study findings and recommendations will be disseminated to the Petauke, Sinda, Chipata, and Lundazi District Health Directors.

3. **National Dissemination Meeting:** A meeting will be organized at the Ministry of Health, with the Director Health Promotion and Maternal and Newborn Health's senior managers, to share the findings and main recommendations of the study.

4. **International Dissemination Meetings:** findings of this study will be published in peer review journals and also presented at international meetings and conferences.

7.7 Conclusion

This research focused on the delivery of ENC HE using the Intervention-Causation and Action-Based Motivational Interviewing Framework in a maternity waiting home setting, to both the pregnant mothers and their caregivers. The delivery of ENCGMI HE using SMAGs was evaluated to explore whether it had an effect on the mothers' ENC knowledge, care of the newborn during the first seven days of life, and newborn morbidity. The factors that influence the

mothers' ENC knowledge, care of the newborn during the first seven days of life, and newborn morbidity were also explored.

The delivery of ENC HE in MWHs, using the services of SMAGs would help pregnant mothers and their caregivers access culturally sensitive and respectful ENC family package messages, through a strong community participation and multisectoral collaboration and involvement.

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ANNEXES

Annex 1: Overview of stages of change and the cognitive and behavioural processes.

Stages of Changes	Processes of Change	Determinants
The stages of change consist of 5 categories along a continuum that reflect and individual's interest and motivation to alter a current behaviour. It is trough movement along these stages that one is able to achieve successful behaviour change.	The processes of change facilitate movement through the stages of change. These processes reflect the cognitive and behavioural techniques employed by individuals to alter certain behaviour. There are 10 processes which can be distinguished in two broad categories: The first category (stage 1 to 5) consists of experiential or cognitive processes, and includes activities relating to thinking and experiencing emotions about changing behaviour. The second category consists of behavioural processes (stage 6-10) that are assumed to be helpful for changing the behaviour.	Individuals have multiple problems that often overlap.
Stages of Changes	**Processes of Change**	**Determinants**

Stage 1: Precontemplation: This is the stage in which there is an unwillingness to change a problem behaviour or there is a lack of recognition of the problem.	**1. Consciousness Raising:** It is described as encouraging individuals to: • increase their level of awareness, • seek new information, or • gain an understanding about a problem. **2. Dramatic Relief:** It is experiencing and expressing emotions, feelings of unease, and the motivation to reduce negative feelings through adequate action. **3. Environmental Reevaluation:** It is assessing the impact of the problem behaviour on the physical and social environment.	Awareness Attitudes Severity / Vulnerability
Stage 2: Contemplation: In this stage, there is a consideration of change with a decision-making evaluation of the pros and cons of both the problem behaviour and the change. Individuals frequently begin to weigh the consequences of action or inaction. At this point, the actors are able to discuss the negative as well as the benefits associated with newborn care behaviours. This opens the door to a collaborative process.	**4. Self-Reevaluation:** It is assessing how one feels and thinks about oneself in relationship to the problem behaviour.	

Stage 3: Preparation: This stage represent the period when there is a commitment to change in the near future, usually 1 month or upon delivery, in this study. Mothers express a high degree of motivation towards the desired behaviours and outcomes. Mothers in the preparatory stage have determined that the adverse costs of maintaining their current behaviours exceed the benefits. Therefore, initiating a new behaviour is more likely. These actors have moved from thinking about the issue to doing something about it.	**5. Self-Liberation:** It is choosing and commitment to act, or belief in one's own capabilities to modify the behaviour.	
Stage 4: Action: This is when change or modification of behaviour actually takes place.	**6. Reinforcement Management:** It is the use of positive reinforcements and appropriate goal setting with the actor. **7. Helping Relationships:** It is a combination of care, trust, acceptance and support of others in changing the behaviour; **8. Counter Conditioning:** It is substituting alternatives for problem behaviours, replacing the existing behaviour with the new behaviour; **9. Stimulus control:** It is helping the actor to restructure the environment so that the stimuli or triggers for the undesired behaviour are controlled/removed.	Self-efficacy Subjective norms Social influence
Stage 5: Maintenance: After 3 to 6 months of success when this stage begun or during subsequent pregnancies in this	**10. Social liberation:** It is increasing alternatives for non-problem behaviours in society.	

study. During this stage, there is focus on behaviour modification in order to avoid relapse and to stabilize the behaviour change.		

Adapted from Bedworth, et al., 2010 and Shinitzky, 2001

Annex 2: CHIs' Maternal and Child Statistics: 2011

Mission Health Facilities	Districts	Catchment Population	# Women in Childbearing Age (22%)	Expected Pregnancies (5.4%)	Expected deliveries (5.2%)	# Health Facility Delivery	# of Live Births	# of Stillbirths	# of Infants dying within 30 Days
Minga Hospital	Petauke	70,320	15,470	804	804	1061	1027	22	5
Nyanje Hospital	Sinda	84,939	18,687	972	972	1166	1114	25	18
Muzeyi Health Center	Chipata	80,000	17,600	915	915	521	545	8	1
Mwami Hospital	Chipata	61,000	13,420	698	698	947	942	35	12
Lumezi Hospital	Lundazi	36,506	8,031	418	418	915	895	20	5
Kanyanga Health Center	Lundazi	71,050	15,631	813	813	601	590	10	8
Total		**403,815**	**88,839**	**4620**	**5,211**	**5,211**	**5,113**	**120**	

Source: CHAZ 2012

Annex 3: Participant Information Sheet

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INFORMATION SHEET

An evaluation of the Effect of Essential Newborn Care Group Motivational Interviewing Health Education delivered in a Maternity Waiting Home setting on the Mothers' Knowledge and Practice and on Early Neonatal Mortality in rural Eastern Province of Zambia

What is this study about?

This is a research project being conducted by Dr. Mutombo Dhally Menda at the University of the Western Cape. We are inviting you to participate in this research project because you are pregnant and being admitted in the maternity waiting home. The purpose of this research project is to test the impact of a Maternity Waiting Homes based peer-to-peer SMAGs led newborn care Motivational Interviewing, equips the mothers and their guardians with necessary knowledge and skills, builds self-confidence, and creates a supportive newborn care environment, on actual newborn care behaviours and early neonatal morbidity in rural Zambia.

What will I be asked to do if I agree to participate?

The research is being conducted to help us establish, the effect that a Maternity Waiting Home based Motivational Interviewing given by SMAGs may have on the waiters' newborn care behaviour and reduction of early neonatal morbidity. Through this study, we are going to compare the health and survival of newborn babies during the first seven day of life, among women who were admitted to the MWH.

This study will be carried out in three phases. In the first phase, while you are admitted in the MWH, we shall interview you to collect your socio-economic and demographic information, and your level of knowledge on newborn care.

The second phase of the interview will be conducted as a follow up after delivery in the hospital maternity postnatal ward. This will help us collect information concerning your stay in the MWH.

The third one will be done at home, six weeks after your delivery, to ask you questions on the health of your baby and events which surrounded your delivery (obstetrical history).

Would my participation in this study be kept confidential?

The completed interview will be kept safely by the researcher in a locked cabinet at the Health Facility and will only be seen by me and my supervisors Dr. M.D. Menda and the Nurse in Charge at the Maternity Ward.

I shall collect your particulars, name and address, for your easy tracking for the second and third phase of the interview and will not disclose them to anyone, apart from the research team. The data collected will be used for the research study only. These interviews will not affect your medical treatment and support from the Health Facility or the SMAGs. All the group sessions' discussions that we will have during your stay in the MWH will not be disclosed to anyone, apart from the research team.

What are the risks of this research?

There are no known risks associated with participating in this research project.

What are the benefits of this research?

The answers that we get from the mothers participating in this study will help us make things better in the Zambian Health Facilities, by formulating strategies which may help us reduce neonatal morbidity and mortality, especially in the rural areas.

You will not receive any money or food for being part of the study.

Do I have to be in this research and may I stop participating at any time?

You are requested to participate in this research study on Motivational Interviewing and early neonatal morbidity, which is being conducted at this Health Facility by Dr. Mutombo Dhally Menda, the CHAZ Director of Health Programmes, who is currently doing his PhD at the University of the Western Cape (UWC).

Participation in this research is both voluntary and free. If you choose to participate, I would like to interview you for about 50 minutes at a place that is comfortable for you. The interview that I will conduct will be private and confidential. Additional interviews and group discussions will be done at a later stage.

What I am requesting from you is a verbal consent, to show that you allow me to interview you.

In case you are negatively affected in the course of this study, counselling services are available and will be provided by the health workers operating at this facility.

What if I have questions?

This research is being conducted by *Dr. Mutombo Dhally Menda, of the School of Public Health at* the University of the Western Cape. If you have any questions about the research study itself, please contact *Dr. Mutombo Dhally Menda* at: Churches Health Association of Zambia, P.O. Box 34511, Lusaka, Zambia; Mobile: + 260 977794101; Email: dhally.menda@chaz.org.zm ; dhally.menda@gmail.com.

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

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This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

Annex 4: Participant Consent Form

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CONSENT FORM

An evaluation of the Effect of Essential Newborn Care Group Motivational Interviewing Health Education delivered in a Maternity Waiting Home setting on the Mothers' Knowledge and Practice and on Early Neonatal Mortality in rural Eastern Province of Zambia

The study has been described to me in language that I understand and I freely and voluntarily agree to participate.

My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name……..……..

Participant's signature…….

Witness…….…….

Date……

Annex 5: Consent Form for SMAGs / Health Workers

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http://www.uwc.ac.za/faculties/chs/soph

CONSENT FORM SMAGs / Health Workers

An evaluation of the Effect of Essential Newborn Care Group Motivational Interviewing Health Education delivered in a Maternity Waiting Home setting on the Mothers; Knowledge and Practices and on Early Neonatal Mortality in rural Eastern Province of Zambia

Once you have been informed about the project, trained and have decided to participate, please sign the following consent form.

1. I confirm that I have been briefed about this study and understand the research project. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
3. Should I give my consent for photographs I understand that they may be used in the final research report.
4. I agree that the information I provide may be directly quoted in the final report but that all comments would be anonymised.
5. I agree to take part in the study.

   SMAGs/ Health Workers Name……

   SMAGs/ Health Workers Signature/Thumb

   Print……..…….

   Date……..…

Annex 6: Summary of the Study Activities

Activities during the Study period	Intervention	Control
Development of the Interventions packages		
Training of ENCGMI Supervisors (Nurses)	✓	
Training of SMAGS in ENCGMI	✓	
Training of FAs in data collection	✓	✓
Community mobilization and awareness creation on the utilization of MWHs	✓	✓
Admission to the MWH	✓	✓
Recruitment of women in the third trimester of gestation	✓	✓
Entry of names in the Pregnancy Register	✓	✓
Provision of Antenatal Care Services and its routine ENC Health Education		✓
Provision of ENCGMI Sessions in the MWHs	✓	
Pre ENC KAP	✓	✓
Data collection on prevailing ENC Practices	✓	
Skilled Delivery	✓	✓
06 Hours Postnatal Care Services for the baby	✓	✓
06 Hours Postnatal Care Services for the mother	✓	✓
Post ENC KAP	✓	✓
Data collection on ENC practices (Home follow up)	✓	✓
Verbal Autopsy of neonatal deaths	✓	✓

Annex 7: Pre-requisites for Change

Table 7.1: Provider's Prerequisite for Behaviour Change

Components	Explanation	Application during ENCGMI
Knowledge	The provider was trained in ENC and was called to refresh his/her knowledge of the newborn and of the ENC family package, as per WHO recommendation (see Box 2.2).	In the implementation of the ENCGMI, the essential of what the SMAG should know about the newborn and its care at home is written at the back to the ENCGMI Flowcharts. The SMAGs is called to refer to it during the ENCGMI sessions.
Discrepancy Creation	Miller and Rollnick (2013) define discrepancy as the space between present and desired behaviour. It is the distance between a personal goal and the status quo; and creating discrepancy is a process of the practitioner sitting together with the client and considering reasons why the client might consider change. Since individuals are more committed to ideas they hear themselves defend, in MI, individuals become conscious of their motivations to change by hearing their own arguments for change (Bem, 1972). The role of the practitioner is to help the client hear their own motivations for and against the change and make it in such a way that the client hears himself or herself again, when the practitioner, through reflective	During ENCGMI, discrepancy is created by asking the mothers and their caregivers to talk about (1) the traditional way of taking care of the newborn; and (2) what they have heard from the health facility about the care of the newborn at home. Change is expected to come out of the mismatch between the traditional way of caring for the newborn and the ENC as recommended by WHO recommendation (see Box 2.2), taking into account the fact that there was supposed be some level of trust

Components	Explanation	Application during ENCGMI
	listening, reflects these motivations. Ambivalence to change is a normal. When the client realizes there is a discord and conflict between their current behaviour and their personal goals, they are more likely to make behaviour changes. Miller and Rollnick (2002) recommend helping the client to see their discrepancies by amplifying these discrepancies until the client realizes what is preventing them from making behaviour changes.	between the 2 groups During the ENCGMI, the SMAGs Emphasize on the awareness of the consequences of the traditional way of caring for the newborn at home, while not taking sides. SMAGs were supposed to acknowledge the different types of knowledge, show respect, work together to discuss how best to change.
Rolling with Resistance	Rolling with resistance is another MI principle, which involves avoidance of arguing and opposing the client's resistance to change on the part of the practitioner, who instead reframes resistance. Rolling with resistance allows the client to be involved in problem solving and developing ways to change behaviour (Miller & Rollnick, 2002). Resistance by the client is an opportunity to enhance motivation and promote behaviour change. If the practitioner argues with the client instead of rolling with resistance, the client is more likely to show greater resistance, which will reduce the likelihood of change (Miller & Rollnick, 2002). Ambivalence and resistance are seen as a normal part of the process and it is the practitioner's job to encourage the client to problem solve and come up with alternative solutions to the problem.	During the ENCGMI sessions, SMAGs invite—don't impose—new perceptions from the mothers, and engage them in solving the problem behaviours. SMAGs are called to avoid being argumentative or defensive or labeling the mothers and to recognize the mothers' resistance as a signal to change strategies. When resistance arises, the MI value is to respect the mother's right to her own opinions.
	Evoking, which is at the heart of MI, involves eliciting the client's own	During the ENCGMI sessions, evoking is done during

Components	Explanation	Application during ENCGMI
Evoking	motivations for change, It occurs when there is a focus on a particular change and the practitioner harnesses the client's own ideas and feelings about why and how they might do it. In other terms, it is having the client voice the arguments for change (Miller and Rollnick, 2013). Evoking is the opposite of what clinicians do: assess the problem, determine it causes and educate the client on how to fix it. Within this model the expert (who is the clinician) provides both the diagnosis and the solution. This approach is not applicable for long term change processes. Personal change requires the individual's active participation in the change process.	the contemplation phase. For each component of the ENC package, the SMAGs collect the mothers' own ideas and feelings about the why and how of their future actions. Mothers are given an opportunity to voice out the arguments for changing the harmful newborn care behaviours.
Righting Reflex	Practitioners are trained to come up with the right answer, provide it promptly to the client and convince or persuade the client to do the right thing (Miller & Rollnick, 2013). The desire to fix what seems wrong with people and to set them promptly on a better course, relying in particular on directing, forms what is called *righting reflex.* During health education interactions practitioner-client, there is a massive righting reflex from the practitioner who confronts the client with reality, provides the solution to his or her problem(s), and whenever the client opposes the practitioner's view or resists, the provider turns up the volume (Miller & Rollnick, 2013). The problem is that this tendency of always wanting to correct and help people is counterproductive and having a paradoxical effect, and blocks change. In the PEC, righting reflex is a denominator, and once minimized or reduced, the 'wrestling' between the practitioner and client will be minimized and make the client to be more receptive to the health	During the ENCGMI sessions, the Righting Reflex is minimized through the utilization of the ENCGMI Flowcharts. SMAGs are trained to use the flowchart during the sessions, and they are called to offer additional information, only with the permission of the mothers.

Components	Explanation	Application during ENCGMI
	education message. One of the aims of MI is to reduction of the righting reflex which voices the practitioner's arguments, ignoring the fact that people talk themselves into change and are commonly disinclined to be told what to do if it conflicts with their own judgment (Miller & Rollnick, 2013).	

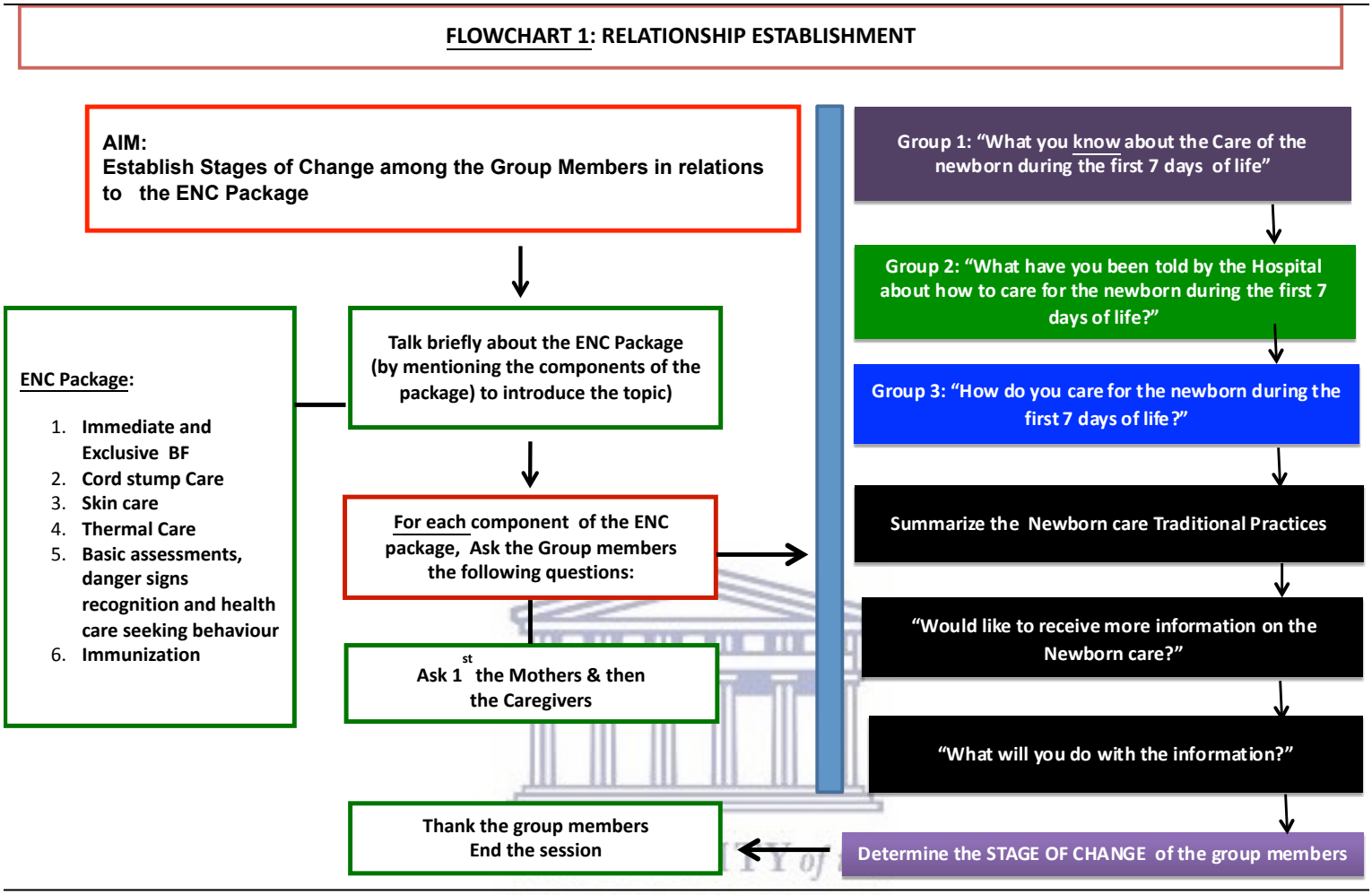
Table 7.2: Client's Prerequisite for Behaviour Change

Components	Explanation	Application during ENCGMI
Knowledge	The provider is called to share on request, with the mothers, the WHO ENC family package (see Box 2.2).	In the implementation of the ENCGMI, this information is shared by the SMAGs, in a participatory way, throughout the ENCGMI sessions.
Self-Efficacy	In the provision of health education, a situation can arise, in which the client clearly recognizes and acknowledges the importance of change but lacks confidence that it is possible. With MI, the counselor is called to lend hope to the client and make him or her believe that change is possible. MI is about activating personal change, with a particular focus on confidence, which ensures the clients that not only is change possible, but that they can contribute	During the ENCGMI sessions, SMAGs are trained to use the "Confidence about Change' rulers to elicit confidence talk: "How confident are you that you could do this if you decided to? On a scale from 0 to 10, where 0 is not at all confident and 10 is extremely confident, where would you say you are?" (See Activity 2 and Box 3.4).

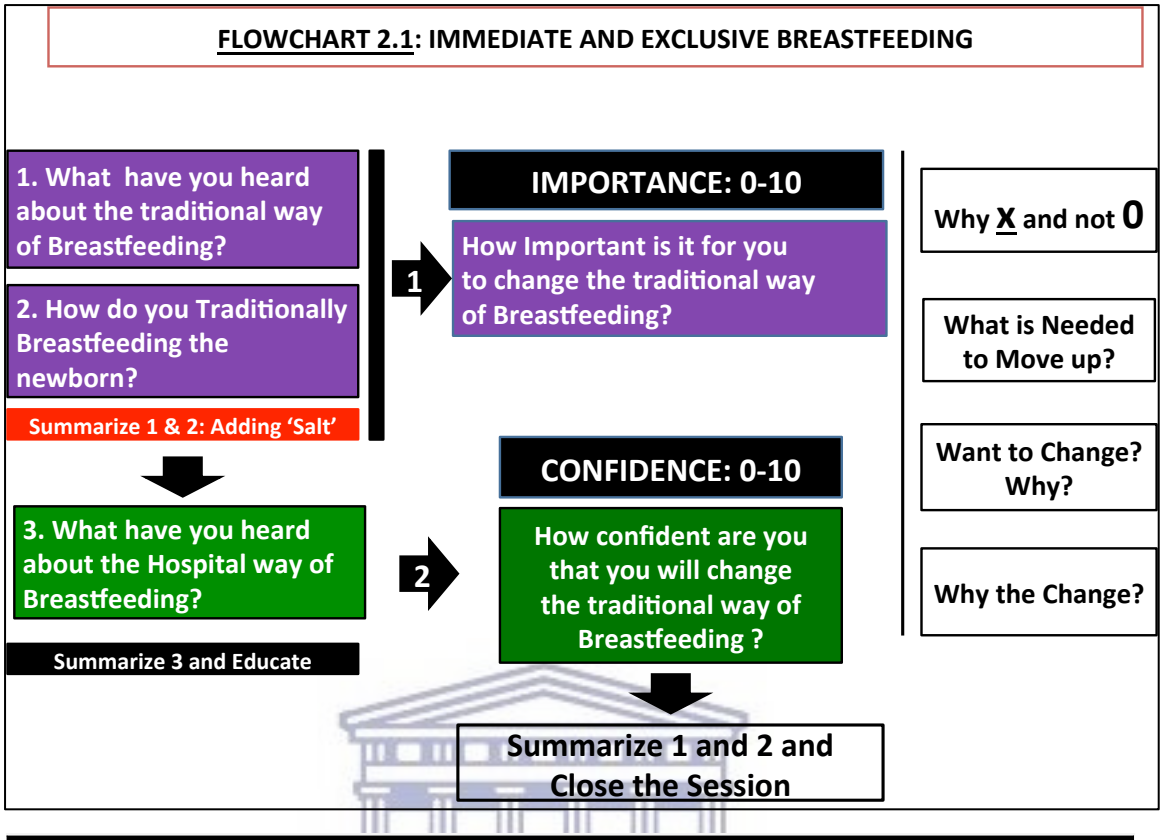
	to making it happen. People are unlikely to commit to making a change unless they have some confidence that it is possible. In fact, lack of confidence can be an obstacle even to acknowledging the importance of change. Both importance and confidence are key components of motivation for change and successful MI supports. At the level of a specific behaviour, confidence has been termed "self-efficacy" and is a good predictor of successful enactment. As with motivation more generally, hope is evoked from within the client. The seeds of hope are already there, waiting to be uncovered and brought into the light. The client is the first source of ideas about how change could be accomplished, and these ideas are harnessed using different approaches, e.g. confidence talk, giving information and advice, identifying and affirming strengths, reviewing past successes, brainstorming (generating as many ideas as possible for how a change might be accomplished). A common purpose that runs through all these methods is for the client to speak • about ways in which change can occur, • about confidence: why and how he or she could succeed with change.	
Motivation	Clients, in MI, are made to realize that the seeds of change are already in them, and that they are just waiting to be uncovered and brought into the light. Looking at the fact that the client is the first source of ideas about how change could be accomplished, the practitioner is called to harness these ideas during the MI counseling.	To achieve motivation during the ENCGMI session, SMAGs are called to: *Negotiate* with the mother on the observed **barriers** to behaviour change; Include the observed **risks associated** with changes in

		behaviour, and Reinforce the observed **opportunities and benefits** of recommended behaviours
Ambivalence	Ambivalence is a normal step on the road to change and shows progress from pre-contemplation (perceiving no reason at all for change) to having simultaneous conflicting motivations for change and status quo. Ambivalence, which is a human nature, is simultaneously wanting and not wanting something, or wanting both of two incompatible things. It is a bit like having a committee inside your mind, with members who disagree on the proper course of action (Miller & Rollnick, 2013). When people are ambivalent they normally express both pro-change and counter-change arguments: "Yes, but . . . ". If the practitioner voices an argument *for* change, clients are likely to respond by expressing a counter-change argument from the other side of their ambivalence. By continuing to express the arguments against change, clients can literally talk themselves out of changing. Similarly, clients can talk themselves into change by continuing to voice pro-change arguments (Miller & Rollnick, 2013). The path out of ambivalence is to choose a direction and follow it, to keep moving in the chosen direction.	During the ENCGMI session, ambivalence is crated for the mothers and their caregivers during the first session or relationship establishment. Mothers are called to talk about the pros and cons of the newborn care. To prevent clients from expressing a counter-change argument from the other side of their ambivalence, SMAGs are trained not to voice arguments for change and not to be judgmental.

Annex 8: ENCGMI Flowcharts



Flowchart 1: Relationship Establishment Flowchart



What you know about the 'Hospital' recommendation on Immediate and Exclusive Breastfeeding?

Breast Milk:

- Provides optimal nutrition and promotes the child's growth and development;
- Is associated with improved growth during the first month of life.
- Has unique anti-infective properties

By Breastfeeding:

- A mother begins the immunization process at birth
- Protects her child against as variety of viral bacterial pathogens before the acquisition of active immunity through vaccination.
- Regulates fertility for many women (frequent and exclusive breast-feeding)

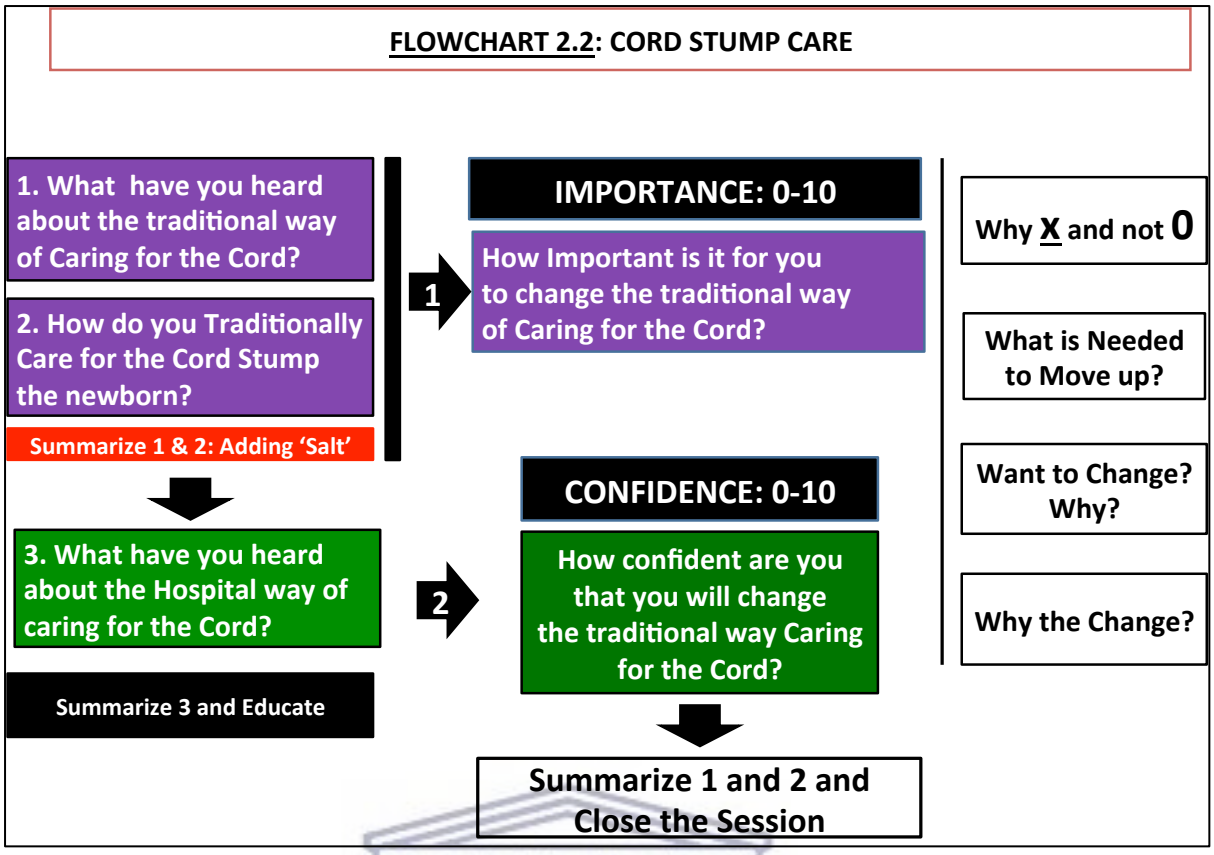
Early Contact (immediately after birth) between the mother and the baby:

- Has a beneficial effect on breast-feeding.
- Early suckling provides the baby with colostrum that offers protection from infection, gives important nutrients, and has a beneficial effect on maternal uterine contractions.
- The baby's skin and gastrointestinal tract are colonised with the mother's microorganisms, against which she has antibodies in her breast milk.

Important Factors in establishing and maintaining breast-feeding after birth are:

- Giving the first feed within one hour of birth,
- Correct position that enables good attachment of the baby,
- Frequent feeds, no other supplements,
- Psychosocial support for breast-feeding mothers.
- Mothers should be instructed about the need for an adequate diet to sustain lactation.

Flowchart 2.1: Immediate and Exclusive Breastfeeding Flowchart



What you know about the 'Hospital' recommendation on Cord Stump Care?

The cord stump remains the major means of entry for infections after birth.

Principles of clean cord stump care:

- Keep it dry
- Keep it clean
- Do not apply anything.

The Cord stump:

- Will dry and mummify if exposed to the air
- Do not dress it or bandage it.
- It will remain clean if it is protected with clean clothes
- Keep it from urine and soiling.

The Cord Stump Cleaning:

- No antiseptics are needed for cleaning.
- If soiled, wash it with clean water and dried with clean cotton or gauze.

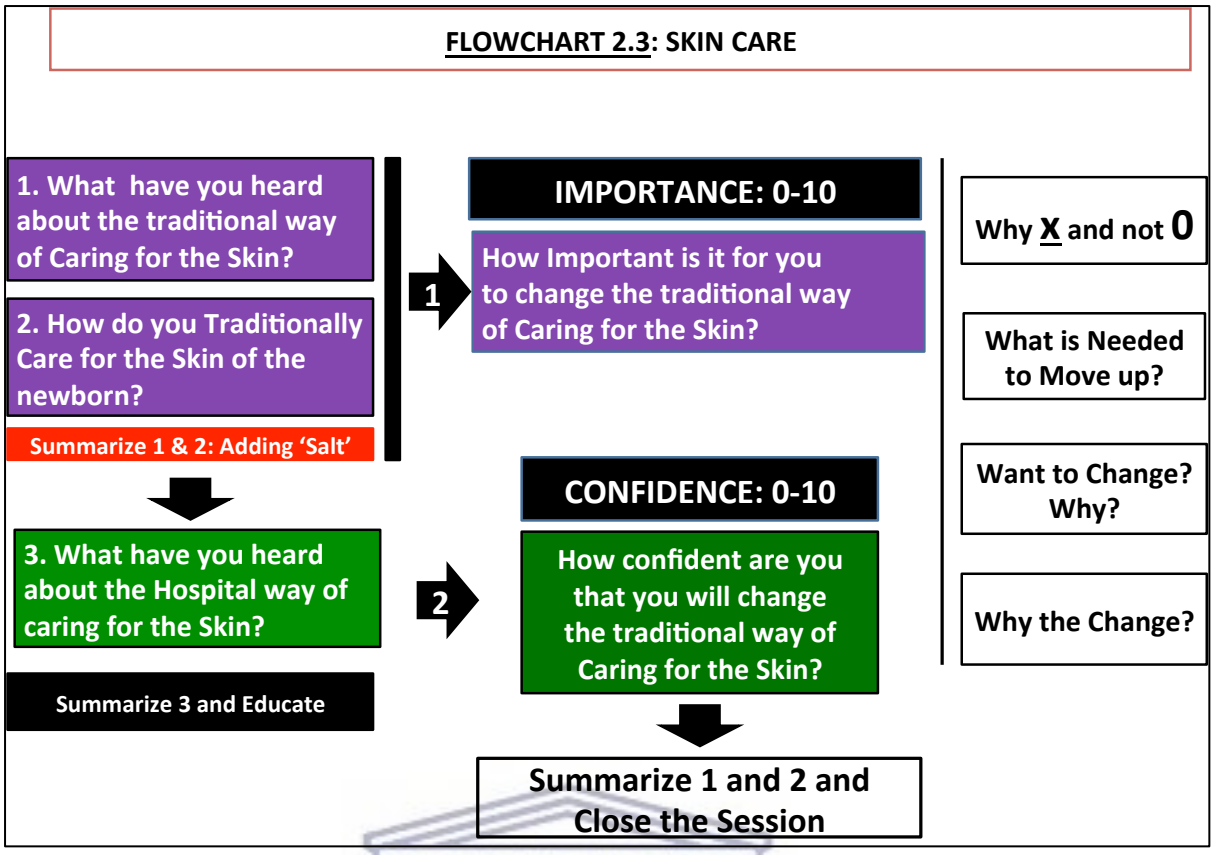
Local Practices:

- Putting various substances on the cord stump should be discouraged if found harmful and substituted with acceptable ones.

Umbilical stump draining pus:

- The skin around it is becoming red and it has a foul smell.
- These are signs of an umbilical infection that requires treatment.
- The baby must be referred immediately to the hospital for proper treatment.

Flowchart 2.2: Cord Stump Care Flowchart



What you know about the 'Hospital' recommendation on Skin Care?

Immediately after birth gently dry the infant

- If any blood or meconium–gently remove
- If at risk due to maternal blood borne pathogens then more aggressive cleansing
- Cleansing should be gentle using warm water–avoid use of harsh cleansers
- Leave vernix as intact as possible

Wrap the infant

- To conserve heat and/or allow skin to skin contact with the mother

Washing and Bathing

- Bathing newborns has multiple purposes; Removal of waste materials, improving appearance and potentially reducing microbial colonization.
- Allows contact between the newborn infant and mother in terms of tactile communication and interaction.
- Should use plain water and be followed immediately by application of an appropriate soap.
- Newborn infants should not be immersed for more than 5 min.
- Frequency of skin cleansing: 1–2 times per week if necessary is reasonable.
- Full bathing appears better tolerated, especially after cord separation than sponge/cloth bathing.

Napkin changes

- Changed frequently, at least at each nursing or feeding time. The infant should be carefully washed in lukewarm water and then rinsed off and dried thoroughly.

Powders:

- Powders are not recommended for use in babies.

Flowchart 2.3: Skin Care Flowchart

FLOWCHART 2.4: THERMAL CARE

1. What have you heard about the traditional way of Caring for the Temperature?

2. How do you Traditionally Care for the Temperature of the newborn?

Summarize 1 & 2: Adding 'Salt'

3. What have you heard about the Hospital way of caring for the Temperature?

Summarize 3 and Educate

1

IMPORTANCE: 0-10

How Important is it for you to change the traditional way of Caring for the Temperature?

2

CONFIDENCE: 0-10

How confident are you that you will change the traditional way of Caring for the Temperature?

Summarize 1 and 2 and Close the Session

Why X and not 0

What is Needed to Move up?

Want to Change? Why?

Why the Change?

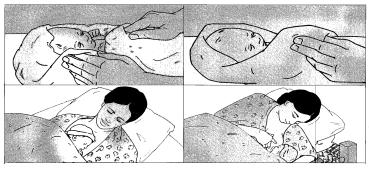
What you know about the 'Hospital' recommendation on Thermal Care ?

How the Newborn Loses Heat

The temperature inside the mother's womb is 38ºC. Leaving the warmth of the womb at birth, the wet newborn finds itself in a much colder environment and immediately starts losing heat.

The newborn baby loses heat in 4 different ways:

- By evaporation of the amniotic fluid from the baby's body.
- If the baby is placed naked on a cold surface (cold mattress)
- If the naked newborn is exposed to cooler surrounding air;
- If the newborn is near a cold wall or a window

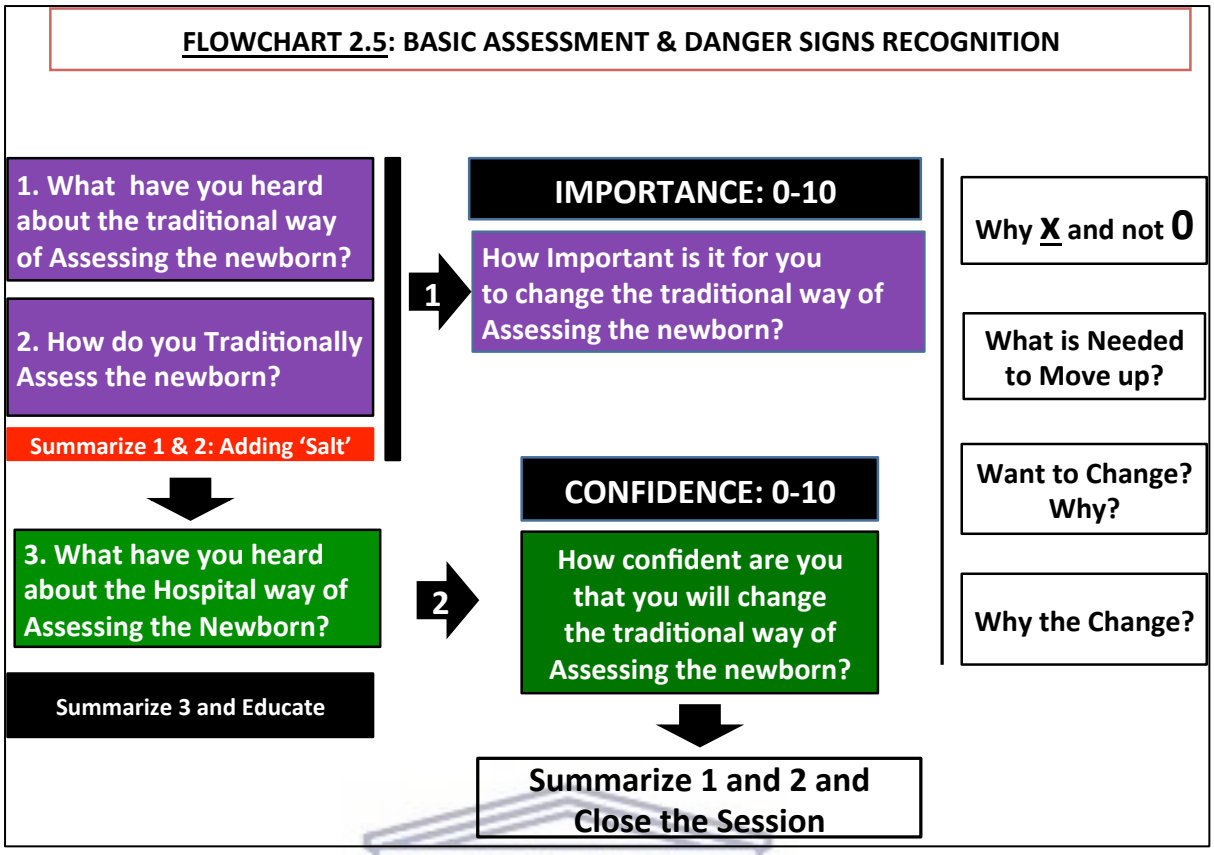


A hypothermic baby is at increased risk of developing health problems and of dying. However, if heat loss is prevented, the newborn will stay warm and will have a much better chance of remaining healthy, or of surviving if it is already sick.

What the Mother is expected to do:

1. Skin-to-skin contact: Baby can be kept in mother's chest in skin to skin contact.
2. Breast Feeding: Breast feeding should begin as soon as possible after birth preferably within an hour. This ensures adequate supply of calories for heat generation.
3. Bathing: Bathing should be postponed for at least 1 week.
4. Clothing: Protect newborn by clothing (1-2 layers) and bedding. Clothing to always include a cup (25% of heat lost from head). Clothing and bedding should not be too tight to allow air spaces between the layers.
5. Attachment: Babies and mother should be attached together for 24 in the same bed and breast fed on demand.
6. The Room: In cool weather, the room where the birth will occur should be warmed
7. Assessing Temperature: Touch then newborn's feet frequently to check for coldness

Flowchart 2.4: Thermal Care Flowchart



What you know about the 'Hospital' recommendation on Basic Assessment of the Newborn?

Why is it important to Assess a newborn for danger signs?

- Newborns can fall sick easily in the first days after birth and the sickness can get serious quickly.
- A delay in receiving treatment can be life threatening for the baby.

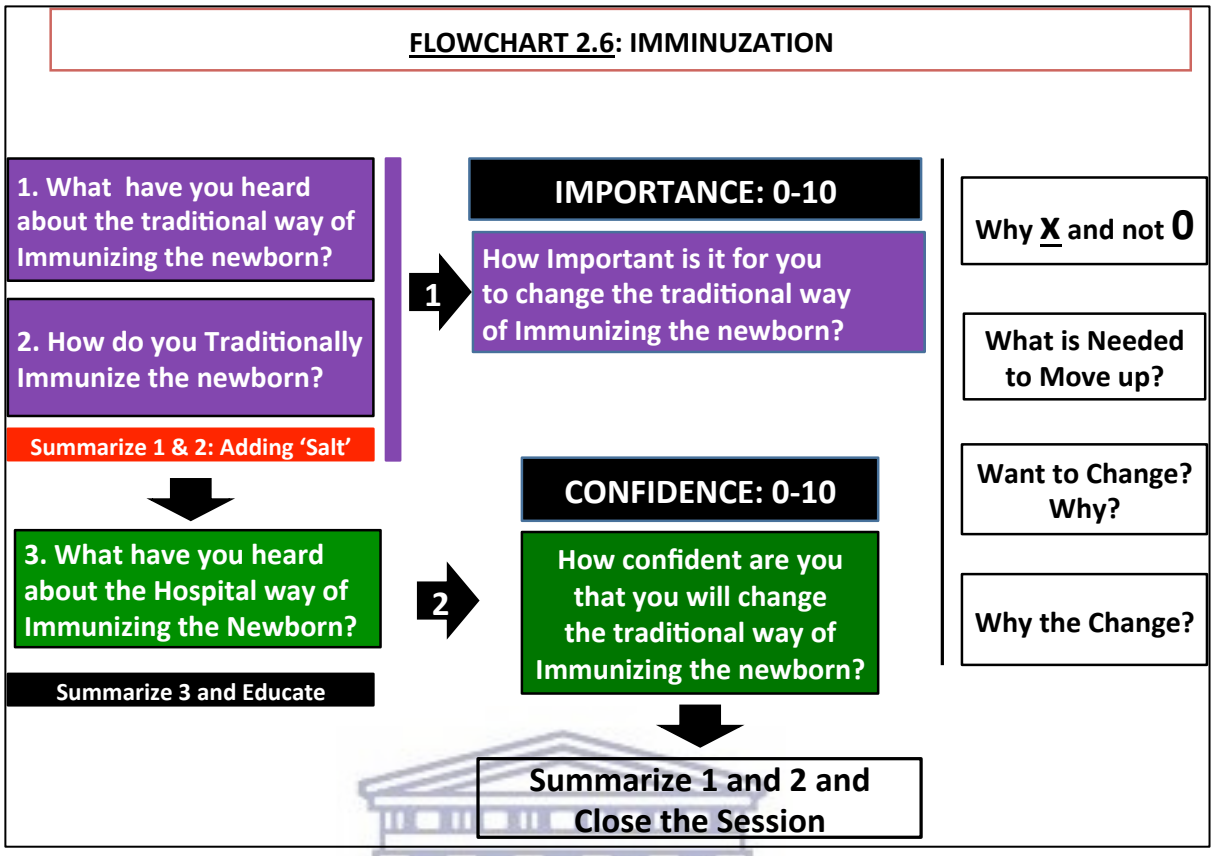
The following are the Danger Signs in a Newborn:

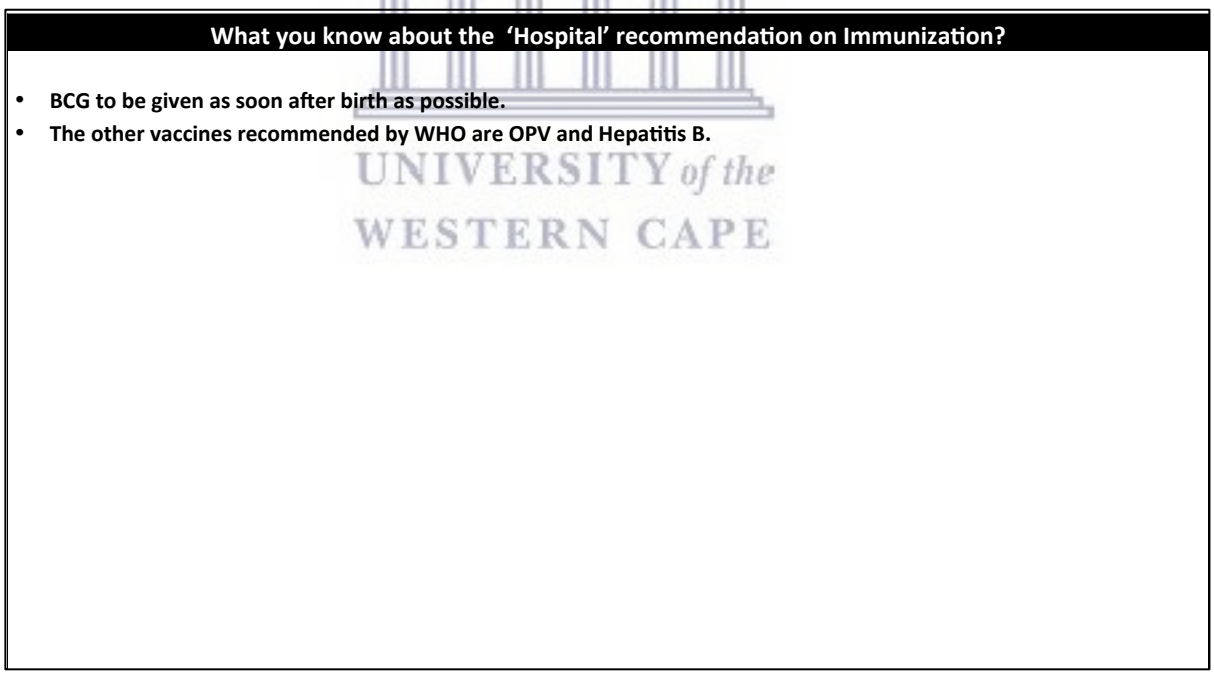
- Not able to feed since birth, or stopped feeding well
- Convulsed or fitted since birth
- Fast breathing: Two counts of 60 breaths or more in one minute
- Chest indrawing
- High temperature: 37.5°C or more
- Very low temperature: 35.4°C or less
- Only moves when stimulated, or does not move even on stimulation
- Yellow soles
- Signs of local infection: umbilicus red or draining pus, skin boils, or eyes draining pus

Referral:

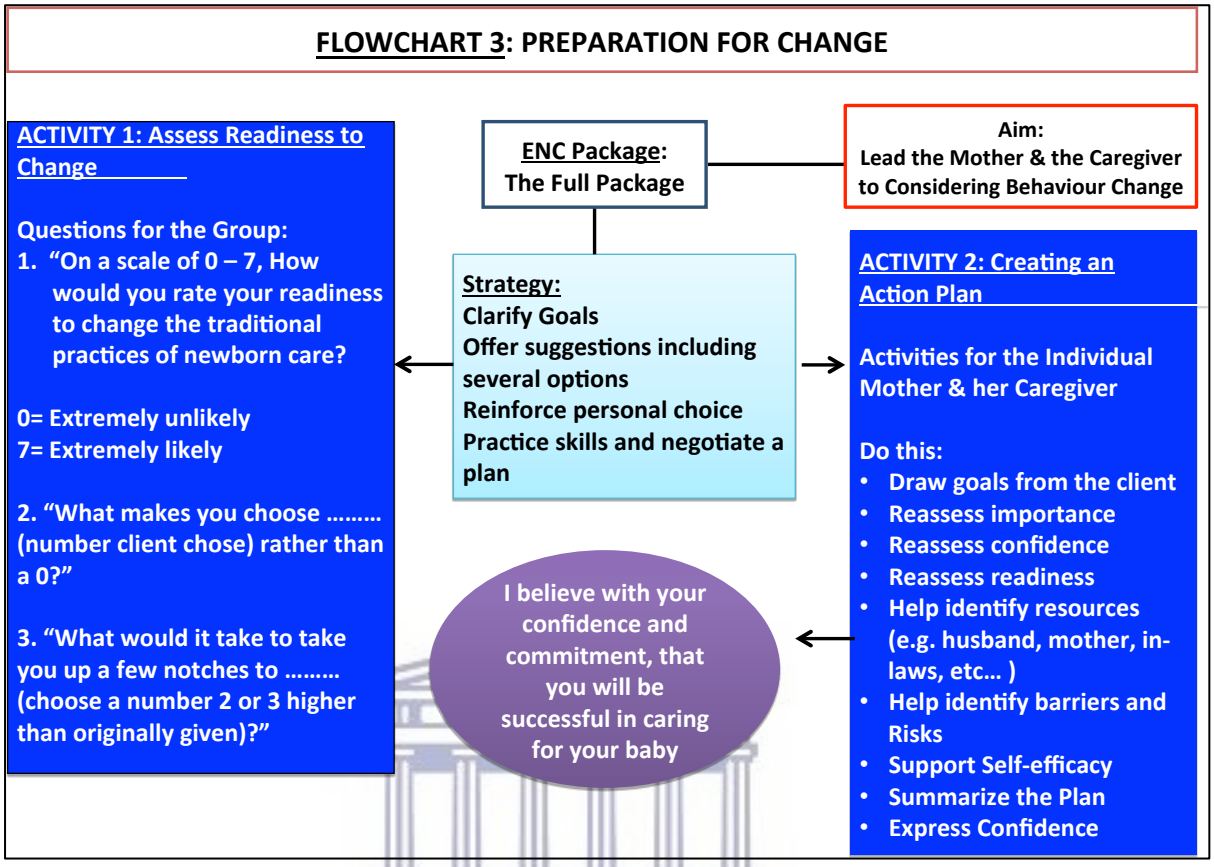
- A baby with a danger sign should be referred to a health facility immediately.

Flowchart 2.5: Basic Assessment & Danger Signs Recognition Flowchart





Flowchart 2.6: Immunization Flowchart



Preparation for Change: SMAG's Guide

Mother-Caregiver Change Plan Discussion Guide (Individual Session)

1. The changes I want to make are (tick those which are applicable):
□ Immediate and Exclusive Breastfeeding
□ Cord Stump Care
□ Skin Care
□ Thermal Care
□ Basic Assessment, danger signs recognition and health seeking behaviour
□ Immunization

2. The reasons I want to make these changes are:_____

3. I plan to do these things to reach my goals: (List plan of action and when it will be done.): _____

4. The first steps I plan to take in changing are: _____

5. Some things that could interfere with my plan are: _____

6. The ways other people could help me in changing are: (List of persons and possible ways they could help.)
- Person
- Possible Ways to help

7. Some things that could interfere with my plan are: _____

8. My back up Plans are: _____

9. Ask how confident the client is, that she can reach the goals: _____

Flowchart 3: Preparation for Change Flowchart

Annex 9: Senate Research Committee of the UWC Approval

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

9 December 2013

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:
Dr MD Menda (School of Public Health)

Research Project:	Impact of newborn care motivational interviewing in a maternity waiting home setting on early neonatal morbidity in rural eastern province of Zambia
Registration no:	13/10/26

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Private Bag X17, Bellville 7535, South Africa
T: +27 21 959 2988/2948 . F: +27 21 959 3170
E: pjosias@uwc.ac.za
www.uwc.ac.za

Annex 10: The University of Zambia Biomedical Research Ethics Committee Approval

THE UNIVERSITY OF ZAMBIA

BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: 260-1-256067
Telegrams: UNZA, LUSAKA
Telex: UNZALU ZA 44370
Fax: + 260-1-250753
E-mail: unzarec@unza.zm

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia

Assurance No. FWA00000338
IRB00001131 of IORG0000774

18th July, 2014.

Our Ref: 005-04-14.

Dr. Mutombo D. Menda,
Church Health Association of Zambia,
Plot No. 9306, Ben Bella Road,
P.O Box 34 511,
Lusaka.

Dear Dr. Menda,

RE: RESUBMITTED RESEARCH PROPOSAL: **"IMPACT OF NEWBORN CARE MOTIVATIONAL INTERVIEWING IN A MATERNITY WAITNG HOME SETTING ON EARLY NEONATAL MORBIDITY IN RURAL EASTERN PROVINCE OF ZAMBIA" (REF. No. 005-04-14)**

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee on 18th July, 2014. The proposal is approved.

CONDITIONS:

- This approval is based strictly on your submitted proposal. Should there be need for you to modify or change the study design or methodology, you will need to seek clearance from the Research Ethics Committee.
- If you have need for further clarification please consult this office. Please note that it is mandatory that you submit a detailed progress report of your study to this Committee every six months and a final copy of your report at the end of the study.
- Any serious adverse events must be reported at once to this Committee.
- Please note that when your approval expires you may need to request for renewal. The request should be accompanied by a Progress Report (Progress Report Forms can be obtained from the Secretariat).
- **Ensure that a final copy of the results is submitted to this Committee.**

Yours sincerely,

Dr. J.C. Munthali
CHAIRPERSON

Date of approval: 18th July, 2014. **Date of expiry:** 17th July, 2015.

Annex 11: Zambia Ministry of Health Authority to Conduct the Research

All Correspondence should be addressed to the Permanent Secretary
Telephone: +260 211 253040/5
Fax: +260 211 253344

In reply please quote:

MH/101/17/6
No.....

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

NDEKE HOUSE
P. O. BOX 30205
LUSAKA

21st April, 2015

Dr.Dhally M.Menda
Churches Health Association of Zambia
Plot No.9306, Ben Bella Road
P.O. Box 34511
LUSAKA

Dear Dr.Menda,

Re: Request for Authority to Conduct Research

The Ministry of Health is in receipt of your request for authority to conduct research on **"Assessment of the Implementation of Motivational Interviewing in the Delivery of Essential Newborn Care Family Package in a Maternity waiting Home Setting in Rural Eastern Province".** I wish to inform you that following submission of your research proposal to my Ministry, our review of the same and in view of the ethical clearance, my Ministry has granted you authority to carry out the study on condition that:

1. The relevant Provincial and District Directors of Health where the study is being conducted are fully appraised;
2. Progress updates are provided to MoH quarterly from the date of commencement of the study;
3. The final study report is cleared by the MoH before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the MoH, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, and all key respondents.

Yours sincerely,

Dr. D. Chikamata
Permanent Secretary
MINISTRY OF HEALTH

Cc: District Medical Officer

Annex 12: Study Tools

SECTION 1: HEALTH FACILITY IDENTIFICATION		FI
This module is to be administered to the Health Facilities' Administrators or In Charge, the pre-intervention period, in all the Health facilities where the study is going to be undertaken.		
FI1. PROVINCE	Province:_____	
FI2. DISTRICT	District: _____	
FI3. CATCHMENT POPULATION	Catchment Population: _____ Number of Neighbourhoods: _____ Number of Villages: _____	
FI4. NAME OF THE HEALTH FACILITY	Name: _____	
FI5. TYPE OF HEALTH FACILITY	1st Level Mission Hospital .....1 Mission Rural Health Center .....2 Mission Zonal Health Center.....3	
FI6. WHAT IS THE HEALTH FACILITY'S BED CAPACITY?	Total Bed Capacity:_____ MWH Capacity:_____	
FI7. WHICH ONE OF THESE **EMOC** COMPONENTS IS THE HEALTH FACILITY OFFERING?	Injectable antibiotics.....1 Injectable Oxytocics .....2 Injectable anticonvulsants .....3 Manual removal of placenta .....4 manual removal of retained products .....5 Assisted vaginal delivery .....6 caesarean section .....7 Blood transfusion 8	

FI8. NUMBER OF HEALTH WORKERS AT THE HEALTH FACILITY:	Doctors..... ☐☐ Clinical Officers/Licentiates..... ☐☐ Midwives ..... ☐☐ Nurses ..... ☐☐ Lab Technicians..... ☐☐ Pharmacist/Pharmacy Technician..... ☐☐	
FI9. NUMBER OF MOBILE ANTENATAL CARE CLINICS (ANC) CLINICS UNDER THE HEALTH FACILITY?	# of Mobile ANC Clinics:_____	
FI10. NUMBER OF HEALTH WORKERS TRAINED IN FOCUSED ANTENATAL CARE (FANC)?	Doctors..... ☐☐ Clinical Officers/Licentiates..... ☐☐ Midwives..... ☐☐ Nurses ..... ☐☐	
FI11. NUMBER OF HEALTH WORKERS TRAINED IN EMOC	Doctors..... ☐☐ Clinical Officers/Licentiates..... ☐☐ Midwives ..... ☐☐ Nurses ..... ☐☐	

Section 1

Structured Interview:

Demographic Questionnaire

When to Administer:

On admission in the Maternity Waiting Home

Date Administered: _____

SECTION 1: PREGNANT MOTHER'S BACKGROUND		PMB
This questionnaire is to be administered, **on admission to the Maternity Waiting Home**, to all pregnant mothers willing to participate in the study. Start by recording the identity of the mother: Safe Motherhood Number: _____		
PMB1. IN WHAT MONTH AND YEAR WERE YOU BORN?	Year ..... ☐☐☐☐ Don't Know year 9998	
PMB2. WHAT IS THE **HIGHEST LEVEL OF SCHOOL** YOU ATTENDED?	None ..... 0 Preschool ..... 1 Primary ..... 2 Secondary ..... 3 Higher 4	
PMB3. WHAT IS YOUR **MARITAL STATUS**?	Married ..... 1 Divorced ..... 2 Widowed ..... 3 Single ..... 4 Other:_____ *(Specify)*	
PMB4. WHICH OF THE FOLLOWING **HOUSEHOLD** SITUATION IS APPLICABLE TO YOU? *MULTIPLE ANSWERS POSSIBLE*	Living alone ..... 1 Living with my husband ..... 2 Living with my parents ..... 3 Living with my in-laws ..... 4 Living with children ..... 5 Other:_____ *(Specify)*	
PMB5. WHAT IS YOUR **RELIGION**?	Catholic ..... 1 Reform Church ..... 2 Pentecostal ..... 3 Muslim ..... 4 Muslim ..... 5 Other:_____ *(Specify)*	

PMB6. **EMPLOYMENT** STATUS	Employed ..... 1 House wife ..... 2 Looking for Job ..... 3 Self Employed ..... 4 Unemployed 5	
PMB7. TO WHAT **TRIBE** DO YOU BELONG?	Tribe: _____	
PMB8. **HOW LONG** (IN HOURS/MINUTES) DOES IT TAKE TO REACH THE NEAREST HEALTH FACILITY FROM YOUR HOME?	Number of Minutes_____ Number of Hours_____ Don't Know_____	
PMB9**. HOW FAR** (IN KM) IS THE NEAREST HEALTH FACILITY FROM YOUR HOME?	Number of kilometers:_____ Don't Know_____	
PMB10. **HOW DO YOU USUALLY GO** TO THE NEAREST HEALTH FACILITY FOR ANTENATAL CARE SERVICES?	On Foot..... 1 By Taxi..... 2 By Minibus ..... 3 By Own Car ..... 4 Other:_____ *(Specify)*	
PMB11. DOES YOUR **HOUSEHOLD HAVE**:	**Yes** **No**	
[A] ELECTRICITY?	Electricity 1 2	
[B] A RADIO?	Radio 1 2	
[C] A TELEVISION?	Television..... 1 2	
[D] A MOBILE TELEPHONE?	Mobile telephone 1 2	
[E] A NON-MOBILE TELEPHONE?	Non-mobile telephone..... 1 2	
[F] A REFRIGERATOR?	Refrigerator 1 2	
[G] AN OXCART?	An Oxcart..... 1 2	
[H] A CAR OR TRUCK?	Car / Truck 1 2	
[I] PIPED WATER?	Piped Water..... 1 2	

PMB 12. DO YOU **READ** FROM A NEWSPAPER OR MAGAZINE?	Almost every day ..... 1 At least once a week..... 2 Less than once a week ..... 3 Not at all..... 4	
PMB 13. DO YOU **WATCH** TELEVISION?	Almost every day ..... 1 At least once a week..... 2 Less than once a week ..... 3 Not at all..... 4	
PMB 14. DO YOU **LISTEN** TO THE RADIO?	Almost every day ..... 1 At least once a week..... 2 Less than once a week ..... 3 Not at all..... 4	
PMB15. HAVE YOU BEEN SMOKING DURING THIS PREGNANCY?	No..... 0 Yes..... 1	
PMB16. HAVE YOU BEEN DRINKING DURING THIS PREGNANCY?	No..... 0 Yes..... 1	

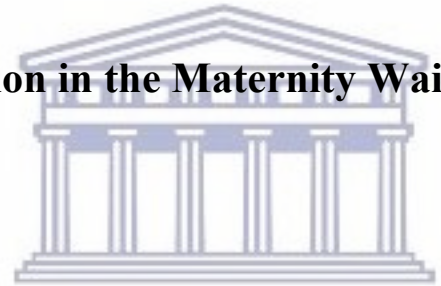
Section 2

Structured Interview:

Pre-Test Knowledge Questionnaire

When to Administer:

On admission in the Maternity Waiting Home



Date Administered: _____

SECTION 2: PREGNANT MOTHER KNOWLEDGE PRE-TEST QUESTIONNAIRE PMKPR		
The following questions are to be asked to **Pregnant Mothers** being admitted in the Maternity Waiting Home. The administration of the questionnaire will be done **upon admission in the Maternity Waiting Home**. These questions look at the mother's general knowledge on the care of the newborn at home. **DK= Don't Know**		
MOTHER'S KNOWLEDGE ON CARE OF THE UMBILICAL CORD, SKIN, TEMPERATURE, BREASTFEEDING AND IMMUNIZATION OF THE NEWBORN		
CARE OF THE UMBILICAL CORD AND THE SKIN		
PMKPR1. THE UMBILICAL STUMP SHOULD BE LEFT UNCOVERED WITHOUT ANY DRESSING	True ..... 1 False ..... 2 DK 8	
PMKPR2. IF THE UMBILICAL STUMP IS SOILED WITH BABY'S URINE OR FAECES, I WOULD WASH IT WITH WATER	True ..... 1 False ..... 2 DK 8	
PMKPR3. THE CORD STUMP SHOULD BE DRIED THOROUGHLY AFTER BATHING	True ..... 1 False ..... 2 DK 8	
PMKPR4. "SURGICAL SPIRIT" (70% ISOPROPYL ALCOHOL) SHOULD NOT BE APPLIED ON THE CORD STUMP.	True ..... 1 False ..... 2 DK 8	
PMKPR5. I WILL APPLY HERBAL MEDICATION ON THE BABY'S SKIN TO PROTECT IT	True ..... 1 False ..... 2 DK 8	

CARE OF THE TEMPERATURE		
PMKPR6. A NEWBORN BABY SHOULD BE WIPED WITHIN 30 MINUTES OF BIRTH	True ..... 1 False ..... 2 DK 8	
PMKPR7. A NEWBORN BABY SHOULD BE WRAPPED WITHIN 30 MINUTES OF BIRTH	True ..... 1 False ..... 2 DK 8	
PMKPR8. THE FIRST BATH SHOULD BE DELAYED BY AT LEAST 24 HOURS	True ..... 1 False ..... 2 DK 8	
PMKPR9. SKIN-TO-SKIN CARE SHOULD BE DONE WITHIN THE FIRST 24 HOURS.	True ..... 1 False ..... 2 DK 8	
IMMEDIATE AND EXCLUSIVE BREASTFEEDING		
PMKPR10. BREAST FEEDING SHOULD BE INITIATED WITHIN ONE HOUR AFTER DELIVERY	True ..... 1 False ..... 2 DK 8	
PMKPR11. THE BABY SHOULD BE BREASTFED ON DEMAND RATHER THAN ACCORDING TO A TIMETABLE.	True ..... 1 False ..... 2 DK 8	
PMKPR12. ONLY BREAST MILK AND NOTHING ELSE SHOULD BE GIVEN DURING THE FIRST 6 MONTHS	True ..... 1 False ..... 2 DK 8	
PMKPR13. THE BABY SHOULD BE BREASTFED DURING THE NIGHTS TOO.	True ..... 1 False ..... 2 DK 8	
PMKPR14. THE BABY IS PROTECTED FROM INFECTIONS BY GIVING "COLOSTRUM" (THICK YELLOWISH FOREMILK) TO THE BABY.	True ..... 1 False ..... 2 DK 8	
PMKPR15. FOODS IN ADDITION TO THE BREAST MILK SHOULD BE INTRODUCED FROM 4-6 MONTHS OF AGE	True ..... 1 False ..... 2 DK 8	

PMKPR16. PASSING URINE LESS THAN 6 TIMES A DAY IS AN INDICATION THAT THE BABY RECEIVES INSUFFICIENT MILK	True ..... 1 False ..... 2 DK 8	
PMKPR17. GIVING HERBAL PREPARATIONS DURING THE PERIOD OF EXCLUSIVE BREASTFEEDING IS NOT BENEFICIAL TO A HEALTHY BABY.	True ..... 1 False ..... 2 DK 8	
PMKPR18. IF I EXPERIENCE A SORE NIPPLE I WOULD APPLY A LITTLE BREAST MILK ON THE NIPPLE AND EXPOSE IT TO AIR TO HEAL THE WOUND	True ..... 1 False ..... 2 DK 8	
PMKPR19. BREAST SIZE IS NOT RELATED TO AMOUNT OF BREAST MILK	True ..... 1 False ..... 2 DK 8	
PMKPR20. COLOSTRUM IS NUTRITIOUS FOR THE BABY	True ..... 1 False ..... 2 DK 8	
PMKPR21. THE POSITION OF THE INFANT DURING BREAST FEEDING IS IMPORTANT	True ..... 1 False ..... 2 DK 8	
PMKPR22. INCREASED CALORIES ARE REQUIRED BY BREAST FEEDING MOTHERS	True ..... 1 False ..... 2 DK 8	
PMKPR23. BREAST FEEDING SHOULD NOT BE STOPPED IF INFANT GETS DIARRHOEA	True ..... 1 False ..... 2 DK 8	
PMKPR 24. BREASTFEEDING PRODUCES DECREASED STOOL FREQUENCY	True ..... 1 False ..... 2 DK 8	
PMKPR25. BREAST FED INFANTS' STOOL IS LOOSE	True ..... 1 False ..... 2 DK 8	
PMKPR26. BREAST SUCKLING INCREASES BREAST MILK	True ..... 1 False ..... 2 DK 8	

PMKPR27. BREAST FEEDING IS OK DURING PREGNANCY	True .....1 False .....2 DK 8	
PMKPR28. BREAST FEEDING IS OK DURING MENSTRUATION	True .....1 False .....2 DK 8	
PMKPR29. FORMULA IS NOT AS NUTRITIOUS AS BREAST MILK	True .....1 False .....2 DK 8	
PMKPR30. BREAST FEEDING PROTECTS AGAINST INFECTION	True .....1 False .....2 DK 8	
PMKPR31. BREAST FEEDING HELPS BONDING BETWEEN THE MOTHER AND THE BABY	True .....1 False .....2 DK 8	
BCG IMMUNIZATION		
PMKPR32. BCG VACCINE WILL PROTECT THE BABY FROM TUBERCULOSIS.	True .....1 False .....2 DK 8	
PMKPR33. THERE WILL BE REDNESS AND SWELLING AT THE SITE OF BCG INJECTION FOLLOWED BY RUPTURE AFTER ABOUT 6-8 WEEKS.	True .....1 False .....2 DK 8	
PMKPR34. IF A SCAR IS NOT FORMED AT THE BCG INJECTION SITE ABOUT 8 WEEKS, I WOULD INFORM A HEALTH WORKER	True .....1 False .....2 DK 8	
MOTHER'S KNOWLEDGE ABOUT SIGNS IN THE NEWBORN THAT NEED URGENT ATTENTION OF A HEALTH WORKERS		
SIGNS THAT NEED URGENT ATTENTION OF HEALTHCARE PROVIDER		
PMKPR35. BABY WHO PREVIOUSLY SUCKED WELL STOPS SUCKING.	True .....1 False .....2 DK 8	
PMKPR36. GETTING ABNORMAL JERKY MOVEMENTS (FITS) IN LIMBS	True .....1 False .....2 DK 8	

PMKPR37. CONTINUOUS RAPID BREATHING	True .....1 False .....2 DK 8	
PMKPR38. BABY'S EYES BECOME RED WITH EXCESSIVE PUS LIKE DISCHARGE	True .....1 False .....2 DK 8	
PMKPR39. BABY'S SKIN IS COLD TO TOUCH	True .....1 False .....2 DK 8	
PMKPR40. HAVING A HOT BODY (FEVER)	True .....1 False .....2 DK 8	
PMKPR41. BABY WHO WAS PREVIOUSLY ACTIVE BECOMES LAZY	True .....1 False .....2 DK 8	
PMKPR42. YELLOWISH VOMITUS	True .....1 False .....2 DK 8	
PMKPR43. PASSING WATERY, LIQUID MOTIONS 3 OR MORE TIMES OR > 9 MOTIONS OF NORMAL CONSISTENCY IN 24 HOURS: OR BLOOD IN LIQUID STOOL	True .....1 False .....2 DK 8	
PMKPR44. SKIN OR EYES YELLOW	True .....1 False .....2 DK 8	
PMKPR45. SKIN AROUND THE UMBILICUS IS RED AND THICK	True .....1 False .....2 DK 8	
PMKPR46. PUS COMING OUT FROM THE CORD STUMP	True .....1 False .....2 DK 8	
PMKPR47. ABSENCE OF TESTIS IN THE SCROTUM IN A FULL TERM BABY BOY	True .....1 False .....2 DK 8	

SIGNS THAT DO NOT NEED ATTENTION OF A HEALTHCARE PROVIDER		
PMKPR48. FALLS INTO SLEEP DURING BREASTFEEDS	True .....1 False .....2 DK 8	
PMKPR49. A NOISE (SNUFFLING) GENERATING FROM THE NOSTRILS WHILE SLEEPING	True .....1 False .....2 DK 8	
PMKPR50. SNEEZING	True .....1 False .....2 DK 8	
PMKPR51. GETTING HICCUPS	True .....1 False .....2 DK 8	
PMKPR52. TWISTING THE BODY	True .....1 False .....2 DK 8	
PMKPR53. SALIVATING OF MILK FOLLOWING A FEED	True .....1 False .....2 DK 8	
PMKPR54. PASSES STOOLS ONCE IN 4-5 DAYS	True .....1 False .....2 DK 8	
PMKPR55. FOUL SMELL FROM THE UMBILICAL STUMP WITHOUT ANY PUS OR REDNESS	True .....1 False .....2 DK 8	
PMKPR56. FAILURE TO RETRACT THE FORESKIN OF THE PENIS IN A NEWBORN BOY	True .....1 False .....2 DK 8	
PMKPR57. BLEEDING FEW DROPS OF BLOOD FROM THE VAGINA OF A NEWBORN GIRL	True .....1 False .....2 DK 8	
PMKPR58. WHITISH DISCHARGE FROM VAGINA OF A NEWBORN GIRL	True .....1 False .....2 DK 8	

PMKPR59. A NODULE IN THE BREAST, WITH A LITTLE MILKY DISCHARGE FROM NEWBORN'S NIPPLE	True ..... 1 False ..... 2 DK 8	

Section 3

Structured Interview:

Post-Test Knowledge Questionnaire

When to Administer:

In the Postnatal Ward, after Delivery

Date Administered: _____

SECTION 3: MOTHER KNOWLEDGE POST-TEST QUESTIONNAIRE	MKPOST

The following questions are to be asked to **women who have delivered**. The administration of the questionnaire will be done In the **Postnatal Ward, after delivery**. These questions look at the mother's general knowledge on the care of the newborn at home, after attending the ENCGMI.

DK= Don't Know

MOTHER'S KNOWLEDGE ON CARE OF THE UMBILICAL CORD, SKIN, TEMPERATURE, BREASTFEEDING AND IMMUNIZATION OF THE NEWBORN

CARE OF THE UMBILICAL CORD AND THE SKIN

MKPOST1. THE UMBILICAL STUMP SHOULD BE LEFT UNCOVERED WITHOUT ANY DRESSING	True ..... 1 False ..... 2 DK 8	
MKPOST2. IF THE UMBILICAL STUMP IS SOILED WITH BABY'S URINE OR FAECES, I WOULD WASH IT WITH WATER	True ..... 1 False ..... 2 DK 8	
MKPOST3. THE CORD STUMP SHOULD BE DRIED THOROUGHLY AFTER BATHING	True ..... 1 False ..... 2 DK 8	
MKPOST4. "SURGICAL SPIRIT" (70% ISOPROPYL ALCOHOL) SHOULD NOT BE APPLIED ON THE CORD STUMP.	True ..... 1 False ..... 2 DK 8	
MKPOST5. I WILL APPLY HERBAL MEDICATION ON THE BABY'S SKIN TO PROTECT IT	True ..... 1 False ..... 2 DK 8	

CARE OF THE TEMPERATURE		
MKPOST6. A NEWBORN BABY SHOULD BE WIPED WITHIN 30 MINUTES OF BIRTH	True ..... 1 False ..... 2 DK 8	
MKPOST7. A NEWBORN BABY SHOULD BE WRAPPED WITHIN 30 MINUTES OF BIRTH	True ..... 1 False ..... 2 DK 8	
MKPOST8. THE FIRST BATH SHOULD BE DELAYED BY AT LEAST 24 HOURS	True ..... 1 False ..... 2 DK 8	
MKPOST9. SKIN-TO-SKIN CARE SHOULD BE DONE WITHIN THE FIRST 24 HOURS.	True ..... 1 False ..... 2 DK 8	
IMMEDIATE AND EXCLUSIVE BREASTFEEDING		
MKPOST10. BREAST FEEDING SHOULD BE INITIATED WITHIN ONE HOUR AFTER DELIVERY	True ..... 1 False ..... 2 DK 8	
MKPOST11. THE BABY SHOULD BE BREASTFED ON DEMAND RATHER THAN ACCORDING TO A TIMETABLE.	True ..... 1 False ..... 2 DK 8	
MKPOST12. ONLY BREAST MILK AND NOTHING ELSE SHOULD BE GIVEN DURING THE FIRST 6 MONTHS	True ..... 1 False ..... 2 DK 8	
MKPOST13. THE BABY SHOULD BE BREASTFED DURING THE NIGHTS TOO.	True ..... 1 False ..... 2 DK 8	
MKPOST14. THE BABY IS PROTECTED FROM INFECTIONS BY GIVING "COLOSTRUM" (THICK YELLOWISH FOREMILK) TO THE BABY.	True ..... 1 False ..... 2 DK 8	
MKPOST15. FOODS IN ADDITION TO THE BREAST MILK SHOULD BE INTRODUCED FROM 4-6	True ..... 1 False ..... 2 DK 8	

MONTHS OF AGE		
MKPOST16. PASSING URINE LESS THAN 6 TIMES A DAY IS AN INDICATION THAT THE BABY RECEIVES INSUFFICIENT MILK	True ..... 1 False ..... 2 DK 8	
MKPOST17. GIVING HERBAL PREPARATIONS DURING THE PERIOD OF EXCLUSIVE BREASTFEEDING IS NOT BENEFICIAL TO A HEALTHY BABY.	True ..... 1 False ..... 2 DK 8	
MKPOST18. IF I EXPERIENCE A SORE NIPPLE I WOULD APPLY A LITTLE BREAST MILK ON THE NIPPLE AND EXPOSE IT TO AIR TO HEAL THE WOUND	True ..... 1 False ..... 2 DK 8	
MKPOST19. BREAST SIZE IS NOT RELATED TO AMOUNT OF BREAST MILK	True ..... 1 False ..... 2 DK 8	
MKPOST20. COLOSTRUM IS NUTRITIOUS FOR THE BABY	True ..... 1 False ..... 2 DK 8	
MKPOST21. THE POSITION OF THE INFANT DURING BREAST FEEDING IS IMPORTANT	True ..... 1 False ..... 2 DK 8	
MKPOST22. INCREASED CALORIES ARE REQUIRED BY BREAST FEEDING MOTHERS	True ..... 1 False ..... 2 DK 8	
MKPOST23. BREAST FEEDING SHOULD NOT BE STOPPED IF INFANT GETS DIARRHOEA	True ..... 1 False ..... 2 DK 8	
MKPOST 24. BREASTFEEDING PRODUCES DECREASED STOOL FREQUENCY	True ..... 1 False ..... 2 DK 8	

MKPOST25. BREAST FED INFANTS' STOOL IS LOOSE	True .....1 False .....2 DK 8	
MKPOST26. BREAST SUCKLING INCREASES BREAST MILK	True .....1 False .....2 DK 8	
MKPOST27. BREAST FEEDING IS OK DURING PREGNANCY	True .....1 False .....2 DK 8	
MKPOST28. BREAST FEEDING IS OK DURING MENSTRUATION	True .....1 False .....2 DK 8	
MKPOST29. FORMULA IS NOT AS NUTRITIOUS AS BREAST MILK	True .....1 False .....2 DK 8	
MKPOST30. BREAST FEEDING PROTECTS AGAINST INFECTION	True .....1 False .....2 DK 8	
MKPOST31. BREAST FEEDING HELPS BONDING BETWEEN THE MOTHER AND THE BABY	True .....1 False .....2 DK 8	
BCG IMMUNIZATION		
MKPOST32. BCG VACCINE WILL PROTECT THE BABY FROM TUBERCULOSIS.	True .....1 False .....2 DK 8	
MKPOST33. THERE WILL BE REDNESS AND SWELLING AT THE SITE OF BCG INJECTION FOLLOWED BY RUPTURE AFTER ABOUT 6-8 WEEKS.	True .....1 False .....2 DK 8	
MKPOST34. IF A SCAR IS NOT FORMED AT THE BCG INJECTION SITE ABOUT 8 WEEKS, I WOULD INFORM A HEALTH WORKER	True .....1 False .....2 DK 8	

MOTHER'S KNOWLEDGE ABOUT SIGNS IN THE NEWBORN THAT NEED URGENT ATTENTION OF A HEALTH WORKERS		
SIGNS THAT NEED URGENT ATTENTION OF HEALTHCARE PROVIDER		
MKPOST35. BABY WHO PREVIOUSLY SUCKED WELL STOPS SUCKING.	True ..... 1 False ..... 2 DK 8	
MKPOST36. GETTING ABNORMAL JERKY MOVEMENTS (FITS) IN LIMBS	True ..... 1 False ..... 2 DK 8	
MKPOST37. CONTINUOUS RAPID BREATHING	True ..... 1 False ..... 2 DK 8	
MKPOST38. BABY'S EYES BECOME RED WITH EXCESSIVE PUS LIKE DISCHARGE	True ..... 1 False ..... 2 DK 8	
MKPOST39. BABY'S SKIN IS COLD TO TOUCH	True ..... 1 False ..... 2 DK 8	
MKPOST40. HAVING A HOT BODY (FEVER)	True ..... 1 False ..... 2 DK 8	
MKPOST41. BABY WHO WAS PREVIOUSLY ACTIVE BECOMES LAZY	True ..... 1 False ..... 2 DK 8	
MKPOST42. YELLOWISH VOMITUS	True ..... 1 False ..... 2 DK 8	
MKPOST43. PASSING WATERY, LIQUID MOTIONS 3 OR MORE TIMES OR > 9 MOTIONS OF NORMAL CONSISTENCY IN 24 HOURS: OR BLOOD IN LIQUID STOOL	True ..... 1 False ..... 2 DK 8	
MKPOST44. SKIN OR EYES YELLOW	True ..... 1 False ..... 2 DK 8	

MKPOST45. SKIN AROUND THE UMBILICUS IS RED AND THICK	True .....1 False .....2 DK 8	
MKPOST46. PUS COMING OUT FROM THE CORD STUMP	True .....1 False .....2 DK 8	
MKPOST47. ABSENCE OF TESTIS IN THE SCROTUM IN A FULL TERM BABY BOY	True .....1 False .....2 DK 8	
SIGNS THAT DO NOT NEED ATTENTION OF A HEALTHCARE PROVIDER		
MKPOST48. FALLS INTO SLEEP DURING BREASTFEEDS	True .....1 False .....2 DK 8	
MKPOST49. A NOISE (SNUFFLING) GENERATING FROM THE NOSTRILS WHILE SLEEPING	True .....1 False .....2 DK 8	
MKPOST50. SNEEZING	True .....1 False .....2 DK 8	
MKPOST51. GETTING HICCUPS	True .....1 False .....2 DK 8	
MKPOST52. TWISTING THE BODY	True .....1 False .....2 DK 8	
MKPOST53. SALIVATING OF MILK FOLLOWING A FEED	True .....1 False .....2 DK 8	
MKPOST54. PASSES STOOLS ONCE IN 4-5 DAYS	True .....1 False .....2 DK 8	
MKPOST55. FOUL SMELL FROM THE UMBILICAL STUMP WITHOUT ANY PUS OR REDNESS	True .....1 False .....2 DK 8	

MKPOST56. FAILURE TO RETRACT THE FORESKIN OF THE PENIS IN A NEWBORN BOY	True ..... 1 False ..... 2 DK 8	
MKPOST57. BLEEDING FEW DROPS OF BLOOD FROM THE VAGINA OF A NEWBORN GIRL	True ..... 1 False ..... 2 DK 8	
MKPOST58. WHITISH DISCHARGE FROM VAGINA OF A NEWBORN GIRL	True ..... 1 False ..... 2 DK 8	
MKPOST59. A NODULE IN THE BREAST, WITH A LITTLE MILKY DISCHARGE FROM NEWBORN'S NIPPLE	True ..... 1 False ..... 2 DK 8	

Section 4

Structured Interview:

Post ENCGMI Questionnaire

(Intervention Sites only)

When to Administer:

In the Postnatal Ward, after Delivery

Date Administered: _____

SECTION 4: MOTHER OPINION ON ENCGMI MO

This module is to be **administered to the Mother prior to her discharge from the Maternity Ward (after delivery).**

The following questions shall focus on the experience you had in relation to the Motivational Interviewing Sessions, while staying in the Maternity Waiting Home.

MO1. OVERALL, **HOW SATISFIED ARE YOU** WITH THE EXPERIENCE YOU HAD WHEN PARTICIPATING IN THE **ENCGMI SESSIONS** IN THE MATERNITY WAITING HOME SUCH AS NEWBORN CARE GROUP SESSIONS + ONE-TO-ONE SESSIONS *ASK THE WOMAN TO INDICATE HER LEVEL OF SATISFACTION* *WITH A NUMBER BETWEEN **0-10**, WITH* • *10 BEING COMPLETELY SATISFIED AND* • *0 BEING NOT SATISFIED AT ALL.*	Discussion on the way you care for the newborn at home ……..……___ ___ / Not Applicable Breast-Feeding Session……...…___ ___ / Not Applicable Cord Stump & Skin Care Session..…___ ___ / Not Applicable Thermal Care Session…….……___ ___ / Not Applicable Basic Assessment, Danger signs recognition and Health care seeking behaviour ……..…...…___ ___ / Not Applicable Immunization…….…..……___ ___ / Not applicable Preparation for Change…….……___ ___ / Not applicable One-to-one Session..……....……___ ___/Not applicable
MO2. WHY WERE YOU "FAIRLY" OR "VERY DISSATISFIED? • *9-10: VERY SATISFIED* • *6-8: SATISFIED* • *3-5: DISSATISFIED* • *0-2: VERY DISSATISFIED*	I was dissatisfied because …… …… …… …… …… …… …… …… …… If Satisfied, go to question MO3
MO3. HOW MUCH **CONFIDENCE** DID YOU HAVE IN THE **SMAGS** WHO FACILITATED THE ENCGMI	A lot of confidence .....1 A fair amount of confidence 2

SESSIONS?	Not too much confidence ..... 3 No confidence at all..... 4 D/K 98	
MO4. WHY WERE YOU "NOT TOO MUCH CONFIDENT" OR "NOT CONFIDENT AT ALL"?	I was not confident because …… …… …… …… …… …… …… …… …… …… …… If fairly/confident, , go to question MO5	
MO5. DURING YOUR STAY IN THE MWH, WERE YOU ABLE TO **UNDERSTAND** THE THINGS WHICH THE SMAG(S) WAS/WERE TELLING YOU?	I understood: Everything ..... 1 Most of it ..... 2 Some of it ..... 3 Only a fraction ..... 4 Nothing at all ..... 5 D/K 98	
MO6. WHY DID YOU UNDERSTAND EVERYTHING?	I did not understand everything because …… …… …… …… ……	

	…… …… …… …… If did not understand, go to question MO7	
MO7. THE SMAGS DID NOT UNDERSTAND MY **BACKGROUND AND VALUES** *To what extend do you agree with this statement concerning the ENCGMI Sessions you had in the MWH?*	Strongly disagree ..... 1 Disagree ..... 2 Neither agree nor disagree ..... 3 Agree ..... 4 Strongly agree ..... 5 D/K 98	
MO8. WHY DID "AGREE" OR "STRONGLY AGREE"?	I agree because …… …… …… …… …… …… …… …… …… …… If disagree, go to question MO9	
MO9. THE SMAGS DID NOT UNDERSTAND MY **BELIEFS** ON THE CARE OF THE NEWBORN *To what extend do you agree with this statement concerning the ENCGMI Sessions you had in the MWH?*	Strongly disagree ..... 1 Disagree ..... 2 Neither agree nor disagree ..... 3 Agree ..... 4 Strongly agree ..... 5 D/K 98	

MO10. WHY DID "AGREE" OR STRONGLY "AGREE"?	I agree because …… …… …… …… …… …… …… …… …… …… …… If disagree, go to question MO11	
MO11. THE SMAGS **LOOKED DOWN ON ME** AND THE WAY I LIVE MY LIFE *To what extend do you agree with this statement concerning the ENCGMI you participated in in the MWH?*	Strongly disagree ..... 1 Disagree ..... 2 Neither agree nor disagree ..... 3 Agree ..... 4 Strongly agree ..... 5 D/K 98	
MO12. WHY DID "AGREE" OR STRONGLY "AGREE"?	I agree because …… …… …… …… …… …… …… …… …… …… If disagree, go to question MO13	

MO13. THE ADVICE THAT I WAS GIVEN BY SMAGS WENT **AGAINST MY PERSONAL BELIEFS** *To what extend do you agree with this statement concerning the ENCGMI you participated in in the MWH?*	Strongly disagree ..... 1 Disagree ..... 2 Neither agree nor disagree ..... 3 Agree ..... 4 Strongly agree ..... 5 D/K 98	
MO14. WHY DID "AGREE" OR STRONGLY "AGREE"?	I agree because …… …… …… …… …… …… …… …… …… If disagree, go to question MO15	
MO15. THE SMAGS DIDN'T TAKE MY **FEELINGS** INTO ACCOUNT *To what extend do you agree with this statement concerning the ENCGMI you participated in in the MWH?*	Strongly disagree ..... 1 Disagree ..... 2 Neither agree nor disagree ..... 3 Agree ..... 4 Strongly agree ..... 5 D/K 98	
MO16. WHY DID "AGREE" OR "STRONGLY AGREE"?	I agree because …… …… …… ……	

	…… …… …… …… …… …… If disagree , go to question MO17	
MO17. THE SMAGS DID NOT **TREAT ME AS AN EQUAL** *To what extend do you agree with this statement concerning the ENCGMI you participated in in the MWH?*	Strongly disagree ..... 1 Disagree ..... 2 Neither agree nor disagree ..... 3 Agree ..... 4 Strongly agree ..... 5 D/K 98	
MO18. WHY DID "AGREE" OR "STRONGLY AGREE"? *CONFIDENCE # MO9*	I agree because …… …… …… …… …… …… …… …… If agree , go to question MO19	
MO19. HOW SATISFIED WERE YOU WITH THE ENCGMI SESSIONS TAKING **PLACE IN THE MWH?** *ASK THE WOMAN TO INDICATE HER LEVEL OF SATISFACTION* *WITH A NUMBER BETWEEN **0-10**, WITH*	My level of satisfactions is___ ___ / Not Applicable	

• *10 BEING COMPLETELY SATISFIED AND* • *0 BEING NOT SATISFIED AT ALL.*		
MO20. WHY WERE YOU "FAIRLY" OR "VERY DISSATISFIED? • *9-10: VERY SATISFIED* • *6-8: SATISFIED* • *3-5: DISSATISFIED* • *0-2: VERY DISSATISFIED*	I was dissatisfied because …… …… …… …… …… …… …… …… …… If dissatisfy, go to question to next section	

Section 5

Structured Interview:

Pregnancy History Questionnaire

When to Administer:

In the Postnatal Ward, after Delivery

Date Administered: _____

SECTION 5: PREGNANCY HISTORY PH

This module is to be administered, **during the home visit follow up**, to **all** women participating in the study.
Ask the woman to give you her **last pregnancy's Antenatal Card** and fill in the entries bellow, based on what is written on the card.
If the woman has no Antenatal card, then ask her questions and fill in the questions based on her answers.

PH1. SAFE MOTHERHOOD REGISTER NUMBER	SM #:_____ Don't Know #..... 98	
PH2. HEIGHT	Height: _____	
PH3. SYPHILIS AND HIV TESTS	RPR 1: _____ RPR 2: _____ HIV: _____ Don't Know Results..... 98	
PH4. OBSTETRIC HISTORY: LMP: Last Menstrual Period EDD: Expected Date of Delivery Gravida: Number of pregnancies Para: Number of delivered children	LMP: _____ EDD: _____ Gravida: _____ Para: _____	
PH5. FINDINGS DURING THE LAST ANC VISIT: **ANY ANTENATAL RISK FACTORS**?	**Antenatal Risk Factors** **Yes** **No** Blood Pressure..... 1 2 Proteinuria..... 1 2 Gross oedema..... 1 2 Vaginal Blood loss.....1 2 Suspected Post maturity..... 1 2 Unstable lie or malposition..... 1 2 Intercurrent Illnesses.....1 2	

PH6. FINDINGS DURING THE LAST ANC VISIT: **ANY MATERNAL RISK FACTORS**?	**Maternal Risk Factors** **Yes No** Younger than 16 or Older than 35 ... 1 2 Height less than 150 cm ..... 1 2 Limp or polio leg ..... 1 2 Gravida 8 or more .....1 2 Previous Caesarean Section ..... 1 2 Vacuum extraction previous delivery 1 2 Previous third stage complications ..1 2 Ten years or more since last delivery1 2 Stillbirth in the last pregnancy..... 1 2 Neonatal death in the last pregnancy 1 2	
PH7. HOW MANY **TIMES** DID YOU RECEIVE ANTENATAL CARE DURING THE LAST PREGNANCY?	Number of times..... __ __ DK..... 98	
PH8. WHERE DID YOU **GIVE BIRTH** TO (*name*)?	Hospital Maternity Ward ..... 1 Maternity Waiting Home ..... 2 Other (*specify*)_____ 8	
PH9. HOW EASILY DID YOU DELIVER?	Normal ..... 1 Forceps/Vacuum used ..... 2 Caesarean Section ..... 3 Other (*specify*)..... 8	
PH10. WHAT IS/WAS THE SEX OF THE BABY?	Male ..... 1 Female ……..... 2	

PH11. NEWBORN HEALTH: IS THE BABY ALIVE OR DEAD?	Alive..... 1 Dead ..... 2 Caesarean Section ..... 3 Other (*specify*)..... 8	

Section 6

Structured Interview:

Newborn Care Questionnaire

When to Administer:

At Home or Health Facility, 2-6 Weeks after Delivery

Date Administered: _____

SECTION 6: POST NATAL CARE OF NEWBORNS		PNC
The following questions are to be asked to mothers **2-6 Weeks after delivery, during home follow up visit, or when they come for the 6 weeks postnatal visit at the health facility.** The questions look at the mother's post natal care of the newborn, during the first 7 days of life.		
MATERNAL N CARE OF THE NEWBORN		
CARE OF THE UMBILICAL CORD AND THE SKIN		
PNC1. SOMETHING WAS APPLIED ON THE CORD STUMP IN THE FIRST 7 DAYS OF LIFE	Yes ..... 1 No ..... 2 DK 8	 2⇨PNC6 8⇨PNC7
PNC2. WHO APPLIED IT ON THE CORD STUMP?	Myself ..... 1 My Husband ..... 2 Mother in-law ..... 3 My mother ..... 4 My Grand-Mother ..... 4 Other, Specify_____	
PNC3. WHAT SUBSTANCE WAS APPLIED ON THE CORD STUMP	Substance:_____	
PNC4. HOW MANY TIMES WAS THE SUBSTANCE APPLIED ON THE CORD STUMP?	Number of times:_____	
PNC5. WHY WAS THE SUBSTANCE APPLIED ON THE CORD STUMP	To accelerate healing ..... 1 To prevent infection ..... 2 Others, Specify_____	
PNC6. WHY DID YOU NOT APPLY SOMETHING ON THE CORD STUMP IN THE FIRST 7 DAYS OF LIFE?	Reason: _____ _____ DK 8	

THERMAL CARE

PNC7. WHEN DID YOU BATH YOUR BABY FOR THE FIRST TIME?	Immediately after birth ..... 1 Within 2 hours..... 2 Within 2-4 hours ..... 3 Within 5-24 hours ..... 4 After 1 or more days ..... 5 After 1 week ..... 5 DK..... 8	
PNC8. WHO BATHED THE BABY FOR THE FIRST TIME?	Myself ..... 1 My mother..... 2 My mother in law ..... 3 My Gran mother ..... 4 Other, Specify_____	
PNC9. WHY DID YOU/SHE BATH THE BABY FOR THE FIRST TIME?	Reason: _____ _____ _____ DK..... 8	
PNC10. DID YOU KEEP YOUR BABY WARM?	Yes ..... 1 No..... 2 DK..... 8	 2⇨PNC14 8⇨PNC15
PNC11. WHICH METHOD DID YOU USE TO KEEP YOUR BABY WARM?	**YES NO** Delay bath for few days 1 2 Skin to Skin Care 1 2 Wrap baby in a warm cloth 1 2 Keep the room heated 1 2 Massage the baby with oil 1 2 Breastfeed every 1-2 hours 1 2 Other …… *Specify*	
PNC12. DID YOU PRACTICE SKIN-TO-SKIN CARE OF YOUR BABY WITHIN THE FIRST 24 HOURS	Yes ..... 1 No..... 2 DK..... 8	

PNC13. HOW DID YOU DO THE SKIN-TO-SKIN CARE?	**YES** **NO** Naked baby firmly placed on the mother's bare chest 1 2 Baby was in upright position? 1 2 Breastfeeding the baby frequently 1 2 Other …… *Specify*	
PNC14. WHY DID YOU NOT KEEP THE BABY WARM?	Reason: _____ _____ _____ DK 8	
BREASTFEEDING		
PNC15. DID YOU EVER **BREASTFEED** (*NAME*)?	Yes ..... 1 No 2	2⇨PNC22
PNC16. HOW LONG AFTER BIRTH DID YOU FIRST PUT (*NAME*) TO THE BREAST? *If less than 1 hour, record '00' hours.* *If less than 24 hours, record hours.* OTHERWISE, RECORD DAYS.	Immediately ..... 000 Hours ..... 1 __ __ Days ..... 2 __ __ Don't know / remember 998	
PNC17. IN THE FIRST SEVEN DAYS AFTER DELIVERY, WAS (NAME) GIVEN ANYTHING TO DRINK OTHER THAN BREAST MILK?	Yes ..... 1 No 2	2ðPNC19
PNC18. WHAT WAS (*NAME*) GIVEN TO DRINK?	Drink:_____ DK 8	

PNC19. DID YOU BREASTFEED YOUR BABY ON DEMAND RATHER THAN ACCORDING TO A TIMETABLE.	Yes ..... 1 No ..... 2 DK 8	2⇨PNC21 8⇨PNC22
PNC20. DID YOU BREASTFEED YOUR BABY AT NIGHT?	Yes ..... 1 No ..... 2 DK 8	
PNC21. WHY DID YOU NOT BREASTFEED YOUR BABY ON DEMAND?	Reason: _____ _____ _____ DK 8	
BCG IMMUNIZATION		
PNC22. DID YOU TAKE YOUR BABY FOR BCG VACCINATION?	Yes ..... 1 No ..... 2 DK 8	2⇨PNC24 8⇨PNC25
PNC23. WHY YOU TAKE THE BABY FOR BCG VACCINATION?	Reason(s): _____ _____ _____ DK 8	
PNC24. WHY DID YOU NOT TAKE THE BABY FOR BCG VACCINATION?	Reason(s): _____ _____ _____ DK 8	
6 DAYS POSTNATAL CARE		
PNC25. DID YOUR BABY RECEIVE 6 DAYS POST-NATAL CARE CHECK-UPS?	Yes ..... 1 No ..... 2 DK 8	2⇨PH28 8⇨29

PNC26. WHAT WAS/WERE THE REASON(S) WHY YOU TOOK YOUR BABY FOR THE 6 DAYS POST-NATAL CARE?	Reason(s): _____ _____ _____ DK 8	
PH27 WHICH FACTORS DID YOU CONSIDER WHEN SELECTING THE PLACE WHERE TO RECEIVE THE 6 DAYS POST-NATAL SERVICES?	Factor(s): _____ _____ _____ DK 8	
PNC28. WHY DID YOU NOT TAKE YOUR BABY FOR 6 DAYS POST-NATAL CARE CHECK-UPS?	Reason(s): _____ _____ _____ DK 8	
MATERNAL ATTITUDE ABOUT SIGNS IN THE NEWBORN THAT NEED URGENT ATTENTION OF A HEALTH WORKERS		
SIGNS THAT NEED URGENT ATTENTION OF HEALTHCARE PROVIDER		
PNC29. DID THE BABY STOP SUCKING DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC30. DID THE BABY GET ABNORMAL JERKY MOVEMENTS (FITS) IN LIMBS DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC31. DID THE BABY HAVE CONTINUOUS RAPID BREATHING DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC32. DID THE BABY'S EYES BECOME RED WITH PUS COMING OUT DURING THE FIRST 7 DAYS	Yes ..... 1 No ..... 2 DK 8	

AFTER DELIVERY?		
PNC33. DID THE BABY'S SKIN BECOME COLD TO TOUCH DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC34. DID THE BABY HAVE HOT BODY DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC35. DID THE BABY BECOME LAZY DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC36. DID THE BABY HAVE YELLOWISH VOMITUS DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC37. PASSING WATERY, LIQUID MOTIONS 3 OR MORE TIMES OR > 9 MOTIONS OF NORMAL CONSISTENCY IN 24 HOURS: OR BLOOD IN LIQUID STOOL DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC38. DID THE BABY DEVELOP YELLOWISH EYES, PALMS OR SOLES DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC39. DID THE SKIN AROUND THE UMBILICUS BECOME RED AND THICK DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC40. DID YOU NOTICE SOME PUS COMING OUT FROM THE CORD STUMP DURING THE FIRST 7 DAYS AFTER DELIVERY?	Yes ..... 1 No ..... 2 DK 8	
PNC41. DID YOU SEEK ANY MEDICAL ATTENTION IN THE FIRST 7 DAYS OF LIVE??	Yes ..... 1 No ..... 2 DK 8	 2⇨END 8⇨END

PNC42. WHOM DID YOU CONSULT?	Health Worker ..... 1 CHW ..... 2 Other, specify_____	