

**POST-MORTEM LESSONS: COMMUNITY-BASED MODEL FOR PREVENTING
MATERNAL MORTALITY AND NEWBORN DEATH IN ETHIOPIA**

by

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DECLARATION

I declare that the thesis on **POST-MORTEM LESSONS: COMMUNITY-BASED MODEL FOR PREVENTING MATERNAL MORTALITY AND NEWBORN DEATH IN ETHIOPIA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.



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ABSTRACT

Ethiopia is one of the five nations that bear the global burden of nearly 50% maternal mortalities and newborn deaths. Cause-specific maternal mortality and newborn death information are vitally important for prevention, but little is known about the causes of deaths. Many maternal mortalities and newborn deaths occur at home, outside the formal health sector, and few are attended by qualified medical professionals. Despite the fact that, non-medical factors are often more important in determining whether a woman/newborn lives or dies than the medical cause of death itself. This study determines and explores factors contributing to maternal mortalities and newborn deaths in Ethiopia with the aim of developing a community-based model for averting maternal mortalities and newborn deaths in Ethiopia.

The study was organised in three phases. In Phase 1, a community-based-retrospective approach using explorative, descriptive and contextual study design, combining both qualitative and quantitative methods (mixed methods) were used to make an in-depth investigation and analysis of the circumstances and events surrounding individual cases of maternal mortality and newborn deaths. The result of the study revealed various direct and indirect as well as possible contributing factors to maternal mortalities and newborn deaths which outlined bases for forwarding Phase 2 of the study called concept analysis. In Phase 3, a prototype model was developed according to Chinn and Kramer's approach to theory generation: initially, based on the empirical perspectives of the study, concept analysis was conducted. The structure and process of a model to avert maternal mortality and newborn death were described; and, six survey list; namely, agent, recipient, context, procedure, dynamic and terminus of Dickoff, James and Wiedenbach (1968) form the basis for development and description of a model for averting maternal mortality and newborn deaths in Ethiopia.

Impediment in receiving prompt, adequate and appropriate care were common problems encountered even after reaching an appropriate medical facility. For any attempt to attain a significant reduction in maternal mortality and newborn death, the health care system in Ethiopia must assume its tasks to institute critical changes in both the structure and process of health care delivery services.

Key concepts

Community health; Ethiopia; Maternal mortality; Maternal and Newborn Health (MNH); Newborn death; Prevention; Verbal autopsy.

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Dedication

*I to MOTHERS - who compromise their life and health- through pregnancy
& child birth - to propagate all of us- the human race.*

What should have been done to rescue you that had not been done?

to my wife- MOTHER OF MY THREE marvellous children

to MY MOTHER - giving birth to me-)

to MOTHERS!

TABLE OF CONTENTS

CHAPTER 1	1
INTRODUCTION AND ORIENTATION TO THE STUDY	1
1.1 INTRODUCTION.....	1
1.2 BACKGROUND TO THE RESERCH PROBLEM	2
1.2.1 The health system features of Ethiopia	3
1.2.2 Epidemiology and the burden.....	4
1.2.3 Beyond numbers – answering the "why"	6
1.2.4 Maternal and newborn death audit/review in Ethiopia.....	7
1.3 STATEMENT OF THE RESEARCH PROBLEM.....	8
1.4 RESEARCH QUESTION.....	10
1.5 PURPOSE AND OBJECTIVES OF THE STUDY	10
1.6 SIGNIFICANCE OF THE STUDY	10
1.7 DEFINITION OF CONCEPTS	11
1.8 THEORETICAL FRAMEWORK OF THE STUDY	14
1.9 RESEARCH PARADIGM	17
1.10 THE RESEARCH METHODOLOGY AND DESIGN	18
1.10.1 Design chosen	18
1.10.2 Phase 1: Research methodology	18
1.10.3 Phase 2: Concept analysis.....	19
1.10.4 Phase 3: Model development.....	19
1.10.5 Ethical considerations	20
1.10.5.1 Obtaining informants consent before the study begins	20
1.10.5.2 Confidentiality	20
1.10.5.3 The culture	20
1.10.5.4 Obtaining ethical clearance	20
1.11 ORGANISATION OF PROPOSED STUDY	21
1.12 CONCLUSION	22
CHAPTER 2	23
LITRATURE REVIEW	23
2.1 INTRODUCTION.....	23
2.2 THE BURDEN AND EPIDEMIOLOGY OF MATERNAL MORTALITY AND NEWBORN DEATH	23
2.3 THE INEXTRICABLE LINK BETWEEN MOTHERS AND NEWBORNS	27
2.4 CAUSES OF MATERNAL MORTALITY AND NEWBORN DEATH	30
2.5 THE SAFE MOTHERHOOD INITIATIVE – 25 YEARS AND PLUS AT A GLANCE	33

2.6	WHY SLOW PROGRESS IN REDUCING MATERNAL MORTALITY AND NEWBORN DEATH?	36
2.6.1	Lack of clear strategic direction	37
2.6.2	Lack of availability and accessibility of emergency obstetric care (EOC)	39
2.6.3	Poor commitment and lack of political will	40
2.6.4	Health system failure	41
2.6.5	Misconceptions	42
2.6.6	Ineffective use of traditional birth attendant (TBA)	42
2.6.7	Family planning	43
2.6.8	Unsafe abortion and lack of access to safe abortion service	44
2.7	COMMUNITY-BASED MATERNAL AND NEWBORN HEALTH CARE INTERVENTIONS	45
2.7.1	Interventions based on community participation	45
2.7.3	Treatment of perinatal sepsis	46
2.7.4	Management of post-partum haemorrhage	47
2.7.5	Collaboration with traditional birth attendants	47
2.7.6	Need for large scale community-based maternal and newborn public health trials	48
2.8	CONTINUUM OF MATERNAL, NEWBORN, AND CHILD CARE	48
2.9	MATERNAL MORTALITY AND NEWBORN DEATH IN ETHIOPIA	53
2.10	MATERNAL MORTALITY AND NEWBORN DEATH REVIEW/AUDIT	56
2.11	MATERNAL MORTALITY AND NEWBORN DEATH REVIEW/AUDIT IN ETHIOPIA	57
2.12	CONCLUSION	58
CHAPTER 3		60
RESEARCH DESIGN AND METHODOLOGY		60
3.1	INTRODUCTION	60
3.2	THE RESEARCH DESIGN CHOSEN	61
3.2.1	Phase 1: Research design	62
3.2.1.1	Qualitative methods	63
3.2.1.2	Quantitative methods	64
3.2.2	Phase 2: Concept analysis	65
3.2.3	Phase 3: Model development	66
3.3	THE RESEARCH METHODOLOGY	66
3.3.1	Study setting	66
3.3.2	Quantitative methods	68
3.3.2.1	Population and sampling	68
3.3.2.2	Data collection method	72
3.3.3	Qualitative methods	73

3.3.3.1	Population and sampling	73
3.3.3.2	Data collection method.....	75
3.3.4	Data collection instruments	76
3.3.4.1	Quantitative data collection instruments	76
3.3.4.2	Qualitative data collection instruments	77
3.3.4.3	Pre-testing of the data collection instrument.....	77
3.3.4.4	Reliability of data collection instrument.....	78
3.3.5	Case identification and reporting	78
3.3.6	Methods of establishing the cause of deaths.....	79
3.3.6.1	Establish the medical cause of death	79
3.3.6.2	Determine the non-medical causes of death	79
3.3.6.3	Determination of preventability	80
3.3.7	Data collection processes	81
3.3.8	Research assistants and data collectors	82
3.3.9	Data handling.....	83
3.3.9.1	Quantitative data handling.....	83
3.3.9.2	Qualitative data handling.....	83
3.3.10	Data analysis	84
3.3.11	Validity and rigour of the study	85
3.3.11.1	Truth value	86
3.3.11.2	Applicability	87
3.3.11.3	Consistency	87
3.3.11.4	Neutrality.....	88
3.3.11.5	Content validity.....	88
3.3.11.6	Internal validity	88
3.3.11.7	External validity	89
3.4	PHASE 2: CONCEPT ANALYSIS	90
3.5	PHASE 3: MODEL DEVELOPMENT	90
3.6	ETHICAL CONSIDERATIONS	93
3.6.1	Obtaining ethical clearances	93
3.6.1.1	Ethical clearance processes.....	93
3.6.2	Obtaining informants consent and authorisation.....	94
3.6.3	Beneficence	94
3.6.4	Non-maleficence	95
3.6.5	Respect for human dignity.....	96
3.6.6	Principle of distributive justice	96
3.6.7	Autonomy.....	96
3.6.8	Privacy and anonymity	96

3.6.9	Confidentiality	97
3.6.10	The culture	97
3.7	CONCLUSION	97
CHAPTER 4		98
FINDINGS PRESENTATION, ANALYSIS AND DISCUSSION		98
4.1	INTRODUCTION.....	98
4.2	ACCOUNT OF CASE IDENTIFICATION.....	99
4.2.1	Identification and reporting of case.....	100
4.2.2	Participants indecisiveness	101
4.2.3	The health records	102
4.2.4	The data collector and the route to data collection	102
4.2.5	Standards of practice	103
4.3	QUANTITATIVE RESEARCH FINDINGS, INTERPRETATIONS AND DISCUSSIONS	104
4.3.1	Place and levels of death	104
4.3.2	Demographic and socio-economic characteristics.....	106
4.3.2.1	The respondents	107
4.3.2.3	Marital status.....	109
4.3.2.4	Residential status, ethnicity and religion.....	110
4.3.2.5	Education, occupations and socio-economic level.....	111
4.3.3	Prenatal history	114
4.3.3.1	Reproductive history	114
4.3.3.2	Medical history	115
4.3.3.3	Pre-existing medical conditions and prenatal risk factors/complications	121
4.3.3.4	Complications during third trimester of pregnancy.....	122
4.3.3.5	Tetanus Toxoid (TT) Vaccination during pregnancy	123
4.3.4	Labour information	124
4.3.4.1	Maternal events during labour	124
4.3.4.2	On-set of seeking, reaching and receiving care.....	125
4.3.5	Delivery information	126
4.3.5.1	Places and methods of delivery.....	126
4.3.5.2	Delivery outcomes.....	128
4.3.5.3	Assistance during delivery.....	128
4.3.5.4	Very common issues identified at health facilities.....	129
4.3.6	Conditions of the newborn baby soon after birth.....	130
4.3.6.1	Cord care	130
4.3.6.2	Crying/breath at birth.....	130
4.3.6.3	Birth weight	131

4.3.6.4	Breastfeeding practices	132
4.3.7	Information on death	134
4.3.7.1	Information on the newborn death	134
4.3.7.2	Information on the maternal death	139
4.4	QUALITATIVE RESEARCH FINDINGS, INTERPRETATIONS AND DISCUSSIONS	143
4.4.1	Potentially avoidable factors and getting on with what works	143
4.4.1.1	Delay in decision to seek care	144
4.4.1.2	Delay in reaching care	153
4.4.1.3	Delay in receiving care	158
4.4.1.4	Family's attitude towards the quality of care	161
4.4.2	Selected maternal and newborn health care management gaps	165
4.4.2.1	Blood transfusion management	165
4.4.2.2	Management of hypertensive disorder – Diazepam/Magnesium sulphate	168
4.4.2.3	Access to newborn intensive care services	170
4.5	CONCLUSION	172
	CHAPTER 5	173
	CONCEPT ANALYSIS	173
5.1	INTRODUCTION	173
5.2	CONCEPT ANALYSIS	173
5.2.1	Selecting concept of interest, relevance, importance and usefulness	174
5.2.2	Why the concept analysis? – aims or purposes	174
5.2.3	Identify uses, characteristics or connotations of the concept	175
5.2.4	Determine the defining attributes	179
5.2.4.1	Provision of home and/or community level skilled care	179
5.2.4.2	Linking household, communities and facilities	179
5.2.4.3	Community participation and mobilisation	180
5.2.5	Identify cases	180
5.2.5.1	Model case and analysis	181
5.2.5.2	Borderline cases and analysis	182
5.2.5.3	Contrary case and analysis	184
5.2.6	Identify antecedents and consequences	184
5.2.6.1	Antecedents	185
5.2.6.2	Consequences	186
5.2.7	Define empirical referents	188
5.3	CONCLUSION	189

CHAPTER 6.....	190
COMMUNITY-BASED MODEL FOR AVERTING MATERNAL MORTALITY AND NEWBORN DEATH IN ETHIOPIA	190
6.1 INTRODUCTION.....	190
6.2 AGENCY: WHO OR WHAT PERFORMS THE ACTIVITY?.....	190
6.2.1 Agents at home/community.....	191
6.2.2 Agents during transportation	192
6.2.3 Agent at the health facilities.....	192
6.3 RECIPIENT: WHO AND WHAT IS THE RECIPIENT OF THE ACTIVITY?.....	193
6.4 CONTEXT: IN WHAT CONTEXT IS THE ACTIVITY PERFORMED?	194
6.4.1 Home and/or community context.....	194
6.4.2 During transportation context	195
6.4.3 Health facility (clinical) context	196
6.5 PROCEDURE: WHAT IS THE GUIDING PROCEDURE, TECHNIQUE OR PROTOCOL OF THE ACTIVITY?	197
6.5.1 Stakeholders consultative workshops.....	198
6.5.2 Training	201
6.5.3 Awareness campaigns	202
6.5.4 Performance-based incentives	202
6.5.5 Team building	203
6.5.6 Periodic assemblies/meetings.....	203
6.6 DYNAMICS – WHAT IS THE ENERGY SOURCE FOR THE ACTIVITY?	204
6.6.1 Deployment in own community.....	204
6.6.2 Culturally acceptable intervention.....	205
6.6.3 Capacity building of community midwives	205
6.6.4 Linkage with health facilities	206
6.6.5 Regular reporting and feedback	206
6.6.6 Support from governmental and non-governmental organisations (NGOs).....	206
6.6.7 Establishment of social network (cluster) and regular monthly meetings	206
6.7 TERMINUS: What is the endpoint of the activity?.....	207
6.8 SCHEMATIC REPRESENTATION OF THE MODLE	207
6.9 EVALUATION (CRITICAL REFLECTIONS) OF THE MODEL.....	210
6.10 CONCLUSION	212
CHAPTER 7	213
CONCLUSIONS AND RECOMMENDATIONS	213
7.1 INTRODUCTION.....	213
7.2 SYNOPSIS OF THE RESEARCH DESIGN AND METHODOLOGY	216
7.3 SUMMARY OF THE RESEARCH FINDINGS	216

7.3.1	General features of maternal mortalities and newborn deaths in the study area...	216
7.3.2	Socio-economic and cultural factors surrounding maternal mortality and newborn deaths.....	217
7.3.3	Health service factors associated with maternal mortality and newborn death	219
7.3.4	The community approach best practices to enhance safe maternal and newborn birth	224
7.3.5	A prototype model to enhance/strengthen health service provision to address the maternal mortality and neonatal death – getting on with what works	225
7.4	CONCLUSIONS OF THE STUDY	226
7.5	RECOMMENDATIONS	229
7.5.1	Improving quality and access to emergency obstetric and newborn care	229
7.5.2	Improving access and quality of maternal and newborn health services.....	231
7.5.2.1	Antenatal care registration	231
7.5.2.2	Quality of antenatal care services.....	231
7.5.2.3	Transporting obstetric emergencies	231
7.5.2.4	Transfusion service at hospitals	232
7.5.2.5	User fees.....	232
7.5.2.6	Monitoring and evaluation	232
7.5.2.7	Resource allocation.....	233
7.5.3	Enhancing community partnership in maternal and newborn health care	233
7.5.3.1	Danger signs.....	233
7.5.3.2	Relationship between health personnel and users of the services.....	233
7.6	FUTURE RESEARCH.....	234
7.7	OTHERS	234
7.8	CONTRIBUTION TO THE BODY OF KNOWLEDGE	235
7.9	LIMITATION OF THE STUDY	235
7.9.1	The nature of verbal autopsy technique	235
7.9.2	Health facility-based studies.....	236
7.9.3	Possibility of flawed classification of a disease	236
7.9.4	Quality of health facility data.....	236
7.9.5	Sensitive issue	236
7.9.6	Validity concern.....	237
7.9.7	Reliability concern	237
7.10	CONCLUDING REMARKS.....	238
	LIST OF REFERENCES	239

APPENDIXES	275
APPENDIX 1: University of South Africa ethical clearance certificate	276
APPENDIX 2: Request for Research Ethics Clearance	277
APPENDIX 3: Permission of Research form the Ministry of Science and Technology	278
APPENDIX 4: Request for support letter to access health facility record and respective care givers of the deceased	279
APPENDIX 5: Permission letter to access health facility record from the MoH.....	280
APPENDIX 6: Maternal death – Verbal autopsy questionnaire	281
APPENDIX 7: Newborn death – Verbal autopsy questionnaire	290
APPENDIX 8: Maternal Deaths Taxonomy form Verbal Autopsy	300
APPENDIX 9: Consent form for the deceased mother's/newborn care giver	302

LIST OF TABLES

Table 3.1	Purposes and descriptions of mixed methods research	61
Table 3.2	Portray of the selected study sites/areas	67
Table 3.3	Maternal and Newborn profile of the study area.....	72
Table 3.4	Criteria for assessing the trustworthiness of the research findings according to quantitative and qualitative research traditions	85
Table 4.1	Places of maternal mortality and newborn death	105
Table 4.2	Maternal and newborn profile of the study area	106
Table 4.3	Person caring for the mother before death, and around at the time of death....	107
Table 4.4	Presence of respondent during the period of the newborn illness and death ...	108
Table 4.5	Socio-demographic characteristics of the deceased women and newborn baby's mothers	110
Table 4.6	Educational level and occupational status of the deceased mother and her husband.....	112
Table 4.7	Description of antenatal care services received	118
Table 4.8	ANC investigation record summary of the deceased women	121
Table 4.9	Complications during third trimester of pregnancy	123
Table 4.10	TT Vaccination during pregnancy	124
Table 4.11	Maternal events during labour	125
Table 4.12	Place and method of delivery.....	127
Table 4.13	Assistance during delivery	129
Table 4.14	Common issues at the health facilities.....	129
Table 4.15	Babies crying and breathing at birth.....	131
Table 4.16	Birth weight.....	132
Table 4.17	Breastfeeding practices	133
Table 4.18	Vital information of the babies.....	135
Table 4.19	Description of identified maternal mortality cases	140
Table 4.20	Delay in seeking care	145
Table 4.21	Modes, distance and time for reaching care	155
Table 4.22	Delay in receiving care at health facility	159
Table 6.1	Summary (matrix) of key inputs for the maternal and newborn care workshop/seminar in Ethiopia	201
Table 6.2	Delay in receiving care at health facility	211

LIST OF FIGURES

Figure 1.1	The three phase delay theoretical framework	16
Figure 2.1	Conceptual framework for maternal and neonatal mortality and morbidity	30
Figure 2.2	Continuum over the dimension of time (throughout the lifecycle)	50
Figure 2.3	Continuum over the dimension of place or level of care.....	51
Figure 2.4	Newborn and maternal health situation in Ethiopia	54
Figure 3.1	Phases of the research.....	62
Figure 3.2	Path-to-survival.....	80
Figure 4.1	Maternal age distribution of the deceased mother and mothers of the newborn babies	109
Figure 4.2	Number of pregnancies (gravidity)	115
Figure 4.3	Major causes of newborn death.....	136
Figure 4.4	Distribution of newborn death by the number of days	137
Figure 6.1	Agent and recipient of the maternal and newborn care	193
Figure 6.2	The level and context in which prevention of maternal mortality and newborn death should be practiced.....	197
Figure 6.3	Procedures and protocols that revolve around during the use of the model.....	198
Figure 6.4	The dynamics – power sources that can drive the activity towards the attainment of the goal	204
Figure 6.5	The terminus or endpoint of the activity	207
Figure 6.6	Model for preventing maternal mortality and newborn death in Ethiopia	208

LIST OF ABBREVIATIONS

BEmONC	Basic Emergency Obstetric and Newborn Care
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CM	Community Midwife
CSA	Central Statistics Authority
EDHS	Ethiopian Demographic and Health Survey
EOC	Emergency Obstetric Care
FMoH	Federal Ministry of Health
HEW	Health Extension Worker
HMIS	health management and information system
HO	Health Officer
HP	Health Post
HSDP	Health Sector Development Plans
ICD	International Classification of Disease
IEOS	Integrated Emergency Obstetric and Surgery
IMR	Internal Migration Rate
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MNC	Maternal and Newborn Care
MoH	Ministry of Health
NRERC	National Research Ethics Review Committee
PHCU	Primary Health Care Unite
RHB	Regional Health Bureau
SNNPR	Southern Nations and Nationalities Peoples Region
TBA	Traditional Birth Attendant
UN	United Nation
UNFPA	United Nations Fund for Population Affairs
UNICEF	United Nations Children's Fund
VA	Verbal Autopsy
VAQ	Verbal Autopsy Questionnaire
WHO	World Health Organization

CHAPTER 1

INTRODUCTION AND ORIENTATION TO THE STUDY

1.1 INTRODUCTION

"Each year, millions of women and children die from preventable causes. These are not mere statistics. They are people with names and faces. Their suffering is unacceptable in the 21st century. We must, therefore, do more for the newborn ... and for the mother who faces complications in childbirth."

Ban Ki-moon, UN Secretary General 2010:1

Pregnancy for a woman, her family and her community is a time of expectation and joyfulness. Even so, they are by no means risk-free. Unfortunately, as wonderful and joyful incident as it is for many, it can also be an easier said than done period, bringing with it new problems as well as the potential for sufferings. In the most extreme cases the mother, the baby, or both may die. And yet, these deaths are only the "tips of the iceberg" (UNICEF 2009:80; WHO 2005:62-74). Many health problems are laid down in the critical period of childbearing – both for the mother and for the newborn child. Many more health concerns continue to unfold in the days and weeks after the birth. Nonetheless, global efforts to reduce deaths among women from complications related to pregnancy and childbirth have been less successful than other areas of human development – with the result that having a child remains among the most serious health risks for both the women and their newborn babies (CSoA & PAI 2009:61-70; WHO 2015:17).

Nearly 90% of Ethiopian mothers deliver at home, without any skilled birth attendant, for a range of socio-cultural, economic and health service factors (CSA 2011:126, CSA 2014:45). Hence, many maternal mortalities and newborn deaths in Ethiopia and in most of the developing countries occur at home, outside the formal health sector, and few are attended by qualified medical professionals (WHO 2005:18). Indeed, high quality death registration data exists in only 23 of about 200 countries (Mathers, Fat, Inoue, Rao & Lopez 2005:171-177; WHO 2014b:71) and, more than two-thirds of deaths worldwide occur without any medical death certification (Baiden, Bawah, Biai et

al 2007:570-571). Statistical facts on the levels of death are important but not enough to identify what can be done to prevent such unnecessary deaths. In order to stop the deaths, the right kind of information is needed upon which to base actions. Cause-specific death information are vitally important for health sector planning (Thatte, Kalter, Baqui, Williams & Darmstadt 2009:187-194; WHO 2014b:71). However, little is known about the causes of maternal and newborn mortalities in many developing countries because vital registration systems are lacking (Mathers et al 2005:171-177; WHO 2014b:71).

A post-mortem in-depth interview with the primary caregiver of the deceased, is increasingly become invaluable in revealing factors surrounding the death. It is an alternative approach recommended by the World Health Organization to determining causes of death in developing countries due to lack of robust or weak death registration system (Danso, Atwell, Johnson, Asbroek, Soromekun, Edmond, Hurt, Hurt, Zandoh, Tawiah, Fenty, Etego, Agyei & Kirkwood 2013:67-101; Soleman, Chandramohan & Shibuya 2006:239-245). Based on the techniques of death review/audit, thus, this study is designed to describe and explore factors contributing to maternal mortalities and neonatal deaths in Ethiopia so as to be able to develop a model to prevent/reduce the number of casualties.

1.2 BACKGROUND TO THE RESERCH PROBLEM

“A deep, dark continuous stream of mortality ... how long is this sacrifice to go on?” (Farr 1838; Farr 1876:241). The first registry-general of England and Wales, William Farr, speculated about the unfair high maternal mortality and newborn death in England in 1838 and onwards. It is now nearly two centuries but this question has still remained as a glowing concern. The risk of maternal mortality and newborn death during pregnancy, childbirth or shortly after delivery is now very rare in industrialised countries in general. Nevertheless, it is still an everyday event in most part of Africa; as well as, in many parts of Asia and Latin America. Ethiopia is one of the five nations that contribute about 50% percent of the global maternal mortality as well as children death (Black, Morris & Bryce 2003:2226-2234; Hogan, Foreman, Naghavi, Ahn, Wang, Lopez, Lozno & Murray 2010:60518-21; WHO 2014a:21; WHO 2014b:22-27).

1.2.1 The health system features of Ethiopia

In 2008, the Ethiopian government introduced a three-tier health care delivery system which is characterised by a first level of a Woreda (District) health system comprising a primary hospital (with population coverage of 60,000-100,000 people), health centres (1/15,000-25,000 population) and their satellite Health Posts (1/3,000-5,000 population) that are connected to each other by a referral system (MoH 2015b:7-11). A primary hospital, health centre and health posts form a primary health care unit (PHCU) with each health centre having five satellite health posts. The second level in the tier is a General (Zonal) Hospital with population coverage of 1–1.5 million people; and the third level is a Specialized (Regional) Hospital that covers population of 3.5–5 million.

Ethiopia has a total workforce of 55,373 (only counting health professionals) which translates to 0.7 health workers per 1000 population (MoH 2015b:41-50). This low health workforce density poses a serious challenge for the provision of essential health care services in the country especially in rural part. The national health management and information system (HMIS) is established and rolled out to ensure information use at all levels of health service delivery system for evidence-based health planning and decision-making.

The Government produced a health policy which was followed by the formulation of four consecutive phases of comprehensive health sector development plans (HSDPs) (MoH 2015b:4). Since the development of HSDP I which also paved the way for the subsequent HSDP II, III and IV, the Federal Ministry of Health has formulated and implemented a number of policies and strategies that afforded an effective framework for improving health in the country. This includes implementations of far reaching and focused strategies such as Making Pregnancy Safer (2000), Reproductive Health Strategy (2006), Adolescent and Youth Reproductive Health Strategy (2006), the Revised Abortion Law (2005) and the Road Map for Accelerated Reduction of Maternal and Newborn Morbidity and Mortality (2012). Others include strategies on free service for key maternal and child health services at PHCU (Health Care Financing Strategy), the training and deployment of health extension workers (HEWs) for the institutionalisation of the community health care services including clean and safe delivery at health post (HP) level, and deployment of health officers (HOs) with M Sc training in skills of integrated emergency obstetric and surgery (IEOS). In addition, the

establishment of the MDG Pool Fund and the priority given to maternal health there in is expected to mobilise the much required additional funding opportunities.

Despite major progresses that have been made to improve the health status of the population in the last one and half decades, Ethiopia's population still faces a high rate of morbidity and mortality and the health status remains relatively poor. Figures on vital health indicators from Ethiopian Demographic and Health Survey (EDHS) 2011 show a life expectancy of 54 years (53.4 years for male and 55.4 for female), and an internal migration rate (IMR) of 59/1000 (CSA 2011:3-4). Under-five mortality rate has been reduced to 88/1000 in 2010/11 (CSA 2011:109). In terms of women health, MMR has remained at 676/100,000 which is one of the highest among the world (CSA 2011:267).

The major causes of maternal death are obstructed/prolonged labour (13%), ruptured uterus (12%), severe pre-eclampsia/ eclampsia (11%) and malaria (9%). Moreover, 6% of all maternal deaths were attributable to complications from abortion. Shortage of skilled midwives, weak referral system at health centre levels, lack of inadequate availability of basic emergency obstetric and newborn care (BEmONC) and comprehensive emergency obstetric and newborn care (CEmONC) equipment, and under financing of the service were identified as major supply side constraints that hindered progress. On the demand side, cultural norms and societal emotional support bestowed to mothers, distance to functioning health centres and financial barrier were found to be the major causes (MoH 2015a:17-31; MoH 2015b:22-27).

1.2.2 Epidemiology and the burden

Based on very recent global estimates, at least 30 birth giving woman and 400 newborn babies die every single hour somewhere in the world from complications of pregnancy and childbirth; that is, well over a quarter million women and nearly 6 million babies under one month, at a minimum, dying every year (Countdown Coverage Writing Group 2008:1247-59; Kassebaum, Bertozzi-Villa, Coggeshall, Shackelford, Steiner, Heuton, Gonzalez-Medina, Barber, Huynh, Dicker et al 2014:980-1004; UNICEF 2009:117; UN IGME 2014:9; WHO 2007a:9-14). There are more than 200 maternal deaths for every 100,000 live births. In least developed countries, however, the figure ascends to 1,000 for every 100,000 live births; whereas, in more developed countries there are only 16 maternal deaths for every 100,000 live births (Kassebaum et al 2014:980-1004; WHO

2007a:9-14). The levels of maternal and newborn mortality differ greatly among the major regions of the developing world. Nearly, 11% of women globally live in Africa. But based on population alone, more than would be expected; an estimated more than 60% of maternal, child and/or newborn deaths take place only in Sub-Saharan Africa (Black et al 2003:2226-2234; Ronsmans & Graham 2006:1189-1200; UN IGME 2014:9; WHO 2014b:22-27).

Worldwide, 34% of deliveries have no skilled attendant (WHO 2008a:3). Based on this WHO estimates, these skilled attendants assist in more than 99% of births in more developed countries versus 62% in developing countries. In five countries including Ethiopia, however, the percentage skilled attendant assisted delivery is less than 20%. Furthermore, African women of reproductive age have a much higher risk. Women's life-time risk of maternal death is over 150 times higher in least developed than in the more developed countries. The life-time risk for African women is 1 in 26 compared to 1 in 120 in Asia, 1 in 7,300 in the developed regions, and in stark contrast to Ireland, which had the lowest lifetime risk, 1 in 48,000 (WHO 2005:13).

As emphasised throughout the Lancet maternal and neonatal series (Lawn, Cousens & Zupan 2005:891-898; Ronsmans & Graham 2006:1189–1200); the UN official publications (UNICEF 2009:7-24; WHO 2009:19; WHO 2005:15); and, other sound scientific researches, the general child mortality rate has significantly declined but progress in reducing maternal mortality and newborn deaths has been slow. Three regions (South-East and East Asia, North Africa and Latin America) have progressed, but the last decade has seen no progress in sub-Saharan Africa, where risks of maternal and newborn death are highest. Among the Health Millennium Development Goals, achieving the goal for maternal health (MDG5) and the child health (MDG4) – specifically newborn death – poses the greatest challenges in Sub-Saharan Africa, to which Ethiopia count one of the lion share (UNICEF 2009:118-126; WHO 2010a: 23-27). Ethiopia is one of the five countries that contribute about 50% of both the world maternal mortality and children deaths; the others being India, Nigeria, the Democratic Republic of Congo and Indonesia (Black et al 2003:2226-34; Hogan et al 2010:60518-21; WHO 2014a:21).

1.2.3 Beyond numbers – answering the "why"

Finagel's Laws states that "The data we have are not the data we want. The data we want are not the data we need. The data we need are not available" (Graham 2002:701-704). An awful lot of time, energy and money are invested on measuring levels of maternal mortality and newborn death than focusing on those factors contributing to maternal and newborn deaths. Analysis of maternal mortality and newborn deaths is more likely to yield the answers to why maternal mortality and newborn deaths continue to occur rather than investing on ratios or rates. Answering the "why" questions is more important for program planners than answering the "how much" question. Answering the "why" question will require a review or audit of maternal and newborn deaths. An audit is a systematic and critical analysis of the quality of care provided mostly in cases of adverse outcomes such as neonatal or maternal deaths. In recent years, the demand for quality in health care delivery has received much attention because of the growing demand for health care, rising costs, constrained resources, growing number and types of health care providers and evidence of variations in clinical practice (Bacci & Chiaffoni 2006:1-2; Supratikto, Wirth, Achadi, Cohen & Ronsmans 2002:228-235; Campbell, Roland & Buetow 2000:1611-1625; Mancy-Jone & Brugha 1997:183-192).

Maternal and newborn audit, in a variety of forms, is now being implemented in many resource-poor countries. All in essence ask the same three questions: what was done well, what was not done well, and how care can be improved in the future (WHO 2004a:43-56)? Avedis Donabedian's framework for assessing quality of care outlined three areas of focus in auditing: structure, process and outcome (Donabedian 1988:1743-1748). Structure refers to the organisational factors that define the health system under which care is provided. It includes physical and staff characteristics. Process is the actual delivery and receipt of care. It involves interaction between users and the health care structure. Two key processes of care have often been identified: technical intervention and interpersonal interaction between users and members of a health care system. Outcomes are consequences or product of the care. Structure as well as processes may influence outcome; indirectly or directly. Of these three dimensions of health care which may be audited, process, is the most relevant to the prevention of maternal and newborn deaths provided that what is involved is known to

improve outcome (Graham, Wagaarachchi, Penney, McCaw-Binns, Antwi & Hall 2000:614-621; Mancy-Jone & Brugha 1997:183-192).

Maternal mortality and newborn death review or audit is a qualitative, in-depth investigation of the causes and circumstances surrounding maternal and newborn deaths (WHO 2013a:11). In maternal and newborn deaths auditing, mismanagement and inadequate routines are discussed and methods to counter and correct them established so that improved norms can be established. The aim of audits is to identify errors or omissions in practice, known as “avoidable factors” or cases of “sub-optimal care”, which have contributed to adverse outcomes. It must be stated that “avoidability” depends on the context and on the resources available. For example, failure to detect congenital abnormalities during prenatal care may not be classified as avoidable in rural developing country hospital, whereas it represented a large proportion of avoidable factors in an audit in Singapore (Biswas, Chew & Joseph 1995:213-216). Instituting routine auditing system of maternal mortality and newborn deaths will not only identify avoidable factors but will also highlight situations where care was below standard. This implies that the starting point in the audit process is to have standards and guidelines against which care will be compared with. In fact, the benefits of auditing goes beyond reducing mortality, it also has positive effect on staff performance and morale (Wilkinson 1991:552-3).

1.2.4 Maternal and newborn death audit/review in Ethiopia

In Ethiopia, women and newborn babies who died as a result of pregnancy or childbirth have essentially been remained invisible to the government and agencies that need to see them. This is because there was no system put in place to review maternal mortalities or newborn deaths that occurred up until this study were conducted. This makes events or circumstances surrounding such deaths unknown. In the past history of the country, classification of maternal mortality and/or newborn deaths by medical causes may conceal what happened. A maternal mortality and/or newborn death is usually preceded by a series of events, each of them deserving attention in their own right and in combination. It is therefore time to shift the focus from measurement to analysis of the problem; from determining the size of the problem to seeking to understand its underlying causes and determinants following the “path to death”

concept. Medical cause of maternal and newborn deaths represents only the most visible dimension of a multilayered problem.

It is easy to say that a woman or her baby has died from fatal haemorrhage or from sepsis, but analysis of such causes of death should comprise a more holistic approach. Tracing the route taken by the deceased woman or child prior to arrival at the health facility offers clues about possible physical, socio-cultural and economic barriers that impede access to appropriate care in a timely manner. Such a practical and an action-oriented means of gathering information on how and why maternal mortalities or newborn deaths occur can lead directly to improvements in service delivery. It may also effort to remove barriers to care. Such an undertaking will raise awareness among health professionals about those factors in the facilities and the community which if avoided, the death may not have occurred. It may stimulate actions to address those avoidable factors so as to prevent future maternal deaths. very interestingly, at the final stage of the present study, the Ethiopian government has officially adopt/adapt the UN maternal death surveillance and response (MDSR) document to the country's maternal death review/audit context (WHO 2013a:1-128; MoH 2013:1-98). The implementation, management and upshots of the bestowed technical guideline, however, are to be seen. Even so, there are no parallel initiatives for newborn death up until now.

The study, thus, is to depict the features of maternal mortality and newborn deaths in Oromiya, Amhara and SNNP regional states though identifying, and describing the events and circumstances surrounding maternal and newborn deaths that have occurred in the selected states of Ethiopia.

1.3 STATEMENT OF THE RESEARCH PROBLEM

In Ethiopia, the aim of averting the alarming high maternal mortality and newborn death through implementing multifaceted interventions, including improved access to emergency obstetric services, have been top-priority of the health sector (Hogan et al. 2010:60518-21; MoH 2015b:7-50). However, there are plenty of cases where health-facilities with trained professional staff exist in the near-by community, and yet maternal mortality and newborn death remains unacceptably high (Shiferaw, Spigt, Godefrooij, Yilma, Melkamu & Tekie 2013:1-10), indicating the mere availability of obstetric services does not necessarily result in better maternal and newborn health. Although

there are recognitions that responsiveness of care could be an important determinant of maternal mortality and newborn death, there are hardly any empirical evidences on the extent and importance of such factors in Ethiopia (Shiferaw et al 2013:1-10). Responsiveness of care usually includes respect towards the patient as reflected by the degree to which the health system is sensitive to patients' dignity, confidentiality, and autonomy as well as the level of attention given to clients such as promptness, quality of environment, access to social assistance and free choice of provider (De-Brouwere & Van-Lerberghe 2001:317-342). Medical causes of maternal mortality and newborn deaths are relatively well documented. However, little or no attention is paid to the non-medical, preventable, contributing factors, also known as avoidable factors of maternal mortality and newborn deaths. Socio-cultural, economic and health service factors associated with maternal mortalities and newborn deaths that if avoided, may have prevented these deaths need to be determined and described so as to deliberate on what can be done (WHO 2007b:1-3). Even if the general causes of continued high maternal mortality and newborn death rates are well known, site-specific information may be key inputs to policy change and action. However, the scarcity of reliable data on the levels and causes of mortality for those living in remote and poorer parts of the country continues to limit efforts to build a solid evidence base for health policy, planning, monitoring and evaluation.

Furthermore, in pursuit of ensuring access to emergency obstetric care services, there is a global and national movement to ensure facility-based maternal and newborn care (FMoH 2009b:1-45; Hogan et al 2010:60518-21). Although, most of the health programmes are designed with a basic claim of "community-based maternal and newborn care"; practically, they are "facility-based". Despite diverse culture and set-up, the Ethiopian government "community-based maternal and newborn care" also appears to adopt this global strategy (FMoH 2009b:1-45; Hogan et al 2010:60518-21; MoH 2015a:4-29; MoH 2015b:7-50). In a country where the vast majority of delivery (nearly 90% or more) took place at home (CSA 2011:126, CSA 2014:45), outside the formal health sector, and very few are attended by qualified and skilled attendants; with the current "only facility based deliver" policy of the Ethiopian government, will "no woman should die while giving life" actually be achieved? An effective maternal and newborn health service provision context is needed to facilitate the transition between maternal and newborn care, preventive and curative to improve/ ensure survival. This should not

just only focus on health facilities context but give due emphasis to homes/community (traditional) context.

1.4 RESEARCH QUESTION

What are the determining factors (medical, non-medical and preventable/avoidable) related with maternal mortality and newborn death?

1.5 PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of the study is to develop a community-based model for averting maternal mortalities and newborn deaths in Ethiopia.

Objectives of the studies are to

- explore socio-cultural and economic factors contributing to maternal mortality and newborn deaths
- explore health service factors associated with maternal mortality and newborn death
- describe the community approach best practices to enhance safe maternal and newborn birth
- develop a community-based model for averting maternal mortality and newborn death in Ethiopia – getting on with what works

1.6 SIGNIFICANCE OF THE STUDY

The findings of this study will be useful in enabling policymakers and practitioners in maternal and newborn care to appreciate the dynamics of policymaking and policy implementation. The significance of the study to public health service delivery system is that it will hopefully contribute towards ensuring significant cutback in maternal mortality and newborn death within maternal and newborn health care delivery system in Ethiopian. Understandably, the results of the study will provide valuable information on the underlying causes of maternal mortality and newborn deaths for policy makers at various levels. It is further envisaged that the findings of this study was used to address gaps identified and also in the subsequent planning and implementation of maternal

and newborn health programs in the Ethiopian communities. Besides, a study of this nature will certainly support the national maternal and newborn health management teams with the necessary ammunitions to put in place evidence based strategies and interventions to tackle the problem of maternal mortality and newborn deaths. The study would be of interest to scholars in health service provisions and maternal and newborn care programme designers as well as managers, particularly in healthcare practice. This study is primarily intended to assess determining factors associated with survival of mothers and newborns, and the results will give a new data on factors contributing to maternal mortalities and newborn death. It is also believed to come-up with an effective and efficient alternative ways (a community-based model) for the survival of mothers and newborns; and hence, ultimately momentous to the mothers and the newborn babies. The worth of the study will be further determined by the degree to which it generates theory, description and understanding. The knowledge will also help in evaluating the newborn and maternal service given in the country. And the results of this study will possibly be used as a base-line for future research.

1.7 DEFINITION OF CONCEPTS

Maternal mortality/death refers to those deaths that are caused by complications due to pregnancy or childbirth. These complications may be experienced during pregnancy or delivery itself, or may occur up to 42 days following childbirth. This is, hence, defined as the death of a woman whiles pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO 2004b; *Oxford Concise Medical Dictionary* 2010:651).

Direct obstetric deaths are maternal deaths resulting from complications of the pregnancy, labour or purperium or from interventions omissions or incorrect treatment.

Indirect obstetric deaths are maternal deaths resulting from previously existing disease or newly developed medical conditions that were aggravated by the physiologic change of pregnancy.

Newborn: A human infant less than a month old – from the time of birth through the 28th day of life – is a newborn infant or a neonate. The term "newborn" includes

premature infants, post-mature infants and full term newborns (*McGraw-Hill Dictionary of Scientific and Technical Terms* 2003:812; *Oxford Concise Medical Dictionary* 2010:726). At birth, the gestational age and birth weight are assessed and the newborn classified accordingly, for example, large for gestational age, preterm (premature), or low birth weight, also called **neonate**, **newborn infant**.

Newborn death is referring to deaths that are occurring after 28 completed weeks of pregnancy and during the first four weeks (28 days) after birth (*Oxford Medical Dictionary* 2010:727). Thus, newborn mortality addresses perinatal mortality – deaths in the first week of life; neonatal mortality - deaths in the first four weeks of life; and, foetal deaths (stillbirths) – occurring after 28 completed weeks of pregnancy.

Death audit is used to describe death case reviews, confidential enquiries, and death surveillance.

Death review is a qualitative, in-depth investigation of the causes of and circumstances surrounding deaths occurring at health facilities. Deaths are initially identified at the facility level but such reviews are also concerned with identifying the combination of factors at the facility and in the community that contributed to the death, and which ones were avoidable.

Verbal autopsy (VA) community-based death review is a method of finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the deaths outside of a medical facility. It identifies deaths that occur in the community and consists of interviewing people who are knowledgeable about the events leading to the death such as family members, neighbours and traditional birth attendants. Verbal autopsy is a method used to ascertain the cause of a death based on an interview with next of kin or other caregivers. This is done using a standardised questionnaire that elicits information on signs, symptoms, medical history and circumstances preceding death. The cause of death, or the sequence of causes that led to death, are assigned based on the data collected by a questionnaire and any other available information. Rules and guidelines, algorithms or computer programs, may assist in evaluating the information to determine the cause of death (Fottrell & Byass 2010:38-55). The main objective of VA is to describe the causes of death at the community level or population level where civil registration and death certification

systems are weak and where most people die at home without having had contact with the health system.

Maternal mortality measurements: Measurements most commonly used in maternal mortality are maternal mortality ratio, maternal mortality rates and life-time risk of maternal death (Graham, Foster, Davidson, Hauke & Campbell 2008:425-445; Graham, Ahmed, Stanton, Abou-Zahr & Campbell 2008:12; Betrán, Wojdyla, Posner & Gülmezoglu 2005:131; Hill, Stanton & Gupta 2001:5-7).

Maternal mortality ratio (MMR) is the number of maternal deaths per 100,000 live births. It is calculated as the number of maternal deaths during a given year per 100,000 live births in the same period. This measure indicates the risk of maternal deaths among pregnant women and recently pregnant women.

Maternal mortality rate is the number of maternal deaths per 100,000 women aged 15 – 49 per year. It is calculated as the number of maternal deaths in a given period per 100,000 women of reproductive age (15–49 years). It measures both the obstetric risk and the frequency with which women are exposed to this risk. This statistic is influenced by a number of forces, including the risk associated with pregnancy (MMR) and the proportion of women of reproductive age who give birth in a year (fertility rate). Consequently, the maternal mortality rate can be lowered either by making childbirth safer or by reducing the fertility rate in a population.

Lifetime-risk is a measure that reflects the probability of maternal death faced by an average woman over her entire reproductive life-span. Influenced by the risk associated with pregnancy and by the number of times she becomes pregnant. Each time a woman becomes pregnant she runs the risk of maternal death again. Unlike infant mortality – each person runs the risk of infant death only once.

Neonatal mortality and **stillbirth** are the two most common measurements of newborn deaths. The standards and reporting requirements related to foetal, perinatal, neonatal and infant mortality are detailed in the 10th ICD edition:

Live birth is 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 as live-born.

Stillbirth or **foetal death** is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.

The **perinatal period** commences at 28 completed weeks (196 days) of gestation and ends seven completed days after birth. The **neonatal period** begins with birth and ends 28 complete days after birth. **Neonatal deaths** may be subdivided into early neonatal deaths, occurring during the first seven days of life (0-6 days), and late neonatal deaths, occurring after the seventh day but before the 28th day of life (7-27 days).

1.8 THEORETICAL FRAMEWORK OF THE STUDY

Theoretical frameworks are useful in directing research decisions (Chinn & Kramer 2008:17-30). Theoretical assumptions include both model and theory; as well as, all testable statements derived from existing theories and models (Mouton & Marais 1990:157). The significance of theoretical assumptions is measurable and often pronounced in the research field. This study has used two theoretical frameworks: (1) the survey list drawn up by Dickoff et al (1968:415-435) to shape model development; and (2) the "Three phases of Delay Model" (Thaddeus & Maine 1994:1091-1110) to shape the causes of maternal mortality and newborn death.

The timing and medical cause of maternal mortality and newborn deaths are well known. Like most health problems, causes of maternal mortality and newborn death can be viewed either narrowly or broadly. A broad view would take into account individual, community and health service factors that contributed to the deaths, not merely the medical cause. The "Three phases of Delay Model" (Thaddeus & Maine 1994:1091-1110) was chosen to classify factors associated with the maternal and newborn deaths in the present study. The model is based on the fact that about 75% of

maternal and newborn deaths are a result of direct causes. These are direct causes of maternal death such as haemorrhage, obstructed labour, sepsis, eclampsia and abortion complications (Say, Chou, Gemmill, Tunçalp, Moller, Daniels, Gülmezoglu, Temmerman & Alkema 2014:e323-333); and, direct causes of neonatal death: sepsis/pneumonia, tetanus, diarrhoea, preterm, asphyxia, congenital anomalies and others (UN IGME 2014:12-15). Most of these deaths are preventable with prompt and adequate medical interventions. Delays in reaching adequate care are prominent factors contributing to maternal and newborn deaths. Thaddeus and Maine (1994:1091-1110) have argued that not getting adequate care in time is the overwhelming reason why women and newborn die in developing countries. Lack of care, they argued, can be related to three factors: (1) a delay in making the decision to seek care when complications develop; (2) a delay in reaching obstetric medical facility once the decision to seek care has been made; and/or (3) delay in receiving adequate and appropriate care once a medical facility has been reached as discussed in figure 1.1. below.

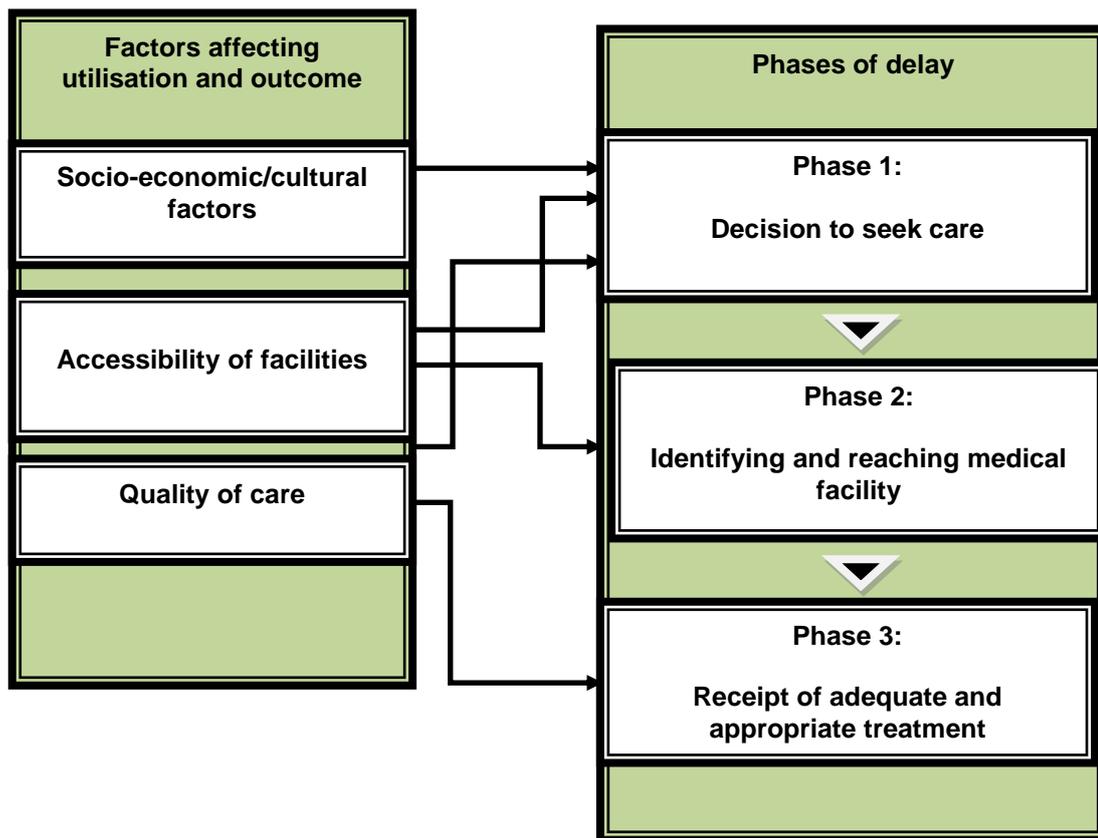


Figure 1.1: The three phase delay theoretical framework

Delay in the decision to seek medical care may be influenced by various factors such as the actors involved in the decision-making process, illness characteristics, and experience with the health system or distance to the health facility. Delay in reaching an appropriate medical facility is affected by the distribution of health facilities, availability of transportation, road conditions or cost of transportation. Delay in receiving adequate and appropriate care, once the facility is reached is mainly due to operational difficulties in the health care delivery system. Such inadequacies may be characterised by shortages in supplies, equipment, lack of trained personnel, incompetence of the available staff, or uncoordinated emergency services. The delay model helps to identify community and health services factors contributing to maternal deaths and as such it is useful in devising interventions and strategies for preventive measures.

The theoretical framework for model development, on the other hand, was based on Dickoff et al (1968:422) survey list as discussed in theoretical paradigms. Model development was based on the results of conceptualisation. Conceptualisation refers to clarification and analysis of key concepts in a study as well as integration of those

concepts in the body of existing theory and research. It is responsible for guiding and directing research in the theoretical framework (Mouton 1996:109). Main concepts and sub-concepts were identified from the results of concepts analysis.

Theory generation, as described by Dickoff et al (1968:422), was used deductively as the survey list – context, agent, recipient, terminus, procedure and dynamics. This survey list was used to conceptualise the central concepts, define these concepts, classify them, establish their relationship to each other and, lastly, to describe a model for preventing maternal mortality and newborn death in Ethiopia.

1.9 RESEARCH PARADIGM

As Taylor, Kermode and Roberts (2007:5), described it – paradigm – a broad view or perspective of the study; and, as Weaver and Olson (2006:460) defined it – paradigm – patterns of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished. Accordingly, to clarify the researcher's structure of inquiry and methodological choices, an exploration of the paradigm adopted for this study need to be discussed prior to any discussion about the specific methodologies utilised in this study.

This study utilised a triangulation approach to explore factors that contribute to maternal mortality and newborn death and guide the development of a community-based model to preventing maternal mortality and newborn death in Ethiopia. The use of mixed study methods, both the qualitative and quantitative, was necessary to encompass the different aspects of factors that contribute to maternal mortality and newborn death. Due to the assorted nature of the study, there was no single paradigm that could satisfactorily deal with all of the required methodological aspects. Therefore, the researcher found it necessary to combine the quantitative/positivist paradigm with the qualitative/interpretive paradigm. The blending of both paradigms provided the researcher with the ability to statistically analyse the scientific data whilst also recognising the complex socio-cultural, economic and service factors that influence maternal mortality and newborn death.

1.10 THE RESEARCH METHODOLOGY AND DESIGN

1.10.1 Design chosen

As it is the blueprint or a detailed plan for how a research study is conducted (Guest & Namey 2015:37-103), the research design was developed to meet the unique requirements of the study. A retrospective mixed study design, combining both qualitative and quantitative methods was used to make an in depth investigation and analysis of the circumstances and events surrounding individual cases of maternal mortality and newborn deaths, for theory generation has been conducted within the context of Ethiopian community maternal and newborn care (Chinn & Kramer 1991:79-120; Mouton 1996:103-109; Mouton & Marais 1990:43). Many definitions of mixed methods are available in the literature (Johnson, Onwuegbuzie & Turner 2007:112-133; Creswell, Klassen, Clark & Smith 2012:27). For the purposes of this study, mixed methods research is defined as a research approach or methodology employing rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs (Creswell et al 2012:27).

The research design for developing a community-based model for averting maternal mortality and newborn death was developed through three phases in accordance with the objectives of the study namely:

- Phase 1. Explore and describe maternal and newborn care in Ethiopia (empirical study).
- Phase 2. Concept analysis of community-based maternal and newborn care.
- Phase 3. Develop a community-based model for averting maternal mortality and newborn death in Ethiopia.

1.10.2 Phase 1: Research methodology

In this phase, research methodology used including quantitative and qualitative paradigms, population, sampling, data collection; data analysis, ethical measures and trustworthiness of data were presented.

As Polit and Beck (2004:731) described it, research methodology refers to techniques used to structure a study and gather and analyse information in a systematic way. The methods used are described comprehensively, including the context in which the data collection took place particularly the relationship between the research question and data collected (De Vos, Strydom, Fouché & Delpont 2005:252).

1.10.3 Phase 2: Concept analysis

The empirical perspectives of the study laid the foundation for this phase and led to the syntheses and identification of the core theme known as community-based care. As main part of this chapter, using Walker and Avant (2005:28) method, concept analysis of community-based care were conducted in order to analyse and generate descriptions, definitions and to further explore the meaning of this concept in the context of preventing maternal mortality and newborn death. The concept analysis together with the empirical perspectives of the study and six aspects of Dickoff et al (1968:422) facilitated the development of a model for community-based prevention of maternal mortality and newborn death in Ethiopia.

1.10.4 Phase 3: Model development

A model was developed according to Chinn and Kramer's (1995:81) approach to theory generation: initially, based on the empirical perspectives of the study which includes analysis and interpretation of the testimonies and experiences of survived newborn mothers', family members of the deceased mothers, traditional birth attendants and health workers, concept analysis was conducted embracing concept identification as well as concept definitions and classification. This was followed by, the identified concepts were compared to each other to show interrelationships and the classification of central and relational concepts was used as a framework for the model. Then, the structure and process of a model to reduce maternal mortality and newborn death were described; and, six survey list of Dickoff et al (1968:422) namely; agent, recipients, context, terminus, procedure and dynamics formed the basis for development and description of a model for reduction of maternal mortality and newborn deaths in Ethiopia. Description for operationalising the model for use was simultaneously presented.

1.10.5 Ethical considerations

1.10.5.1 Obtaining informants consent before the study begins

Participation to the study was completely voluntary and free from any form of coercion. Individuals or families to be approached to participate in the study will first be fully briefed on the purpose of the study and as well as their roles. It will also be explained to them that shall they decide not to participate or decide to withdraw during the process no penalty was levied against them. All the explanations was done comprehensively in a language that the individual or family can speak or understand. It is upon this that a verbal/written consent was sought. However, a verbal consent was primarily used in this study as in Ethiopia generally people felt reluctant to sign or thumb print even among literates for various reasons (Tekola, Bull, Farsides, Newport, Adeyemo, Rotimi & Davey 2009:482-486). They are more comfortable with giving verbal consent.

1.10.5.2 Confidentiality

The researcher will ensure the subjects for the confidentiality of the data obtained. Moreover, different strategies such as allowing the informants not to write name, appropriate control on data collection, etc. was made.

1.10.5.3 The culture

The researcher has a good experience of the study area's culture and hence all attempts was made to respect the cultural values, traditions or taboos valued by the informants.

1.10.5.4 Obtaining ethical clearance

To undertake this study, Ethical clearance was sought from the University of South Africa then from Ethiopian Government Science and technology Ethical Committee. Permission to access health facility kept records was requested from the Director of Medical Services of the Ethiopian government Ministry of Health (MoH).

1.11 ORGANISATION OF PROPOSED STUDY

The layout of the research report will include the following chapters:

Chapter 1: Introduction and orientation to the study. Discussion of the maternal mortality and newborn death issue in Ethiopia confiscate the key part. And yet, the aim and objectives, theoretical framework and relevance of the study are included and pertinent terminologies and concepts are clarified.

Chapter 2: Literature review. A literature review of relevant articles, journals, books, research reports and other information sources was conducted with the aim of establishing and identifying available knowledge and substantiation on factors contributing to maternal mortality and newborn death. Information sought includes issues related to maternal and newborn health care, interventions, death reviews and death audits among others.

Chapter 3: Research methodology. Research design and techniques are explained. Detailed information about the population and sample, instrumentation used, methods for data collection and analysis were presented.

Chapter 4: Presentation of findings, analysis of data with regard to the questionnaires and **discussion** based on the research findings are presented.

Chapter 5: Concept analysis. Using Walker and Avant (1995:39) method, concept analysis of community-based care will be conducted in order to analyse and generate descriptions, definitions and to further explore the meaning of this concept in the context of preventing maternal mortality and newborn death.

Chapter 6: Model development. The development and description of a community-based maternal and newborn care model for preventing maternal mortality and newborn death in Ethiopia, based on the findings from empirical perspectives of the study as conceptualised following the six aspects of activity by Dickoff et al (1968:422).

Chapter 7: Conclusions and recommendations. Conclusions were derived from the results. Recommendations and suggestions for further studies are outlined and a

framework/model for developing and improving maternal and newborn health service provision is proposed.

1.12 CONCLUSION

In this chapter, an overview of maternal mortality and newborn death and the maternal and newborn situation in Ethiopia led to the development of the research questions, purpose and objectives of the study. A theoretical framework, relevant to the issues of maternal mortality and newborn death was identified. Furthermore, the methodology to be used to conduct the study and the process to be used to collect the data and analysis is briefly discussed. The next chapter will deal with the literature review.

CHAPTER 2

LITERATURE REVIEW

"The greatest part of a writer's time is spent in reading, in order to write: a man will turn over half a library to make one book."

Samuel Johnson 1772.

2.1 INTRODUCTION

In this particular study, the review of literatures tries to contemplate on the global, regional and national events and circumstances surrounding cases of maternal mortality and newborn deaths that have occurred in the world as well as in Ethiopia, so as to coin a cost-effective health care provision framework/model to address the maternal and infant mortality rates within an Ethiopian community context: getting on with what works. The reviewed literature, thus, tries to illuminate on the underlying factors – health service and community related factors – that may contribute to the high rates of maternal mortality and newborn deaths; the safe Motherhood and newborn care strategies and those intervention or strategies appears effective; and, the general maternal and newborn situations in Ethiopia; counting on the burden and epidemiology of maternal mortality and newborn death.

2.2 THE BURDEN AND EPIDEMIOLOGY OF MATERNAL MORTALITY AND NEWBORN DEATH

Based on a very recent estimates, at least one birth giving woman and eleven newborn babies dies every two minute somewhere in the world from complications of pregnancy and childbirth; that is, well over a quarter million women and nearly 6 million babies under one month, at a minimum, dying every year (Countdown Coverage Writing Group 2008:1247-59; Kassebaum et al 2014:980-1004; UNICEF 2009:117; UN IGME 2014:9; WHO 2007a:9-14). There are more than 200 maternal deaths for every 100,000 live births. In least developed countries, however, the figure ascends to 1,000 for every 100,000 live births; whereas, in more developed countries there are only 16 maternal deaths for every 100,000 live births (Kassebaum et al 2014:980-1004; WHO 2007a:9-14).

Very surprisingly, the majority of these deaths are avoidable. Although the degree and type of risk related to pregnancy, birth, post-partum, and the early weeks of life differ between countries and settings, the need to implement effective, sustainable, and affordable improvements in the quality of care is common to all. And yet, new knowledge is needed to eliminate the avoidable maternal and newborn mortality and morbidity, and to inform decision making for universal health care and the UN post-2015 development agenda (WHO 2013b:57-65).

Reduction of maternal mortality and newborn death has long been a global health priority and are targets in the UN Millennium Development Goals (MDG) framework (UN 2013:11) and a key concern of the Global Strategy for Women's and Children's Health launched by the UN Secretary-General in September, 2010 (UN 2010a:1). Some progress towards maternal mortality and newborn death has been reported, especially in the past decade but further improvements are needed (Kassebaum et al 2014:384:980-1004; UN 2013:14; UN-IGME 2014:9).

Evidence shows that 15% of all pregnant women will develop sudden serious complications and require life-saving access to quality obstetric services (WHO 2009:5-115; Maine 1991:10-17). What's more, 53% of women in developing countries have the assistance of a skilled attendant at birth and only 40% give birth in health institutions (WHO 2008a:3). Besides, the majority or more than 60 percent of maternal deaths take place soon after birth or during the postpartum period. And yet 70 percent or more women in developing countries did not receive any postpartum care (Koblinsky 2005:20-28; WHO 2007a:19).

More strikingly, the levels of maternal and newborn mortality differ greatly among the major regions of the developing world. Nearly, 11% of women globally live in Africa. But based on population alone, more than would be expected; an estimated more than 60% of maternal, child and/or newborn deaths take place only in Sub-Saharan Africa (Black et al 2003:2226-2234; Ronsmans & Graham 2006:1189-1200; UN IGME 2014:9; WHO 2014b:22-27). The highest maternal mortality rates are found in Sub-Saharan Africa where in some countries more than 1,100 women die from every 100,000 live births. Worldwide, 34% of deliveries have no skilled attendant (WHO 2008a:3). Based on this WHO estimates, these skilled attendants assist in more than 99% of births in more developed countries versus 62% in developing countries. In five countries including

Ethiopia, however, the percentage of delivery assisted by skilled birth attendants is less than 20%. Furthermore, African women of reproductive age have a much higher risk. Women's life-time risk of maternal death is over 150 times higher in least developed than in the more developed countries. The life-time risk for African women is 1 in 26 compared to 1 in 120 in Asia, 1 in 7,300 in the developed regions, and in stark contrast to Ireland, which had the lowest lifetime risk, 1 in 48,000 (WHO 2005:13).

Then again, there are 2.9 million early neonatal deaths and 2.6 stillbirths each year in addition to the prevailing maternal mortality (Lawn et al 2005:891-900; Renfrew, McFadden, Bastos, Campbell, Channon, Cheung, Silva, Downe, Kennedy, Malata et al 2014:1129-1145; UN IGME 2014:9). These deaths are largely the result of the same factors that causes the deaths and disabilities of mothers. Almost all (99%) neonatal deaths arise in low-income and middle-income countries, yet most epidemiological and other research focuses on the 1% of deaths in rich countries. Between 1990 and 2013, the number of neonatal deaths declined from 4.7 million in 1990 to 2.9 million in 2013. However, the decline in neonatal mortality over 1990–2013 has been slower than that of post-neonatal mortality. The share of neonatal deaths among under-five deaths increased from about 37 percent in 1990 to 44 percent in 2013 (Lawn, Blencowe, Oza, You, Lee, Waiswa, Lalli, Bhutta, Barros, Christian et al 2014:189-205; Renfrew et al 2014:1129-1145). Similarly, between 1980 and 2000, child mortality after the first month of life – i.e., from month 2 to age 5 years – fell by a third, whereas the neonatal mortality rate (NMR) was reduced by only about a quarter. Hence, an increasing proportion of child death is now in the neonatal period. Estimates show that about 40% of all deaths in children younger than age 5 years happen in the first month of life (Lawn et al 2005:891-900; WHO 2007c:38). A similar number of babies are stillborn – dying in utero during the last 3 months of pregnancy. More specifically, deaths in the first week of life particularly have shown the least progress. In 1980, only 23% of deaths arose in the first week of life; after two decades, this figure had risen to an estimated 28% [3 million deaths] (Lawn et al 2005:891-900); in 2013 almost 1 million newborns (36 percent) died on the day they were born, and another 1 million (37 percent) died within the next six days of birth. Some 0.8 million neonatal deaths (27 percent) occurred between day 7 and day 27 of life (Lawn et al 2014:185-205).

Ethiopia is one of the four countries that contribute about 45% of both the world maternal mortality and children deaths; the others being India, Nigeria and the

Democratic Republic of Congo (WHO 2014a; Hogan et al 2010:60518-1; Black et al 2003:2226-2234). The Ethiopian Demographic and Health Surveys (EDHS) of the 2000/1, 2005/6 and 2011 are the three biggest ever conducted surveys for the country, gave figures of maternal mortalities and newborn deaths for the period of 5-6 years prior to the surveys. The maternal mortalities are escalating as evidenced in the 2011 EDHS, maternal deaths represent 30 percent of all deaths to women age 15-49 (CSA 2011:267-271), compared with 21 percent in the 2005 EDHS (CSA 2006:102-120); and, 25 percent in the 2000 EDHS (CSA 2001:97-110). This may show that the situation of maternal mortality in Ethiopia remains unmerited tragedy.

The maternal mortality ratio, which is obtained by dividing the age-standardised maternal mortality rate by the age-standardised general fertility rate, is often considered a more useful measure of maternal mortality since it measures the obstetric risk associated with each live birth. The maternal mortality ratio figure of the 2011 EDHS (676) is slightly greater than the 2005 EDHS (673) which may further prove that maternal mortality situation in Ethiopia is not getting better. The 2000 EDHS show the maternal mortality ratio for Ethiopia for the period 1994–2000 to be 871 deaths per 100,000 live births (CSA 2001:97-110). Although it appears that maternal mortality ratio of 2005 may be declining in Ethiopia in comparison to the 2000, the rates are both subject to a high degree of sampling error and 95 percent confidence intervals around the two estimates partakes overlapping intervals, it is not possible to conclude that there has been a decline at all. A similar conclusion can be drawn comparing the maternal mortality ratios measured in the 2011 EDHS (676) with those in the 2000 EDHS (871). The confidence interval surrounding the maternal mortality ratio of 676 deaths per 100,000 live births is 541-810, while the confidence interval for the 2005 ratio of 673 deaths per 100,000 live births is 548–799 deaths. The maternal mortality ratio obtained from the 2000 EDHS is 871 deaths per 100,000 live births; and, the true ratio of the 95 percent confidence intervals ranges between 703 and 1,039. Since the confidence intervals among the three estimates significantly overlap; there is no evidence to suggest that the maternal mortality ratio have ever decreased in Ethiopia between each survey periods.

For neonatal mortality, the national rates are 49/1000, 39/1000 and 37/1000 live births as reported in the EDHS 2001, 2006 and 2011 respectively. High fertility potentially increasing obstetric risk, add an extra burden to overstretched maternity services, and it

will also have a major impact on the health and well-being of both the mother and the child. When it comes to Ethiopia, the value for having many children is very common in the country with total fertility rate of 5 (five) children per women. Some populous regional states even have current total fertility rate estimate of more than seven (7.1) children per women; fertility rates are, thus, comparatively very high (CSA 2011:71).

Generally, the levels of maternal and newborn mortality in Ethiopia, like many other countries in Sub-Saharan Africa are unacceptably very high. This nationally high level maternal mortality and newborn death rates become more alarming when it comes to the densely inhabited Regional States of Ethiopia such as Oromiya, Amhara, and Southern nations and Nationalities peoples (SNNP) regional states

2.3 THE INEXTRICABLE LINK BETWEEN MOTHERS AND NEWBORNS

A mother's death in childbirth in developing countries particularly means that her newborn will almost certainly die and that her older children are more likely to suffer from disease. In Nepal, for instance, infants of mothers who died during childbirth were six times more likely to die in the first week of life, 12 times more likely between 8 and 28 days, and 52 times more likely to die between 4 and 24 weeks (Katz, West Jr, Khatri, Christian, LeClerq, Pradhan & Shrestha 2003:717-725). Moreover, when mothers are malnourished, ill, or receive inadequate care, their newborns face a higher risk of disease and premature death (Abu-Saad & Fraser 2010:5-25; Tinker & Ransom 2002:1-6). Almost one-quarter of newborns in developing countries are born low birth weight, largely due to their mothers' poor health and nutritional status, which results in increased vulnerability to infection and a higher risk of developmental problems. The quality of care that both mother and newborn receive during pregnancy, at delivery, and in the early postnatal period is essential to ensuring women remain healthy and that children get a strong start (Oestergaard, Inoue, Yoshida, Mahanani, Gore, Cousens, Lawn & Mathers 2011:1080; Tinker, Hoop-Bender, Azfar, Bustreo & Bell 2005: 822-825).

Many stillbirths and newborn deaths could be averted if more women were in good health, well-nourished, and received quality (life-saving) care during pregnancy, labour and delivery, and if both mother and newborn received appropriate care in the postpartum period (Darmstadt, Bhutta, Cousens, Adam, Walker & De Bernis 2005:977-

988; Tinker 1997:15-20). Health policies and programs in the fields of maternal, newborn, and child health have generally focused on one issue alone. Targeting interventions to only one of these groups will obscure important linkages. For example, antenatal care and skilled birth attendance (SBA) not only address the three major causes of maternal mortality (bleeding, hypertensive diseases and infections), but also the three main causes of neonatal death (infections, complications arising from preterm birth and intrapartum-related neonatal deaths). Lower coverage of SBA correlates with higher neonatal mortality, with 77% of neonatal deaths occurring in countries where coverage of SBA is 50% or less. Simple treatments such as cleansing of the umbilical cord and promotion of immediate breastfeeding can prevent a significant portion of neonatal infections. Providing birth attendants with basic training and equipment (bag and mask) for neonatal resuscitation is a low-tech, low-cost opportunity for reducing intrapartum-related neonatal deaths. When approached together and incorporated into integrated programs, these interventions could save millions of lives at a lower cost than separate initiatives (Lassi, Majeed, Rashid, Yakoob & Bhutta 2013:3-53; Kerber, De Graft-Johnson, Bhutta, Okong, Starrs & Lawn 2007:1358-69; Sines, Tinker & Ruben 2006:1-7).

Linking interventions can reduce costs by allowing greater efficiency in training, monitoring and supervision, and use of resources. Grouping interventions will help families more easily access and take advantage of them. Linking interventions also avoids the duplication and competition over resources that can divert attention from each cause. When overall levels of financial investment are limited, working together and pooling resources can have a stronger impact.

Perhaps, the inextricable link between mothers and newborns may best be explained by the conceptual framework for maternal and neonatal mortality and morbidity of UNICEF: Many of the causal factors responsible for maternal and neonatal morbidity and mortality are quite interrelated, as illustrated in UNICEF conceptual framework in the underneath figure. As clearly stimulated in the document (UNICEF 2009:16-20); while there are still many gaps in the knowledge of the extent and causes of maternal mortality and newborn deaths, certainly enough interventions are known that could save millions of lives. Given that the risks of maternal and newborn death are greatest during the first 24–48 hours after birth, post-natal care urgently needs to be expanded during this period, and greater emphasis needs to be placed on follow-up visits for babies and

mothers. Visits shortly after birth are vital for new mothers, who may remain at higher risk of mortality and morbidity for up to a year after birth. This is usually not possible, however, as maternal and newborn services are often greatly lacking in the poorest countries and communities where the most deaths occur. Particularly in Sub-Saharan Africa, factors such as distance, migration, urbanisation, armed conflict, disease and lack of investment in public health have left severe shortages of skilled health professionals. Thus, the theoretical framework may be considered and will be tested as key way-out.

UNICEF's conceptual framework described below on the causes of maternal mortality and newborn deaths illustrates that health outcomes are determined by interrelated factors, encompassing nutrition, water, sanitation and hygiene, health-care services and healthy behaviours, and disease control, among others. These factors are defined as proximate (individual), underlying (household, community and district) and basic (societal). Factors at one level influence other levels. The framework is devised to be useful in assessing and analysing the causes of maternal and newborn mortality and morbidity, and in planning effective actions to enhance community-based maternal and newborn health care provisions.

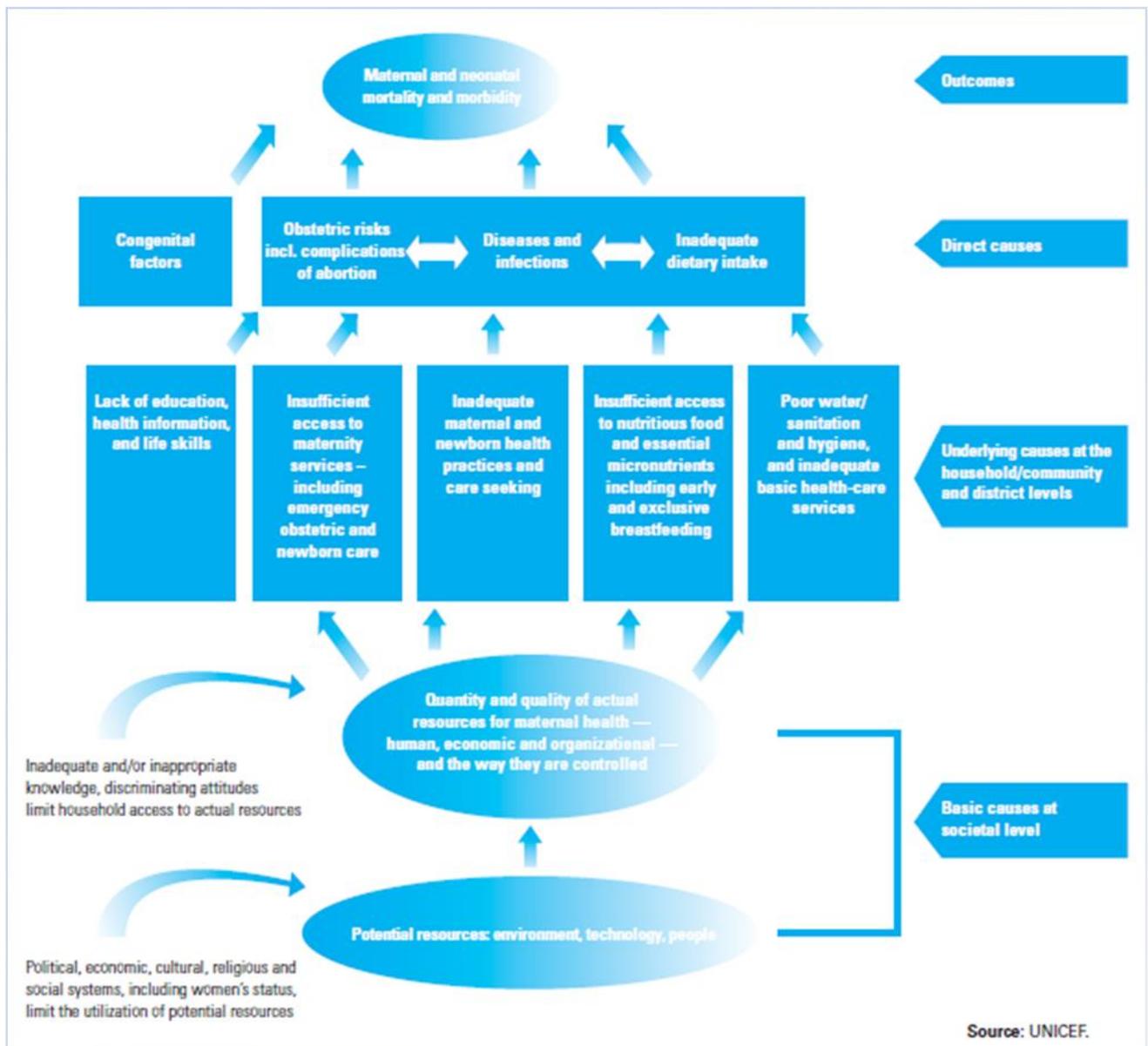


Figure 2.1: Conceptual framework for maternal and neonatal mortality and morbidity

(Adapted from UNICEF 2009)

2.4 CAUSES OF MATERNAL MORTALITY AND NEWBORN DEATH

Although the distribution of causes differs somewhat from region to region, both developed and developing countries have remarkably similar medical causes of maternal and newborn death (Hogan et al 2010:60518-1). Medical causes of maternal deaths are sub-divided into two categories: direct and indirect obstetric deaths. Direct obstetric deaths are those arising from obstetric complications of pregnant state (pregnancy, labour and the postpartum period), from any interventions, omissions, incorrect treatment, or from a chain of events resulting to any of the above. Indirect

obstetric deaths are those resulting from previously existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but was aggravated by physiological effects of pregnancy. Globally, around 80% of all maternal deaths are the direct result of complications arising during pregnancy, delivery or the postpartum. The single most common cause – accounting for a quarter of all maternal deaths – is severe bleeding. The other direct causes of maternal deaths are sepsis/infection (15%), unsafe abortion complications (13%), eclampsia (12%) and obstructed labour accounting for 8% while other direct causes account for 8% of the deaths (Audu, Takai & Bukar 2010:147-151; Khan, Wojdyla, Say, Gulmezoglu & Van 2006:1066-1074; Thaddeus & Maine 1994:1091-1110; Ravindran & Berer 1999:3-12; Ronsmans, Walraven & Etard 2004:43-56; WHO 2005:62-74). Indirect causes of death such as anaemia, malaria, cardiovascular diseases, and diabetes and HIV/AIDS accounts for about 20% of global maternal deaths (Audu et al 2010:147-151; Khan et al 2006:1066-1074; Thaddeus & Maine 1994:1091-1110; Ravindran & Berer 1999:3-12; Ronsmans et al 2004:43-56; WHO 2005:62-74). These statistics indicate that globally the largest proportion of maternal deaths is due to haemorrhage/sever bleeding.

On the other hand, causes and determinants of neonatal deaths and stillbirths differ from those causing and contributing to post-neonatal and child deaths. Allocation of one death to one cause is somewhat artificial when multiple causes act synergistically, and the rules applied by different coders for allocation of coexisting causes are not always clear (Lawn, Shibuya & Stein 2005:891-900). However, to be programmatically useful, recorded causes of death should relate to prevention or management – if a moderately preterm infant dies of infection, then infection is the key cause to address. However, in a very preterm infant – preterm born before 28 weeks' gestation, infection management alone is unlikely to avert their death. Generally, newborn deaths (neonatal mortality and stillbirths) stem from poor maternal health, inadequate care during pregnancy, inappropriate management of complications during pregnancy and delivery, poor hygiene during delivery and the first critical hours after birth, and lack of newborn care. Besides these listed medical causes, several factors such as women's status in society, their nutritional status at the time of conception, early childbearing, too many closely spaced pregnancies and harmful practices, such as inadequate cord care, letting the baby stay wet and cold, discarding colostrums and feeding other food, are deeply rooted in the cultural fabric of societies and interact in ways that are not always clearly understood (Lawn et al 2005:891-900).

The major direct causes of newborn deaths globally are infections (36%), preterm birth (28%), and asphyxia (23%) (Lawn et al 2005:891-900). The distribution of causes of neonatal death varies with the degree of neonatal mortality. Generally, 60–80% of neonatal deaths arise in low birth-weight babies. Reduction of mortality among moderately preterm and term in-utero growth restriction infants is feasible without complex technology. Maternal complications, especially during childbirth, carry a high risk of neonatal death. The poor health and nutrition of women and the lack of care that contributes to their death in pregnancy and child birth also compromise the health and survival of the infants and children they leave behind. It is estimated that nearly two-third of the 8 million infant deaths that occur each year largely from poor maternal health and hygiene, inadequate care, inefficient management of delivery, and lack of essential care of newborn (UNICEF 2008:31-42; WHO 1999a:4-7).

Low economic and social status of women and lack of access to and use of essential obstetric services are strong determinants of maternal and newborn mortality in general (WHO 2010a:23-27). Low social status of women limits their access to economic resources and basic education and thus their ability to make decisions related to theirs and their new-born's health and nutrition. Maternal and newborn/child mortality is a particularly sensitive indicator of inequality; WHO and UNICEF have called it a litmus test of the status of women, their access to health care and the adequacy of the health care system in responding adequately to their health care needs (UN 2010a:4; UN 2010b). Information about the levels and trends of maternal and newborn mortality is needed not only for what it tells us about the risk of pregnancy and childbirth but also for what it implies about the women and her baby's health in general, their social and economic status. Thus maternal and newborn mortality is not merely a "health disadvantage" it is also a "social disadvantage".

The common causes of obstetric deaths in Ethiopia are similar to most developing countries: haemorrhage, sepsis, obstructed labor, abortion and hypertensive disease in pregnancy (Ahmed 2010:115-122). The major causes of maternal mortality in Ethiopia are obstructed/prolonged labour (13%), ruptured uterus (12%), severe pre-eclampsia/eclampsia (11%) and malaria (9%). Moreover, 6% of all maternal deaths were attributable to complications from abortion. Shortage of skilled midwives, weak referral system at health centre levels, lack of inadequate availability of basic emergency

obstetric and newborn care (BEmONC) and comprehensive emergency obstetric and newborn care (CEmONC) equipment, and under financing of the service were identified as major supply side constraints that hindered progress. On the demand side, cultural norms and societal emotional support bestowed to mothers, distance to functioning health centres and financial barrier were found to be the major causes (MoH 2010:38-59).

2.5 THE SAFE MOTHERHOOD INITIATIVE – 25 YEARS AND PLUS AT A GLANCE

Perhaps the most sobering analysis of the state of safe motherhood comes from Ann Starrs on the international safe motherhood conference held in New York (Starrs 1987:1-54). Consequently, the global campaign to reduce maternal mortality was launched in February 1987, when three UN agencies – UNFPA, the World Bank, and WHO – sponsored the international Safe Motherhood Conference in Nairobi, Kenya (Starrs 1987:1-54). The aim of the Safe Motherhood initiative was, thus, to draw attention to the dimensions on consequences of poor maternal health in developing countries, and to mobilise action to address the high rates of deaths and disability caused by the complications of pregnancy and childbirth. Safe motherhood aims to ensure that all women and their babies receive the care they need to be safe and healthy throughout pregnancy and childbirth.

The safe motherhood principles are based on the following "four pillars" (WHO 1994:17-49):

1. **Family planning:** to ensure that individuals and couples have the information and services to plan the timing, number and spacing of pregnancies.
2. **Prenatal care:** to prevent complications where possible and ensure that those of pregnancy are detected early and treated appropriately.
3. **Clean and safe delivery:** to ensure that all birth attendants have knowledge, skills and equipment to perform a clean and safe delivery and provide postpartum care to the mother and her baby.
4. **Emergency obstetric care:** to ensure that essential care for high-risk pregnancies and those who develop complications is made available to all women who need it.

On October 2007, thus, the Safe Motherhood Initiative was celebrating its 20th anniversary. Based on the programme review report of the 20 years safe motherhood intervention, it was evident that many countries have been able to improve the health and well-being of mothers and newborns. However, countries with the highest burdens of mortality and illness have made the least progress, and inequalities between countries are increasing (Fosu 2007:733-820). During this anniversary, it was illuminated that in many places, inequalities within countries are increasing too, between those who live in better conditions and have access to care, and those who for a variety of reasons are excluded (FCI 2007:4-93; Fosu 2007:733-820). Globally, the numbers remain staggering: each year there are at least 3.2 million stillborn babies, 4 million neonatal deaths and more than half a million maternal mortality. And more strikingly, the majority of these deaths are avoidable. It was further revealed that a total of 11–17% of maternal deaths occur during childbirth itself; 50–71% occur in the post-partum period. The time spent in labour and giving birth, the critical moments when a joyful event can suddenly turn into an unforeseen crisis, needs more attention, as does the often-neglected post-partum period. These periods account not only for the high burden of post-partum maternal deaths, but also for the associated large number of stillbirths and early newborn deaths.

The WHO bulletin contains several papers that focus on important technical areas, particularly the management of post-partum complications and saving pregnant women's and newborns' lives by providing evidence and recommendations for policy changes and programme implementation. In an editorial introducing these papers, Monir Islam describes the enormous challenges to reduce child and maternal mortality in the developing world faced by the Safe Motherhood initiative in 20 years since it was formed. Other papers provide evidence that simple but effective monitoring of programmes in developing countries is possible (Fosu 2007:733-820). As stated in the bulletin, the challenges to be met are neither new technologies nor new knowledge about effective interventions, because it is mostly known what needs to be done to save the lives of mothers and newborns. The real challenges are how to deliver services and scale up interventions, particularly to those who are vulnerable, hard to reach, marginalised and excluded. As it is described in this issue of the bulletin, effective health interventions exist for mothers and babies; and yet, proven means of distribution need to be used to put these in place.

The other identified key constraint limiting progress in safe motherhood initiative 20 years anniversary was the gap between what is needed and what exists in terms of skills and geographical availability of human resources at local, national and international levels. Other challenges are how to address deteriorating infrastructures; how to maintain stocks of drugs, supplies and equipment in the face of increased demand; lack of transport; ineffective referral to and inadequate availability of 24-hour quality services – particularly emergency obstetric care services – and weak management systems. It was strongly suggested that we need to challenge our policy-makers and programme managers to refocus programme content and to shift focus from development of new technologies towards development of viable organisational strategies that ensure a continuum of care and account for every birth and death.

The Safe Motherhood Initiative has learned important lessons during the past 20 years and plus. At the Nairobi conference, the framework for action in Fred Sai's closing statement encompassed the need to improve women's status, educate communities, and strengthen and expand core elements of maternal health – antenatal care, delivery care, and postpartum care – at the community and referral levels. The conference proceedings echoed these recommendations (Starrs 1987:1-54), but they were not always taken up by key actors. During this period, less than 10 years after the Alma Ata conference and the global commitment to primary health care, the public-health community was prioritising community-based preventive interventions. Donors, UN agencies, and governments therefore seized on two elements of the safe motherhood strategy discussed at the Nairobi conference – antenatal care, with a focus on screening women to identify those at risk of complications, and training of traditional birth attendants to improve delivery care at the community level – and poured their funding and support into these strategies.

In its healthy motherhood publication, a crucial message from The Lancet Maternal Health Steering Group is that professionalisation of maternity care must be the absolute priority (Horton 2006:69389-6). It was further elucidated that this in turn demands strong political leadership to train, develop, and retain skilled health workers, and to maintain a strong focus on equity of access to facility-based obstetric care. Calls for action such as these can seem over-simplistic. Nevertheless, as Robert Horton – on behalf of the Lancet – point out, there is a dramatic crisis in human resources for health in sub-

Saharan Africa. Transport and communication links between rural and urban settings are fragile. Basic emergency obstetric care needs: intravenous antibiotics, anticonvulsants, and oxytocic drugs, together with surgical instruments are often absent. There remains disagreement about the value of traditional birth attendants. And many governments have shown little interest in prioritising MDG-5 (Horton 2006:69389-6). And yet, there can be no safe future for our species without healthy motherhood.

The tragedy of maternal mortalities and newborn deaths has multiple causes and must be confronted with a multiple strategy. The identified interventions are needed to save and preserve the health of mothers and babies. They cannot be implemented in a vertical or in an uncoordinated fashion but must form part of a broad strategy to improve reproductive health through primary health care. Each of the safe motherhood pillars is equally important. This implies that safe motherhood interventions should be applied holistically within a general health context that promotes equity in access to, and quality of, care. The dwelling of safe motherhood is built with many stones, among them prenatal care, nutrition, education, transport, identification of mothers at high risk for complications of pregnancy, skilled attendants, and home birth kits. But the abode will fall down – meaning that women will die – without prompt, adequate treatment when they suffer life-threatening complications during pregnancy, delivery or in the puerperium (Fortney 2001:95-97; Fosu 2007:733-820).

2.6 WHY SLOW PROGRESS IN REDUCING MATERNAL MORTALITY AND NEWBORN DEATH?

Despite vast effort and the launch of widely acknowledged Safe Motherhood Initiative nearly 25 years ago; MDG-5 and MDG 4 (particularly newborn death), are the ones towards which the least and slow progress have been made (WHO 2014b:22-27, UN IGME 2014:9, Lawn et al 2014:189-205; AbouZahr 2003:15-16; Bryce, Daelmans, Dwivedi, Fauveau, Lawn, Mason, Newby, Requejo, Salama, Shankar, Starrs & Wardlaw for Countdown to 2015 Core Group 2008:1247-5128; Hill, Thomas, AbouZahr, Walker, Say, Inoue, Suzuki on behalf of the Maternal Mortality Working Group 2007:1311-1319; Simwaka, Theobald, Amekudzi & Tolhurst 2005:708-709). Ties Boerma, director of the WHO's department of health statistics in his presentation of the World Health Statistics 2010 said, "Maternal mortality is stuck at what it was in 1990". He further described the annoying newborn death. He stress; *increasingly, lowering child*

mortality depends on "tackling neonatal mortality". Adding that, an estimated 40% of global deaths among children younger than age five occur in the "first month of life, most in the first week." Thus, according to the World Health Statistics 2010 report (WHO 2010b:7), the number of worldwide deaths among children younger than age five has fallen by 27% since 1990, but there has been little progress in reducing newborn deaths and maternal mortality. Most maternal deaths occur in Africa, where the maternal mortality ratio in 2005 was 900 per 100,000 live births – more than double the global rate of 400 per 100,000. Nevertheless, it is believed that substantial progress can be achieved. Indeed, a 2003 World Bank report (De Silva, Lissner, Padmanathan, Liljestrand, Martins, Rajapaksa, Singh & Selvaraju 2003:23-29) on the success of several developing countries, including China, Sri Lanka, and Malaysia, in reducing maternal mortality rates concluded that "maternal mortality can be halved in developing countries every 7–10 years regardless of income level and growth rate". To make real progress; substantial, flexible, medium-term funding for field programmes and related research were recommended, with a clear focus on important programme elements, implemented with commitment to the crucial goal of strengthening national health systems.

Generally, various interlinked explanations have been provided on the "why slow progress in reducing maternal mortality and newborn death" at different platforms. These may include:

2.6.1 Lack of clear strategic direction

Maine and Rosenfield (1999:480-482) in their article "The Safe Motherhood Initiative: Why has it stalled", argued that one of the reasons for the lack of progress in reducing maternal mortality and hence her newborn is the absence of a clear strategic focus in the Safe Motherhood Initiative). In the effort to significantly reduce maternal mortality and newborn death; competing policies for clinical versus community care has swung between facility-based and community-based care, slowing progress in building integrated health systems. As independence dawned in the 1950s and 1960s, most countries in Africa and Asia invested in facility-based care for rich people in urban settings. The 1970s and 1980s saw a reaction to this with subsequent emphasis placed on primary health care for all through training of community health workers (CHWs) and traditional birth attendants (TBAs) (Lawn, Tinker, Munjanja & Coursens 2006:69387-2).

In many cases CHWs and TBAs were trained only briefly and then left unsupervised, without a functional referral system.

By the end of the 1990s, interest in community health systems waned and global focus shifted to vertical approaches epitomised by global funds for vaccines and specific infectious diseases. In safe motherhood programmes the need for skilled attendance and emergency obstetric care was strongly emphasised, often without parallel efforts to promote demand for care. Governments were advised to stop training TBAs (WHO 2005:62-74). However, even in countries working hard to increase skilled care there is an inevitable time lag – filling the global gap of 330,000 midwives requires new midwifery schools and teachers and takes time, especially to reach poorer rural communities (WHO 2005:62-74).

Conflict between policies for skilled care and community care has also been competing health care strategy. Indeed WHO's model of health systems includes the community as a key component (Smith & Ovenden 2007:1-42; WHO 2008b:110). But practically, strong community services promote demand for skilled care. Assessments of the integrated management of childhood illness (IMCI) (Bryce, Gouws, Adam, Black, Schellenberg, Manzi, Victora & Habicht 2005:69-76) suggest that either clinical system strengthening or community activities alone have limited effect – the greatest success comes when both are linked. Preclusion of community care leaves the most vulnerable women and babies without options for many years to come (Knippenberg, Lawn, Darmstadt, Begkoyian, Fogstad, Walelign & Paul for the Lancet Neonatal Survival Steering Team 2005:1087-1098). By applying a phased approach, family-community services can save up to 37% of neonatal deaths now (Darmstadt et al 2005:977-988) and most child deaths (Darmstadt et al 2005:977-988) and also benefit maternal and newborn health (Costello, Osrin & Manandhar 2004:1166-1168).

In Nepal, empowering community-based women's groups and simultaneous strengthening of the health system resulted in an increase in healthy behaviours and uptake of antenatal and skilled delivery care, and in a significant reduction in both neonatal and maternal deaths (Manandhar, Osrin, Shrestha, Mesko, Morrison, Tambahangphe, Tamang, Thapa, Shrestha, Thapa et al 2004:970-979). Several studies have shown the effectiveness of well-trained and supported CHWs in reduction of neonatal mortality, especially late neonatal mortality (Sazawal & Black 2003:547-556;

Bang, Bang, Baitule, Reddy & Deshmukh 1999:1955-1961). Although a meta-analysis of training of TBAs indicates a significant decrease in perinatal and neonatal mortality due to birth asphyxia (11%) (Sibley & Sipe 2004:51-60), no effect of training TBAs on maternal mortality has been identified (Campbell & Graham 2006:69381-1). The failure to detect an effect might be related to the absence of any result or the formidable measurement challenges faced in showing a modest effect on a rare event (Ronsmans & Graham 2006:1189-1200; Campbell & Graham 2006:69381-1). Whichever is the case, attempts to exclude TBAs from any role in communities where they have long been responsible for childbirth might be counterproductive. Roles for TBAs can be redefined – eg, in Burundi, the involvement of TBAs to promote skilled attendance has increased facility deliveries in one district (Lawn & Kerber 2006:73). Malaysia has successfully used TBA training as a step towards skilled care (Koblinsky, Matthews, Hussein, Mavalankar, Mridha, Anwar, Achadi, Adjei, Padmanabhan, Marchal, De Brouwere, Van Lerberghe for the Lancet Maternal Survival Series Steering Group 2006:69382-3).

2.6.2 Lack of availability and accessibility of emergency obstetric care (EOC)

Another factor that has contributed to the slow progress in maternal mortality and newborn death reduction is the lack of access to and availability of emergency obstetric services. In contrast, it has been emphasised that professionalisation of maternity care must be the absolute priority (Horton 2006:69389-6). Of all the interventions laid down to combat maternal mortality and her newborn death, access to emergency obstetric care is the one that can substantially reduce maternal mortality and ensure survival of newborns. As most obstetric complications cannot be predicted nor prevented but nearly all can be successfully treated (Fournier, Dumont, Tourigny, Dunkley & Drame 2009:30-38; Maine and Rosenfield 1999:480-482). Furthermore, even if obstetric complications could be predicted, those women identified would certainly need emergency obstetric services for their problem to be successfully managed. Thus, EOC is the key stone (pillar) that holds all those other blocks (pillars) in place.

However, with all the potentials and benefits of access to essential obstetric services in the global efforts to combat maternal mortality and newborn death, it has unfortunately received little attention. In the past many years, this component has received such a poor reception among health planners and politicians even though several studies have

shown its effectiveness (Holmes & Kennedy 2010:7-18). In a seven year clinical control trial carried out in Bangladesh, maternal mortality has been reduced by 50% mainly because women have a reliable access to emergency obstetric services (Maine, Akalin, Chakraborty, Francisco & Strong 1996:179-87; Ronsmans, Vanneste, Chakraborty & Van Ginneken 1997:1810-1814). Furthermore, the dramatic reduction of maternal mortality and newborn death in Europe particularly in Sweden (1751–1920) and England and Wales (1934–1960) to levels that commands no public health attention was largely due to increased access to emergency obstetric services and advances in medical technology (Maine & Rosenfield 1999:480-482; Papiernik 1995:73-77; Loudon 1992:543). These are testimonies that signify the superiority of EOC to all other interventions in the fight to reduce maternal mortality as well as newborn death. Nevertheless, as stated above, this demands strong political leadership to train, develop, and retain skilled health workers, and to maintain a strong focus on equity of access to facility-based obstetric care.

2.6.3 Poor commitment and lack of political will

Deficiency in political will and commitment has been blamed for some of the slow progress primarily in developing countries (Shiffman 2007:796-803; Horton 2006:69389-6). With the mere fact that maternal mortality and newborn death has been reduced drastically in industrialised countries to levels which is no longer a public health concern goes on to mean that with the strong political will and commitment the same could happen in developing countries. Sadly, in developing countries political commitment is mostly equated to the signing of international charters and treaties and not committing resources. Dr Mahmoud Fathalla in his opening speech at the Colombo meeting in 1997 said “the road ahead is a road of will” adding that “will without the wallet will not be possible” (Kasonde & Kamal 1998:103-105). Whichever angle one looks at will it must entail committing adequate resources. The lack of commitment has also been manifested in the implementation of only one or few of the components of safe motherhood or at most implemented in piecemeal fashion in developing countries assuming that it will pay dividend. Despite the fact that safe motherhood proved to be one of the most cost effective and indeed an economic investment, little resources is allocated to it in most developing countries.

2.6.4 Health system failure

Health systems' failure in addressing the health care needs of women and the newborn in obstetric complications is also blamed for the slow progress in addressing the problem of maternal mortality and newborn death. If a woman does develop a life-threatening complication, her survival depends exclusively on getting prompt and adequate emergency obstetric care. It must be noted that even though a multitude of factors come into play for maternal mortality and newborn death to occur, in reality it is often logistics or health service factors that determine whether a woman with pregnancy-related complications lives or dies (DFID 2008:26-30; Maine 1999:175-182). There has been much talk from among health workers about women dying in childbirth because in their opinion those women did not come to a health facility. It is high time to acknowledge the large proportion of women who die despite reaching a health facility for care. In most instances the services that should save the life of those women with complication are not available or accessible or even if available it will be in a poor quality or standards. In other words the effectiveness and efficiency of the health system in addressing the health care needs of women with obstetrical complication is questionable.

Health system failure manifest itself in different forms but its most common exposures are operational difficulties such as lack of or intermittent shortages of essential drugs and other medical supplies; lack of equipment, lack of competent or well-motivated work force; professional delays and errors in diagnosis. Other manifestations of health system failure are lack of reliable water and/or electricity supply. Under the leadership of committed physicians and midwives, better management of resources, improvements in staff skills through on-the-job training, systematic reviews of all maternal mortality and newborn deaths and adherence to standards and protocols, and promotion of professional responsibility can achieve a great deal in a space of years (De-Brouuwere, Tonglet & Lerberghe 1998:771-782; Ravindran & Berer 1999:3-12; WHO 2002a:1-34; WHO 2002b:1-13; WHO 2007c:21-39). A health system's efficacy depends on the efficacy of its different components (first-level health services and hospitals). It also depends on the system's ability to ensure the continuity of care among the various levels of the system (Bakry, Laabid, De-Brouuwere & Dujardin 1999:65-74).

2.6.5 Misconceptions

The lack of focus has led to a lot of misconceptions about how to annihilate maternal mortality and newborn death. One common misconception is that governments and health planners react that reduction of maternal mortality and newborn death requires large-scale investment. It is true that safe motherhood implies a range of interventions and that no one approach can achieve success. Nonetheless, two arguments can counter such unfounded thinking. First, safe motherhood interventions involve the introduction of appropriate technologies that do not require large-scale investment in expensive drugs or equipment. Second, it does not mean the total overhaul of existing programs and creating new ones but strengthening existing ones to make them more functional and to be able to address the health care needs of all women and the newborn baby. Safe motherhood programs are among the most cost effective interventions available in public health. Such critics are totally blind of the economic and social gains and benefits attached to investing on safe motherhood. Literature has indicated that the cost of the entire package in low income countries is about US \$3 (£2) per person in a year and the cost per live saved is US \$230 (£153) (WB 2006:1-6; Tinker 1997:15-20; WHO 1999a:4-7). Furthermore, it also contributes to the alleviation of 7% of the burden of disease in such countries.

Another misconception implicated in this slow progress is the belief that maternal mortality and newborn death cannot be reduced without general socioeconomic development. Again literature has totally refuted this. A study conducted in Indiana, USA among women in extremist religious communities, although well nourished, well-educated and financially secure, have maternal mortality and newborn rates hundred times higher than the national figures (Kaunitz, Spence, Danielson, Rochat & Grimes 1984:826-831). The reason is that members of that religion do not make use of modern medical care even in emergency situations.

2.6.6 Ineffective use of traditional birth attendant (TBA)

Training of traditional birth attendants (TBA) in reducing maternal mortality has received much attention and criticism. It was thought that training of TBA can contribute to the reduction of maternal mortality; however, evidence has indicated that this is not the case. TBA training is only effective when there is high quality emergency obstetric care

which is available, accessible and affordable. Anything short of it will render TBA training ineffective. Of the five major causes of maternal mortality, it has been acknowledged that TBAs can have a direct impact on preventing infection (through proper hygiene) and post-partum haemorrhage (through proper management of placenta) which, actually, has even been challenged (Goodburn, Chowdhury, Gazi, Marshall & Graham 2000:394-399).

Generally, TBA training is to contribute to the reduction of maternal and child mortality and morbidity through improved delivery and child care practices by: (a) improving the skills, understanding and stature of TBAs; (b) increasing the number of births conducted by trained TBAs; and (c) improving links between modern health services and the community through TBAs (Cabral, Kamal, Kumar & Mehra 1992:24-41). Core training generally focuses on teaching TBAs to perform deliveries in a more hygienic and safer fashion, discouraging harmful practices, recognising danger signs and referring women with complications to facilities where essential obstetric care is available. Health education for pregnant women and antenatal and postnatal care are usually included. In some programs TBA training has assumed a much wider agenda and includes child health intervention, health promotion and family planning. It has even been proposed that training TBAs in anthropometry could help in identification and improved management of pregnant women with malnutrition (Krasovek & Anderson 1991:523-532).

NGOs working at community level in resource poor countries frequently include TBA training in their activities. A number of governments, for instance Bangladesh, have also adopted this approach, supported by massive donor funding. International agencies, including WHO, UNICEF and UNFPA have also supported TBA training. However, gradually the value of TBA training has been increasingly questioned (Maine 1999:175-182) although there are still many groups who remain enthusiastic (Greene 1995:141-143). There often appears to be little common ground between the proponents and opponents of TBA training.

2.6.7 Family planning

The role of family planning in the reduction of maternal mortality and unwanted pregnancies has also received much attention and debate. As it was observed that

pregnancies at the extremes of age (too early and too old), too many and too frequent pregnancies are very important pathways for maternal mortality and newborn deaths, it was believed that widespread use of contraceptives could considerably reduce maternal mortality and unwanted pregnancies. It has been accepted that contraceptive use can reduce unwanted and undesirable pregnancies and indeed the number of possible complications and thus the number of maternal deaths. It has been documented that family planning can reduce maternal mortality and related newborn death by some 20% (AbouZahr, Wardlaw, Stanton & Hill 1996:77-87; Fauveau, Stewart, Khan & Chakraborty 1991:345-348), however, other analyses has questioned such results (Maine et al 1996:179-187; Ronsmans et al 1997:1810-1814). The fact of the matter is once pregnant, family planning cannot modify a woman's risk of dying. A study conducted in Matlab, Bangladesh by Ronsmans has proven the complexity of the nature. The results of that study do not support the frequently made assertion that closely spaced births increase the risk of maternal death (Ronsmans & Campbell 1998:282-290).

2.6.8 Unsafe abortion and lack of access to safe abortion service

WHO estimates that each year about 25% of all pregnancies worldwide end in an induced abortion, approximately 50 million. Of these abortions, approximately 20 million are being performed under dangerous conditions, either by untrained abortion providers or using unsafe procedure, or both (Berer 2000:580-589; WHO 1997:19-31). They result in nearly 80,000 maternal deaths – 13% of all maternal deaths globally - and hundreds of thousands of disabilities. Ninety-nine percent of these unsafe abortions are performed in developing countries (Grimes, Benson, Singh, Romero, Ganatra, Okonofua & Shah 2006:69481-6; WHO 1998:11).

Deaths as a result of unsafe abortion in developing countries are estimated at 400 per 100,000 abortions. This figure hides substantial regional variation, as unsafe abortions in Africa being at least 700 times more likely to lead to death than in developed countries (WHO 2002a:1-34; WHO 2006b:1-13). In Africa, abortion is illegal or very restricted, making it extremely difficult to estimate the number of procedures performed or the frequency of associated complications including deaths. A study conducted in three West African countries shows an extremely high proportion of deaths as a result of complications of induced abortion within the first trimester of pregnancy (Thonneau,

Goufodji & Sundby 2002:1984-1985). Safe abortion services may be beyond the reach of many women in developing countries because it may not be available as it is illegal; or even when it is not prohibited by legislation the services are practically unavailable. Unsafe abortion procedures, untrained abortion providers, restrictive abortion laws and high mortality and morbidity from abortion tend to occur in one and the same countries. In countries where women have access to safe abortion services, deaths from abortion are virtually eradicated (Berer 2000:580-592). Putting in place an enabling abortion laws i.e. legalising abortion and making services available, like in Romania has remarkably contributed to maternal mortality reduction by 40% (WB 1993:17).

2.7 COMMUNITY-BASED MATERNAL AND NEWBORN HEALTH CARE INTERVENTIONS

Epidemiology has been criticised for concentrating on biomedical rather than social issues, and researchers have been encouraged to tackle the social aspects of public health through community-based participatory research (Shy 1997:479-484). Evidences are growing for use of community-based interventions to reduce maternal mortality and newborn death. Just to portray some of such interventions:

2.7.1 Interventions based on community participation

A cluster randomised controlled trial of a community-based maternal and newborn health care intervention in Nepal shows the potential of this approach (Manandhar et al 2004:970-979). In each community-based maternal and newborn health care intervention cluster, one woman facilitator convened nine monthly women's group meetings. She supported the groups through an action learning cycle in which they identified local perinatal problems and formulated strategies to overcome them. Women in intervention clusters had more antenatal care, institutional delivery, trained birth attendance, and hygienic care. This social intervention harnessed the creativity, self-interest, and self-organising activities of poor women, and seems to have had results unpredicted by linear biological models (Manandhar et al 2004:970-979). Communities often show an overwhelming preference to seek care locally (Mesko, Osrin, Tamang, Shrestha, Manandhar, Manandhar, Standing & Costello 2003:3. Safe motherhood and newborn care programmes must tackle the resulting delays in seeking care – for example, recognition of a problem at home, a decision to seek care, getting transport to

a health facility. As well as improving hygiene practices at home, the Nepal intervention probably shortened delays through better awareness of warning signs, less dependence on traditional remedies, and the development of stretcher schemes and funds to allow transport of sick mothers and newborns to health facilities.

2.7.2 Family planning

The importance of family planning in reducing maternal mortality is uncontroversial. As many as 50% of pregnancies are unplanned and 25% are unwanted; and, complications of unsafe abortion are responsible for a substantial proportion of deaths (Donnay 2000:89-97). The existing demand for family planning services could reduce maternal deaths in developing countries by 20% or more. Bangladesh, which achieved great success in expanding family planning uptake and reducing fertility rates, reduced maternal mortality from 850/100,000 in 1990 to 380/100,000 in 2000, even though, in 2002, only 12% deliveries had a skilled attendant (UN 2004). Community-based distribution of injectable contraceptives is common place in some countries in Asia and Latin America, but is practically unknown in Africa (Fosu 2007:733-820). A community trial in Uganda, by Stanback, Mbonye and Bekiita (2007:768-773), shows that well trained community health workers can safely provide contraceptive injections.

2.7.3 Treatment of perinatal sepsis

Adriaanse, Pel and Bleker (2000:153-158) convincingly showed the contribution of puerperal sepsis to maternal mortality in 1846. Attention to hygiene greatly decreased maternal mortality, but cleanliness in childbirth remained poor in the industrialised world well into the 20th century. Detailed analysis of the fall in maternal mortalities and newborn deaths in the United Kingdom in the middle of the last century showed that 40% of the reduction followed treatment of infection rather than sophisticated obstetric care; maternal mortality from sepsis fell from 203/100 000 in 1931, when sulphonamides became available, to 58/100 000 just nine years later (Tew 1990:14). Further meta-analysis of community-based treatment of acute respiratory infections underlines the potential for reducing neonatal mortality (Sazawal & Black 2003:547-556), and a results of Nepal trial seem to reflect prevention or early treatment of sepsis (Manandhar et al 2004:970-979).

2.7.4 Management of post-partum haemorrhage

Globally, the largest proportion of maternal deaths is due to haemorrhage/severe bleeding (Audu et al 2010:147-151; Khan et al 2006:1066-1074; Ronsmans et al 2004:43-56; WHO 2005:62-74). Because postpartum haemorrhage can kill within two hours, an effective community-based intervention could prevent 25% of global and/or 34% of African maternal deaths. In 1996, it was suggested that misoprostol (a prostaglandin E1 analogue) might be a suitable treatment as it is inexpensive, orally administered, and does not require refrigeration (El-Refaey, O'Brien, Morafa, Walder & Rodeck 1996:1257). By 2001, WHO had reported a hospital based trial of misoprostol versus oxytocin. The authors concluded that oxytocin was preferable for clinical use, but the study did not examine whether misoprostol could reduce haemorrhagic death outside hospital in high risk populations (Gülmezoglu, Villar, Ngoc, Piaggio, Carroli, Adetoro, Abdel-Aleem, Cheng, Hofmeyr, Lumbiganon et al for WHO Collaborative Group to Evaluate Misoprostol in the Management of the Third Stage of Labour 2001:689-695). Despite numerous clinical evaluations showing misoprostol's safety and effectiveness (Tsu, Langer & Aldrich 2004:42-51), no trial has examined this, and a low cost drug that could be carried by community health workers is little used. The failure to evaluate misoprostol properly is a serious omission in international public health. Pharmaceutical and international politics may have played a part, given its use to induce abortion.

2.7.5 Collaboration with traditional birth attendants

Speculation about the cost and effectiveness of programmes to train traditional birth attendants has led to their widespread abandonment, despite an absence of trial evidence (De-Brouwere et al 1998:771-82). Absence of evidence of effect is not evidence of absence of effect. A meta-analysis of 60 studies showed that training traditional birth attendants was associated with significant improvements in performance and mortality (Sibley & Sipe 2004:51-60). Concerns about the cost effectiveness of training traditional birth attendants are legitimate in settings where their coverage or workload is low. Nevertheless, they are often key providers of support and opinion in their communities. It is believed that in countries where maternal mortality is high and use of traditional birth attendants common, programmes should collaborate with them to promote reproductive health and hygiene, avoid delays in seeking care for

complications, and perhaps to help with vital surveillance (Costello et al 2004:1166-1168).

2.7.6 Need for large scale community-based maternal and newborn public health trials

Improving obstetric care and midwifery skills should remain a core element of safer motherhood and newborn health programmes. The low coverage of health centre based obstetric care and the potential value of primary care strategies, however, provides an imperative to evaluate the cost effectiveness of community interventions. There are very limited community-based maternal and newborn health care trails. One community effectiveness study has reported maternal mortality as a primary outcome, a trial of vitamin A supplementation in pregnancy – which showed a 40% reduction in maternal mortality in Nepal (West Jr, Katz, Khatry, LeClerq, Pradhan, Shrestha, Connor, Dali, Christian, Pokhrel & Sommer 1999:570-575). This dearth of evidence reflects a widely held belief that trials, even if necessary, are not practicable. It is not convincing that the assertion large scale community effectiveness trials would “require resources ... that could ... be much better spent on programs to save lives” (Maine & Rosenfield 1999:480-482). The trial in Nepal was inexpensive and took four years to complete. Such randomised trials are important: they measure the true scale of a problem, accurately assess community and cost effectiveness, and avoid investment in ineffective strategies. In communities where maternal mortality is above 150/100,000 and neonatal mortality above 35/1,000, it is suggested that a combination of the approaches described above could potentially reduce maternal and neonatal mortality significantly (at least 30% or more), and should at least be evaluated (Costello et al 2004:1166-1168). In areas of high prevalence of malaria and HIV, community initiatives could also address prevention of malaria in pregnancy and voluntary counselling, testing, and use of antiretroviral drugs for HIV.

2.8 CONTINUUM OF MATERNAL, NEWBORN, AND CHILD CARE

During the brief history of international interest in the continuum of maternal, newborn, and child health care, a range of definitions have been proposed, predominantly quite in recent times (Tinker et al 2005:822-825; Otchere & Ransom 2005:18-23; WHO 2005:62-74; Mangiattera, Mathero & Dunkelberg 2006:37-47). These definitions differ in

scope, and address various levels and aspects of care for mothers, newborn babies, and children. Few, if any, of these definitions focus on reproductive health and almost none incorporate the dimension of coverage of care. For the suitability of the specific study, the researcher uses Kerber et al's (2007:1358-1369) definition that builds on the previous work and incorporate the dimension of coverage of care: "The continuum of care for maternal, neonatal, and child health requires access to care provided by families and communities, by outpatient and outreach services, and by clinical services throughout the lifecycle, including adolescence, pregnancy, childbirth, the postnatal period, and childhood. Saving lives depends on high coverage and quality of integrated service-delivery packages throughout the continuum, with functional linkages between levels of care in the health system and between service-delivery packages, so that the care provided at each time and place contributes to the effectiveness of all the linked packages".

The health of mothers, newborn babies, as well as children at large, consists of sequential stages and transitions throughout the lifecycle. Every woman need services to help them to plan and space their pregnancies and to avoid or treat sexually transmitted infections. Pregnant women need antenatal care that is linked to safe childbirth care provided by skilled attendants. Both mothers and babies need postnatal care during the crucial 6 weeks after birth. Postnatal care should also link the mother to family-planning services and the baby to child health care. Adolescents need education and services for nutritional, sexual, and reproductive health. If women, babies, children, or adolescents experience complications or illness at any point, continuity of care from household to hospital, with referral and timely emergency management, is crucial. Each contact with the health system is an opportunity not only to provide promotional, preventive, or curative care, but also to amplify the effect of the subsequent contact. However, the challenges are apparent even in strong health systems, since each transition requires connections between care providers, programmes, and levels of care to ensure that a mother, baby, or child does not fall through the cracks of a weak continuum (Kerber et al 2007:1358-1369).

Figures 2.2 and 2.3 below show that the continuum can be defined over the dimension of time (throughout the lifecycle), and over the dimension of place or level of care (Lawn & Kerber 2006:23-38). The continuum of care over time includes care before pregnancy (including family-planning services, education, and empowerment for adolescent girls)

and during pregnancy. During childbirth and the days immediately afterwards, mothers and babies are at highest risk of death; over half of all maternal and neonatal deaths occur during this period (Stanton, Lawn, Rahman, Wilczynska-Ketende & Hill 2006:1487-1494). Of the estimated 3.2 million stillbirths every year (Stanton et al 2006:1487-1494), 30% occur during childbirth, yet, every year 50 million women deliver at home (Lawn et al 2005:409-417). In the case of Ethiopia, the figure of home delivery rise to nearly 90% (CSA 2011:126, CSA 2014:45). An effective postnatal care package for mothers and babies would facilitate the transition between maternal care and preventive and curative care to improve child survival.

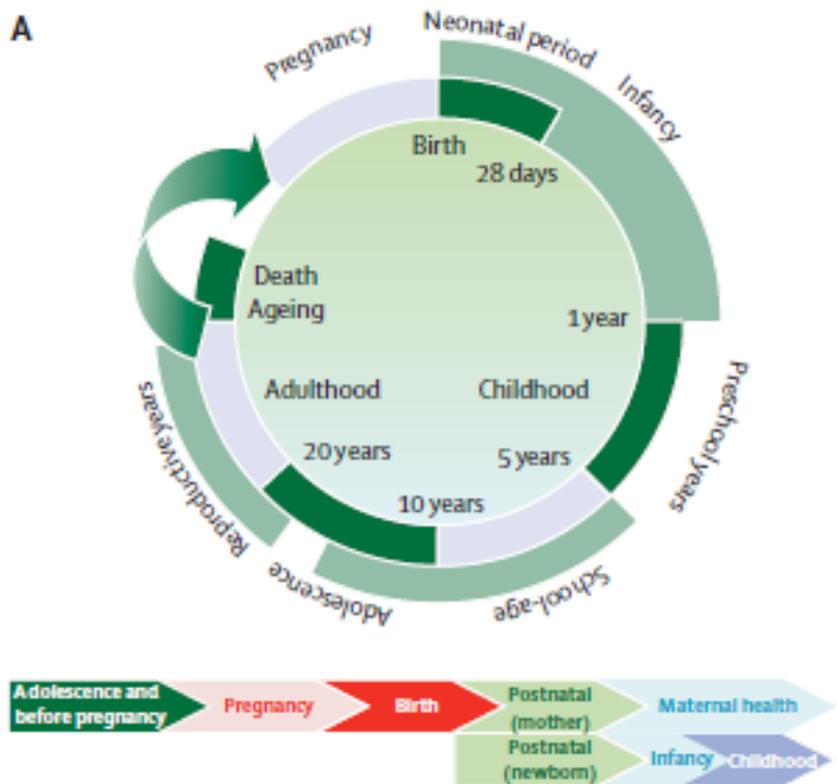


Figure 2.2: Continuum over the dimension of time (throughout the lifecycle)

The continuum of care over the dimension of place or level includes the home, the first-level facility, and the hospital. An effective continuum would ensure that appropriate care was available wherever it was needed, and linked, where necessary, to other levels of care (figure 2.3).



Figure 2.3: Continuum over the dimension of place or level of care

In many developing countries, most deaths of babies (Lawn et al 2005:891-900) and children (Black et al 2003:2226-2234), and many maternal deaths (Ronsmans & Graham 2006:1189-1200) occur at home, commonly because of delays in reaching care (Thaddeus & Maine 1994:1091-1110).

Three Delays Model (Thaddeus & Maine 1994:1091-1110)

Delay in decision to seek care: Lack of understanding of complications; acceptance of maternal death; low status of women; socio-cultural barriers to seeking care: women's mobility, ability to command resources, decision-making abilities, beliefs and practices surrounding childbirth and delivery, nutrition and education.

Delay in reaching care: Mountains, islands, rivers – poor organisation.

Delay in receiving care: Facilities, supplies, personnel; poorly trained personnel with punitive attitudes; and finances (Thaddeus & Main 1994:1091-1110).

Mothers and babies are especially vulnerable to death: a woman with postpartum haemorrhage or a baby with birth asphyxia, sepsis, or complications of preterm birth can die within hours or even minutes if appropriate care is not provided. Delayed attention to complications during labour leads not only to deaths but also to poor outcomes such as intrapartum stillbirths, neonatal illness and disability, obstetric fistula,

and other long-term obstetric complications (Thaddeus & Maine 1994:1091-1110). Long distances, financial constraints, poor communication and transport, weak referral links, and at times, low-quality care in health facilities, can limit access to care for those who need it most.

The place dimension of the continuum can be defined as the physical location where care is provided. The operational levels of different health systems vary widely, but three distinct approaches can be differentiated on the basis of the skill and intensity of service delivery and the obstacles to care (WB 2004:13). The first approach – clinical care – consists of individual-oriented case management of mothers, babies, and children with illness or complications, which is typically provided through facility-based care at primary and referral sites. These services, such as emergency obstetric care, are the most challenging and costly to provide, but also have the highest potential to save lives. Clinical care should therefore be available for 24-hour per day, and providers must be adequately trained, equipped, and supervised. Normal childbirth also demands skilled clinical case management and continuous availability of health-care professionals.

The second approach – outpatient and outreach services – consists of population-oriented services, delivered on a routine scheduled basis, either through static clinics (for example, routine antenatal or postnatal care) or through mobile services (for example, immunisation campaigns or child-health days). These services are commonly standardised, in that clients receive the same care, and therefore the skills needed by providers are easier to learn than those for clinical case management.

The third – family and community care – consists of home-based care practices. Programmes to improve family and community care, by promoting adoption of healthy behaviours and empowering individuals and families to demand quality services, should be tailored to specific social and cultural environments through formative research. Community health workers need negotiation skills (eg, to promote breastfeeding or use of oral rehydration salts) and skills to address basic health needs across the lifecycle (Haines, Sanders, Lehmann, Rowe, Lawn, Jan, Walker & Qar Bhutta 2007:2121-2131). In some health systems, provision of clinical case management to communities might be the most feasible way to increase access to essential interventions, at least in the

short term. However, synergistic connections between the three delivery approaches are necessary; none of them is sufficient on its own (Kerber et al 2007:1358-1369).

2.9 MATERNAL MORTALITY AND NEWBORN DEATH IN ETHIOPIA

Despite major progresses have been made to improve the health status of the Ethiopia population in the last one and half decades, Ethiopia's population still face a high rate of morbidity and mortality and its health status remained poor. Latest figures (MoH 2014a:21) in vital health indicators show a life expectance of 54 years, an IMR of 77/1,000 and under-five mortality rate of 123/1,000. More than 90% of child deaths are due to neonatal problems and malnutrition, pneumonia, diarrhoea, malaria; and, often to a combination of these conditions. These are very high levels, though there has been a gradual decline in these rates during the past 15 years. In terms of maternal mortality and newborn death the levels are unacceptably very high throughout the country. These pose difficult public health challenge to the Health Bureau of the Regional State and the Federal Ministry of Health at large.

According to the 2001, 2006 and 2011 maternal mortality surveys, the only three biggest ever conducted in Ethiopia, the maternal mortality rates was estimated at 1,680/100,000 in 2001; 1,336/100,000 in 2006; and, 1,140/100,000 in 2011. Conversely, the maternal mortality ratio (expressed per 100,000 woman of reproductive age (15-49 yrs)) was estimated at 871/100,000 in 2001; 673/100,000 in 2006 and 676 in 2011 with overlapping intervals (CSA 2001:109-110; CSA 2006:233-234; CSA 2011:270-271). For neonatal mortality, the rates are 48.7/1000; 39/1000; and 37/1000 live births as reported in the EDHS 2001, 2006 and 2011 respectively. Similar studies carried out in the country also shows similar results (Lawn & Kerber 2006:190; UNFPA 2011:72-73). A UN estimates carried out in the country in 2010, however, shows a national estimate of 470 deaths per 100,000 live births (WHO 2010c:24). However, this estimate in question had serious methodological weaknesses that render its findings questionable with significantly huge range of uncertainty that extends the figure up to 790. Furthermore, in figure 2.4 below, Lawn and Kerber (2006:190) on behalf of the PMNCH team depict more or less similar figures.

Total Population 75,600,000
Annual births 3,064,000

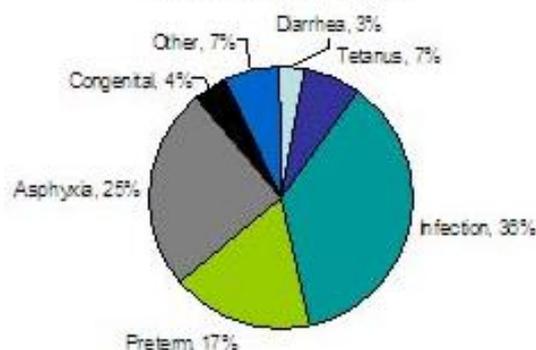
Newborns
Annual number of stillbirths 114,600
Stillbirth rate per 1,000 total births 36
Annual number of newborn deaths 119,500
Neonatal mortality rate per 1,000 live births 39
% of child deaths that are newborns 32

Children
Annual number of child deaths 376,900
Under 5 mortality rate per 1,000 live births 123

Mothers
Number of maternal deaths 26,000
Maternal mortality ratio per 100,000 live births 850

Source: Opportunities for Africa's Newborns, 2006

Estimated Causes of Neonatal Death in Ethiopia



Source: Opportunities for Africa's Newborns, 2006

Progress To Millennium Development Goal 4 For Child Survival For Ethiopia

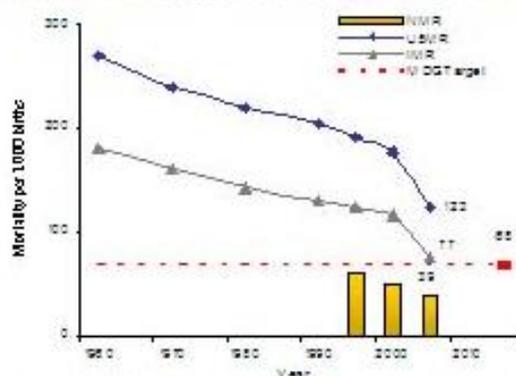


Figure 2.4: Newborn and maternal health situation in Ethiopia

(Source: Opportunities for Africa's Newborns 2006)

The common causes of obstetric deaths in Ethiopia are similar to most developing countries: sepsis, haemorrhage, obstructed labour, abortion and hypertensive disease in pregnancy (Ahmed 2010:115-122). The major causes of maternal mortality in Ethiopia are obstructed/prolonged labour (13%), ruptured uterus (12%), severe pre-eclampsia/ eclampsia (11%) and malaria (9%). Moreover, 6% of all maternal deaths were attributable to complications from abortion. Shortage of skilled midwives, weak referral system at health centre levels, lack of inadequate availability of basic emergency obstetric and newborn care (BEmONC) and comprehensive emergency obstetric and newborn care (CEmONC) equipment, and under financing of the service were identified as major supply side constraints that hindered progress (MoH 2015a:17-31; MoH 2015b:22-27; MoH 2010:38-59). On the demand side, cultural norms and societal emotional support bestowed to mothers, distance to functioning health centres

and financial barrier were found to be the major causes (MoH 2015a:17-31; MoH 2015b:22-27; MoH 2010:38-59).

The levels of maternal mortality and newborn death in Ethiopia, thus, like many other countries in Sub-Saharan Africa are unacceptably very high. This nationally high level maternal mortality and newborn death become most awful when it comes to the remote Regional State of Ethiopia. The levels are quite higher in non-primary health care coverage districts or areas compared to urban or primary health care covered areas.

Reduction of maternal mortality and newborn death is a priority area for the government of Ethiopia and its development partners notably WHO, UNFPA and UNICEF. In the quest to address this scourge, certain health sector interventions has been implemented most notably: the training of midwives in advanced midwifery to be able to provide adequate and appropriate care to obstetric emergencies; upgrading of minor health centres to the status of major health centres by improving equipment and personnel to facilitate the provision of essential obstetric care and to be able to handle obstetric emergencies within the health district; ambulances, were provided to facilitate the evacuation of patients needing care to a higher level of the health system; telephone links was established to facilitate communication between health facilities; and, access to family planning services and information has been an area that has received much attention and improvement. Furthermore, more than 30,000 health extension workers (HEW) were deployed throughout the country (MoH 2010:68). Nevertheless, regardless of all these tremendous effort little progress has been registered in maternal mortality and newborn death reduction in Ethiopia. Taking this into account, the Federal MoH has developed child survival strategy with the objective of reducing neonatal, infant and child mortality rates, contributing to the reduction of maternal mortality and ensuring availability of quality essential health care for women and children in order to achieve the MDGs (FMoH 2005b:1-79). The main pillar of the strategy is the Health Service Extension Program so as to address the underlying conditions that account for 90% of child mortality. The focus is on selected cost effective and high impact interventions.

2.10 MATERNAL MORTALITY AND NEWBORN DEATH REVIEW/AUDIT

Analysis of maternal mortality and newborn deaths is more likely to yield the answers to why maternal mortality and newborn deaths continue to occur rather than investing on ratios or rates. Answering the “why” questions is more important for program planners than answering the “how much” question. Finagel’s Laws states that “The data we have are not the data we want. The data we want are not the data we need. The data we need are not available” (Graham 2002:701-704). An awful lot of time, energy and money are invested on measuring levels of maternal mortality and newborn death than focusing on those factors contributing to maternal and newborn deaths. Answering the “why” question will require a review or audit of maternal and newborn deaths. An audit is a systematic and critical analysis of the quality of care provided mostly in cases of adverse outcomes such as neonatal or maternal deaths. In recent years, the demand for quality in health care delivery has received much attention because of the growing demand for health care, rising costs, constrained resources, growing number and types of health care providers and evidence of variations in clinical practice (Bacci & Chiaffoni 2006:1-2; Supratikto, Wirth, Achadi, Cohen & Ronsmans 2002:228-235; Campbell et al 2000:1611-1625; Mancey-Jones & Brugha 1997:183-192).

Maternity and newborn audit, in a variety of forms, is now being implemented in many resource-poor countries. All in essence ask the same three questions: what was done well, what was not done well, and how care can be improved in the future (WHO 2004a:43-56)? Avedis Donabedian's framework for assessing quality of care outlined three areas of focus in auditing: structure, process and outcome (Donabedian 1988:1743-1748). Structure refers to the organisational factors that define the health system under which care is provided. It includes physical and staff characteristics. Process is the actual delivery and receipt of care. It involves interaction between users and the health care structure. Two key processes of care have often been identified: technical intervention and interpersonal interaction between users and members of a health care system. Outcomes are consequences or product of the care. Structure as well as processes may influence outcome; indirectly or directly. Of these three dimensions of health care which may be audited, process, is the most relevant to the prevention of maternal and newborn deaths provided that what is involved is known to improve outcome (Graham, Wagaarachchi, Penney et al 2000:614-621; Mancy-Jone & Brugha 1997:183-192).

Maternal and newborn death review or audit is a qualitative, in-depth investigation of the causes and circumstances surrounding maternal and newborn deaths (WHO 2013a:11). In maternal and newborn deaths auditing, mismanagement and inadequate routines are discussed and methods to counter and correct them established so that improved norms can be established. The aim of audits is to identify errors or omissions in practice, known as “avoidable factors” or cases of “sub-optimal care”, which have contributed to adverse outcomes. It must be stated that “avoidability” depends on the context and on the resources available. For example, failure to detect congenital abnormalities during prenatal care may not be classified as avoidable in rural developing country hospital, whereas it represented a large proportion of avoidable factors in an audit in Singapore (Biswas et al 1995:213-216).

Instituting routine auditing system of maternal and newborn deaths will not only identify avoidable factors but will also highlight situations where care was below standard. This implies that the starting point in the audit process is to have standards and guidelines against which care will be compared with.

Literature has shown that auditing has a significant effect in the reduction of perinatal mortality. Wilkinson’s (1991:552-553) ten months routine and internal perinatal audits in South Africa recorded a statistically significant reduction in perinatal mortality. It was concluded that perinatal mortality auditing is an effective method of detecting preventable deaths and can increase efficiency. The benefits of auditing goes beyond reducing mortality, it also has positive effect on staff performance and morale.

2.11 MATERNAL MORTALITY AND NEWBORN DEATH REVIEW/AUDIT IN ETHIOPIA

In Ethiopia, women and newborn babies who died as a result of pregnancy or childbirth have essentially been remained invisible to the government and agencies that need to see them. This is because there was no system put in place to review maternal mortalities or newborn deaths that occurred up until this study were conducted. This makes events or circumstances surrounding such deaths unknown. In the past history of the country, classification of maternal and/or newborn deaths by medical causes may conceal what happened. A maternal mortality and/or newborn death is usually preceded

by a series of events, each of them deserving attention in their own right and in combination. It is therefore time to shift the focus from measurement to analysis of the problem; from determining the size of the problem to seeking to understand its underlying causes and determinants following the “path to death” concept. Medical cause of maternal and newborn deaths represents only the most visible dimension of a multilayered problem. It is easy to say that a woman or her baby has died from fatal haemorrhage or from sepsis, but analysis of such causes of death should comprise a more holistic approach. Tracing the route taken by the deceased woman/child prior to arrival at the health facility offers clues about possible physical, socio-cultural and economic barriers that impede access to appropriate care in a timely manner. Such a practical and an action-oriented means of gathering information on how and why maternal deaths occur can lead directly to improvements in service delivery. It may also effort to remove barriers to care. Such an undertaking will raise awareness among health professionals about those factors in the facilities and the community which if avoided, the death may not have occurred. It may stimulate actions to address those avoidable factors so as to prevent future maternal deaths. At this final stage of this study, very interestingly, the Ethiopian government has officially adopt/adapt the UN Maternal Death Surveillance and Response (MDSR) document to the country's maternal death review/ audit context (WHO 2013a:1-128; MoH 2013:1-98). The implementation, management and upshots of the bestowed technical guideline, however, is to be seen. Even so, there are no parallel initiatives for newborn death up until now.

This present study, thus, is to depict the features of maternal mortality and newborn deaths in Oromiya, Amhara and SNNP regional states through identifying, and describing the events and circumstances surrounding maternal and newborn deaths that have occurred in the selected states of Ethiopia.

2.12 CONCLUSION

The review of related literature served as a guide to provide the theoretical groundings, methodological framework and understanding of the prevailing issues of importance in the efforts to prevent the unfair maternal mortality and newborn death. It also provided glimpse of existing knowledge and practices in the area of maternal and newborn care.

This chapter has presented, discussed and summarised the extensive and assorted literature which was reviewed as part of this study. The literature review tried to encapsulated all relevant literatures as early as 18th century to up-to-dates; both on local and international, methods, issues and trends in maternal and newborn health. The literature review notably helped to refine the research designing and the methods to be followed for the study which is presented in the succeeding chapter – research design and mythology.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

"Research is to see what everybody else has seen, and to think what nobody else has thought."

Albert Szent-Gyorgyi (Physiologist), 1962

3.1 INTRODUCTION

The previous chapters dealt with the overview, rationale and substantial background towards the sobering maternal and newborn care. In a quest to describe factors contributing to high maternal mortality and neonatal death in Ethiopia, and in order to be able to develop a community-based model for averting maternal mortality and newborn death in the country, a retrospective exploratory, descriptive and contextual study design combining both qualitative and quantitative methods was employed.

Many definitions of mixed methods are available in the literature (Johnson et al 2007:112-133; Creswell et al 2012:27). For the purposes of this study, mixed methods research is defined as a research approach or methodology employing rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs (Creswell et al 2012:27). Mixed methods research, then, is more than simply collecting qualitative data from interviews, or collecting multiple forms of qualitative evidence (for example, observations and interviews) or multiple types of quantitative evidence (for example, surveys and diagnostic tests). It involves the intentional collection of both quantitative and qualitative data and the combination of the strengths of each to answer research questions (Creswell & Clark 2011:109).

It may be well understood that qualitative and quantitative research relies on different assumptions about reality (ontological assumption) as well as about the production of knowledge (epistemological assumption). Besides, there may be practical reasons why mixing quantitative and qualitative methodologies is problematic, such as lack of competence with the research group in both methodologies, only one kind of information being requested, or funding constraints. However, here we focus on

theoretical reasons why mixing methods purposively implemented. Purposes of mixed methods research may include but not limited to:

Table 3.1: Purposes and descriptions of mixed methods research

Purposes	Description
Complementarities	Mixed methods are used in order to gain complementary views about the same phenomena or relationship.
Completeness	Mixed methods designs are used to make sure a complete picture of a phenomenon is obtained.
Developmental	Questions for on strand emerge from the inferences of a previous one (sequential mixed methods), or one strand provides hypotheses to be tested in the next one
Expansion	Mixed methods are used in order to explain or expand upon the understanding obtained in a previous strand of a study.
Corroboration/ Confirmation	Mixed methods are used in order to assess the credibility of inferences obtained from one approach (strand).
Compensation	Mixed methods enable compensating for the weaknesses of one approach by using the other.
Diversity	Mixed methods are used with the hope of obtaining divergent views of the same phenomenon.

In this context of mixed research approach, the study followed an **explorative, descriptive and contextual design**.

The research design chosen enabled the researcher to achieve the purpose and objectives of the study. In this chapter, thus, the research approaches are described in terms of design, methods, population, instruments and procedures used for data collection as well as procedures used during the data analysis.

3.2 THE RESEARCH DESIGN CHOSEN

As it is the overall structure, the blueprint or a detailed plan for how a research study is conducted (Guest & Namey 2015:37-103), the research design was developed to meet the unique requirements of the study. A good design strengthens the study such that it can effectively contribute to the evidence base for practice. The research design must therefore be appropriate to the purpose of the study, feasible to the realistic constraints and effective in reducing threats to validity (Burns & Grove 2013:218-226). Accordingly, the research design for developing a community-based model for reducing maternal

mortality and newborn death was developed through three phases in accordance with the objectives of the study, explicitly: Figure 3.1 presents the phases of the study.

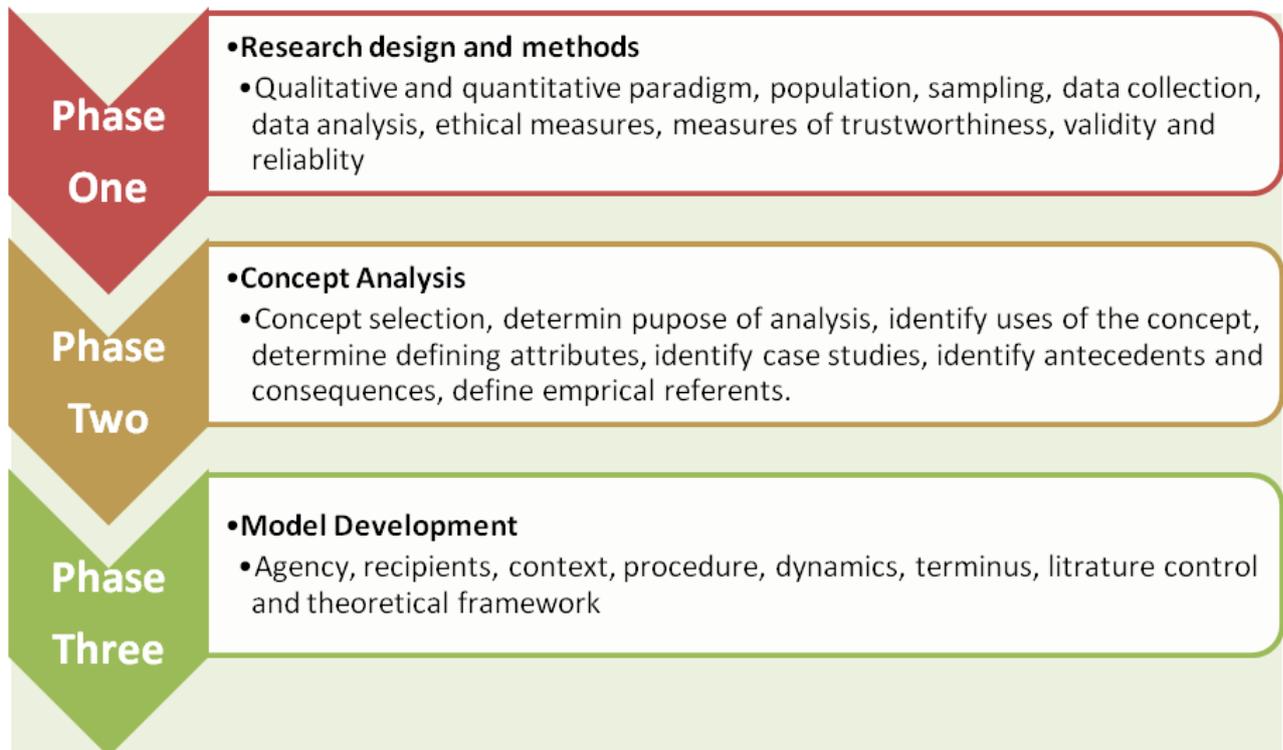


Figure 3.1: Phases of the research

3.2.1 Phase 1: Research design

A community-based retrospective mixed study design, combining both qualitative and quantitative methods which is exploratory, descriptive and contextual were used to make an in-depth investigation and analysis of the circumstances and events surrounding individual cases of maternal mortality and newborn deaths, for theory generation was conducted within the context of Ethiopian community maternal and newborn care (Chinn & Kramer 1991:79-120; Mouton 1996:103-109; Mouton & Marais 1990:43). The combination of quantitative and qualitative data (Mixed methods research) originally begins with the assumption that investigators, in understanding the social and health worlds, gather evidence based on the nature of the question and theoretical orientation (Creswell & Clark 2011:109).

3.2.1.1 Qualitative methods

Qualitative (mainly inductive) methods allow for identification of previously unknown processes, explanations of why and how phenomena occur, and the range of their effects (Pasick, Burke, Barker, Joseph, Bird, Otero-Sabogal, Tuason, Stewart, Rakowski, Clark et al 2009:11-35). Denzin and Lincoln (2005:294) define qualitative research as being "multi-method in focus, involving an interpretive, naturalistic approach to its subject matter". This means that qualitative research involves the use and collection of a variety of empirical materials; case study, personal experience, introspective, life story, individual interview, observational, historical and visual texts and that describe routine and problematic moments and meaning in individuals' lives.

The qualitative method is employed as the researcher seeks to describe and interpret the subjective, meaningful world of participants. Qualitative research is a broad description of a method of inquiry which encompasses different approaches based on specific philosophical orientation derived from philosophy, sociology and psychology. Despite the differences, the common purpose of all approaches is to examine meaning, the unit of analysis is narrative rather than numerical and all are based on the world view which is holistic and has the following beliefs (Burns & Grove 2013:240):

- There is no single reality. Reality based on perceptions is different for each person and changes over time.
- What we know has meaning only within a given situation or context.
- The reasoning process involves perceptually putting pieces together to make wholes.
- From this process meaning is produced.

In a qualitative approach, the researcher obtained an explanation of what experiences the families of the deceased mothers and newborns have during pregnancy, delivery and after delivery in relation to maternal and newborn care. Qualitative results provide the researcher with the critical information for addressing the problems being experienced (Denzin & Lincoln 2005:295).

3.2.1.1.1 Descriptive

According to Burns and Grove (2013:38), **descriptive research** enables a researcher to explore and describe a phenomenon in its real situation. It also allows the researcher to generate new knowledge of the subject by describing characteristics of persons, situations and the frequency with which certain phenomena occur. Descriptive studies also measure incidence rates, prevalence rates and relative risks (Polit & Beck 2004:192-193). Accordingly, based on the international standard, a tailored community-based verbal autopsy and confidential inquiry techniques was utilised reviewing all maternal mortality and newborn death cases that occurred in three largest regional states' six selected hospitals and their main catchment area communities. Each deceased case was reviewed following the 'path-to-death' concept in pursuit to generate adequate information on events preceding the death - for both maternal and newborn death cases (WHO 2001:17-44; WHO 2007b:1-7; WHO 2012:7-22). In all the cases the health records were retrieved and reviewed. Two groups of reviewers, (three members of obstetricians and child health physicians in each) performed independent classification of cause of death and contributing factors to these deaths. Finally, a descriptive analysis of the data was made, presented and discussed - in both quantitative and qualitative reports.

3.2.1.1.2 Contextual

This research is contextual in that it focuses on maternal and newborn care in Ethiopian community. Walcott (2001:41) states that what makes the research contextual are the situations, instances and life events or lived experiences, with particular meanings that are known to people in their specific environment under study. The context used to emphasise that is unique or regarding viewpoints in the Ethiopian community and what impact these experiences have on maternal and newborn care. The context thus is unique because there is a dichotomy between community and health facility with regard to maternal and newborn care.

3.2.1.2 Quantitative methods

Quantitative (mainly deductive) methods are ideal for measuring pervasiveness of “known” phenomena and central patterns of association, including inferences of

causality. According to Babbie (2012:40), there are different types of social research methods that can be identified from the literature, namely exploratory, descriptive and explanatory research. Peil (1982:10) stated that much of the social research, especially in developing countries, sets out to explore a new era or at least one about which little is known in local context. This aptly describes this research study, as it is the first of its kind in maternal and newborn care of the Ethiopian community. Thus, the nature of the study also lends towards quantitative research, as maternal and newborn care being practiced by the communities and health facilities were explored and discussed in multifactor verbal autopsy questionnaires.

3.2.1.2.1 Explorative

The **exploratory design** allows the use of questionnaires distributed to a large sample of the population and is therefore intent on finding facts which relate to the field of study (Couchman & Dawson 1995:40). This is very important, especially since no previous studies were done in Ethiopia on underlying/embedded causes of maternal mortality and newborn death. According to Struwig and Stead (2001:7) and Polit and Beck (2006:19), exploratory research probes more by allowing for an in-depth exploration of dimensions of the phenomenon existing in the present and links it to phenomena that happened in the past. In other words, the researcher is investigating a current outcome by attempting to determine previous factors that caused it.

3.2.2 Phase 2: Concept analysis

The empirical perspectives of the study laid the foundation for this phase and led to the syntheses and identification of the core theme known as community-based care. As main part of this chapter, using Walker and Avant (1995:39) method, concept analysis of community-based care were conducted in order to analyse and generate descriptions, definitions and to further explore the meaning of this concept in the context of preventing maternal mortality and newborn death. The concept analysis together with the empirical perspectives of the study and six aspects of Dickoff et al (1968:422) facilitated the development of a model for community-based prevention of maternal mortality and newborn death in Ethiopia.

3.2.3 Phase 3: Model development

A model was developed according to Chinn and Kramer's (1995:81) approach to theory generation: initially, based on the empirical perspectives of the study which includes analysis and interpretation of the testimonies and experiences of survived newborn mothers', family members of the deceased mothers, traditional birth attendants and health workers, concept analysis was conducted embracing concept identification as well as concept definitions and classification. This was followed by, the identified concepts were compared to each other to show interrelationships and the classification of central and relational concepts was used as a framework for the model. Then, the structure and process of a model to reduce maternal mortality and newborn death were described; and, six survey list of Dickoff et al (1968:422) namely; agent, recipients, context, terminus, procedure and dynamics formed the basis for development and description of a model for averting maternal mortality and newborn deaths in Ethiopia.

3.3 THE RESEARCH METHODOLOGY

Research methodology refers to techniques used to structure a study, gather and analyse information in a systematic way (Polit & Beck 2004:731). Accordingly, the methods used were described comprehensively, including the context in which the data collection took place particularly the relationship between the research question and data collected (De Vos et al 2005:252). The study opted for the mixed method design, triangulated in both qualitative and quantitative research methods. In this section, the research methods that were used to conduct the study were described. These included the study setting, the quantitative and qualitative methods used, population, external validity and ethical consideration of the study.

3.3.1 Study setting

The study were carried out in the three largest Regional States of Ethiopia; namely, Oromiya, Amhara and SNNP regional states. The study sites were situated in six zones of the three regional states (two zones per each region) with median distance to the nearest facility providing specialised services are more than 160 kilometres away. Six hospitals and their main catchment areas were purposively selected based on the established facility standards. Facility standards for basic emergency obstetric and

neonatal care (BEmONC) and comprehensive emergency obstetric and neonatal care (CEmONC) are specified in the 2013 Maternal, Child Health and Nutrition Directorate's case teams of MoH (MoH 2014b). Three of these six hospitals are general/district hospitals; whereas, the other three are referral hospitals - serve as a referral hospital to numerous health centres and health posts within its health catchment area but also receive considerable number of patients from other districts and zone hospitals.

Besides, we were randomly selected five districts from each zones; and, asked community workers to identify maternal mortalities and newborn deaths occurring in the districts between July 1, 2014, and June 30, 2015, and conducted verbal autopsies with families of a randomly selected districts and identified all maternal mortality cases and one-third of newborn deaths cases to capture factors and processes leading to the deaths.

Table 3.2: Portray of the selected study sites/areas

Selected Regional States	Selected Zone	Selected (Woreda) Districts	Selected Hospitals	EmONC Status
Oromiya	East Wollega	Jima Arjo, Guto Gida, Leka Dulacha, Sasiga and Diga	Nekempte Referral Hospital	Comprehensive (CEmONC)
	West Wollega	Homa, Nole Kaba, Haru, Genji and Gimbi	Gimbi general Hospital	Basic (BEmONC)
Amhara	East Gojjam	Dejen, Machakel, Awobel, Enemay and Baso Liben	Debre Markos Referral Hospital	Comprehensive (CEmONC)
	West Gojjam	Semen Achefer, Wonberma, Bure, Dembecha and Bahir Dar Zuria	Finote-Selam genera; Hospital	Basic (BEmONC)
SNNP	Wolayita	Humbo, Sodo Zuria, Damot Gale, Damot Woyide and	Wolayta Sodo Referral Hospital	Comprehensive (CEmONC)
	Sidama	Dale, Aleta Wondo, Boricha, Bensa and Bursa	Yirgalem general Hospital	Comprehensive (CEmONC)

The sites for the present study are selected for various reasons: to start with, the largest number of maternal mortality and newborn death in the country is coming from these three regional state. On the whole, the three regions: Oromia, Amhara and SNNPR represents more than 80% of the country's population (CSA 2007:47); and, this logically means any glimpse of failure or any hope of success in these regions will directly mean failure/success of the country. Thus, conducting such a study in this area will provide information on the underlying factors contributing to the high levels of maternal mortality in the country. The information generated from this present study could be useful in combating the problem.

The second justification for selecting these sites for the present study is the fact that the hospitals health catchment area fits very well the UN proposed guidelines for monitoring availability, access to and utilisation of emergency obstetric care (EmOC) (WHO 2009:5-115). Carrying such a study in these sites may also give a very good opportunity to test the guidelines in the area and in the country that has never done so.

The third ground for opting this area is the ease in identifying and subsequent follow up of maternal and newborn deaths in the hospital and in the community. Save for the country's level of development, these sites hosts excellent representations of what we may refer as modern maternal and newborn health and the traditional maternal and newborn health systems.

3.3.2 Quantitative methods

3.3.2.1 Population and sampling

Population and sample selection totally depend on the research design followed. A typical goal of quantitative research is to generalise findings to larger populations, achieving a high degree of reliability. To minimise sampling error, every case in a sampling frame must have an equal probability of selection (Patton 2001:185). The target population is, hence, the aggregate of cases about which the researcher would like to make generalisations. Sampling therefore involves selection of a number of units from a defined study population. The representative sample consists of subsets of the elements of a population; this allows for study results to be generalised (De Vos et al 2005:194; Polit & Beck 2004:290). The characteristics of the sample population are intended to be representative of the target population.

3.3.2.1.1 The study population

Population is defined as an entire aggregation or eligible group from which a sample can be drawn (Polit & Beck 2004:290). In their definition, Polit and Beck further explain that the accessible population is the aggregate of cases that conform to the designated criteria and that are accessible as a pool of subjects. The study population - an entire aggregation or eligible group from which a sample can be drawn (Polit & Beck 2004:290) – for this retrospective study are: 1) deceased mothers (all maternal death

cases of any age) – mothers who are died during pregnancy or 42 days after delivery during the study period – July 1st 2014-June 30th 2015 (N=142); and, 2) Deceased newborn (all newborn babies of neonatal & perinatal death) – within 28 weeks of gestational age and 28 days after delivery - within the study period (N=302). These are maternal mortality and newborn death cases of any nationality but are resident in the selected zones health catchment area.

3.3.2.1.2 Sampling methods

It is convincingly well explained in Bluman (2012:6-17) and numerous scholars in the area of sampling that in determining the sample size particular attention was given in getting adequate sample size that would ensure the generalisability of the study findings. The literature differentiates between two types of sampling: non-probability and probability. Non-probability sampling is used in large-scale surveys where the elements are not known and are thus non-random selection of subjects (Babbie 2005:188). Despite its inherent strength, the main disadvantage of non-probability sampling is that it is a less representative approach. The method used in this study was purposive sampling which is based on the researcher's judgement regarding the respondents to be included in the study (Polit & Beck 2004:311; Babbie 2005:196).

Probability sampling is usually seen as the best way of selecting a sample that is representative of the population from which it is drawn. In probability sampling, every element has an equal chance of being selected for the sample. Probability sampling allows for the calculation of the desired sample size for the margin of error the researcher will agree to (De Vos et al 2005:198; Polit & Beck 2004:311; Wood & Ross-Kerr 2011:134). The method used for this study was a mix of two sampling methods, also known as stratified sampling (De Vos et al 2005:198; Polit & Beck 2004:311; Babbie 2005:196; Wood & Ross-Kerr 2011:140).

A mix of two sampling methods promoted the completeness of the study. Stratified sampling was selected because it firstly allowed for the population to be divided into strata or groups, and all units have an equal chance to be included in the sample. Then, purposive sampling was relevant because the population under consideration is small and rare events of maternal mortality and newborn death cases, every cases in the specific study area were considered based on the researcher's judgement.

3.3.2.1.3 *Sampling criteria*

Sampling criteria, which is also referred to as 'eligibility criteria', involves listing of attributes essential to the study. The sampling criteria also consist of inclusion criteria which are characteristics the subject should have to be included in the study. Also important are exclusion criteria that are characteristics that will exclude a subject from a study (Burns & Grove 2013:234). In this study, the study population for the retrospective study was women who were pregnant or had been recently pregnant or delivered in the last twelve months or delivered; and, newborn babies within 28 days. These are newborn babies and women of any age or nationality but are resident in these Regional States.

The cases eligible for inclusion of maternal and newborn were those which:

- Qualified to be classified as a maternal mortality and newborn death or suspected maternal mortality and newborn death according to the WHO ICD 10 definition.
- The deceased must be resident in the selected three regional states before death.
- The death must have occurred within the selected Hospitals and their catchment area; in other words, the death must have occurred in a health facility (hospital, health centre, health post), in the community or en route to a health facility.
- Death must have occurred between the time intervals of 1st July 2014 to 30th June 2015.

The exclusion criteria used:

- The death that does not meet the WHO definition of a maternal mortality and newborn death.
- Death occurred out of the study area – Oromia, Amhara and SNNPS Region.
- Death of women and newborn not a resident of the selected hospitals catchment area.

- Deaths of women and newborn not resident within the study area and the hospitals health catchment area will be excluded from the study mainly because including them will mean expanding the study area which would in turn demand extensive travelling for follow up. This will be labour intensive, costly and may make the study unmanageable.

3.3.2.1.4 Sample size

The size of the sample was determined by the fact that each hospitals on average have 10 maternal mortality and 60 newborn death in the previous year; and, projected to have similar or less maternal mortality and newborn death in the coming year. Based on the previous year review and the following year maternal mortality and newborn death projections of the selected hospitals, it was planned to include all expected 60 maternal mortalities and one third of 360 newborn death cases that were expected to take place in 12 months duration of the study period, in the selected six hospitals. Five districts from each zone were randomly selected and community workers were asked to identify maternal mortalities and newborn deaths which have occurred in the district between July 1, 2014, and June 30, 2015, and conducted verbal autopsies with families of the deceased maternal and newborn cases to capture factors and processes leading to the deaths. The 30 districts and the six hospitals were assumed to give us a total of 120 maternal mortality and 240 newborn deaths cases both from the six hospitals and the thirty randomly selected districts for the verbal autopsy. However, due to an overwhelming number of maternal mortality and newborn death cases recorded during the study period, in the study sites; instead a total of 142 maternal and 302 newborn cases were identified for the study. However, based on the inclusion criteria, only 133 maternal and 286 newborn cases were reviewed. All the maternal mortality and one-third of newborn deaths that occurred during the study period as well as in the study area and those cases met the inclusion criteria were included.

Table 3.3: Maternal and Newborn profile of the study area

Regional States	Selected Zone	Selected Hospital	Total birth in the selected			Maternal mortality in the selected			Newborn death in the selected		
			Districts	Hospitals	Total	Districts	Hospitals	Total	Districts	Hospitals	Total
Oromiya	East Wollega	Nekempte Referral Hospital	1,797	2,049	3,846	15	10	25	88	69	157
	West Wollega	Gimbie Hospital	2,085	1,617	3,702	17	9	26	83	59	142
Amhara	East Gojjam	Debre Markos Referral Hospital	1,908	2,007	3,915	14	11	25	97	62	159
	West Gojjam	Finote-Selam Hospital	1,734	1,441	3,175	12	9	21	93	56	149
SNNP	Wolayita	Wolayta Sodo Referral Hospital	1,452	2,109	3,561	10	10	20	78	49	127
	Sidama	Yirgalem Hospital	1,989	1,544	3,533	16	9	25	106	66	172
Total			10,965	10,767	21,173	84	58	142	545	361	906

3.3.2.2 Data collection method

Data collection is the process of gathering and measuring information on targeted variables in an established systematic fashion, which then enables one to answer relevant questions and evaluate conclusions (Harris 2010:107-151; Sapsford & Jupp 2006:23-29). The data collection component of research is common to all fields of study. While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same. The goal for all data collection is to capture quality evidence that then translates to rich data analysis and allows that building of a convincing and credible answer to questions that have been posed.

Literatures have shown that it is difficult to obtain comprehensive information about maternal mortality and newborn deaths (AbouZahr 2000:27-43; WHO 2007a:9-14). Thus, it became clear that obtaining such information required the use of a variety of sources of information. Due to this reason a combination of approaches were used in this present study. In addition to the informal conversations and investigations; the two main approaches used were confidential enquiry and verbal autopsy as outlined in the WHO guidelines (WHO 2001:17-44; WHO 2007b:1-7; WHO 2012:7-22). In this section, the data collection method for quantitative aspects of verbal autopsy was discussed, and the qualitative aspects were discussed below.

The quantitative aspects of the verbal autopsy (VA) involved questionnaire in the community with family members, relatives (husband, co-wife, sister, in-laws, and parent), neighbours, TBA or HEW, and other people who were knowledgeable about the case). The researcher tried to interview as many people as possible among those

who were involved in these cases. These VA based interviews helped to reconstruct events prior to death in order to reach a cause of death and also in assigning contributing factors to a death.

Use of combined approaches was necessary because often maternal and/or newborn death is preceded by a multitude of factors and no one single factor could be responsible for the death. These could be community or health service factors or both. It was therefore essential to make a description of all the events surrounding maternal and newborn deaths. It serves as the basis for the development of more comprehensive model for reduction of maternal mortality and newborn death. The non-medical circumstances, in which the woman and/or her baby dies, helped in identifying departures from accepted standards of care and include failure of the patient to use or cooperate with the services, as well as failure of the services to provide or offer adequate and prompt care.

3.3.3 Qualitative methods

3.3.3.1 Population and sampling

The purpose of most qualitative studies is to produce information-rich data from a sample chosen for its ability to speak to the research issue (Patton 2001:185). Qualitative research emphasises depth more than breadth, insight rather than generalisation, illuminating the meaning of human behaviour (Ulin, Robinson & Tolley 2005:54). With this in mind, the study population and sampling for qualitative study was tuned.

3.3.3.1.1 The study population

Basically, the qualitative and quantitative aspects of the verbal autopsy questionnaire were administered concurrently to the respondents who participated in the verbal autopsy based part of the study. According to Johnson and Christensen (2012:238), this approach is called “an identical concurrent sample relation criterion. Thus, the study population described in 3.3.2.1.1 above applied for that part of the qualitative study. The participants for confidential inquiry and informal conversations and investigations were drawn from case-informed health workers in the health facilities

(N=12), and the family members of the deceased maternal and newborn cases in the communities (N=20) in the three regional states. The participants were selected through an open invitation on the basis that these participants must be able to verbalise their experiences and concerns as they have represented the most common facets of maternal mortality and newborn death factors in the communities (N=32).

3.3.3.1.2 Sampling method

The researcher adopted a purposive sampling which is based on the assumption that the researcher wants to discover, understand and gain insight, so that the researcher can learn the most (Merriam 2009:48). According to Silverman (2009:104), choosing a sample allows one to select participants because they pose a feature or process in which the researcher is interested and that they meet the sampling criteria for inclusion. The logic and power of purposive sampling lies in selecting rich information cases from which one can learn a great deal about issues that are important to the purpose of the research (Patton 2001:169). It is important to determine the sampling criteria before approaching the participants. This is one of the essential characteristics from the list that qualified participants for selection in the research (Bums & Grove 2013:246).

3.3.3.1.3 Sampling criteria

- Sampling criteria for the deceased maternal and newborn case participants selected were based on the criteria as outlined on 3.3.2.1.3 above.
- The participants are, however, the key care providers who have direct taking-part before, during and after delivery from several members of the community such as community midwife, health extension workers, traditional birth attendants (TBAs), family members, neighbours who provide support at home; health workers such as midwives, nurses, doctors, health officers who provide support at health facility; and, individuals who support during transport such as community health workers, ambulance drivers, local taxi/cart driver, relatives and neighbourhoods during the postnatal period.

3.3.3.1.4 Sample size

The size of the sample is determined by the saturation of the data. According to Morse (2015:587-588), data saturation is adequate and operationalised when collecting data until no new information is obtained. The repetition of themes or information is an indication that data is now saturated (Streubert & Carpenter 2011:313). In this research, participants are interviewed until no new information comes forth (N=444(142+302); and, N=32).

3.3.3.2 Data collection method

So as to obtain comprehensive information about the maternal mortality and newborn deaths (AbouZahr 2000:27-43; WHO 2007a:9-14), it required the use of a variety of sources of information. Due to this reason a combination of approaches were used. As qualitative aspect of the study, informal conversations and investigations; confidential enquiry and qualitative aspects of verbal autopsy as outlined in the WHO guidelines (WHO 2001:17-44; WHO 2007b:1-7; WHO 2012:7-22) were used. The data collection method for quantitative aspects of verbal autopsy was discussed above.

Informal conversations and investigations, confidential enquiry and the qualitative aspects of the verbal autopsy was used to explore what had happened in the health facility or facilities where the deceased sought care and where the mother/baby finally died. It involved the review of client's health records and also the interviewing of key people who were knowledgeable about the case in question such as midwives, nurses, doctors, etc. Usually these were health care providers who had participated in providing care to that client and had knowledge about the death. This approach helps to illuminate health service factors related to the death. This information was used by the independent reviewers to determine to what extent it could have been avoided. Another reason for opting for this approach was that health records have valuable information about the deceased woman and the newborn which might be missed using another data source.

3.3.4 Data collection instruments

Various data collection tools were employed to measure the contributing and/or avoidable factors that entail individual cases of maternal mortality and newborn deaths. Literatures have shown that questionnaires are the commonest tools used for recording data (Enarson, Kennedy, Miller & Bakke 2001:73-79). Well-designed questionnaires should collect accurate and reliable information. The advantage of questionnaires is that they are simple and relatively inexpensive and can provide information from large numbers of subjects. The disadvantage, however, is that they depend on personal reporting and therefore may be biased or inaccurate (Enarson et al 2001:73-79).

3.3.4.1 Quantitative data collection instruments

Anchored in an international standard verbal autopsy questionnaire (VAQ) avail by the UN, two sets of questionnaires were adapted (for maternal and newborn cases) guided by the objectives of the study and the literature research (WHO 2013a:13-20; WHO 2001:17-22). The questionnaires included both open-ended and closed questions. They also encompass both quantitative and qualitative in nature and has sections on: background characteristics of the deceased, relatives' account of events around the woman's as well as the baby's illness and death (open-ended); symptoms developed during her final illness and a section during pregnancy, labour, or within six weeks after delivery. The questionnaire incorporates verbal autopsy (VA) and a section on health seeking behaviour or contributing factors. The relatives' of the deceased were interviewed using the VA questionnaire and technique which includes open-ended questions to prompt the relatives to narrate all the events that led to the death. The aim of these open-ended questions was to elicit the relatives' perception of the conditions surrounding the death of the women and/or the newborn. This encourages them to freely reconstruct the process that led to the event and to describe its most relevant aspects. The questionnaire includes an open section to record the respondent or respondents' verbatim account of the deceased's final illness and up to her/its death. The VAQ also included closed sections to probe for specific signs and symptoms. This questionnaire was chosen mainly because it fits to achieving the aim of the present study. However, some questions in the tool that were found not necessary for this study were deleted and some new ones added. It was adapted to fit the present study.

3.3.4.2 Qualitative data collection instruments

The qualitative approach was incorporated in a technique that had been used to obtain quantitative results is a very good initiative in that it produced the collection of valuable information that otherwise would be impossible to generate in the course of health research. This approach has been used in similar studies carried out in developing countries (Walraven, Telfer, Rowley & Ronsmans 2000:603-613; Castro, Campero, Hernandez & Langer 2000:679-690).

A separate tool used called a standard classification form for maternal death verbal autopsy also forwarded by the UN (WHO 2013a:1-67). This tool was used in the classification or assigning medical cause of death and contributing factors. This tool has two main components: one on cause of death to assign the categories (either direct or indirect cause of maternal death) as well as the underlying cause or causes of death. The other component was a checklist on contributing factors structured in pre-defined categories organised into two levels and further in the order “probably” or “possibly” contributed to the death.

3.3.4.3 Pre-testing of the data collection instrument

Pre-testing of the data collection instrument was carried out at the end of the planning phase of research instruments in order to explore and test the research elements (Rea & Parker 2000:40). Pre-testing would improve reliability and validity of data collection tool. Using the same procedure prior to data collection, the verbal autopsy questionnaire was pre-tested in one of the nearby study site (which was not participated in the actual study) pertinent to the study objective. This exercise is essential in that even though this tool may be used in Ethiopia but the principal investigator has never used it before. It is therefore necessary to acquaint the researcher with it. The tool is also given to health authorities particularly those at the ministry and at the department head level for comments. All these combined helped in checking for clarity, applicability, and the length of time it may take to administer. Through this the acceptability of the tool was assessed. Rehearsals on interviews with health care providers was done to assess how it likes so as to prepare for surprises that may occur during the process of data collection with health workers.

3.3.4.4 Reliability of data collection instrument

Reliability of a questionnaire refers to the consistency with which respondents understand and respond to all the questions unambiguously enough in the same way and interpret the instructions similarly (Herzog 1996:100). For this regards, the researcher conducted pre-testing study for data collection instruments at one of the nearby site, which was not participated in the actual study, before actual data collection process take place. Based on output from pre-testing, the instrument was modified and adjusted. In addition to that, feedback from supervisors and ethical committee was used to enhance instruments' reliability.

3.3.5 Case identification and reporting

It was planned and envisaged that maternal mortalities and newborn deaths occurring in the community (villages) or during transportation to a health facility would be reported by the traditional birth attendant (TBA) or health extension worker (HEW) who would in turn notify the district Health worker or the principal investigator. Deaths occurring at a health centre or health post were identified and reported by the midwife or head of that particular health facility; while for deaths in the hospital (maternity unit, female ward or at the outpatients) were traced and identified mainly by the head midwife of the maternity unit, head of the female ward and the principal investigator. A similar approach was used in Indonesia (Supratiko, Wirth, Achadi, Cohen & Ronsmans 2002:228-234). Identification and notification of deaths that occurred in a health centre or health post were relatively better as the only deaths that occur there was reported instantly.

In practice, identification and reporting of deaths in the community was not as expected. Deaths that have occurred in the hospital were not reported by the traditional birth attendant or health extension worker responsible for that particular village where the deceased woman and baby were coming from. It was only during follow up when they are asked about that particular case by mentioning her name and address they would acknowledge it. This could be a product of many factors. It could be that as the death occurred at the hospital they are with the opinion that it is the hospital that should report such cases or may be a deliberate act to concealed the death, or most importantly, they were trying to notify the principal investigator but because of poor communication

facilities that exist in the rural areas they could not even if they intend to. Identifying and reporting of cases of maternal deaths at the maternity unit of the hospital was satisfactory in that most if not all were captured.

3.3.6 Methods of establishing the cause of deaths

3.3.6.1 Establish the medical cause of death

The investigation should determine the medical or pathophysiologic cause of death as specifically as possible and categorise it as a direct obstetric, indirect obstetric or non-maternal death (for maternal review). Mechanisms for establishing the medical cause of death will depend on whether the woman and/or the newborn baby was hospitalised or not.

3.3.6.1.1 Facility deaths

The medical cause of death can frequently be established from the medical records. Interviews of facility personnel involved in the care of the woman may provide additional information that can be used to corroborate facts in the facility record. This is particularly important in situations where there are questions on quality of care.

3.3.6.1.2 Deaths occurring outside the facility

In some cases, a woman or newborn who dies outside the facility may have had antenatal care or been hospitalised prior to her/its death. Medical records may be helpful but are sometimes unavailable in these situations. Verbal autopsy is a tool that can be used to determine the medical cause of death.

3.3.6.2 Determine the non-medical causes of death

Non-medical causes of death are often more important in determining whether a woman and/or newborn lives or dies than the medical condition itself. It is important to investigate these in order to reduce maternal mortality. Major examples of non-medical causes of death include the timeliness of the problem recognition and decision making, access to care and logistics of the referral process (see figure 3 pathway to survival).

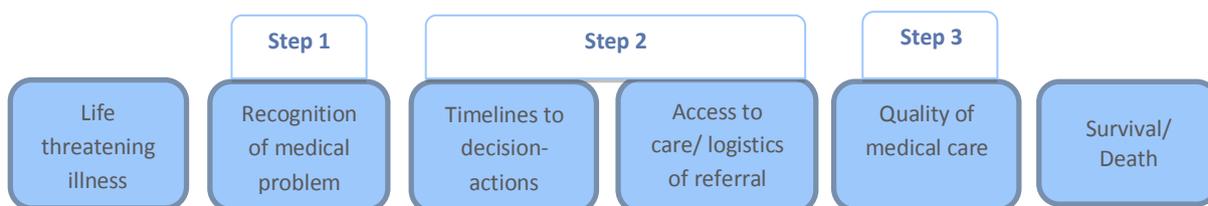


Figure 3.2: Path-to-survival

3.3.6.3 Determination of preventability

The purpose of every death investigation is to determine the causes of death, whether the death was preventable and if so, how it could have been prevented. The aim of this investigation is not to blame a particular person or facility for the death. Rather preventability is a pro-active concept in which lessons are learned and applied to prevent future deaths from similar factors. The following factors should be considered when assessing if a death was preventable:

3.3.6.2.1 Family/community level

- (a) Patient/family factors: Did the woman and her family: – recognise that a problem existed; seek medical care; seek prenatal care; and, comply with any medical advice given
- (b) Delivery attendant factors: Did the delivery attendant: – manage the labour and delivery correctly; recognise that a problem existed; refer the women appropriately and without delay; and, consider herself part of the local health care system?

3.3.6.2.2 Formal health care delivery-system level

- (a) Antenatal care: Determine whether: – the woman received antenatal care; antenatal care followed country guidelines; risk factors and medical problems were correctly assessed and treated; and, patient received education on signs and symptoms of complications.

- (b) Health facility factors: Determine whether: – essential obstetric functions were available at the first referral level; resources were adequate to resolve the problem; protocols/norms were available and appropriate; and, care was available regardless of the ability to pay.
- (c) Health care provider factors: Determine whether the health personnel: – were trained to treat the problem correctly – if so, treated the problem adequately; were sensitive to the social and cultural values of the patient and her family.

3.3.6.2.3 Intersectoral level

This is mainly related with Transportation factors – assessment of if transfer was hindered by: Availability of transport; Adequacy of transport; Ability to travel at night; Cost; Education factors; Communication factors; and, Status of women.

3.3.7 Data collection processes

The systemic way of gathering information, which is relevant to the research purpose or questions – data Collection (Harris 2010:107-151), was commenced at the hospitals and in the community where most women and/or the newborn with obstetric complication came and finally died, then trace the case back. All the places the deceased visited to seek for care were visited to collect information. All (possible) those who provided care and well knowledgeable about the case were interviewed. The “path to death” notion was followed.

No interview guide was used when conducting interviews with health staff. The interviewer asked open-ended questions basically on the arrival time of the deceased to the facility; assessment of her/its condition and what happened. In his/her opinion what contributed to the death, and if the death is preventable how it could be. Probing questions were asked for follow up about what he/she think “should have been done but not done” or better still “what have happened but should not have happened”. The aim was to elicit deficiencies in care provided and to determine operational factors that in their opinion might have been implicated in the death of the woman. Questions asked were mainly dictated by the case – circumstances surrounding the death.

The health staffs interviewed included health care managers and care provider: doctors, midwives and nurses, and laboratory officer if there is an issue concerning the laboratory. Other paramedical staffs interviewed include ambulance drivers – if the deceased were evacuated to another facility; generator operators – if electricity was an issue mentioned in a case; etc.

During the process of data collection, while at a health facility, the health facility records of the deceased were reviewed. The health records reviewed were mainly inpatient case notes, delivery register (if delivered), referral in or out register, daily ward report or diary book. Besides, the researcher kept different types of personal notes.

After collecting data from the health facility or facilities to which the deceased seek care, data collection was then continued at the community. The relatives interviewed were principally the one most knowledgeable about the case. These were the persons who were taking care of the deceased from the onset. Data collection at family level was commenced at least one week but not more than twenty-five weeks after the death. To approach a bereaved family too soon after a death was considered culturally insensitive or offensive in some cultures in Ethiopia. However, waiting too long on the other hand might result in the loss of valuable information as key persons for possible interviews might be hard to trace. All interviews were conducted in the specified period.

The interviews were conducted in the local language spoken and understood by the participants. The principal investigator is fluent in the main languages spoken in this area and can understand the related cultural issues, too.

3.3.8 Research assistants and data collectors

Three research assistants were recruited prior to the commencement of data collection; one from each Hospitals. All of them were health workers: midwife-nurses or midwives. They were independently sensitised on the purpose and objectives of the study. Their roles in the project were clearly explained. This includes the identification and reporting of maternal and newborn death cases that had occurred in their respective areas to the principal investigator and to assist in data collection or interviews. They were also be introduced to the data collection tools and methods, and was given the opportunity to

ask questions in case they needed any clarification. This was done to secure their cooperation and to ensure case reporting by the health extension workers.

3.3.9 Data handling

All data were collected and generated was handled by the principal investigator and were not made accessible to any other person except the reviewers during the review process.

3.3.9.1 Quantitative data handling

Data collected through verbal autopsy were all cross-checked at night after every day's field work to assess if all information intended to be collected has actually been collected. Cross checking was also done to assess for accuracy and clarity in recording. Furthermore, all data for the same case (verbal autopsy and case notes) were given the same case review number assigned for that particular case. They were then collated for easy sorting and to avoiding mixing up the many papers being handled. In one occasion, certain information was found missing so the principal investigator had to revisit the family of concern to collect the missing information. Finally, the data was pre-coded, entered, stored, inputted into IBM SPSS Statistics version 23.0 and analysed. After appropriate data cleaning is carried out, findings was summarised in the form of rates and proportions and presented in tables.

3.3.9.2 Qualitative data handling

Interviews recorded on tapes were recorded on a separate cassette for each case and then given again the same case review number for that particular case. At night after every day's work a summary of the recorded interviews were made and transferred to section two (family or relative's account on event surrounding the death) on the questionnaire. This information was used during the review process by reviewers. Subsequent to that exercise, the interviews were transcribed in full to record the participants' verbatim account of the deceased's final illness up to death. The transcribed materials were transformed into plain text files prior to being inputted into a qualitative software package called ATLAS.ti. Numbering was used for the identification of the deceased instead of their names for confidentiality reasons. All data collected

and generated were handled by the principal investigator and was not made accessible to any other person except the reviewers during the review process.

3.3.10 Data analysis

Data analysis is a systematic organisation and synthesis of research data, and the testing of a research hypothesis using those data (Harris 2010:107-151; Bluman 2012:37). As two different but interwoven sets and two different types of data were collected – quantitative and qualitative; and, maternal mortality and newborn death, respectively – they were also analysed differently. The quantitative data was analysed using IBM SPSS Statistics version 23.0 to make simple descriptive analysis of the data. The qualitative data whiles in ATLAS.ti was coded according to different categories in the “Three Phase Delay” model used in the analysis of this data. The data was organised and reorganised into these categories and print outs made.

It must be mentioned that the analytic process of the qualitative data began even during data collection as data gathered were shaped into the different categories of the model. The categories were derived deductively as a framework was used for the analysis, however, categories were also derived inductively as reading through the text new issues and concepts were identified.

Non-conventional method of analysis was utilised for rigorous and systematic analysis of the data. This was felt necessary in that high quality qualitative data depends on the skills, vision and integrity of the researcher and not through the use of software package.

The steps to be used in the analysis of the qualitative data can be summarised into (Ulin et al 2005:139-174):

- Step 1.** Familiarisation to the data by listening to the tapes and reading through the transcribed materials in order to list the key ideas.
- Step 2.** Identifying the key ideas, issues and concepts according to the model.
- Step 3.** Indexed systematically to all the data by colouring with the use of varied colours into the different categories of the model.

Step 4. Rearranging the data according to the appropriate components in the model to which it relates.

Step 5. Interpretation of data with a view to providing possible explanations for the finding.

3.3.11 Validity and rigour of the study

The ultimate intent of validity and rigour (trustworthiness) is to capture the very essence of neutrality of findings or decisions within the research process. Trustworthiness addresses questions such as: “Do measures used by the researcher yield data reflecting the truth? How can an inquirer persuade his/her audience (including himself/herself) that the findings of an inquiry are worth paying attention to or worth taking account of?” (Babbie 2012:314; Brink 2011:193; Polit & Beck 2006:416).

The current study mix qualitative and quantitative methods. Accordingly, several criteria have been established within both qualitative and quantitative research to judge their trustworthiness or rigor. In Table 1, four most common criteria for both traditions are listed, together with the issues and questions that they address.

Table 3.4: Criteria for assessing the trustworthiness of the research findings according to quantitative and qualitative research traditions

Question asked	Issue	Qualitative criteria	Quantitative criteria
Have we really measured what we set out to measure?	Truth value	Credibility	Internal validity
How applicable are our results to other subjects and other contexts?	Applicability	Transferability	External validity
Would our findings be repeated if our research were replicated in the same context with the same subjects?	Consistency	Dependability	Reliability
To what extent are our findings affected by personal interests and biases?	Neutrality	Conformability	Objectivity

3.3.11.1 Truth value

Truth value refers to the ability of the study to capture what the research really aimed at studying, meaning that the results are not simply the product of research design errors, misunderstandings, or influence of unknown factors. In quantitative research we talk about *internal validity* or lack of bias. Strategies for increasing internal validity aim at identifying proper selection criteria and at groups of the study subjects. Means of achieving this include random sampling of the subjects, randomisation of the study subjects to different treatments at the beginning of the study and stratification of subjects during data analysis.

In qualitative research, truth value is assessed by *credibility*. Credibility refers to our ability to really capture the multiple realities of those we study. Strategies for increasing credibility include activities that bring the researcher closer to the study subjects as well as activities that help the researcher negotiate with the study participants about the findings. These includes: Prolonged engagement – spending lengthy periods in the field so that the researcher grasped the reality of those studied. This is in a way that allows the researcher to build trust with the study participants, ensuring acquaintance of cultural competence. Another technique that was used for enhancing credibility is triangulation. The researcher evaluated each issue with the help of perspectives that comes from several angles (compare with the determination of positions in navigation). Triangulation was employed in data sources, data collection methods, and even research methodologies. Triangulation in data sources entailed collecting data from different people involved in the event of maternal mortality and/or newborn death, for example, care givers and health workers. Triangulation in data collection methods included the combination of in-depth interviews with document analysis. And triangulation in research methodologies refers to the combination of qualitative and quantitative methodologies for addressing the same research topic. Peer-debriefing – the presentation of preliminary findings to colleagues was a technique that proposed to help the researcher evaluate his own role in the research process. It also allowed the researcher to receive input and critical comments from those outside the research process. Further, negative case analysis – the conscious search for data that do not fit the current working hypotheses, within existing data as well as in planned data collection. The results of this activity forced the researcher to further revise the working hypotheses. Finally, member checks – bringing back the results to the members of the

studied group, for example, back to the interviewee. However, caution was taken about the outcome of this process. Disagreement should not necessarily lead to full revision of the report but lead to critical evaluations of the research process.

3.3.11.2 *Applicability*

Applicability is evaluated in quantitative research as external validity or generalisability. In survey research, external validity depends on how representative the sample is for the target population in terms of demographic characteristics. The level of generalisability depends entirely on the sampling and schemes used and on the demographic resemblance between sample and target population. Thus, the external validity improves the more the study samples resemble society at large. Using statistics, it is possible to make probability statements about the target population. This limited sense of generalisability is called statistical generalisability. Several epidemiologists, however, argue that for epidemiological research this narrow interpretation of generalisability is insufficient. These abstractions apply to a broader domain of experience than that observed or sampled. This process referred to as analytical generalisation, which depends on the judgement and logical reasoning.

Applicability in qualitative research referred to as transferability. That means, demographic resemblance between study sample and target population is of no importance. The sample selection, however, carried out to achieve analytical generalisations in a way that it ensures the theory is comprehensive, complete, saturated and accounts for negative cases. The knowledge gained from this theory should fit all scenarios that may be identified in a larger population. Hence, the theory is applicable beyond the study sample to all similar situations, questions and problems, regardless of demographic characteristics. The knowledge gained will not limited to demographic variables; it is the fit of the topic or the comparability of the problem that is of concern. It is the knowledge that is transferred to other contexts.

3.3.11.3 *Consistency*

Consistency or reliability of measurements is in quantitative research, a cornerstone of trustworthiness. If reliability is high, repeated measurements arrive at the same results. Reliability can be improved by the use of good measurement equipment and the

training of data collectors. Consistency in qualitative research – dependability – refers to the ability of the researcher to account for the constantly changing conditions of the phenomenon studied, for the interaction with study participants and the entire research process carried out with an emergent design. The researcher kept different types of personal notes.

3.3.11.4 Neutrality

Neutrality in quantitative research refers to the ability of the researcher to maintain distance from the observed phenomenon (objectivity). In qualitative research, the closeness between researcher and study participants is entirely unavoidable because both parties belong to one interaction; actually, this interaction is the bases for credibility claims. Conformability refers to neutrality of the data rather than neutrality of the researcher.

3.3.11.5 Content validity

Content validity refers to the degree to which the instrument includes a representative sample of the content of construct (Babbie 2012:123). In pursuit of the validity in which different elements, skills and behaviours are adequately and effectively measured, the research instruments and the data were reviewed by three experts in the field of maternal and newborn research. Based on the reviewer's comments, the unclear and obscure questions were revised and the complex items were reworded. Besides, the ineffective and non-functioning questions were discarded altogether; and, the questions were face validated by these persons.

3.3.11.6 Internal validity

So as to attain congruence of the research findings with the reality, and ensure the most possible degree to which the researcher measures what is supposed to be measured; the researcher apply the various methods which includes:

3.3.11.6.1 Triangulation

In order to strengthen the validity of evaluation data and findings, the investigator tried to collect data through several sources: questionnaires, interviews and observations; with a basic assumption that collecting information from a variety of sources and with a variety of techniques can confirm findings.

3.3.11.6.2 Member checks

Through member checks the results and interpretations were taken back to the participants in order to be confirmed and validated. Therefore, the results and interpretations of interviews were handed over to the interviewees in order to confirm the content of what they have stated during the interview encounter. In this way the plausibility and truthfulness of the information were recognised and supported.

3.3.11.6.3 Peer examination

In peer examination process the research data and findings were reviewed and commented on by three experienced experts in the area of maternal and newborn health that were nonparticipants in the field. However, these peers were familiarised with the subject under study and possess enough background information in it.

3.3.11.6.4 Researcher's bias

It is clear that every researcher has his/her own particular values, beliefs and worldviews. Nonetheless, the investigator tried to collect, analyse and interpret data as impartially as possible. The inquirers (including the researcher) were explicit, critical and faithful at different phases of the inquiry process. The researcher tried to remain as nonjudgmental and clear as possible throughout the research process.

3.3.11.7 External validity

In quest to address the key concern with the applicability of the findings in other settings or with other subjects (Burns 2010:78); the researcher puts emphasis on the research

design in such that one could generalise beyond the subjects under investigation to a wider population.

3.4 PHASE 2: CONCEPT ANALYSIS

Using the framework described by Walker and Avant (2005:28), Rodger and Knafelz (2000:78), Chinn and Kramer (2008:192) and Wilson (1969:8) the researcher explicate the meaning of community-based care, identify the attributes and characteristics as well as its theoretical and practical application in preventing maternal mortality and newborn death. The aim of this analysis was to clarify the meaning of the concept 'community-based care' in order to be able to develop a community-based model to prevent the unacceptably high maternal mortality and newborn death in Ethiopia. Attempts were made to appropriately follow Wilson's (1969:8) 13-step procedure and Walker and Avant (1995:40) 8-steps of concept analysis framework. In view of that, the following seven steps have been adapted:

- I. Select a concept
- II. Determine the aims or purposes of analysis
- III. Identify all uses of concept that can be discovered
- IV. Determine the defining attributes
- V. Identify Cases Studies: a model case, borderline cases, related cases, invented cases and illegitimate cases
- VI. Identify antecedents and consequences
- VII. Define empirical referents

3.5 PHASE 3: MODEL DEVELOPMENT

The theoretical framework for model development was based on Dickoff et al (1968:422) survey list as discussed in theoretical paradigms. Model development was based on the results of conceptualisation. Conceptualisation refers to clarification and analysis of key concepts in a study as well as integration of those concepts in the body of existing theory and research. It is responsible for guiding and directing research in the theoretical framework (Mouton 1996:109). Main concepts and sub-concepts were identified from the results of concepts analysis.

Dickoff et al (1968:422) survey list was applied in developing the theoretical framework discussed in the model development according to six aspects of activity that was presented below.

The development and description of a community-based maternal and newborn care model for preventing maternal mortality and newborn death in Ethiopia, based on the findings from empirical perspectives of the study as conceptualised following the six aspects of activity by Dickoff et al (1968:422) namely:

Agency: Who or what performs the activity?

The first aspect, an agent, is described by Dickoff et al (1968:425) as a person who performs an activity towards realisation of a goal. In this study, three set of agents who perform the activity, simultaneously or separately, towards prevention of maternal mortality and newborn death, in three different places are identified. These three groups of agents are mainly based on the physical location where maternal and newborn care is provided, but not necessary refers to the level of care, skill and/or intensity of service delivery.

Recipient: Who and what is the recipient of the activity?

Recipient (patient), as the second aspect, relates to those who receive services or supports from the activity of an agent. In this study the recipients are pregnant women and neonates in Ethiopia as they receive care before, during and after delivery from several members of the community mentioned above such as community midwife, health extension workers, traditional birth attendants (TBAs), family members, neighbours who provide support at home; health workers such as midwives, nurses, doctors, health officers who provide support at Health facility; and, individuals who support during transport such as community health workers, ambulance drivers, local taxi/cart driver, relatives and neighbourhoods during the postnatal period.

Context: In what context is the activity performed?

An activity is produced within the third aspect, the context, by the agent and received by the patient. In this study, three context in which effective prevention of maternal

mortality and newborn death practices are identified. Namely: - Home and/or in the community; en route to health facility; and, Health facility context.

Dynamics: What is the energy source for the activity?

Dickoff et al (1968:431) described the fourth aspect, dynamics, as chemical, physical, biological or psychological power sources that can drive the activity towards the attainment of a goal. In this model, almost all maternal and newborn health care returns to the community with referral to the clinic or Hospitals only when necessary. Thus, consideration of a number of dynamics and power bases is important for the community-based maternal and newborn care model.

Procedure: What is the guiding procedure, technique or protocol of the activity?

The fifth aspect, the guiding procedure, technique, or protocol of the activity involves several interlinked steps. These may include stakeholders consultative workshops, trainings, awareness campaigns, performance based incentives for traditional birth attendants and family members; team building and meetings between the family members, traditional birth attendants and the health workers (community midwives) to discuss their concerns, challenges and recommendations. The procedure should encourage community participation and involvement in the prevention of maternal mortality and newborn death and ensure protection and safety of pregnant women during the delivery period. A plan should also be designed which will address the process to be followed during implementation of the new way of community-based maternal and newborn service delivery.

Terminus: What is the endpoint of the activity?

The final aspect of Dickoff et al (1968:432), the terminus, is the end point or purpose of the activity. In this study, it is the reduction of maternal mortality and newborn death in Ethiopia, and involves making the maternal and newborn care services convenient both culturally and accessibility – at home and referral if needed; affordable and understand the finest features of payment for the pregnant women; and effective, good quality and it also prevent risks, too.

3.6 ETHICAL CONSIDERATIONS

As a system of moral values that is concerned with the degree to which research procedures adhere to professional, legal and sociological obligations to the study participants (Tulchinsky & Varavikova 2009:593-596), the researcher complied with the ethical guidelines as described by National Research Ethics Review Committee of Ethiopia at the Ministry of Science and Technology of Ethiopia (1994). The researcher further complied with research ethics code of the University of South Africa health studies department involved. The study, therefore, conducted with fairness and justice by eliminating all potential risks, including:

3.6.1 Obtaining ethical clearances

Before the study begins, ethical clearance was obtained from Health Studies Higher Degrees Committee of College of Human Sciences at the University of South Africa (Appendix 1). Besides, permission to conduct the study (ethical clearance) was sought (Appendix 2) and obtained from the National Research Ethics Review Committee of Ethiopia at the Ministry of Science and Technology (Appendix 3) and respective Regional Health Bureaus of Ethiopia. Institutional consent and permission to access health facility kept records was also sought from the Director of Medical Services of the Ethiopian government Ministry of Health (MoH) (Appendix 4) and obtained (Appendix 5).

3.6.1.1 Ethical clearance processes

To secure ethical approval, the researcher followed the succeeding procedures:

1. Preparation of study proposal and its approval by Health Studies Higher Committee of College of Human Sciences at UNISA.
2. Present request letter prepared by researcher along with ethical certificate (Ref: HSHDC/214/2013) from UNISA Health Studies Higher Committee to Ethiopian Ministry of Science and Ministry of Health to request institutional consent.
3. Institutional consent was granted from both and ethical certificate indicating approval of proposal. Besides, letters to respective regional government and health facilities were send-off.

4. Take formal permission letter from Ethiopian Ministry of Science and Ministry of Health to respective regions and inform the health offices and health facilities management about the study and secure written permission to conduct study in respective region, zones, woreda (districts) and health facilities.
5. Start formal data collection process as per sampling procedure.
6. All relevant bodies were informed about the right to request and access the final report of this study output.
7. Each steps of the study was given due emphasis to maintain its ethicality.

3.6.2 Obtaining informants consent and authorisation

Informed consent means that participants have adequate information regarding to the research, are capable of comprehending the information and have the power of free choices, enabling them to consent to or decline participation voluntarily (Polit & Beck 2012:175-177). Participation to the study were completely voluntary and free from any form of coercion. Individuals or families approached to participate in the study were first fully briefed on the purpose of the study and as well as their roles. It was also explained to them that should they decide not to participate or decide to withdraw during the process no penalty to be levied against them. All the explanations were done comprehensively in a language that the individual or family can speak or understand. It was upon this that a verbal/written consent was sought (Appendix 9). However, a verbal consent was primarily used in this study as in Ethiopia generally people feel reluctant to sign or thumb print even among literates for various reasons (Tekola et al 2009:482-486). They are more comfortable with giving verbal consent.

3.6.3 Beneficence

One of most fundamental ethical principles in research is that of beneficence which imposes a duty on researchers to minimise harm and maximise benefits. This principle covers multiple dimensions such as the right to freedom from harm and discomfort, the right to protect from exploitation (Polit & Beck 2012:170-171). According to Campbell (2005:26), actions taken under this rule must benefit others.

Current study also emphasised on a moral responsibility to do things for the benefit of others. The researcher and research assistants guarded against any discomforts that

might occur and immediately phrase the question so that it could not appear to be a personal experience.

In general, before the participants were interviewed: the purpose of study was clearly communicated; the role of study findings in improving the maternal and newborn situation in Ethiopia was clearly informed; confidentiality of the information was assured; about no need of personal identifier was told; value of information to be provided by each participant were clearly communicated and emphasised; and likewise the right of each participant to join or withdraw from study at any point of interview process if they feel necessary was guaranteed.

3.6.4 Non-maleficance

Researchers should not engage in discriminatory, harmful or exploitative practices or harassment. Researchers should ensure that the actual benefits to be derived by the participants or society from the research clearly outweigh possible risks and that participants are subjected to only those risks that are clearly necessary for the conduct of the research. Similarly researchers should ensure that the risks are assessed and that adequate precautions are taken to minimise and mitigate risks (UNISA 2007:5, 10).

This principle stipulates that care should be taken to prevent harm which could be emotional, social or physical. For this study questions was phrased and re-phrased in a manner that they are general. A question that appears to ask for personal responses were dropped or re-phrased. The researcher and the assistants emphasised that the responses were not experienced but were envisaged.

This section clearly described the steps undertaken to avoid possible adverse events with respect to physical, social and psychological which could be experienced by the participants due to their participation in the study. Firstly, the data collectors communicated to each participants prior to actual data collection process took place about no discomfort could be posed due to being participated in the study. Secondly, each participant was informed about no psychological problem can be manifested to them on rationale of their participation in the study. Thirdly, each study participant was informed about ethicality of the study. In the same way, the participants were also clearly communicated about anonymity and confidentiality of all responses made by

them. Further, they were also assured as no personal identifier could be used in the questionnaires thus nobody can correlate them with their response.

3.6.5 Respect for human dignity

Respect for human dignity is another ethical principle which includes the right to self-determination and the right to full disclosure (Polit & Beck 2012:171-172). The principle is one of principles for current study to enhance its ethicality.

3.6.6 Principle of distributive justice

Justice is another ethical principle which includes right to fair treatment and privacy (Polit & Beck 2012:173-174). In this study participant who was felt not emotionally ready to discuss about the deceased maternal and newborn case with data collector was assured the right to withdraw himself from the study immediately if he felt necessary. All participants in the study were equally respected and were given similar information on the study.

3.6.7 Autonomy

Autonomy is the right of participants or institutions to do the things they want to do (Pera & Van Tonder 2011:53-54). Participants were told that their participation in the study is voluntary and they are free to decline to participate or that they can withdraw from the study at any time. Those who agreed to participate were told that if they want to withdraw or not answer some or all questions during the interview, assured as they are free not to answer or even withdraw from the study without any punishment.

3.6.8 Privacy and anonymity

Privacy and anonymity was ascertained by using codes and not the participants' names in the questionnaires. The participants would not be asked to give their names even for informal discussion. Contact details of the researcher and the supervisor was also given to each participants.

3.6.9 Confidentiality

The researcher ensured the subjects for the confidentiality of the data obtained whether orally or written would be used only for the research purpose and will therefore be strictly anonymous and confidential. Moreover, different strategies such as allowing the informants not to write name, substituting name with letters (codes) to allow the person interviewing to identify participants in special cases, appropriate control on data collection, etc. were made. For all forms of studies, the data from the participants was placed under lock and key at the centre where the researcher works.

3.6.10 The culture

The researcher has a good experience of the study area's culture and hence all attempts were made to respect the cultural values, traditions or taboos valued by the informants.

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3.7 CONCLUSION

In this chapter, the research design and methodologies presented in three phases. In Phase 1 – the research methodologies used including the study population, sampling and sample design were discussed. Data collection instruments, the data collection process, pre-testing of the data collection tools, validity and reliability of data collection instruments were also well addressed. Furthermore, permission for research, pilot testing and ethical considerations were considered. In Phase 2 – concept analysis; and in Phase 3 – model development were presented.

In the next chapter the findings of the research obtained through all forms of data collection tools will be presented, interpreted, analysed and discussed.

CHAPTER 4

FINDINGS PRESENTATION, ANALYSIS AND DISCUSSION

"Our deepest fear is not that we are inadequate. our deepest fear is that we are powerful beyond measure. It is our light not our darkness that frightens us. Actually, who are you not to be? You are a child of God. Your playing small doesn't serve the world. There's nothing enlightened about shrinking so that other people won't feel insecure around you. We were born to make manifest the glory of God that is within us. "

Nelson Mandela, inaugural address (Atikim 2010).

4.1 INTRODUCTION

The objective of this chapter is to analytically present, interpret and discuss the views of the respondents on the determining factors which may cause maternal mortality and newborn deaths in the selected hospitals and its catchment area in the three regional states. This is an all-encompassing health facility and community-based study carried out in six hospitals, thirty districts that found in six zones of three regional states, to examine maternal mortality and newborn deaths identified in these areas during July 1, 2014 to June 30, 2015.

In this study, a retrospective mixed research study design combining both quantitative and qualitative methods was utilised. Confidential inquiry to investigate what happened in the health facility through the interview of health care provider; review of health records; and, verbal autopsy (VA) to collect data at the community or family level were employed. To make an in-depth investigation and analysis of events surrounding each maternal mortality and newborn deaths case, the 'path-to-death' notion was followed. People well knowledgeable about the maternal mortalities and/or the newborn deaths such as care-givers and/or next of kin were interviewed.

In order to give clear portrait of the data collection milieu, account of case identification process were also presented as part of the study findings or lessons learned. The findings, the interpretations and the discussions are concurrently organised in relation

to the instruments used to collect data that were designed for the study (Annex I and Annex II) and related death taxonomy form (Annex III).

4.2 ACCOUNT OF CASE IDENTIFICATION

This section has been addressed under the five case identification quandary lessons which had appeared worthy to share as part of the findings by the principal investigator. All these experiences have been discussed under account of the case identification as presented underneath.

The need for examining maternal mortality and newborn death in Ethiopia is increasingly become a gleaming concern. This is largely because of (a) the unacceptably high maternal mortality and newborn death in the country; and, (b) the Ethiopian government's commitment to its health sector development partners, and/or global communities interest that pledge to reduce or halt the unfair and high maternal mortality and newborn deaths. Nonetheless, one may conclude that in Ethiopia, information about maternal mortality and newborn death is needed, not only for what it tells about but also for what it implies about the women's and her baby's health, social and economic status in general. In effect, WHO and UNICEF described maternal mortality and newborn deaths as litmus test of the status of women and her baby, their access to health care and the adequacy of the health care system in responding adequately to their health care needs (UN 2010a:3-4; UN 2010b:13-25). The positive effects beginning to surface in maternal mortality reviews currently in operation in very few selected parts of the country has also added impetus to such thinking (MoH 2013:16-23).

Generally, maternal mortality and newborn death is a reportable incident in the country; however, in reality lots of them occur neither recorded nor reported. Putting in place a system of routine reviews of maternal mortalities and newborn deaths in Ethiopia has to overcome certain practical challenges. During the course of fieldwork in the present study, some key bottlenecks and organisational issues were identified, and the lessons are presented, which may also poses a big challenge to any review of maternal mortalities and newborn deaths in Ethiopia. These includes:

4.2.1 Identification and reporting of case

It is generally believed that deaths that have occurred in health facilities are easy to identify and report. This may be true for maternal mortality and newborn deaths that occurred in a maternity ward and neonatal unit but not the case for those taking place in other units. Quite a lot of women and significant number of newborn babies die in the outpatient units of the selected hospitals. Some of these are maternal mortalities and newborn deaths, but go unrecorded or misclassified. During the course of this study, a lot of female deaths within reproductive age were recorded at the medical and other wards of the hospital. However, none of them could be classified or suspected as a maternal death because their pregnancy status was not known during the time of admission. Currently, in Ethiopia's health information system there is nowhere in the admission records where the pregnancy status of women admitted is stated. This is also true for the newborn cases assorted as children. Outpatient deaths observed to have occurred at the hospital during the study were generally not documented within the hospital recording system. In effect, none had case notes so consequently were nowhere in the hospital's information system.

Likewise, identification and reporting of abortion related deaths are generally difficult particularly in places where abortion is top secret. In Ethiopia, such deaths stand a high chance of not being reported for various reasons including illegality. Furthermore, in a society such as Ethiopia where out of marriage pregnancies are socially unacceptable for religious and other social reasons such deaths will be hard if not impossible to identify. In the present study, no abortion related death was reported nor identified. This does not signify that such deaths did not happen in the study area. Considering the high fertility rate in the area, documented early sexual debut among young girls and related abortion cases coupled with low contraceptive utilisation (CSA 2011:59-80), theoretical there may be significant pregnancies which might have been aborted, and some of these are most likely unsafe that result in maternal death.

What's more, reporting of maternal mortalities and newborn deaths in the selected zones and regional states was not satisfactory even with the existence of professional skilled birth attendants in the health facilities, health extension workers (HEW) and/or traditional birth attendant (TBA) in the communities of the selected districts or zones and regional states. The situation seems similar in the other parts of the country, too.

Despite the size of maternal mortality and newborn death cases they may have, almost all hospitals appears to be willing to communicate only limited number of cases (usually about 10 maternal death cases) for a twelve month time. Interestingly, even this is possible only if the researcher have official government letter. In one of the hospitals, the principal investigator has actually come to a clear discrepancy of what is registered on log-book and the deceased case cards retrieved for review during the study period. Following the introduction of maternal death surveillance and response (MDSR) a couple of months prior to this study by the Ethiopian government in a very few pilot-health-facilities, maternal mortality and newborn death appears to be highly sensitive and politicised issue. As it could be seen in this study, 118 out of the 133 maternal deaths identified were women permanently resident in the selected study sites but only 72 of them were actually reported.

4.2.2 Participants indecisiveness

Families or relatives of the deceased women or the newborn babies were generally open and willing to be interviewed on events surrounding the death only if they trust you and are confident that the information being generated will not be used to punish or warning anybody. A lot of deaths including maternal deaths occur in Ethiopian communities but almost none has been audited or deeply reviewed. Therefore, auditing maternal deaths now will naturally cause undue hesitancy; more precisely, if the interviewer is not familiar to interviewees. In most instances the interviewer may even be viewed as an intelligence agent. Ethiopians are socially interconnected, very interactive and generally people know each other. But they very much mind “who said what” and “who did what”. They generally don’t like to offend each other or to be known to hurt or implicate another person particularly the one you know. Paradoxically, the culture of silence is deep rooted among Ethiopians. People don’t like to be quoted especially on issues viewed as negative. During the course of data collection in the present study, there were instances in which families felt reluctant to be interviewed.

Health care providers also seem to be concerned by the investigative approach to deaths they may be involved in providing care or at least knew about the case. While at the hospital, trying to interview health care providers who actually provided care to a case, some of the staff pretends not to remember that particular case just to avoid the interview. During informal discussions with some of the staff it was realised that their

behaviour were understandable and justified. They feared being reprimanded by the hospital management for revealing what happened within the hospital as what happened in the hospital is generally believed to be kept confidential. They also feared being punished by the higher authorities at ministry level if deficiency in care was highlighted. In effect they were confronted with 'double fear'. This illustrates that in many instances, 'supervision' is not really an enabling activity, rather a control mechanism to ensure that things don't go wrong.

4.2.3 The health records

Incomplete health data, missing records or lack of clarity in such records remains a big issue. Tracing and retrieving of health facility kept records were labour intensive and time consuming. In situations where they exist, most of the time they are chaotically stored. Generally, record keeping relatively appears better at the referral hospitals. At the peripheral hospitals, health centres and health posts, the situation was totally different. The recording system in these facilities was not uniform and very inconsistent, with key features of the recording (such as column headings) varying in different facilities and even at different times or with different staff in the same facility. Chronic lack of reliable stationery supply at peripheral health care facilities also makes matters worse. What contributed to the deplorable situation is the virtually non-existent supportive supervision in these health facilities. Past monthly returns may be available but in none of the health facilities were service statistics in the form of picture diagrams displayed. This implies that peripheral health staffs do not make simple analysis of the data collected to observe trends.

4.2.4 The data collector and the route to data collection

The data collector either male or female; health worker or a lay person does not matter. What is essential is that the data collector must win the confidence of the informants, should exercise high degree of confidentiality and patience. The interviewer must be one who has detective skills, non-dominant and considerate. Above all he/she should be aware of local customs and traditions and be sensitive to them. On several occasions, families were visited for an interview but seem not prepared as the head of the house hold was not in. They are usually men, who must authorise family members to be interviewed. Some families refuse interviews of some specific days, linked with

their beliefs. In such situations a revisit was arranged and done just to show respect to local customs, beliefs and traditions. Revisits could be both time consuming and expensive.

The maternal mortality and newborn deaths examining process predominantly starts at what happened at the health facilities, where care was assumed to be sought; and, radiate to the community cases where bulk of deceased cases believed to dwell. It is generally important to assess both levels in a comprehensive way to have a holistic picture of the 'path-to-death'. This approach is, however, labour intensive and could be very expensive. It means spending longer time in examining a case because different places and often many people need to be interviewed. It may also require long distance walking often on dirt terrain roads. The poor road network and conditions in Ethiopia, worse in the rainy season, may make it more difficult. During data collection, sometimes the research team had to walk for over 25 kilometres just to follow-up a case. Sometimes the key informant for that case is away in the farm field. Data collectors end up walking to meet him/her at the farms as the road was too muddy for a vehicle. On the other hand, these difficult access issues are also relevant in the reverse direction – when a client needs to seek health care urgently.

4.2.5 Standards of practice

Any form of health review or an audit is only effective if care provided is compared with explicit standards. This implies that service standards, protocols or guidelines must first be in place before instituting an audit or a review system. In Ethiopia, one of the biggest challenges is having effective maternal and newborn health care standards with which care will be compared. During the course of data collection, certain aspects of substandard care were noted but there were no written procedures in the maternal and newborn health services in Ethiopia addressing most of those issues. In such instances, internationally agreed standards were used to compare with current care practices. This may not be appropriate as standards and protocols should be adapted to meet local situations.

To conclude, more could have been said under this section - account of the case identification – which one may expect as lessons or challenges. But these five case

identification quandary lessons appear worthy to share as part of the findings by the principal investigator.

4.3 QUANTITATIVE RESEARCH FINDINGS, INTERPRETATIONS AND DISCUSSIONS

The purpose of this section is to present the information obtained from the quantitative aspects of the questionnaires, interpret and discuss as guided by the objectives of the study. The statistical information presented was obtained from the deceased 133 maternal and 286 newborn case verbal autopsy questionnaires that met a set of criteria.

4.3.1 Place and levels of death

A total of 120 individual cases of maternal mortality and 240 individual cases of newborn deaths were planned to be identified from the selected districts' health catchment areas and six hospitals. Due to the overwhelming number of maternal mortality and newborn death case recorded and identified during the study period and study area, a total of 142 maternal mortality and 302 newborn death cases were identified for the study. However, a total of 133 maternal mortality and 286 newborn death cases were found eligible for the study. Table 4.1 shows places of death for the identified Maternal and Newborn cases. More than forty percent of cases, fifty-four of the maternal mortalities and 117 of newborn deaths were occurred at the six hospitals found in six different zones (three referral and three district hospitals). Besides, 17 of the maternal mortality and 18 of the newborn death cases where identified at health centres, no maternal but one newborn case at health post, 21 maternal and 22 newborn cases on the road to the hospital and 40 maternal and 124 newborn cases at home or it might be after discharge from the health facilities.

Table 4.1: Places of maternal mortality and newborn death

Regional State	Maternal (n=133)		Newborn (n=286)	
	Frequency	Percent	Frequency	Percent
Amhara	43	32.33	88	30.77
Oromiya	49	36.84	106	37.06
SNNP	41	30.83	92	32.17
Total	133	100.00	286	100.00
Place of Death				
Hospital	54	40.60	117	40.91
Health Centre	17	12.78	18	6.29
In-transit	21	15.79	22	7.69
Health Post	0	0.00	1	0.35
Home	40	30.08	124	43.36
Others	1	0.75	3	1.05
Don't Know	0	0.00	1	0.35
Total	133	100.00	286	100.00

Further analysis shows that hospital-based mortality ratio in the present study appears to be very low. As disclosed above, fifty-four of the maternal mortalities were occurred at the six hospitals. In the same corresponding period, a total of 10,767 live births were recorded in these hospitals. This gives a hospital-based maternal mortality ratio of 502 per 100,000 live births, which is even less than the national maternal mortality ratio as indicated in the three ever conducted demographic and health survey in 2001, 2006 and 2011 with 810, 673 and 676 maternal mortality ratio per 100,000 live births respectively (CSA 2001:109-110; CSA 2006:233-234; CSA 2011:270-271). This low ratio was somehow reflected in the newborn death, too. Habitually and reasonably, hospital based maternal and/or newborn mortality is significantly higher than the general community maternal mortality and newborn death rates. For instance, in an earlier study conducted for ten years in a neighbouring zone referral hospital in the country, the hospital based maternal mortality rate for the period was 1,965 maternal deaths per 100,000 live births ranging from 1,636 to 2,332 death per 100,000 live birth (Gaym 2000:215-223). Even in a relatively better maternal health hospital set up in Ghana, the hospital-based maternal mortality figure is 1,077 (Greelhoed, Visser, Asare, Schagen Van & Van Roosmalen 2003:135-139). Furthermore, the levels of hospital based neonatal mortality ratio appear very low, too. As specified below, 361 of the newborn death were occurred at the six hospitals. In the same corresponding period, a total of 10,767 or slightly more neonates were delivered in these hospitals. This gives a hospital-based neonatal mortality ratio of 34 per 1,000 live births. For neonatal

mortality, the national rates are 49/1,000, 39/1,000 and 37/1,000 live births as reported in the EDHS 2001, 2006 and 2011 respectively. On the other hand, the community maternal mortality and newborn death ratios are 766 per 100,000 live births and 51 per 1,000 live births respectively.

Table 4.2: Maternal and Newborn profile of the study area

Regional States	Selected Zone	Selected Hospital	Total birth		Maternal mortality		Newborn death	
			In the Selected Districts	In the Hospitals	In the Selected Districts	In the Hospitals	In the Selected Districts	In the Hospitals
Oromiya	East Wollega	Nekempte Referral Hospital	1,797	2,049	15	10	88	69
	West Wollega	Gimbie Hospital	2,085	1,617	17	9	83	59
Amhara	East Gojjam	Debre Markos Referral Hospital	1,908	2,007	14	11	97	62
	West Gojjam	Finote-Selam Hospital	1,734	1,441	12	9	93	56
SNNP	Wolayita	Wolayta Sodo Referral Hospital	1,452	2,109	10	10	78	49
	Sidama	Yirgalem Hospital	1,989	1,544	16	9	106	66
Total			10,965	10,767	84	58	545	361

The situations in the levels of hospital based maternal mortality and newborn death could be more explained with the researcher's reservations that despite the size of maternal and newborn cases they may have, almost all hospitals appears to be willing to communicate only limited number of death cases for a twelve month time. Providing the whole profile of maternal mortality and newborn death in these hospitals of the study areas appears to be highly sensitive and politicised issue. As a result, putting significant number of maternal mortality and newborn death case cards out of sight seems a common-new-practice in those public hospitals.

4.3.2 Demographic and socio-economic characteristics

This section provides the demographic and socio-economic profile of the subjects and the seminal population under study. These include: the background characteristics of deceased women (maternal mortality cases); vital information of the deceased baby (newborn death cases); and, the basic characteristics of mothers of the deceased newborn baby and husband of the deceased women. The background information - demographic and socio-economic characteristics - is essential to interpreting the findings and understanding the results presented subsequently in this report. Background information collected include age, level of education, marital status and

ethnicity/regional states of identified cases. The present study also examined education and employment status/occupation of the subjects and seminal population.

4.3.2.1 *The respondents*

The deceased maternal and newborn information was collected from people well knowledgeable about the deaths such as care-takers, next of kin or any other family member present at the time and/or prior to death. In the cases of the newborns, however, the primary target was the mother of the deceased newborn. In case she was unable to respond for some reason (debilitating disease, mental breakdown, death, etc.) any other woman who was present with the mother during childbirth and/or during the death of the newborn was the secondary target. The father of the deceased newborn and any other male member of the family were considered next and respectively or simultaneously. Nonetheless, the person who was with the baby or the deceased women during the entire period of illness (i.e. from start of illness till death) is the general guiding principle. Even so, this exercise did not involve any children as respondents.

The community respondents for the maternal cases (N=133) comprised husband, mother, mother-in-law, father, sister, brother, brother-in-law, son, daughter, TBA, other relative and/or or non-relatives.

Table 4.3: Person caring for the mother before death, and around at the time of death

Respondents	Person Caring for the Women before death		Person around at the time of death	
	Frequency	Weighted Percentage (Adjusted CI)	Frequency	Weighted Percentage (Adjusted CI)
Husband	35	26.3 (23.5,29.3)	25	18.8 (14.4, 24.5)
Mother	56	42.1 (32.8,46.3)	41	30.8 (23.6,40.2)
Mother-in-law	22	16.5 (12.6,21.6)	22	16.5 (12.6,21.56)
Sister	6	4.5 (3.5, 5.8)	3	2.3 (1.7,2.9)
TBA	7	5.3 (4.0,6.9)	36	27.1 (20.7,35.3)
Other relative	2	1.5 (1.2,2.0)	5	3.8 (2.9,4.9)
No relation	5	3.8 (2.9,4.9)	1	0.8 (0.6,1.0)
Total	133	100.0	133	100.0

On the other hand, although the majority of the respondents (N=286) for the newborn cases were mothers of the newborn baby, it was broadly grouped into mothers, relatives (sibling and other relatives), non-relatives and fathers. This was the person who was with the deceased baby during the period of illness till death. The lead respondents were mothers (220), relatives (41), non-relatives (14), and father (11).

Similarly, assessment was conducted on the level of presence of respondents during the period of illness. The majority of the respondents (86 percent) claimed that they were present the entire duration; from illness till death, compared to 6 percent and 4 percent of respondents who were present during the initial and last stages of illness. Table 4.4 shows the presence of respondents during the period of illness.

Table 4.4: Presence of respondent during the period of the newborn illness and death

Timing	Frequency(N=197)	Percent
Initial stage of illness	17	5.94
Illness to death	246	86.01
At the last stage	12	4.20
Not present	11	3.85
Total	286	100.00

4.3.2.2. Maternal Age

Age is an important demographic variable and is the primary basis of demographic classification in vital statistics. Focused to the study under investigation, it is also very important variable in the study of maternal mortality, fertility and nuptiality. As it is shown in Figure 4.1 below, the age distribution of the deceased women (N=133) shows that 12 (9%) were aged less than 18 years, 107 (80.5%) aged between 18 to 35 years and 14 (10.5%) were above the age of 35 years. The youngest among the deceased maternal death cases was aged 15 years while the oldest was 45 years old giving an age range of 30 years. The mean age of the entire maternal cases was 26.56 years. On the other hand, maternal age distribution of the deceased newborn mothers (N=286) depicts that nearly half (48 percent) of the mothers were between 18-24 years of age. About one in seven mothers were below the age of 18, and about one in 13 were above 35 years of age.

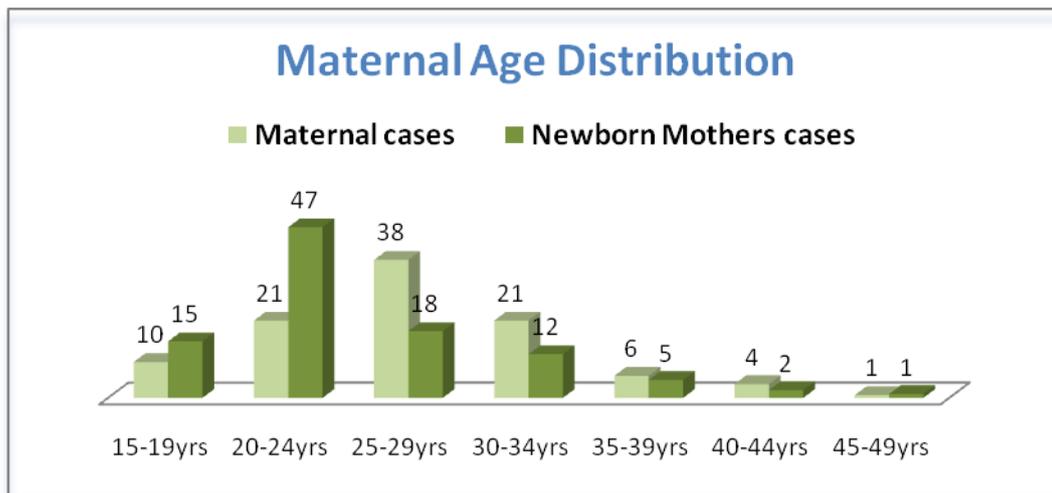


Figure 4.1: Maternal age distribution of the deceased mother and mothers of the newborn babies

4.3.2.3 Marital status

The other principal factor than age, that affect a woman’s risk of becoming pregnant and her child survival is marriage. In Ethiopia, for most women, marriage marks the onset of regular exposure to the risk of pregnancy – a major cause of maternal mortality and newborn death. Therefore, information on marriage is important for understanding factors surrounding maternal mortalities and newborn deaths. Table 4.5 below presents the frequency and percent distribution of the women by marital status. The term ‘married’ refers to legal or formal marriage, while the term ‘living together’ designates an informal union in which a man and a woman live together but a formal civil or religious ceremony has not taken place. Maternal information on who are married, widowed, divorced, or separated are all referred to as ‘ever married’. Of the 133 deceased maternal cases with information on marital status, 97% (129) of them were identified as ‘ever married’. However, it is only 108 (81.2%) of the deceased women who were living together and/or having active marriage life at the time of their death. That means, nearly, one in every five women were not living with their life partner. The marital status of the deceased newborn babies mothers have also very similar percentile figures with out of 286 mothers of deceased newborn baby cases, 279 (97.6%) of them were identified as ‘ever married’. And, it is once again only 233 (81.47%) of the deceased women who were living together and/or having active marriage life at the time of their newborn death. In comparison, the most recent Ethiopian Demographic and Health

survey (CSA 2014:25) shows 85% women are living together and/or having active marriage life with their partners.

4.3.2.4 Residential status, ethnicity and religion

As it was mention in Chapter one, Ethiopia introduced an ethnic based federal government structure in 1994 composed of nine ethnic based Regional States. Despite the fact that, the country is home to more than 80 ethnic groups, which drastically vary in population size from more than 30 million people to fewer than just 100 people (CSA 2013:59). However, the three regional states (Oromiya, Amahara and SNNP) represent more than 80% of the national population of the country. More or less, the deceased women and newborn cases were fairly divided proportionally between these three major ethnic based regional states called Oromiya, Amhara and SNNP by residence. Table 4.5 provides a summary of the distribution of residential status, ethnicity and religion of the late maternal and mothers of deceased newborn cases.

Table 4.5: Socio-demographic characteristics of the deceased women and newborn baby's mothers

Socio-demographic Characteristics	Maternal cases (n=133)		Newborn babies' mother (n=286)	
	Frequency	Percent	Frequency	Percent
Age distribution				
<18	12	9.0	40	13.99
18-24	44	33.08	137	47.90
25-35	61	45.86	86	30.07
>35	14	10.5	23	8.04
Total	133	99.99	286	100.00
Marital status				
Never married	4	3.01	7	2.45
Married/Living together	108	81.20	233	81.47
Widowed	7	5.26	12	4.20
Divorced/Separated	13	9.78	28	9.79
Don't know	1	0.75	6	2.10
Total	133	100.00	286	100.00
Residential status (Region)				
Amhara	43	32.33	88	30.77
Oromiya	49	36.84	106	37.06
SNNP	41	30.83	92	32.17
Total	133	100.00	286	100.00
Ethnicity				
Oromo	47	35.34	98	34.27
Amhara	37	27.82	85	29.72
Sidama	15	11.28	25	8.74
Welayita	12	9.02	19	6.64
Tigre	8	6.02	18	6.29
Hadiya	7	5.26	11	3.85
Others	7	5.26	30	10.49
Total	133	100.00	286	100.00

Socio-demographic Characteristics	Maternal cases (n=133)		Newborn babies' mother (n=286)	
Religion				
Orthodox Christian	47	35.34	96	33.57
Protestant Christian	43	32.33	87	30.42
Muslim	40	30.08	95	33.22
Others	3	2.25	8	2.79
Total	133	100.00	286	100.00

4.3.2.5 Education, occupations and socio-economic level

Education is a key determinant of individual life style, level and status in both social and economic context. Studies have consistently shown that educational attainment has a strong effect on reproductive behaviour, fertility, maternal and child health. The current system of Ethiopian formal education is based on a three-tier system: eight years of primary education, followed by four years of secondary education (which embrace technical colleges and preparatory), and four to seven years for tertiary education, depending on the area of study.

Table 4.6 provides information on the educational attainment of deceased women (maternal cases) and her husband. Of the 133 autopsied maternal cases, only 38 (28.6 percent) had attended some form of formal schooling. Fifteen of them (11 percent) reached secondary school level. Comparing their educational status, 71.4 percent of mothers had never been to formal school and among those mothers who had attended formal school, one in seven mothers had education less than or equal to grade 8 and one out of seven mothers had an education of more than grade 8.

Table 4.6: Educational level and occupational status of the deceased mother and her husband (N=133)

	Maternal		Her husband	
	Frequency	Percent	Frequency	Percent
Education and literacy				
No formal education	95	71.4	3	2.3
Primary	19	14.3	27	20.3
Secondary	15	11.3	47	35.3
Technical	1	0.8	31	23.3
University	3	2.3	6	4.5
Don't know	0	0.0	19	14.3
Unknown	0	0.0	0	0.0
Total	133	100.0	133	100.0
Occupations and Socio-economic level				
Professional/ Technical/ Managerial/ Clerical service employed	3	2.3	4	3
Skilled manual employed	2	1.5	32	24.1
Unskilled manual employed	15	11.3	28	21.1
House wife or self-employed (Farmer)	113	85.0	52	39.1
Don't know	0	0.0	17	12.8
Total	133	100.0	133	100.0

Vigilantly, the educational attainment findings of the deceased women are not in harmony with the most recent national demographic and health survey (CSA 2014:21) that utters only 49 percent of women age 15-49 have no formal education. However, this may give an excellent clue that uneducated women are more susceptible to maternal mortality than the educated ones. In fact, this national figure of uneducated women climbs to 56 percent for rural women, compared with 19 percent for urban women; which still remains far from the findings of this study, with 71.4 percent of the deceased women had never been to formal school. The national urban-rural difference is also pronounced at the secondary or higher levels, with only 7 percent of women in rural areas have secondary or higher education, compared with 41 percent of urban women (CSA 2014:22). Nevertheless, all studies witnessed that educational attainment among Ethiopia women is low and men are better educated than women. For instance, the proportion of Ethiopian population age 15-49 with no formal education is 51 percent for women and 33 percent for men.

In the present study, respondents were asked on the pregnancy outcome of the 133 deceased mother, and at the time of the study 41 (31 percent) of the deceased mothers' newborn babies were survived. Very interestingly, there was statistically significant positive association between maternal educational status ($r=0.494$, $n=286$, $P<0.01$) and their newborn babies survival. Generally, a mother's death in childbirth in developing countries particularly means that her newborn will almost certainly die and that her older

children are more likely to suffer from disease. In Nepal, for instance, infants of mothers who died during childbirth were six times more likely to die in the first week of life, 12 times more likely between 8 and 28 days, and 52 times more likely to die between 4 and 24 weeks (Katz et al 2003:717-725).

Conversely, the socio-economic status of the families of the deceased women and newborn babies has not been extensively assessed in this study, but considering the high proportion of maternal cases in which no formal education (71.4 percent), no employment record and remain as house wife (85 percent), and funds to seek care was not readily available (82 percent), are ample evidences illuminating the poor economic status of these families. In the present study, it can be concluded that economic factors appears to play an important role in the path to death. Not surprisingly, the employment and economic level of the deceased women in the study increased with their educational level. But more interestingly, the 2014 national mini health and demographic survey come up with a strong association of women's education and economic empowerment. According to this survey, access to education increases with household wealth. About three-fourths of women in the lowest wealth quintile (74 percent) have no education, compared with just 19 percent in the highest wealth quintile. Furthermore, women in the highest wealth quintile have had substantially more opportunity to move beyond the primary level of education than other women. More than one-third of women in the highest wealth quintile (35 percent) have attended or completed secondary or higher levels of education, compared with 1-11 percent of women in the lowest four wealth quintiles (CSA 2014:23).

In Ethiopia, men usually decide when and where to seek care and often provide the funds. In sixty-two of the one hundred thirty-three cases autopsied, however, the husband was not around to make the decision to seek care when complication developed. Furthermore, in a substantial number of cases they were without available funds when the complication developed. All of these cases potentially could delay the care seeking process. These are good indicators of the general women's health and the status of women in the country. Like many other findings of other studies (Thaddeus & Maine 1994:1091-1110; Barnes-Josiah, Myntti & Augustin 1998:981-993; Sundari 1992:513-528) where economic reasons was the inhibitor resulting in a delay in seeking care or not even attempting to seek care, that could be the case in this study. However, when the hospitalised case respondents were asked what may prompted them to seek

care from a medical facility and not from other alternatives, almost all of them expressed some level of confidence on modern medical care. This may be a good sign of their trust on conventional medical care.

Low economic and social status of women and lack of access to and use of essential obstetric services are strong determinants of maternal mortality and newborn deaths (Maine 1991:10-17). Low social status of women limits their access to economic resources and basic education and thus their ability to make decisions related to their health and nutrition. Maternal mortality and death of her newborns are particularly sensitive indicator of inequality and usually called a litmus test of the status of women and her children, their access to health care and the adequacy of the health care system in responding adequately to their health care needs (Ravindran & Berer 1999:3-12; Bhatia 1988:22; Brown & Closser 2015:117).

Information about the levels and trends of maternal mortality and newborn death are needed not only for what it tells us about the risk of pregnancy and childbirth but also for what it implies about women's and children's health in general, and their social and economic status. Thus maternal mortality and newborn death is not merely a "health disadvantage" it is also a "social disadvantage". Knowledge about the major causes of death is essential to policy-makers in determining priorities and health-care providers in evaluating the quality of services, even though maternal mortality rates are difficult to use in practice, especially to demonstrate program impact (WHO 1993a:1-47).

4.3.3 Prenatal history

4.3.3.1 Reproductive history

Reproductive history is one of the most important issues in the present study because of its direct relevance in the investigation of both maternal mortality and newborn death cases. Out of the 133 maternal mortality cases, 19 (14.3%) were first pregnancies, 92 (69.2%) second to fifth pregnancy and 22 (16.5%) sixth or higher pregnancy. The average number of the deceased women's pregnancies in this study was 4.1. The highest number of pregnancies recorded among the cases was 11. Figure 4.2 shows the number of pregnancies of the diseased maternal case.

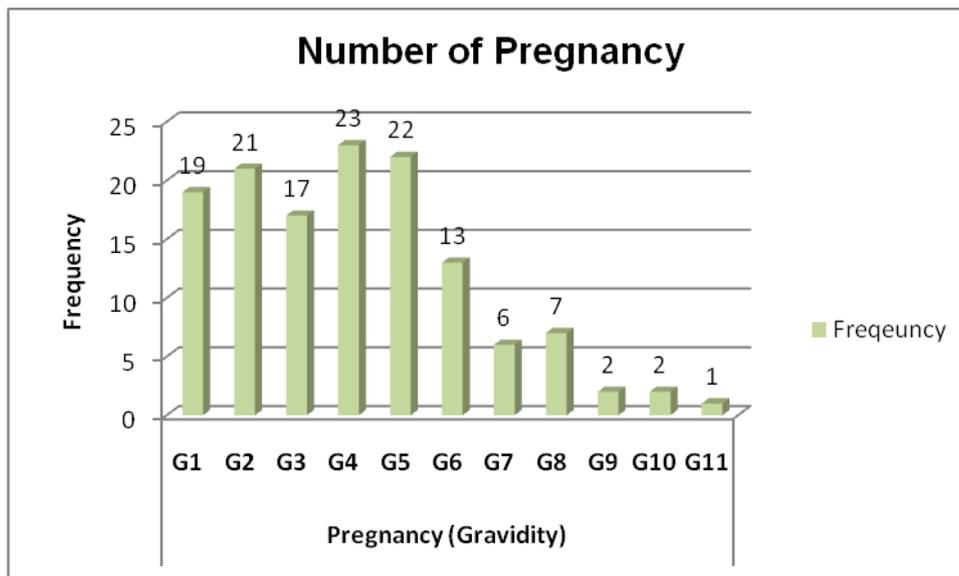


Figure 4.2: Number of pregnancies (gravidity)

Based on the 2011 Ethiopian Demographic and Health Survey (EDHS), the total fertility rate (TFR) or the average number of pregnancy for the Ethiopian women is 4.8 children per woman (CSA 2011:70). Which this study may implies the deceased women have the possibility of deliver more babies and/or most of them died at their reproductive and productive ages. Besides, according to the EDHS, the TFR in rural areas exceeds the TFR in urban areas by almost three children per woman (5.5 and 2.6 children per woman, respectively). This 4.8 average number of pregnancy per woman generally means that an Ethiopian woman who is at the beginning of her childbearing years would give birth to just under five children by the end of her reproductive period if fertility levels remained constant over the childbearing years.

4.3.3.2 Medical history

During prenatal period, medical history of a pregnant woman (the woman and her baby) is largely depend on antenatal care (ANC). Antenatal care refers to caring of women during pregnancy, which ideally should begin soon after conception and continue throughout pregnancy. The primary aim of antenatal care is to achieve at the end of the pregnancy, a healthy mother and a healthy baby. Despite the fact is that, once a complication develop, ANC per se cannot save the life of the pregnant woman or the newborn baby. Nevertheless, there is overwhelming evidence that lack of antenatal care increases the risk of maternal mortality and newborn death. Risks of as high as over ten times among none-antenatal care attendants have been documented (Yego,

D'Este, Byles, Williams & Nyongesa 2014:38; Ngoc, Merialdi, Abdel-Aleem, Carroli, Manorama, Campodonico, Ali, Hofmeyr, Mathai et al 2006:699-705; Mashini 1984:275-279).

Attempts were made to retrieve the antenatal care cards of the deceased women; and, collect meticulous information on the antenatal care of the deceased newborn babies' mothers. Respondents of 74 maternal cases (56 percent) and 129 mothers of deceased newborn cases were claimed to receive antenatal care. However, it was only possible to recover 63 (47 percent) antenatal care record cards of the deceased maternal cases, and antenatal care information of 113 (40 percent) deceased newborn babies' mothers. Among those cards recovered (N=63), 55 were found in different health facilities (hospitals, health centres and health posts) and the other eight with the deceased families. Among those retrieved within the health facilities, 38 were found filed in the deceased women's case notes, the other 17 were extensively searched and later found in different pool of many antenatal cards abandoned in drawers at the maternity ward. The multiple places where they were kept the cards in the health facilities should be a cause for concern. Antenatal care cards provide valuable information to the woman, her newborn baby, her relatives, to the health care providers and to the health system including health researchers. This shows the confusion among care providers on who should keep the card when the woman dies. More surprisingly, only 23 of the 63 maternal cases (37 percent) had their medical and obstetric history documented, leaving a substantial number of the cases had their history not taken during prenatal care registration. The inconsistency in the filling of the cards should also be a concern. The possible reasons for the poor filling of cards may be the inadequate staffing situation, time constraint on the part of the available staff or their lack of concern for records or record-keeping.

The quality of antenatal care (ANC) can be measured by the qualifications of the provider and the number and frequency of ANC visits. Antenatal care quality can also be monitored through the content of services received and the kinds of information given to women during their visits. The Ethiopian government also practices in the sense that these services raise awareness of the danger signs during pregnancy, delivery, and the postnatal period (MoH 2015b:4-29; MoH 2014a:14-20). It was also acknowledged that ANC visits improve the health-seeking behaviour of the client, orient

the client to birth preparedness issues, and provide basic preventive and therapeutic care.

Table 4.7 shows depiction of core aspects of ANC services utilisation by the deceased mothers and mothers of the deceased newborn babies. Forty-seven percent of maternal cases and 40 percent of the deceased newborn mothers evidently claimed that they had received ANC services during their last pregnancy. As per WHO recommendation, a pregnant woman should have at least four ANC visits (WHO 2002c:24). The findings shown in Table 4.7 depicts that only 20 percent of maternal cases and 16 percent of the deceased newborn mothers made four or more antenatal care visits during their pregnancy, with 53 percent of maternal cases and 60 percent of the deceased newborn mothers making no ANC visits at all. More strikingly, it was just 34 of the 63 (54 percent) of deceased women (maternal cases) that reported receiving antenatal care from a skilled provider (a doctor, or a nurse/midwife) during their pregnancy. The remaining 46 percent of pregnant women received antenatal care from health extension workers or trained health workers such as a health assistant. This drops the rate of deceased maternal cases that receive antenatal care from a skilled provider to only 26 percent.

In general, health centres and health posts were the two major sources of ANC services for the deceased women. Correspondingly, the findings also show that among the deceased mothers and mothers of the deceased newborn babies who sought ANC services at least once, 73 and 77 percent had their weight taken, 86 and 81 percent had their blood pressure measured, 37 and 44 percent had their urine tested and 55 and 51 percent had their blood tested respectively. But when it comes to the deceased mothers and mothers of the deceased newborn babies who tested all the four test, the figures drop to only 25 and 20 percent respectively.

Table 4.7: Description of antenatal care services received

ANC item	Maternal (N=133)		Newborn Mothers (N=286)	
	Frequency	Percent	Frequency	Percent
Status of ANC services received				
Yes	74	55.64	129	45.11
No	59	44.36	157	54.89
Total	133	100.00	286	100.00
Number of ANC Visit				
No ANC	70	52.63	173	60.49
Less than 4 ANC	36	27.07	67	23.43
Four or more ANC	27	20.30	46	16.08
Total	133	100.00	286	100.00
Place from where ANC Services was received				
Hospital	6	9.53	11	9.74
Health Centre	29	46.03	64	56.63
Health Post	25	39.68	31	27.43
Private Health Facilities and others	3	4.76	7	6.20
Total	63	100.00	113	100.00
ANC care provider				
Doctors	3	4.76	5	4.43
Nurse and/or midwife	31	49.21	69	61.06
Health Extension Workers and others	29	46.03	39	34.51
Total	63	100.00	113	100.00
Components of ANC				
Weight taken	46	73.02	87	76.99
Blood pressure measured	54	85.71	91	80.53
Urine Test	23	36.51	50	44.25
Blood test	35	55.56	58	51.33
All four test done	16	25.40	23	20.35

In Ethiopia antenatal care coverage is generally low and quit recently begin to show some improvement with the highest national coverage ever attempted till this study were conducted is just 40% was recorded (CSA 2014:39). Various studies and most importantly the National Health and Demographic survey consistently shown that antenatal care attendance is low indicating 27% (CSA 2001:111); 28% (CSA 2006:112) and 34% (CSA 2011:119). The reason for this low coverage may be as a result of geographical accessibility to health facilities; associated cost of getting the services and most importantly women's knowledge, attitude and practice for prenatal care.

As a general rule, early prenatal care is important as it avails the opportunity for early identification of a preventable cause of death like anaemia; an important indirect cause of death in this study. Maternal mortality rates are associated with the period of registration at antenatal clinic and are lowest among those who register early in their

first trimester (Kisuule, Kaye, Najjuka, Ssematimba, Arinda, Nakitende & Otim 2013:121; Ngoc, Merialdi, Abdel-Aleem et al 2006:699-705; Rattanporn 1980:8-15). This theory is supported by the present study as among the 63 maternal cases, whose time of antenatal care registration was known, 56 (89%) registered after the first trimester of pregnancy. The majority of which, 32 (58%) registered in the third trimester of pregnancy. Late antenatal care registration is common in Ethiopia despite efforts made by the Ministry of Health (MoH) to avert the situation. Cultural factors may explain some element of it. During the verbal autopsy, it was discovered that early going to antenatal care clinic is practically the same as to disclosing pregnancy to family members, which was witnessed as not welcomed in most families' cultures in Ethiopia. Family members are expected to discover the pregnancy themselves. Disclosing pregnancy or going to antenatal care clinic before family members discovers the pregnancy is believed to lead to poor pregnancy outcomes.

Early antenatal care and making several ANC visits are equally important and are mostly influenced by the same factors. The majority of ANC visits recorded in this study is not within the WHO model recommendation (WHO 2002c:24) as it is only 20% of the deceased maternal cases and 16% of the mothers of the deceased newborn babies made four or more visits. A significant proportion made less than four visits mostly among women in their first pregnancy or those who had more than four previous pregnancies. First time pregnant women generally feel shy to attend clinics for fear of the 'unknown'. And relatively high parity women often register late in pregnancy and make limited number of visits to prenatal clinics. This may be because their previous pregnancies were problem free so they don't see the need for it. Other social factors may also contribute to the lesser number of visits by high parity women. Attending the same antenatal clinic together with other women who are far younger daunt other women from frequently attending clinic. The age of the care providers also matters to them. A young or what they called 'child health care providers' frequently witnessed not to be their preference.

Substandard antenatal care can also be a major factor contributing to both low utilisation of ANC services and/or none attendance of antenatal clinic. Antenatal care is effective if the services provided are of high quality – i.e. in conformity with standard guidelines or if perceived by the user as satisfactory. As presented on table 4.8. below, a detailed review of the ANC card of the deceased women (maternal cases) were made

and reveals that in a significant number of visits, various observations or investigations such as weight, height, blood pressure, and haemoglobin measurements were not performed. Lack of basic equipment such as weighing scales, sphygmomanometers, haemoglobin meters, and inadequate number of trained staff in health facilities are the main reasons for this.

The poor quality of prenatal care may be a product of the way and manner clinics are conducted. Tasks such as history taking and screening (blood pressure, weight measure) are mostly performed by untrained personnel who often perform them wrongly, and even if assessed accurately, they cannot interpret the findings. Low morale among staff and the virtually non-existent supervision of peripheral health staff in the study areas may also have played a role in the poor quality of antenatal care services.

Prenatal clinics are dreadfully not well organised as there are usually too many patients to be seen by very few staff. They do not have the time to extensively provide individualised care to the pregnant women. In a case of a woman that died of eclampsia, she had six regular prenatal care visits but had her blood pressure checked only twice.

Almost all of cases (94%) failed to be classified by risk status of their pregnancy at the antenatal clinic and a significant proportion of these (76%) were at-risk according to the maternal health guidelines. Furthermore, in 88% of the cases recommended place of delivery was not stated during antenatal care visit. All these may expose the degree of the poor quality of antenatal care being provided. Table 4.8 shows the investigations performed during routine prenatal care visits.

Table 4.8: ANC investigation record summary of the deceased women

Investigation	(N=63)	%
Height Measurement		
Measured	2	(3.17%)
Not Measured	61	(96.83%)
Urine Testing		
Tested	23	(36.51%)
Not Tested	40	(63.49%)
Number of times:		
Just once	21	(91.30%)
Twice/more	2	(8.70%)
Syphilis Screening		
Performed	4	(6.35%)
Not Performed	59	(93.65%)
Blood Pressure Checking		
Checked on all ANC visits	54	(85.71%)
Not checked at least on a visit	9	(14.29%)
Number of visits B/P not checked:		
One visit	5	(77.78%)
Two visits	2	
Four or more visit	2	(22.22%)
Weight taking		
Weight taken on all ANC visits	46	(73.02%)
Weight not taken on at least an ANC visit	17	(26.98%)
Number of visits for which weight was not taken:		
Once	6	(35.29%)
Twice	4	(23.53%)
Thrice	4	(23.53%)
Four times	3	(17.65%)
Haemoglobin Checking		
Checked	35	(55.56%)
Not checked	28	(44.44%)
Haemoglobin estimation if checked:		
< 8 g/dl	18	(51.43%)
8.1 or more g/dl	17	(48.57%)
Statistics of HB Results:		
Mean	7.89 g/dl	
Median	8.7 g/dl	
Lowest Result	4.9 g/dl	
Highest Result	13.7 g/dl	

4.3.3.3 Pre-existing medical conditions and prenatal risk factors/complications

Table 4.8 above haemoglobin check-up shows that anaemia appears to be a very important cause of maternal mortality and newborn death in the study area. Fertility rates in Ethiopia are high and too close and/or too early pregnancies are common. Contraceptive use is lower in the rural areas (CSA 2011:59-80; CSA 2014:27-29). Such a situation tends to undermine the health of the woman as her body doesn't get enough time to fully recover from the previous pregnancy. Poor and inadequate nutrition appears also to complicate the matter. Malnutrition is generally higher throughout the

country (CSA 2011:155-188; CSA 2014:53-58). The recent inflation on the staple food items such as 'Teff' may exacerbate the malnutrition situation. Literatures persistently indicate that anaemia directly or indirectly contributes to a significant proportion of maternal deaths. Severe anaemia can lead to cardiac failure in pregnancy, while lesser grades of severity are associated with decreased maternal wellbeing and contribute to maternal deaths from haemorrhage or infection (WHO 1993b:1-35). In this study 18 of the 35 women who take haemoglobin check-up had a haemoglobin level, measured during the prenatal period, below 8.1 g/dl, when complication developed. This low haemoglobin may also shows hospital based anaemia. In a 7-year cohort study in the southern nations and nationalities region university referral hospital, it was revealed that the proportion of overall severe anaemia increased from about 28% on admission to 41% at discharge from the hospital (Crane, Van de Hof, Dodds, Armson & Liston 2000:101-105), which showed the high incidence of anaemia and inadequate blood transfusion due to inadequate blood in the bank. It was also disclosed in this university based study that unlike reports from other countries, there were related 50% perinatal deaths (38% stillbirth).

4.3.3.4 Complications during third trimester of pregnancy

Respondents were also asked whether the deceased women and the mothers of the deceased babies experienced complications (high blood pressure, ante-partum haemorrhage, pallor and shortness of breath, blurring of vision, convulsions, or abnormal delivery) during their third trimester of pregnancy. Nearly 20 percent of the deceased maternal cases (26 respondents) and 21 percent of the deceased newborn mother case (60 respondents) said that the women had experienced complication during third trimester of pregnancy. Table 4.9 shows the frequency and percentage of mothers who experienced pregnancy related complications during their third trimester of pregnancy. A majority of women (about 30%) are developing pallor and shortness of breath (both present). Ante-partum haemorrhage also takes significant portion (more than 15%) of the cases.

Table 4.9: Complications during third trimester of pregnancy

Complications during third trimester	Maternal cases		Mothers' of deceased Newborn	
	Frequency	Percent	Frequency	Percent
High blood pressure	3	12.5	9	15.00
Ante-partum haemorrhage	4	16.67	9	15.00
Pallor and shortness of breath (both present)	7	29.17	17	28.34
Convulsions	3	12.5	6	10.00
Blurred vision	3	12.5	8	13.33
Abnormal delivery	5	12.5	8	13.33
Other Complications	1	4.16	3	5.00
Total	26	100.00	60	100.00

This study has been evident that most obstetric complications occur around the time of delivery and was not predicted. As rule of thumb, while most pregnancies and births are uneventful, all pregnancies are at risk. Around 15% of all pregnant women develop a potentially life-threatening complication that calls for skilled care and some will require a major obstetrical intervention to survive (WHO 2007d:12). Complications may cause adverse perinatal and maternal outcomes. Because complications are often difficult to treat, efforts should be made to prevent them by early diagnosis and proper management. Health care providers should be aware that management can also lead to complications. A woman presenting with a life-threatening obstetric complication is in an emergency situation requiring immediate diagnosis and management.

4.3.3.5 Tetanus Toxoid (TT) Vaccination during pregnancy

Neonatal tetanus is now comparatively rare in developed countries, but it is a leading cause of neonatal deaths in Ethiopia and other developing countries where a high proportion of deliveries are conducted at home or in other places where hygiene is poorly maintained, it has resulted in large number of deaths. Tetanus toxoid (TT) immunisation is given to pregnant women to prevent neonatal tetanus (CSA 2011:124). If a woman has received no previous TT injections, she needs two doses of TT during pregnancy for full protection. However, if a woman was immunised before she became pregnant, she may require one injection or not require any TT injections during pregnancy, depending on the number of injections she has already received and the timing of the last injection. For a woman to have lifetime protection, a total of five doses are required (CSA 2011:124).

Table 4.10 presents the percentage of deceased newborn babies' mothers who received TT vaccine during their last pregnancy. It is only fourteen percent of the mothers that is confirmed to receive two or more tetanus vaccine, less than ten percent of mothers received one tetanus vaccine, while one out of four mothers reported that they did not receive any tetanus vaccine during their last pregnancy.

Table 4.10: TT vaccination during pregnancy

	Frequency	Percent
Receive TT Vaccine once	23	8.04
Receive TT Vaccine twice	37	12.94
Receive TT Vaccine three times	3	1.04
Don't know	154	53.85
Not taken	69	24.13
Total	286	100.00

Despite the fact that, the 2011 Ethiopian Demographic and Health Survey announced that thirty-four percent of women with a birth received two or more tetanus toxoid injections during their last pregnancy, and 48 percent of mothers were protected for their last birth (CSA 2011:125).

4.3.4 Labour information

4.3.4.1 Maternal events during labour

In pursuit of understanding the maternal events during labour, respondents were asked about the timing, colour and odour of the water break during labour. Table 4.11 below shows the events during labour related with water break of the mother during her last pregnancy. More than half of the mothers in both cases said that their water broke during labour, compared to only 8 percent of deceased maternal cases and 9 percent of mothers' of the deceased newborn babies who said that their water broke prior to labour. Significant proportion of the mothers were not aware of the colour of water, whereas, 13 percent and 17 percent of deceased maternal cases and mothers' of the deceased newborn babies respectively said that the colour of water was brown and 30 percent and 41 percent of mothers respectively said clear. Similarly, only 14 percent deceased maternal cases and 17 percent of mothers' of the deceased newborn babies of mothers said that they noticed some odour of the water.

Table 4.11: Maternal events during labour

	Maternal Cases		Mother of the deceased babies	
	Frequency	Percent	Frequency	Percent
Time of water break				
Prior to labor	11	8.27	26	9.09
During labor	72	54.14	145	50.70
Not broken	13	9.77	17	5.94
Don't know	37	27.82	98	34.27
Total	133	100.00	286	100.00
Colour of water				
Brown	11	13.25	29	16.96
Clear	25	30.12	70	40.94
Don't know	47	56.63	72	42.10
Total	83	100	171	100.00
Odour of water				
Yes	11	13.25	29	16.96
No	37	44.58	86	50.29
Don't know	35	42.17	56	32.75
Total	83	100.00	171	100.00

4.3.4.2 On-set of seeking, reaching and receiving care

For both cases, the first-place to seek care was from a traditional birth attendant in 108 (81%) and in 237 (83%); followed by private clinics and health centres in 21 (16%) and in 43 (15%); and, hospitals in 4 (3%) and 6 (2%) of the deceased maternal and the deceased newborn babies mothers' cases respectively. The mode of transportation to place where the first-care was sought ranges from no need of transportation (home based care) in 104 (78%) and in 231 (81%) of the deceased maternal and mothers' of the deceased newborn babies cases, respectively; to a cart, donkey, mule, horse, shouldering, or walk in 19 (14%) and in 42 (15%) of the deceased maternal and the deceased newborn babies mothers' cases, respectively; and, a motorised vehicle in 10 (8%) and 13 (5%) of the deceased maternal and the deceased newborn babies mothers' cases, respectively. The number of people who accompanied the deceased maternal cases and mothers of the deceased newborn babies to the health facilities was usually large more than five especially in the case of shouldering. However, in normal cases, the average number was two and in most cases they were women. The average time for the women to reach the first place where care was sought ranges from about five minutes (calling the TBA from neighbour) while the longest time elapsed was about five hours (in the case of going to health facilities).

As elaborated underneath, despite these first-place to seek care, 93 (70%) of the maternal cases and 185 (65%) of the newborn mothers cases finally come to a decision to seek medical attention at health facilities after the recognition of the complication. And yet, reaching a medical facility does not always mean that a woman will receive the treatment necessary to save her life and the life of the newborn baby. In this study 34% of all the cases visited as many as three medical facilities, 59% visited two health facilities and the rest contacted only one facility. This indicates that 93% of the women went to a facility where the required services was not available and were further referred to another facility.

Although all the under consideration health centres and hospitals have at least one ambulance, ambulance services was not available to 76% pregnant women who need it. The patient and her relatives had to find their own means of transportation. In 3 out of 4 cases, the relatives had to hire a vehicle to take them to two or more different facilities they were referred to. The average distance from the deceased's place of residence to health centres is 30 kilometres and to the hospital is 56 kilometres. The shortest distance trekked to health facility was 3-5 kilometres while the furthest was up to 120 kilometres.

Reaching the hospital obstetric referral facility does not automatically mean receiving the care required. Fifty-eight of the cases actually needed urgent blood transfusion but twenty-six of them were unable to be transfused because blood bags were not available in the hospital at that time. And most of those transfused, 21 (66%) had to pay money, in one way or the other, before blood was made available. Obstructions in receiving care at the hospital were more prominent among anaemia cases or those cases needing blood transfusion because money is needed before blood could be available, which was further analysed and discussed below.

4.3.5 Delivery information

4.3.5.1 Places and methods of delivery

Perhaps, Ethiopia has the worst facility based delivery records in the world. Based on the most recent Ethiopian Demographic and Health Survey (CSA 2014:45), fifteen percent of births in Ethiopia are delivered at a health facility - 14 percent in a public

facility and 1 percent in a private facility. Even though the percentage of facility births continues to be low in Ethiopia, there has been remarkable progress in the last fifteen years that progress from 6% (CSA 2001:113) to 15% (CSA 2014:45). An important constituent of efforts to reduce health risks to mothers and children, however, is increasing the proportion of babies that are delivered in health facilities. Proper medical attention and hygienic conditions during delivery can reduce the risk of complications and infections that can cause the death or serious illness of the mother and/or the newborn baby. The study sought to gather information on places of delivery for maternal cases and mother of the deceased Newborn babies. In this health facility centred/based study, 44 percent of maternal cases and 38 percent of mothers of deceased newborn babies deliveries had taken place at the health facility (Hospital, Health centre and Health Post including private clinics). This high institutional delivery figure (in comparison to the national data) is due to the nature of the study which is based in health facilities as the starting point of case identification. Of the remaining, 42 percent of maternal cases and 51 percent of the mothers of the deceased newborn babies deliveries had taken place at home and the rest 14 and 11 percent respectively took place elsewhere on the way to the health facilities. Similarly, 60 percent of maternal cases and 64 percent of the mothers of the deceased newborn babies deliveries were normal spontaneous vaginal delivery; 14 and 15 percent respectively were instrumental delivery (forceps or vacuum); and, 19 and 16 percent of deliveries were emergency/elective caesarean section, respectively.

Table 4.12: Places and methods of delivery

Place of delivery	Maternal cases		Mothers of deceased newborn babies case	
	Frequency	Percent	Frequency	Percent
Home	56	42.10	145	50.70
Health facilities	58	43.61	110	38.46
<i>Hospitals</i>	37	63.79	63	57.27
<i>Health Centres</i>	21	36.21	46	41.82
<i>Health Posts</i>	0	0.0	1	0.91
Others	19	14.29	31	10.84
Total	133	100.00	286	100.00
Method of delivery at HF				
Normal (vaginal) delivery	35	60.34	70	63.64
Instrumental delivery				
Forceps	3	5.17	9	8.18
Vacuum	5	8.62	8	7.27
Caesarean Section	11	18.97	18	16.36
Don't know	4	6.90	5	4.55
Total	58	100.00	110	100.00

4.3.5.2 Delivery outcomes

Out of the 58 cases that had delivered in health facilities, 17 were multiple pregnancies. Noticeably, it was only for 3 of the deceased women that the diagnosed made during the prenatal period by ultra-sound scan while the others was detected during delivery. Actually, nine of the remaining cases were referred for scanning at the hospital but did not go. The reason for not going was lack of funds as revealed during the autopsy. They stayed on average more than 60 kilometres away from the hospital. The average number of prenatal care visits for the fourteen women with multiple pregnancies that was not diagnosed was 2. Of the 41 single births, 18 were live births and 23 ended as stillbirths. Among the multiple pregnancies, in 8 out of the 17 twins cases were still births; in another 4 women the outcome of delivery was a live birth and stillbirth twin. In only two case twins' were live births. More strikingly, of the 37 maternal and 63 newborn case deliveries that took place in the hospitals, it was only 10 of the maternal case and 14 of the deceased newborn mothers that were recommended for hospital delivery at the prenatal care clinic.

4.3.5.3 Assistance during delivery

The type of assistance a woman receives during childbirth has important health consequences for both the mother and the child. In addition, the proportion of births attended by skilled providers is a measure of the health system's effectiveness, accessibility, and quality of care. Delivery assisted by skilled providers is the most important proven intervention in reducing maternal mortality and newborn death, and one of the MDG indicators to track national effort towards safe motherhood. Hence, obstetric care during delivery by a skilled health worker is considered critical for the reduction of maternal mortality and newborn death. Table 17 shows delivery assistance at both institutional and home delivery by types of providers. Specific to this study, nearly one in two births took place with assistance from traditional birth attendant (TBA) or relatives and the other half was managed by skilled birth attendants (SBA).

Table 4.13: Assistance during delivery

Assistance during delivery	Maternal Cases		Mothers of deceased newborn	
	Frequency	Percent	Frequency	Percent
Doctor	11	8.27	18	6.29
Nurse/midwife	47	35.34	91	31.82
Health Extension Worker	0	0	1	0.35
Traditional Birth Attendant	39	29.32	117	40.91
Relatives (not health worker)	22	16.54	33	11.54
Non-relative	14	10.53	26	9.09
Total	133	100.00	286	100.00

Based on the most recent national data, fifteen percent of births in Ethiopia were assisted by a skilled provider: about 4 percent by a doctor and about 10 percent by a nurse or midwife. About 2 percent of births were assisted by a HEW, and 51 percent of births were assisted by a relative, or some other person. Twenty-seven percent of births were assisted by a traditional birth attendant, while 5 percent of births were unattended. Skilled assistance at delivery increased from 6 percent to 15 percent in the last fifteen years (CSA 2014:46).

4.3.5.4 Very common issues identified at health facilities

Table 4.14: Common issues at the health facilities

Obstetric referral hospital	Primary care facilities
Delay in deciding to institute active management by the doctor providing care	Condition of patient not detected early
Intermittent blackout or erratic electricity supply;	Low standard of prenatal care services
Shortage of drugs such as dyzapam/magnesium sulphate, octicitonine,	Delay in evacuating patients
Non-functional amenities such as sterilisers, refrigerators, water systems, etc	Unavailability of ambulance to evacuate a patient
Shortages of blood bags	Lack of reliable electricity supply
Lack of readily available blood for necessary transfusion	Lack of drugs, for example, magnesium sulphate
Partograph not systematically used and even if used only the post-partum section is attended	Medical supplies shortage: intravenous fluid, gloves, cannula, blood bags etc
None of the cases transfused was monitored before or during the process of transfusion	Oxytocic drugs prescribed by junior nurses
Vacuum extraction performed by all cadres of midwives.	Partograph not systematically used and even if used only the post-partum section is attended
	Delivery conducted by untrained nurse

4.3.6 Conditions of the newborn baby soon after birth

4.3.6.1 Cord care

Tetanus is considered as the leading cause of death in neonates in Ethiopia; and, it is mostly prevalent in rural areas where non-sterilised instruments are used to cut the umbilical cord and where deliveries are carried out under poor hygienic conditions (CSA 2011:124). Most of these deaths could be prevented by ensuring that all babies receive essential newborn care (ENC), including appropriate cord care. The study asked mothers with non-institutional delivery about newborn care practices they adopted. When mothers were asked about the instruments used to cut the umbilical cord during delivery and materials applied for cord care (in deliveries other than health facility), 82.4 percent of mothers said that a new blade was used to cut the umbilical cord, 11.7 percent said that a boiled blade was used and 5.9 percent of mothers were unaware about the instrument used to cut the cord. Similarly, only 34 percent of mothers reported that the room where the delivery was carried out was clean. When mothers were asked about cord care immediately after cutting, more than two third (69.6%) of mothers said that nothing was applied after cord cutting, while 24.1 percent reported that butter was applied to the cord area and 6.3 percent of mothers mentioned the application of vaseline or oil. Keeping the cord clean and dry have been the best and only way of cord care in both home or institutional delivery. However, a more recent intervention shown to reduce newborn mortality by about 23% is the application of 7.1% chlorhexidine on the umbilical cord stump compared to the previous practice of keeping the cord clean and dry (Hodgins, Pradhan, Khanal, Upreti & KC 2013:5-10).

4.3.6.2 Crying/ breath at birth

Nearly two third of mothers (respondents) reported that the deceased newborn babies breathed normally after birth. Similarly, 54 percent of mothers said that the baby cried immediately after birth. About 15 percent (one in seven) of newborns required some sort of help to induce normal breathing or crying. Initial stimulation was the most applied (7 percent) intervention to make the baby cry/ breathe. Fifteen percent of the newborns required Bag and Mask ventilation.

Table 4.15: Babies crying and breathing at birth

Babies breathing immediately after birth	Frequency	Percent
Yes	188	65.73
No	94	32.87
Don't know	4	1.40
Total	286	100.00
Babies crying immediately after birth		
Yes	154	53.85
No	128	44.75
Don't know	4	1.40
Total	286	100.00

Hypothermia among newborns is one of the principal causes of neonatal death, and a large number of deaths can be prevented if adequate measures are taken to keep the baby warm. In this study, Nearly seventy (69.2) percent of mothers (respondents) reported that the baby was dried and/or wiped before the placenta was delivered. The immediate most common placements of the newborn baby for home birth were beside the mother (44.4%) compared with somewhere else (17.8) or newborn bed/table (37.8). It is only 6.9 percent of home birth mothers mentioned that their babies were placed in skin-to-skin contact, while 29.1 percent of facility birth mentioned that their babies were placed in skin-to-skin contact. Room temperature plays an important role in preventing hypothermia in newborns, if not, newborns can lose heat in a very short span of time by convection and evaporation. The study shows, 53 percent of non-institutional delivery was carried out in a room that was not heated during the time of the delivery. Despite the advice to avoid bathing within 24 hours of delivery, one in five newborns (21.4 percent), as shown by the study, were bathed shortly after delivery. In only 25.3% of births did the mother report that bathing of the newborn was delayed at least 24 hours. Comparing facility and home births, drying and wrapping before delivery of the placenta, skin-to-skin position, and delayed bathing indicators were higher for facility deliveries, although these differences were not statistically significantly different. However, placing the baby on the mother's chest immediately after delivery was significantly higher for facility deliveries.

4.3.6.3 Birth weight

Birth weight is an important indicator of the child's susceptibility to illness and chances of survival. Based on most recent available data, it is only 5 percent of children in Ethiopia are weighed at birth (CSA 2011:136). This is not surprising because the

majority of births do not take place in a health facility, and children are less likely to be weighed at birth in a non-institutional setting. Since most births in Ethiopia occur at home, where children often are not weighed at birth, data on birth weight is available for only a few children. However, in this study, mothers were asked whether their children were very large, larger than average, average, smaller than average, or very small at birth, since this has been found to be a good proxy for the child’s weight. The data show little variation in mortality by size of child at birth.

Children with birth weight less than 2.5 kilograms or those considered “very small” or “smaller than average” are more prone to complications than those with birth weight more than 2.5 kilograms or those considered “appropriate for age”. Accordingly, in this study, mothers (respondents) reported 27.4 percent of all live births to be very small and 13.2 percent as smaller than average.

Table 4.16: Birth weight

Birth Weight	Frequency	Percent
very small (< 1 Kilogram)	54	27.41
smaller than average (1–2.49 Kilograms)	26	13.20
(Appropriate for age) 2.5–4 kilograms	93	47.21
Very large (> 4 Kilograms)	17	8.63
Don't know	7	3.55
Total	197	100.00

In 2011 national Demographic and Health Survey (EDHS), similar figures reported with 21 percent of all live births in the five years preceding the survey to be very small and 9 percent as smaller than average (CSA 2011:136). In further analysis of this national data, it was also identified that newborn baby of very young mothers (<20 years), first-order births, children of mothers with no education, and children born to mothers in the lowest wealth quintile were the most likely to be reported as very small. Despite the smallness and poor-representativeness of the data, this trend was also attested in the present study, too.

4.3.6.4 Breastfeeding practices

Breast milk is the ideal food for the newborn. And early initiation of breastfeeding is important for both the mother and the child. Early suckling stimulates the release of prolactin, which helps in the production of milk, and oxytocin, which is responsible for

the ejection of milk and stimulates the contraction of the uterus after childbirth. The first liquid to come from the breast, known as colostrums, is produced in the first few days after delivery and provides natural immunity to the infant. It is recommended that children be fed colostrums immediately after birth and continue to be exclusively breastfed even if the regular breast milk has not yet let down.

The study collected information on children who were ever breastfed, who were breastfed in the first hour and the first day after birth, and who were fed anything other than breast milk before breast milk was regularly given (also known as pre-lacteal feeding). Table 4.17 below shows the percentage of the deceased but live birth babies that ever began breastfeeding, time of breastfeeding initiation and whether they were fed anything other than breast milk prior to breastfeeding (pre-lacteal feed). One in every two newborn babies were breastfed immediately after birth and four in every five newborn were breastfed within the first day of birth. The practice of providing pre-lacteal feed was found to be widely prevalent among communities with low educational status and among certain ethnic groups. In this study, 24 percent of babies were given pre-lacteal feed: nearly half gave milk other than mother's milk and the remaining gave other feeds such as plain water, butter, honey, etc.

Table 4.17: Breastfeeding practices

Initiation of breastfeeding ever	Frequency	Percent
Yes	193	97.97
No	3	1.52
Don't know	1	0.51
Total	197	100.00
Time of initiation of breastfeeding	Frequency	Percent
Immediately (Within one hour)	96	49.74
Total initiated in the first day	160	82.90
Total breastfeeding ever	193	100.00
Feeding other than breast milk		
Yes	47	23.86
No	139	70.56
Don't know	11	5.58
Total	197	100.00

Approximately 25% of the global burden of newborn deaths occurs every year as a result newborn infections. Most of these deaths could be prevented by ensuring that all babies receive essential newborn care (ENC), including appropriate cord care, early initiation and exclusive breastfeeding, maintenance of warmth, and prompt treatment

with antibiotics. Hygienic practices such as clean delivery and hand washing are also known to reduce newborn infections (Lawn, et al 2014:189-205).

4.3.7 Information on death

Accurate estimates of maternal mortality and neonatal death plays a fundamental role for program planners and policy makers to prioritise public health intervention. Among the various approaches to concluding the causes of death, physician's review approach was used to arrive at the diagnosis. Physician's review is the most widely used approach and the major advantage is that all sections of the verbal autopsy questionnaire, even open ended questions and comments are utilised to arrive at the diagnosis (Soleman et al 2006:239-245; Quigley, Chandramohan & Rodrigues 1999:1081-1087). In the present study, 133 mortality cases out of all the 142 cases identified from the study area for the purpose of the study were confirmed as maternal mortalities by all three maternal case reviewers. Conversely, 286 out of the 302 randomly selected neonatal cases were confirmed as newborn deaths by all three newborn case reviewers. All three agreed (from each cases) on a single cause of death in 110 (83%) of the deceased maternal cases, and in 223 (78%) of the deceased neonatal cases. The agreement among the reviewers was higher in the classification of the 119 maternal and 262 newborn cases in which both verbal autopsy and case notes were available, with 89% for maternal and 84% for newborn cases, compared to 64% for the 14 maternal and 59% for the 24 newborn cases in which only case notes was available.

4.3.7.1 Information on the newborn death

4.3.7.1.1 Sex, birth outcome and age at death of the newborn babies

Some of the vital statistics such as the sex, birth outcomes and age at death regarding deaths of the newborn babies appears very important. These indicators are specifically important as it helps to identify areas that need policy and programmed interventions. Table 3 provides vital information of deceased babies. Sixty-five percent of the randomly identified deceased babies were males and Thirty-five percent were females. Among total recorded deaths (N=286), 197 were live births and 89 were stillbirths. Among the live births, an overwhelming 71 percent of newborn deaths were during the

first 7 days of life (early neonatal period), followed by 29 percent of deaths in the late neonatal period (8-28 days).

Table 4.18: Vital information of the babies

Sex of the deceased babies (N=286)	Frequency	Percent
Males	185	64.69
Females	99	34.61
Sex not differentiated	2	0.70
Total	286	100.00
Birth Outcome		
Live births	197	68.88
Still births	89	31.12
Fresh still births		68 76.40
Macerated still births		14 15.73
Don't know		7 7.87
Newborn babies age at death		
Same day	60	20.98
1–7 days	146	51.05
8–28 days	80	27.97
Total	286	100.00

4.3.7.1.2 Causes of the newborns death

As shown in figure 1 below, the greatest proportion of deaths in the newborn was due to neonatal Infection (31.47 percent), birth asphyxia (24.37 percent), prematurity related (19.80 percent), low birth weight related (8.12 percent) and others (16.24 percent). The other category includes causes such as congenital anomaly (1.52 percent), hypothermia (1.02 percent), birth injury (0.51 percent), meconium aspiration syndrome (1.52 percent), respiratory distress syndrome (2.03 percent), severe jaundice (0.51 percent), others (3.55 percent), and unclassifiable causes (6 percent).

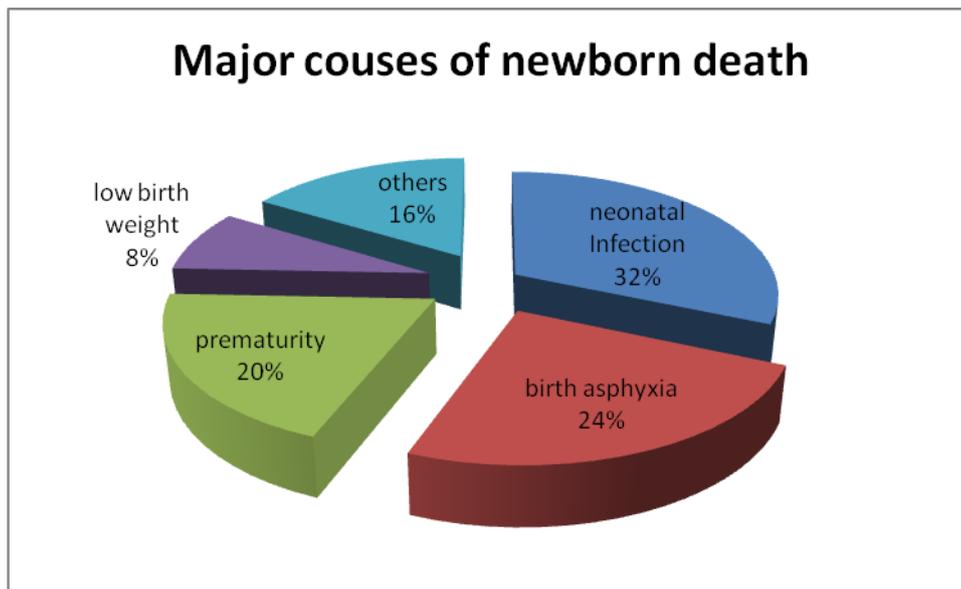


Figure 4.3: Major causes of newborn death

4.3.7.1.3 Time of the newborn deaths

Global mortality indicators show that some three-quarter of neonatal deaths happen in the first week after birth – early neonatal period (Zupan & Ahman 2006:4). Almost all (99%) of individuals die in low-income and middle-income countries, with limited information for decision-making. Two-thirds of deaths occur in only ten countries, where Ethiopia is one these countries. At least half of neonatal deaths arise after home births. The results obtained from this study as shown in figure 5 and 6 are consistent with global mortality data and shows a similar pattern. Among the causes of deaths, birth asphyxia was found to be the most frequent in neonates dying on the day of birth, similarly, neonatal sepsis was the frequent cause of deaths in neonates more than 3 days old.

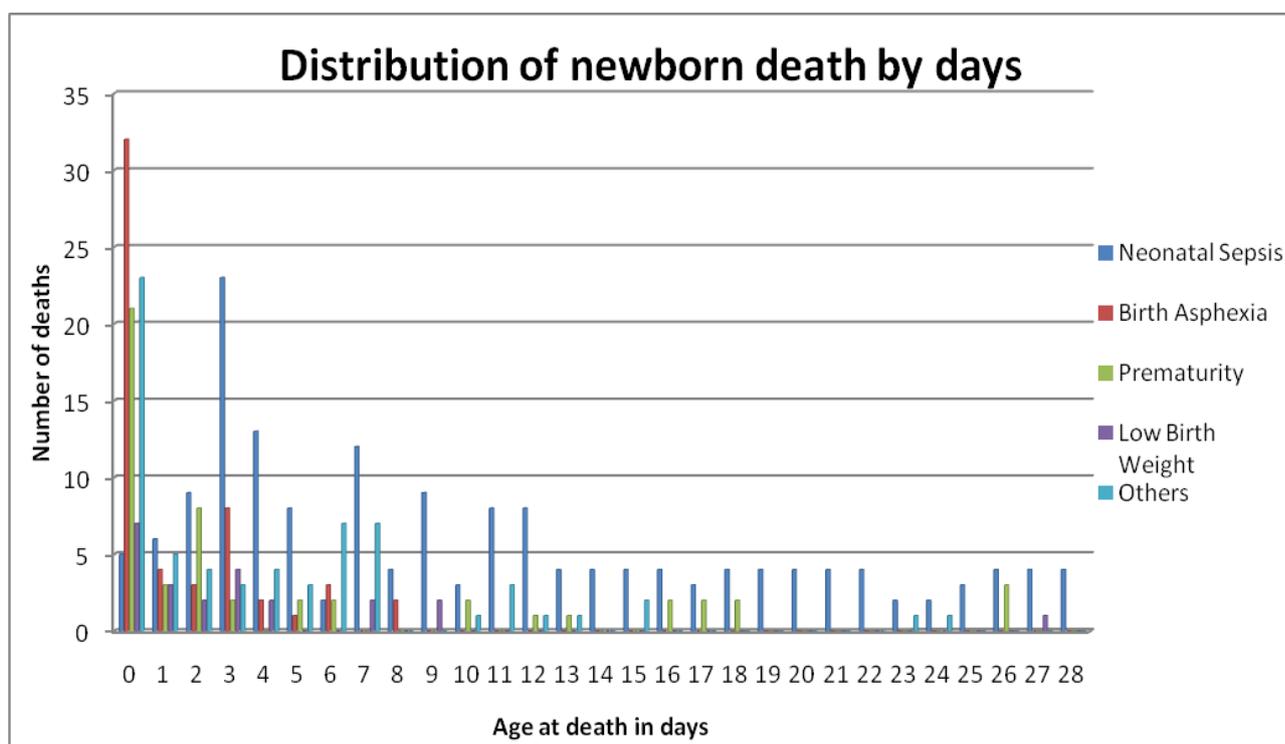


Figure 4.4: Distribution of newborn death by the number of days

In this study, the majority of newborn deaths occurred at home, among males, and on the day of birth. The three leading causes of neonatal mortality in this study were: neonatal sepsis, birth asphyxia, and prematurity related. Death numbers was observed to be high on the day of birth and most deaths were attributed to birth asphyxia. In the context of the study area, with some health extension workers trained in resuscitation of asphyxiated newborns, the death toll is still high, highlighting an urgent need to improve and make available newborn care services through skill birth attendants. Recently, birth asphyxia has been proposed to be classified as “intrapartum-related deaths” since the former has been expressed as a poorly defined term (Goldenberg & McClure 2009:1-3; Darmstadt, Lee, Cousens, Sibley, Bhutta, Donnay, Osrin, Bang, Kumar, Wall, Baqui & Lawn 2009:89-112; Liu, Johnson, Cousens, Perin, Scott, Lawn, Rudan, Campbell, Cibulskis, Li et al for the Child Health Epidemiology Reference Group of WHO and UNICEF 2012:2151-2161).

Death due to neonatal sepsis was found to be particularly high on the third day of birth, and fairly equally distributed among the three regional states. A verbal autopsy conducted in rural Nepal using physicians review along with algorithm based cause of death assignment, show very comparable findings (Freeman, Christian, Khatri, Adhikari, LeClerq, Katz and Darmstadt 2005:323-331). The finding is also consistent

with analogous studies conducted by Khanal, Gc, Dawson and Houston (2011:21-27) and Bang, Paul, Reddy and Baitule (2005:29-34). Similarly, a study conducted in rural India showed 32, 50 and 71 percent of deaths to take place during the day of birth, first three days of life and during the first week, respectively. The primary cause of death on the first day of life was birth asphyxia or injury with preterm birth and sepsis or pneumonia being the commonest cause during days 1-6 (Baqui, Darmstadt, Williams, Kumar, Kiran, Panwar, Srivastava, Ahuja, Black & Santosham 2006:706-713).

A substantial proportion of deaths due to sepsis was observed after day 2, showing a declining trend afterwards. Most of the early infections are due to pathogens acquired from the mother (Bale, Stoll & Lucas 2004:165-204), but the rise in deaths due to sepsis on day 3 could possibly hint towards infection linked to environmental exposures and practices during delivery at home and at the health facility (Bhutta, Darmstadt, Hasan & Haws 2005:115:519-617). Use of chlorhexidine, improved hygiene (hand washing and clean delivery) and neonatal care practices may reduce the incidence of neonatal infection (Bhutta et al 2005:519-617; Mullany, Darmstadt & Tielsch 2003:996-1002; Taha, Biggar, Broadhead, Mtimavalye, Justesen, Liomba, Chipangwi & Miotti 1997:216-219; Vergnano, Sharland, Kazembe, Mwansambo & Heath 2005:F220-224), and has been used in the current Ethiopian newborn care strategy, but further exploration is required to see whether the interventions are working in programmatic perspective. The examination of causes of deaths by number of days gives a useful insight for health program planning and thus highlights the need for a continuum of care (Tinker, Hoop-Bender, Azfar, Bustreo & Bell 2005:822-825). Further analysis also shows that neonatal deaths rate due to neonatal sepsis and birth asphyxia were slightly higher in deliveries at health facilities. Generally, the hygienic environment of most, if not all, of the selected health facilities found to be very poor; but, it is also possible that only those pregnancies considered serious by family members reached the health facility, hence delivering high-risk cases, and thus accounting for a higher mortality at the health facility.

Global estimates suggest that stillbirths occur at about the same rate as neonatal deaths (Awasthi & Pande 1998:358-361; Chou, Daelmans, Jolivet & Kinney. 2015:1-10) and in this study stillbirths accounted for only 31 percent of the total deaths, of which, 76 percent were fresh still births. Globally, acute intra-partum events is estimated to account for 26 percent of still births and compared to the number of fresh still births in

this study suggests a strong need in terms of intervention directed towards intra-partum stillbirths.

Mothers should be aware about essential newborn care messages and received the message through health extension workers. During the verbal autopsy, it was learnt that a very large number of mothers have no contact with Health extension workers. However, such intervention plays a very important role in reducing neonatal mortality and should be started during pregnancy and the target audience should not only include mothers but also family members, traditional birth attendants' even gatekeepers of health facilities (NMFR WG 2008:2-8).

4.3.7.2 Information on the maternal death

Ninety-four (71 percent) of the maternal deaths were as a result of direct obstetric causes of which haemorrhage was the leading cause of the direct obstetric deaths accounting for 34 percent (32 of the cases). Nearly one in three of these 32 deaths (34.4 percent) were ante partum haemorrhage and 81.8 percent of them were due to abruption placenta. Thirty-one cases (33 percent) of the direct obstetric deaths were caused by sepsis and most of them (91 percent) were home deliveries conducted by both TBAs and relatives respectively. Indirect obstetric deaths accounted for 39 (29.3%) of the deaths and the predominant indirect deaths was due to anaemia in 34 of the cases. Table 4.19 below shows description of causes, timing, place and outcomes of maternal deaths.

Ten (7.5%) of the deaths occurred during the ante partum period, 21 (15.8%) during labour and 102 (76.7%) during the postpartum period. Furthermore, of the postpartum deaths 38 (37.3%) occurred in less than 24 hours after delivery, 30 (29.4%) between one to two days after delivery, 34 (33.3%) occurred at least more than two days after delivery. Three of every four death generally found to be during postpartum period with the vast majority of death happening within the first two or three days. Further analysis of deaths by specific causes revealed that of the deaths due to haemorrhage 3 in every 5 death occurred in the postpartum period. More strikingly, 2 in every 3 of these deaths occurred in less than 24 hours after delivery and nearly 1 in 3 took place between one to two days after delivery. Of a separate 21 deaths due to haemorrhage, whose haemoglobin level was checked during prenatal care visits, 16 of them was

haemoglobin 8 g/dl or less and in only two was their haemoglobin above 8 g/dl. In the same subgroup haemoglobin results after the complication developed was below 8 g/dl in 23 (71.9%) of the cases.

Analysis of the deaths due to anaemia also indicated striking results in that of the 21 cases that were fortunate to have their haemoglobin level checked during prenatal care visits, 13 in 21 haemoglobin was 8 g/dl or less and in 7 cases haemoglobin was above 8 g/dl. However, among the same cases that died due to anaemia, 26 out of 34 haemoglobin level was below 8 g/dl after the complication developed. haemoglobin level as low as 2.2 g/dl was recorded among these deceased mothers.

Table 4.19: Description of identified maternal mortality cases

Categorical cause of death (N=133)	Frequency	Percent
Direct	94	70.68
Indirect	39	29.32
Total	133	100.00
Medical causes of death		
Maternal sepsis and other related Infections	31	23.31
Haemorrhage	32	24.06
Eclampsia (Hypertensive disorder in pregnancy)	14	10.53
Obstructed labour	7	5.26
Other direct causes of death	10	7.52
Anaemia	34	25.56
Other indirect causes of death	5	3.76
Total	133	100.00
Period (timing) of death		
Ante partum (Before labour began)	10	7.52
Intra partum (during labour)	21	15.79
Postpartum	102	76.69
<i>Same day of delivery</i>	38	37.25
<i>1-7 days</i>	41	40.20
<i>8-42 days</i>	23	22.55
Total	133	100.00
Place of death		
Hospital	54	40.60
Health centre	17	12.78
On transit	21	15.79
Home	40	30.08
Others	1	0.75
Total	133	100.00
Pregnancy outcomes		
Live birth	98	73.68
Still birth	35	26.32
<i>Fresh still birth</i>	23	65.71
<i>Macerated still birth</i>	11	31.43
<i>Don't know</i>	1	2.86
Total	133	100.00

In this study, direct obstetric deaths accounted for the majority of deceased maternal cases. Haemorrhage in general and postpartum haemorrhage (PPH) in particular was the major cause of direct obstetric death. These are in harmony with findings of other studies (Fawole, Awolude, Adenji & Onafowokan 2010:1-17; Khan et al 2006:1066-1074) and WHO estimates (Kassebaum et al 2014:980-1004). However, now a days, there are various high-impact medical interventions which can effectively prevent PPH. Active management of the third stage of labor, using oxytocin as the preferred uterotonic, is prominent among them (Leduc, Senikas, Lalonde, Ballerman, Biringier, Delaney, Duperron, Girard, Jones, Lee, Shepherd & Wilson 2009:980-993; Smith, Gubin, Holston, Fullerton & Prata 2013:2044; WHO 2008c:1-8). Administration of oxytocin, however, requires the assistance of a skilled birth attendant (SBA), and therefore is not available to women experiencing unattended home births, either by choice or lack of access to SBAs (Crowe, Utley, Costello & Pagel 2012:4; Prata, Passano, Rowen, Bell, Walsh & Potts 2011:81-91). Misoprostol, an oral prostaglandin E1 analogue that can be administered immediately following delivery, offers an important alternative for PPH prevention in low-resource settings and at home births, where oxytocin is not available or where its use is not feasible. Misoprostol requires no injection supplies or skilled provider for administration. Misoprostol does not need refrigeration and can therefore be stored and provided where there is no electricity. These factors enable programs for the prevention of PPH using misoprostol to potentially achieve high coverage and can be used particularly by women who reside at a distance from a health facility and deliver at home (E-Nasreen, Nahar, Al Mamun, Afsana & Byass 2011:10; Mobeen, Durocher, Zuberi, Jahan, Blum, Wasim, Walraven & Hatcher 2011:353-361; Pagel, Lewychka, Colbourn, Mwansambo, Meguid, Chiudzu, Utley & Costello. 2009 1441-1448; Prata, Gessessew, Abraha, Holson & Potts 2009:87-95).

On the other hand, significant portion (1 in every 3) of the deaths due to haemorrhage was as a result of abruption placenta (ante-partum haemorrhage). Ethiopian women particularly the rural women like most African women, work in the fields and in addition to the routine domestic chores throughout the year even during pregnancy. In the rainy season, in addition to the daily chores: cooking, cleaning, taking care of children, etc. most Ethiopia pregnant women are in the farm field predominantly to support the

cultivation of labour intensive cereal called '*Teff*'¹. In the dry season they are involved in vegetable gardening, breeding, etc. This is in addition to their domestic chores, as women are not relieved off their domestic roles even during pregnancy, in the rural areas of the Ethiopia. This hard and continuous series of labour might have been the possible triggering factor for the recorded high incidence of abruption found in this study. More convincingly, 73 percent of the abruption placenta cases occurred during the peak of the rainy (farming) season (June–August).

In this study, sepsis also takes the lion share with haemorrhage as a direct cause of medical death for maternal mortality. This appears to be in concurrence with most developing countries experiences (Kassebaum et al 2014:980-1004). The good news, however, is that despite the fact that the hygienic environment of most, if not all, of health facilities found to be very poor, only three of the 31 sepsis related death case was related with health facilities. This could be a result of the fact that a women delivered in a medical facility (hospital) attended by skilled personnel and presumably in a more hygienic environment than the homes; the systematic prescribed antibiotics in the hospital (even though there is no systematic sterilisation of delivery trays due to erratic electricity supply) may have contributed to the low incidence of sepsis in the health facilities. The remaining 28 sepsis cases identified were home deliveries attended by TBA and/or relatives of the deceased women. The role of TBAs in the prevention of postpartum sepsis is challenged elsewhere (Goodburn et al 2000:394-399).

In this study no abortion related death was identified as was the case in other studies carried out in developing countries (Haddad & Nour 2009:122-126; Olsen, Hinderraker, Bergsjø & Lie 2002:1101-1109). In Ethiopian society, abortion is culturally very sensitive and structurally illegal except in some particular contexts. It is, hence, performed, unreported and undocumented even in medical facilities. In rural Ethiopia, particularly in the area of this present study, early marriage and childbearing is common. In Ethiopian societies, having many children in a marriage is a pride as it serves as a form of social security for women. Furthermore, in a religious society such as Ethiopia, illegitimate pregnancy is a social taboo and abortion predominantly neither reported nor

¹ Teff is a major cereal in Ethiopia used for staple food called 'Enjera'

documented. These may be a reason why this study failed to capture any abortion related death.

4.4 QUALITATIVE RESEARCH FINDINGS, INTERPRETATIONS AND DISCUSSIONS

The purpose of this section is to present the information obtained from the qualitative data, interpret and discuss as guided by the objectives of the study.

4.4.1 Potentially avoidable factors and getting on with what works

The culmination of the period of pregnancy with childbirth is one of the most crucial periods in a women's life. Series of changes take place in the women's body that results in the expulsion of a viable product of conception. Although childbirth is a normal physiological process, complications may arise during pregnancy, delivery and/or postnatal period. Providing information about avoidable factors that contribute to maternal mortality and newborn death and using the information to guide actions that must be taken at the community level, within the formal health care system, and at the intersectoral level (i.e. in other governmental and social sectors) are critical for preventing similar deaths in the future. In pursuit of the objectives of the study, which includes exploring the medical, non-medical and avoidable factors contributing to maternal mortalities and newborn deaths; describing the community approach best practices; and, getting on with what work, multifaceted assessments were conducted.

During delivery or labour process, evidence shows that obstetric emergencies are associated with three key delays. These are (i) Delay in decision to seek care, (ii) Delay in reaching care, and (iii) Delay in receiving care. Hence, it is an absolute necessary to take every child-birth seriously; and, negligence in any part of the process can lead to serious consequences on both the mother and the newborn baby's health. During the verbal autopsy in the three largest regional states of Ethiopia (Oromiya, Amhara and SNNP, the present study undergone in-depth assessment of these crucial delays.

4.4.1.1 Delay in decision to seek care

The primary constituent of the three-delay model shows the duration of time after which they (the woman or her family) initiated to seek care from the health facility. The length of time in delay within this phase of the model is estimated from the moment somebody, either the woman or her family realised that there is a complication which may range from minor discomforts to serious diseases that require medical interventions during or after pregnancy. Participants were asked how long after initiation of labour did they actually decide to go to health facility. Table 4.20 below shows delays in care seeking behaviour of pregnant mothers during their last pregnancy. Forty of the one hundred thirty-three maternal cases (30%) and 101 of the 286 newborn mother's cases (35%) did not exhibit any attempt of decision for the process of seeking medical attention after the recognition of complication. They limited the whole labour and delivery process at home with an attempt for home deliver. For the remaining 93 deceased maternal and 185 mothers' of deceased newborn baby cases; the delay in time period range from one hour (the swiftest) and up to four days for both maternal and deceased newborn baby's mother cases. The average time in delay was thirty-five hours or nearly one and a half day with slight difference between the averages of maternal cases and newborn baby mothers with 37 and 34 hours respectively. Forty three percent of maternal and 36% of the deceased newborn baby's mother case participants respectively said that they went to the health facilities 25-48 hours after the start of labour. Similarly, 22% of maternal and 19% of the deceased newborn baby's mother case participants respectively went to the health facility after two days of the start of labour; and, 16% of maternal case participants and 21% of mothers' of the deceased newborn babies took at least 24 hours of start of labour before they went to health facility.

Table 4.20: Delay in seeking care

Service Received at Health Facility (HF)	Maternal cases (N=93)				Mothers' of deceased newborn babies (N=185)			
	F	X ¹	FX ¹	%	F	X ¹	FX ¹	%
< 3 hour	7	2	14	7.53	17	2	34	9.19
4-12 hours	11	9	99	11.83	28	9	252	15.13
13-24 hours	15	19	285	16.13	38	20	760	20.54
25-48 hours	40	42	1,680	43.01	67	45	3,015	36.22
> two days	20	66	1,320	21.50	35	64	2,240	18.92
Total	93		3,398	100.00	185		5,900	100
Mean = $\frac{\sum fx^1}{N} = \frac{3,398}{93} = 36.54$				Mean = $\frac{\sum fx^1}{N} = \frac{6,301}{185} = 34.06$				
N 93				N 185				

Thaddeus and Maine (1994:1091-1100) discuss the factors that contributed to the delay in deciding to seek care are normally regarded as the 'pregnant-women-factors' because they originate directly from within the individual pregnant women, her family or both. In the present study, four key predisposing or aggravating factors identified under this initial phase of delay:

4.4.1.1.1 Lack of understanding of complications to seeking care

The literature clearly shows that an important predictor of health care seeking behaviour is illness characteristics as perceived by the individual (patient) and/or family members. First of all, the illness or complication must be recognised and classified as 'not-normal'. Most importantly, it worth to note that recognition of an illness is defined by the women or her relatives' view of reality, not by the health professional's medical criteria, with which it may be quite different (Chenge, Vennet, Luboya, Vanlerberghe, Mapatano & Criel 2014:173; De Boer, Wijker & De Gaes 1997:101-115; Tanner, Cockerham & Spaeth 1983:360-369). The findings of this study also justify that although almost all deceased cases developed some form of life threatening complications; only about twenty percent of the deceased maternal and newborn mother's cases were recognised by the women or her relatives as complication. Skolnik (2015:123-127) highlights recognition of an illness may be influenced by factors such as the commonness of the condition; i.e. if a condition is widespread and common, it is generally perceived as 'normal' so it may not be regarded as a problem. Studies among pregnant women in various African countries, including Ethiopia, shows that significant

number of pregnant women regard headache, swelling of the legs, fever, pallor and dizziness as normal signs in pregnancy because they are common among pregnant women (Dia 1989:4-7; Jackson 2008:11-25; Thonneau, Matsudai, Alihonou, De Souza, Faye, Moreau, Djanhan, Wellfens-Ekra & Goyaux 2004:150-154). Pregnancy and childbirth are normally considered to be natural, normal work for women. However, this may entail a negative consequence on health care seeking for pregnant or labouring women when complications developed. It may result in delay in seeking medical attention. In the Ethiopian societies, pregnant women are socially classified as 'not in good health' implying that these women are always with health problems as long as the pregnancy is on. This stereotyping has a negative implication in that it may cause unjustifiable delay in the process of seeking medical care when complications develop. A survived 18 years mother of a deceased newborn baby anxiously witnessed that:

"It was my first pregnancy. During my final days, I had some difficulties such as severe headache, blurring of vision and convulsions. My mother-in-law told me that these are 'normal' during pregnancy. My delivery was attended by a traditional birth attendant. When the baby was born, it didn't cry. The attendants supposed that the baby had died; so, she put it aside. After three hours or so, a health extension worker was passing by and learn the situation. She used suction pump and the baby started to cry with difficulties. The baby was abandoned with no cloths and in unclean manner. We run to health centre. The baby only survived just for couples of hours."

Once the illness is recognised as 'not-normal', its perceived severity is an important factor in the decision-making process. If a condition is not rated as severe it may not merit seeking any medical care. In other words, the perceived severity of the condition is another key predictor for seeking care. In this study, although 30% of the deceased maternal cases and 35% the deceased newborn mother's cases evidently recognise the existence of complications, they did not exhibit any attempt of decision for the process of seeking medical attention. Perhaps, the health belief model best explains the rationale for such a behaviour (Ayers, Baum & Manus 2007:97-100). This model asserts that it is the 'perceived severity' and the 'perceived threat' of an illness or a complication as viewed by the woman or her relatives that will motivate them to seek care. Similarly, in a study carried out in Kenya in which family members of women who died from maternal case were asked about their awareness of the seriousness of the

complication, high proportion of the relatives did not regard the complication as serious and did not see the need to seek care (Liambila & Kuria 2014:311). Correspondingly in this study, having many previous problem-free deliveries appears to play as an inhibiting factor in seeking care:

“She never go to anywhere for delivery. All her previous six deliveries were at home without any problem. She even didn't call the traditional birth attendant in her last two deliveries. She was just accompanied by her mom and the nice old women in our neighbour. This time, the prominent traditional birth attendant was with her. All of us assume she will deliver without any problem, as usual”.

Prior problem-free delivery appears to infuse the belief that "no complication happen before so it may not happen this time". Women or their relatives tend to use this as their risk-forecasting-technique for the present and subsequent pregnancies. If the previous pregnancy or pregnancies were without incidents subsequent ones are usually thought to be the same. Several testimonies during the data collection tend to suggest this pattern of attitude among relatives which instil significant reluctance to seek care at health facilities.

4.4.1.1.2 Traditional beliefs/cultural norm barriers to seeking care

As a complex whole that refers to the learnt pattern of thoughts and behaviour characteristics of a social group, culture involves religion, kinship, knowledge, belief, art and morals and child bearing practices (Brown & Closser 2015:73). Culture and experience shapes peoples' beliefs, way of thinking and consequently influences how an individual or groups behaves in any given circumstances. The tendency to act or not doing anything in the presence of a complication is also influenced by the interpretations supported by their cultural beliefs. Several traditions in certain cultures may also influence behaviour particularly in health care seeking. Illnesses or diseases are culturally or traditionally classified either by cause or origin and this classification may restraint one from seeking medical attention. Mother of a deceased woman stipulated why her daughter didn't want to go to the nearby health centre until she become unconscious and they finally took her to health facility:

"This is her fifth delivery and she gave birth to her second child at health centre. Then, she hates delivering at health facility. She couldn't stand the way they (health workers) stare at her naked body. She felt silly and assumed that they have no culture, no taboo, no respect and no shame. And more importantly, she condemns that they throw away the placenta for dogs into the garbage hole."

Several testimonies indicated that the traditional birth attendants (TBA) offered an environment more conducive to childbirth in the community. This was stated by participants to be due to almost all TBAs being older women who command respect within their communities. In addition, TBAs assist births in the clients' own homeward which allowed relatives to be around to give emotional and social support during labour. Assisting births in clients' homes also allowed women and their relatives to dispose the placenta in a culturally acceptable manner. In almost all parts of the study area, the culture supports births at home and places a lot of significance on where and how placentas are disposed. These were highlighted to be major cultural barriers to facility birth.

On the other hand, the present study also revealed the testimonies of traditional techniques used by family members of a deceased woman:

"The baby was delivered without much problem. But she couldn't deliver the placenta and she was bleeding. 'They say', eating fresh, raw, cleaned but not-washed cattle stomach is good to easily release a retained placenta; she tried to eat but didn't work. Then, her husband shook her to release the retained placenta. The placenta still remains retained and the bleeding continued. We were looking for a vehicle; but, she seems tired and sleepy. We sprinkle cold water on her but she still seems faded. We make songs with louder noise but she couldn't make it and slept forever."

Other studies have also revealed that in various parts of Ethiopia traditional techniques are used to deal with prolonged labour or retained placenta which includes massaging her abdomen with butter or binding it with cloth, shaking the woman, shouting or firing a gun, giving a drink made from coffee leaves to stop haemorrhage and/or more (Jackson 2008:11-25; MoH 2006:6). Prayer as a palliative care was also mentioned by a number of women and TBAs that may contribute to delays in seeking care. In contrast, in their delay model, Thaddeus and Maine (1994:1091-1100) elucidate that in many parts of

Africa, prolonged obstructed labour is taken to be a sign of the woman's infidelity. Obstructed labour is thus interpreted as punishment for adultery and not recognised as a medical problem. It is believed that the woman must 'confess her sins' so that the delivery will progress smoothly, thus preventing the decision to seek medical care for the complication. Numerous studies in Ethiopia, Africa and elsewhere have shown how culture influenced maternal health care seeking behaviours.

Another families of a deceased woman who had an episode of bleeding before delivery revealed that even after the recognition of the complication, care was not sought immediately. The mother-in-law and trusted old friend looking after the woman asked them to wait until the subsequent St Marry Orthodox Church Sabbath-praying time. From the testimony the rationale for the delay was that it is believed if labour/childbirth correspond with the St. Marry Sabbath-praying times; you should not do anything but pray and wait until the Sabbath-praying time is over.

"Since it corresponds with the Sabbath-praying times, we hope that St. Marry will mediate and help her to deliver. It was around late-afternoon so we thought she will deliver by then. It was after that when she did not deliver we took her to health centre."

This testimony epitomises how religious belief has influenced the care-seeking process. Ideas and practices relating to illness are inseparable from the domain of religious beliefs and practices. The value attached to prayers to St. Marry in this case is very important. Prayers are used in the healing process and it is interesting to note how prayer to St. Marry (mother of Jesus Christ) was linked with labour and childbirth. Jansen (1973:34) asserted that religion, medicine and magic are closely interwoven.

What's more, in the study area and in the general Ethiopian society, pregnancy and childbirth are normally regarded as an entirely women's thing so men assume an absolutely passive role in it. More surprisingly, in almost all modern health facilities (public and private), husband of a pregnant woman is not expected (not allowed) to accompany his wife in delivery room. Alternatively, older women in their menopause including traditional birth attendants are assumed to be "specialists" on issues of pregnancy and childbirth especially in the rural areas. This is because of the number of pregnancies and deliveries they survived. These women are consulted during

pregnancy, labour and childbirth if a complication is recognised. Their 'advice' or 'words' on these issues are barely challenged. In most cases, in Ethiopian culture, words of an elder are not challenged.

4.4.1.1.3 Concern about costs of care – barrier to seeking care

Payments for health services are likely to present a barrier to access. Cognisant of this, recently, several international campaigns have advocated the removal of user fees, especially for primary care services (CA 2005:16; SC 2005:1-19). Commendably, the Ethiopian government is also adapted a strategies on free service for key maternal and child health services. Despite the fact that, the findings of the present study light-up on the '*cost of the free maternal and child health service*'. Firstly, for the vast majority, 109 (82%) of the maternal cases and 211 (74%) of the deceased newborn mothers cases money was not readily at hand when the complication developed. Be that as it may, they tried to resort through loaning money from within or outside the family and/or selling of assets. For the remaining cases that money was readily available, the husband was the money provider with the exception of just three maternal and seven mothers' of the deceased newborn babies cases. For those 93 deceased maternal and 185 mothers of deceased newborn cases, who decide to seek care at health facilities, analysis of expenditure spend to seek care by categories, cases and further by specific cause of death was performed and it indicated huge variation. The cost of care ranged between about ETB100 and as high as about ETB6,000.00 (US\$1 equivalent to ETB21.00). This expenditure covered transportation, things asked to buy at the medical facilities and miscellaneous fees. The average expenditure was ETB1,300.00. The average amount spent on transportation i.e. from home to all the health facilities visited was ETB300.00 representing 23% of the average total spending. The average total expenditure on things asked to buy at health facilities including at the hospital was ETB780.00, which is 65% of the total expenditure in seeking care. The highest expenditure was incurred by cases that died of anaemia, as they spent on average ETB1,860.00. In one case the highest amount of money the deceased or her relatives had to part with was ETB5,894.00. Haemorrhage cases spent 2.3 times lower than the anaemia cases; expenditure was 4.8 times lower among eclampsia cases and 2.8 times lower among those who died of obstructed labour compared to anaemia victims.

Discussion with health professionals in the public health facilities of the three regional states evidently confirmed that antenatal care, delivery and post-natal care services were free of charge at their nearest health facility; but, they pointed out that there are noticeable associated cost on each maternal cases. According to these senior health professionals, it is not uncommon to see health facilities with no supplies, no delivery kits, no gloves, no drug like Pitocin and Ergometrine, no functional refrigerator, no examination table and so on which entails referrals to other public health facilities or purchase of these supplies/service from the private health facilities with unreasonably high costs. These shortages of supplies and equipment in public health facilities must in part be attributable to insufficient budgets and weak management skills. If women or their families cannot afford the private facilities cost and seek care from the public health facilities (health post, health centre or public hospital) and these facilities are forced to refer women to the next level of facility, this delays access to appropriate treatment. A health worker in a peripheral health post witness on the death of a mother who was referred to the nearest health centre:

"It was a complicated case to our capacity and we let the families know that the labour is not progressing well and the labouring mother need to go to health centre, immediately. But they stayed three days until they exhaust all possibilities to cover their transportation and accommodation expenses (sell asset). Such financial constraint often prevent mothers from seeking timely care."

Even when maternal health care is free at the point of delivery, access remains dependent on the ability to meet additional costs such as transport and costs for accompanying family members to stay nearby/hotel, as well as the additional opportunity cost of seeking healthcare. Poor families are the most affected, meaning that they benefit the least from the availability of the free maternal healthcare. The researcher was able to confirm this in a range of confidential inquiry. By and large, access to basic maternal and newborn health services of acceptable quality appears to still deny to many of the Ethiopian's poorest people. In general, against a backdrop of severely underfunded health systems, governments are faced with a dilemma (CA 2005:16; SC 2005:1-19). Yet, a shortage of resources at the facility level is a contributor to failure to deliver quality services, and this also presents a barrier to access. Some have argued that user charges can generate vital resources at the local level and help provide good quality services (Ellis 1987:995-1002; Litvack & Bodart 1993:369-383; WB

1987:1-37); others have highlighted their negative effects, particularly on equity (Lagarde & Palmer 2008:839-848; Russell & Gilson 1997:359-379; Yoder 1989:35-42; Gilson 1988:1-12; Gertler & Locay 1987:67-88).

4.4.1.1.4 Family's/community's attitude towards the health-care system

Decision to seek care is regarded as a patient factor but health service factors often influence the decision-making process (Cham, Sundby & Vangen 2005:1-8). A woman's personal or a close relative's previous encounter with the health system is a very important determinant in subsequent health care seeking process. Bad experience with the health system will mostly lead to reluctance or non-utilisation of the health care system even if it deemed necessary. There are instances in which one may want to seek medical care but certain health service factors prevent them from doing so. In the collected data, testimonies identified that perceived poor provider attitude was an obstacle to service utilisation. Older people expect to be treated nicely by the care providers and particularly by those whom they are older than. This perceived poor provider attitude and behaviour infuse an unnecessary agony on the impending patient and her relatives:

“Since her last delivery, her husband vowed not to go to that health centre. And yet, she was groaning throughout the night, the following morning the husband decided to take her to the health centre. But she refused. She feared the nurses because she will be asked all nitty-gritty things; and, if she fail to respond to their level of specificity, they will throw all resentful words, unwelcoming face and may even be totally offensive insulting. She may not even be given any sort of remedy and ignored the whole time”.

In this study, health service factors identified to have inhibited the decision-making process were perceived provider attitude. Akum (2013:1-9) in his study on factors contributing to low institutional delivery in Ghana, identified poor staff attitude towards patients and negligence of health care workers as a major contributor to both high maternal mortality and low utilisation of the services in Bawku Municipality. Poor provider attitude was also identified as a major contributing factor to low compliance to a referral hospital by at-risked women (Kowalewski, Jahn & Kimatta 2000:100-109).

There are a number of reasons why women are reluctant or do not even use the health system during labour or delivery and prefer home delivery assisted by a traditional birth attendant or relatives. Unfamiliar setting at the health facility, being attended to by strangers, lack of family support, attendant being a male care provider (unwelcome in some cultures including in some part of Ethiopia), non-tolerance of health staff of cultural practices related to childbirth, reduced autonomy, the lack of sympathy and understanding on the part of health care personnel and not seeing the need for care are some of factors identified that contributes to non-utilisation of health services during labour or childbirth (Akum 2013:1-9; Riaz, Zaidi & Khowaja 2015:279-284; Nigussie, Hailemariam & Mitike 2004:145-152; Kowalewski et al 2000:100-109; Wilunda, Quaglio, Putoto, Lochoro, Dall'Oglio, Manenti, Atzori, Lochiam, Takahashi, Mukundwa & Oyerinde 2014:1-12). More importantly, these studies revealed how health services related factors affects health service uptake.

Besides, in the collected data, testimonies indicated that structural factors in the way maternal care services is being provided barred women from seeking care. Antenatal care clinics in Ethiopia are held on specific days and predominantly for urban communities. If exist in the rural area, antenatal clinics are not held on weekends. This gives the impression to women that maternal health services are available to them only on the days clinics are held. In the collected data, testimonies indicated that women with an obstetrical complication did not seek care early due to structural factors in the health system. Relatives of a deceased woman in a rural district stated that:

"During the weekend, she was suffering from severe headache and abdominal pain. But we stayed at home until Monday as it is the day on which pregnant women are attended. Unfortunately, Monday was Epiphany. The clinic day for our village is held only on Tuesday, and moreover, during the weekends the clinic is always closed."

4.4.1.2 Delay in reaching care

In their 'three delays model', Thaddeus and Maine (1994:1091-1110) explained that the accessibility of health services, influenced by distance and availability of transportation, is considered to play a dual role in the health care seeking process. On the one hand, it influences people's decision-making and on the other hand, it determines the time

spent in reaching a facility after the decision to seek care has been made. Reaching an appropriate obstetric care facility early is influenced by the location and geographical distribution of these facilities. Once a decision to seek medical care has been made, other obstacles must be overcome in reaching there.

In Ethiopia, the modes of transportation mainly vary based on where you are (geographically) and who you are (economically). With the very strenuous landscape of the country and the meagre economy, it can easily be assumed that the Ethiopian transportation system in general is among the nastiest in the world. The participants were asked about the modes of transportation they were using²; distances they cover; and, time lapse before they actually reach health facility (reaching care). About one out of ten participants said that the pregnant women went on foot (walking); about one out of four said that the pregnant women went by shouldering using 'Qareza'³/chair/mini-bed or cart; and, nearly half of them said that they took some sort of vehicle such as bus/lorry/ taxi/rickshaw, etc. Virtually half of mothers said that the distance between their home and the appropriate health facility was more than 20 kilometres and it is only about 15 percent of mothers said that the distance was less than 5 kilometres. Factors such as topography, connection with paved roads and availability of transportation facilities, all play a role in accessibility and in reaching the health facility. Nearly 55 percent of the mothers need up to six hours to reach the appropriate health facility/provider and the remaining about 45% need more than six hours to reach the appropriate health facility/provider. The average time needed to reach an appropriate health facility/ provider found to be 6.32 hours; whereas, the average distance was 26.97 km.

² In most cases, the modes of transportation are a mix of two or more means such as walking, Qareza, vehicle, etc. In this study, the major mode of transportation is identified for classification.

³ 'Qareza' refers to stretcher made from bamboo, wood, hide, or other natural material. The patient is tied to the stretcher and covered with clothes. Four men at a time take turn to carry the stretcher. It needs to gather around 20 or more people from the village depending on the distance they will cover.

treat the condition or even administer essential first aid so patients are referred to another facility that is better equipped.

In this study among the 93 maternal cases and 185 mothers of the deceased newborn cases autopsied, almost all had some level of delay in reaching an appropriate obstetric care facility. From the testimonies contained in the data collected the constant reasons identified resulting in a delay in reaching an appropriate obstetric care facility can be grouped into three subcategories: lack of transportation; chain of transfer up until appropriate source of care; and, prolonged transportation.

4.4.1.2.1 Lack of transport

Transportation constraints contribute to the late arrival of patients to a hospital. This is particularly the case for women with obstetric complication. Community factors such as poor road conditions, lack of readily available transport or inadequate means of transportation are responsible. Relatives of the deceased women experienced transportation difficulties during the process of seeking health care. Transportation difficulties encountered in some instances led to the use of alternative means of transportation such as cart (donkey, mule or horse) or in extreme case they had to shoulder her on a 'qareza'/chair/mini-bed and walk. The family of a deceased woman who has difficult-breathing explained that they had to stay at home over night because transport was not available:

“It was late in the evening just after cattle hording that she had fast and difficult breathing. We took her to the road to look for transport. We were there up to midnight but couldn't get any. We had to go back home and get up early to catch the first vehicle in the morning”.

Overcoming transportation difficulties in the community and reaching a medical facility does not mean the transportation hardship is over. Some health facilities are without an ambulance, and even among those with an ambulance it serves multiple purposes. It may be practically unavailable at certain times. This shows the transportation difficulties that could happen when obstetric emergencies are to be referred from one medical facility to another. Health officer at a health centre testify:

“Her case can't be manage here at the health centre, so we have to transport her to the hospital. But the ambulance had already left for the health office head's zonal meeting. We looked for other transport and get very late afternoon.”

Here, a key remark is that the specified ambulance was donated through UNFA for exclusive maternal and newborn care (not for office use at all). In another health centre, concerned maternity ward health workers stipulated:

"It is not uncommon to use the MNC-Ambulance for government officials transportation. And when the health centre's ambulance may be available, lack of fuel makes it practically out of order. So, the pregnant women or her relatives are asked to provide fuel cost."

4.4.1.2.2 Chain of transfer up until appropriate source of care

In Ethiopia, there are at least three levels of maternal and child health services. Seeking care at an inappropriate level of facility, in fact, delays access to appropriate treatment. Peripheral and/or first level health facilities' inability to provide comprehensive obstetrical services forces them to transfer all those cases needing such services from one facility to another ending up in the hospital. Most of the cases in this study visited at least two different medical facilities. Sixty-two (67%) of the maternal and One hundred and seventeen (63%) of the mothers' of deceased newborn cases visited two different facilities; and, another twenty-eight (31%) deceased maternal and sixty-three (34%) of mothers' of the deceased newborn babies cases visited three different medical facilities. The Ethiopian health system organisation; which is characterised by a three-tier health care delivery system might significantly contribute to these chain of transfer. From the testimonies of a deceased women mother:

"... she was not delivered the placenta and was persistently bleeding. We run to the health post, and it was difficult for the health extension workers to remove the retained placenta. So, they referred us to the nearest health centre (37 km away). The nurse at the health centre tried but it was difficult to take it out, again. In the following morning, they referred us to the next health centre (26 km away) where there is a health officer. Nevertheless, after sometime, the health officer told us she need to go to hospital (42 km away), where there is blood transfusion and other facilities. But when we reach the hospital, she passed away.

4.4.1.2.3 Poor infrastructure (road network)

On top of long distance to health facilities; bad terrains, flooding of river valleys and muddy roads during rainy seasons, poor state of the vehicle and visiting more than one health facilities all contribute to delay in reaching care. As comprehensive emergency obstetrical care services are not available in the peripheral health facilities, obstetric emergency cases travelled up to the hospitals. Particularly, this is more frequent if there are vehicles (transportation) to travel in. Several testimonies highlighted poor infrastructure (road network) where there is better means to transport:

“She can't deliver the whole day. The TBA advise us to took her to the health centre at our village where she was transferred to another health centre (21 km away); she was again transferred to the hospital (47 km away). It was market day, there were plenty of cars and we start to travel. But after about 15 km, the heavy rain stops all vehicles. We spent the day out there, until hot sun dried the mud. We start to continue the journey after six hours, but she died before we reach the hospital”.

4.4.1.3 Delay in receiving care

Failures of the health care delivery system have been identified as a major contributing factor to maternal mortality and newborn death (Akum 2013:1-9; Riaz et al 2015:279-284; Nigussie, Hailemariam & Mitike 2004:145-152; Kowalewski et al 2000:100-109; Wilunda et al 2014:1-12; Thaddeus and Maine 1994:1091-1110). Delays in the delivery of care are good indicative of the inadequacy in the health care delivery system. Inadequacy may be due to one or a chain of shortage of supplies, equipment, lack of trained personnel, and incompetence of the available staff.

Participants were asked about the time (delay) it took to receive prompt and appropriate care after reaching the health facility. Of the 93 deceased maternal cases and 185 mothers of the deceased newborn babies' cases almost all had experienced some level of delay in receiving prompt and adequate obstetric care. Surprisingly, more than 90 percent of the mothers received care after an hour of reaching the health facility. And more strikingly, one out of four mothers (maternal cases) and one out of three mothers

of deceased newborn cases responded that it took them more than six hours to receive care. Generally, on average it was found to take a pregnant woman about five hours before they receive appropriate care but after reaching health facilities.

Table 4.22: Delay in receiving care at health facility

Receiving care	Maternal cases				Mothers of deceased newborn			
	F ¹	F ¹ X ¹	X ¹	%	F ²	X ²	F ² X ²	%
Within half an hour	1	30	30	1.07	0	0	0	0
Half an hour to one hour	4	45	180	4.30	9	45	405	4.86
one to six hours	62	240	14880	66.67	107	240	25680	57.84
More than six hours	26	480	12480	27.96	69	480	33120	37.30
Total	93		27570	100.00	185		59205	100.00
Mean = $\frac{\sum fx^1}{N} = \frac{27,570}{93}$ =297minutees = 4.57 hrs				Mean = $\frac{\sum fx^1}{N} = \frac{59,205}{185}$ = 320 minutes = 5.20 hrs				

When other obstacles are overcome and a pregnant woman and/or her newborn baby with complications reached an obstetrical care medical facility, there may be other problems that threaten their chances of survival. The challenge of receiving prompt and appropriate care after reaching the health facility may start just at the entrance. The dismal story of a 19 years old mother with her first delivery may illuminate the situation. Her delivery was presumed to be normal as she was receiving ANC services from health extension worker. But while she was about eight months pregnant she went into labour, which lasted less than two hours. As the gestation was unexpected, she was not taken to health facility. With the assistance of her friends and neighbours, she gave birth to a baby girl at home who cried rowdily. However, the baby had very low birth weight (about 1 kg) and was cold. She was rushed to the public hospital near their village. Unfortunately the hospital was going through routine cleaning, and only the mother was able to enter the hospital while the baby held by her older sister was stopped by the security guard outside. The family pleaded with the security guards to let the baby in, however, they didn't up until the cleaning is finished. Due to the delay in the treatment, the baby expired. The baby died due to delay by the hospital's security personnel. Physicians diagnosed the cause of death as 'low birth weight' and 'prematurity related'.

The availability of electricity and water are critical for the delivery of health services, the quality and safety of patient care, as well as provider safety. Key operational issue

mentioned in the testimonies was lack and/or termination of power and water supply. This affected not only operations but also prevented the laboratory from functioning. An obstetrician explained:

“the mother came to the hospital with uterine ruptured. She was in critical condition and need operation, immediately. unluckily, no electric the whole day and the backup generator is also not working. Besides, our water system depends on the electric supply. Late afternoon (eight hours later), they fix the generator but we couldn't save both the mother and the baby.”

In a national survey five years prior to this study, significant portion (16%) of health centres and some hospitals in Ethiopia has no electric and water supply at all (FMoH 2009b:75-76). However, the situation of unavailability and interruption of supply doesn't appear to get better.

The other cause of considerable delay in receiving prompt and appropriate care after reaching the hospitals, more often mentioned in the testimonies, was related with lack of blood at the hospital blood bank. In Ethiopia, the majority of the hospitals are not yet backed up with standard blood banks (Berhan & Berhan 2014a:105-117). In fact, the issue of blood transfusion in Ethiopia goes beyond establishing the blood bank. It is known that although there are no blood banks around the majority of the hospitals outside Addis, several hospitals have organised a mini blood bank in their laboratory rooms, or blood donation and transfusion may be possible on demand base. The big challenge commonly encountered includes inadequate supplies and transport, lack of blood donors, the unwillingness of relatives to donate blood and inability to afford blood were the major reasons for lack of emergency blood transfusions which entails delay in receiving prompt and appropriate care after reaching the hospitals. From the testimonies of husband of a deceased mother:

"The doctor told me to find two units of blood for my wife. I donated one bottle and I couldn't find anyone here (town) to donate blood. They introduce to me a young man and he asked me ETB 2,000 (about USD100) which I can't afford. Finally, I called her bother (110 km away) to come and donate. When he arrived the blood bags were finished and we have to wait until they get it. After giving her the blood, the doctor told us to get another two units. I went to sell one of our cow. But I learned that she couldn't make it.”

In a 7-year cohort study in a Southern Nations and Nationalities Peoples (SNNP) University Hospital in Ethiopia revealed that the proportion of overall severe anemia increased from about 28% on admission to 41% at discharge (Crane et al 2000:101-105), which showed inadequate blood transfusion due to inadequate blood in the bank. Unlike reports from other countries, in this study there were 50% perinatal deaths (38% stillbirth) due to inadequate blood transfusion. Perhaps, this is a good example of how fatal obstetric haemorrhage problems are and how severely compromised the obstetric management is due to the delay in even after arrival. It has shown how challenging blood transfusion is due to incapacitated blood transfusion setting in the hospital. In other words, if the central referral and a university hospital in the Southern Region is as such incapacitated, it is easy to imagine the situation in the district and zonal hospitals.

4.4.1.4 Family's attitude towards the quality of care

Technical quality of care cannot be evaluated through the information generated from the consumers of health care services. However, information generated from such interviews provides very important clues regarding how users of the health system perceived health services. Quality perceptions have strong influence on one's inclination to avail to health services. If the health care system cannot be trusted to guarantee a threshold level of quality, it will remain underutilised, be bypassed, used only for minor ailments, or used as a measure of last resort. On the other hand, high utilisation of health care services cannot always be associated with the quality of care. There may be no other alternative services available forcing people to use the only available services. The low utilisation of maternal health services identified in this study cannot and should not be used to conclude that the services provided are of poor quality. However, from the data collected testimonies revealed relatives' perceived poor quality of care. Provider and user interaction was not the least desirable according to the data. Husbands or men escorting women to health facilities expressed outraged for always being asked to leave the ward. A common testimony was:

“After carrying my wife to the bed in the delivery room the nurse told me to go out. Anytime I go to see her, the nurse will shout “go out of this place (labour ward), that this is not a place for men. The way they talk to elders is not nice. Some of them may be the same age as my children.”

It was not only men who were subjected to what they called “*harassment*”. Even women escorts expressed similar sentiments. A mother of a deceased woman narrates what she was told:

“You brought her here because you cannot manage her at home. So, just stay away from the ward. Whenever we need you we will call you. I don’t want to see you in the ward again and if you come in I will call the security guards to get you out of the hospital.”

Similar expressions were common in the testimonies.

The testimonies also indicated relatives subjected to unwarranted hospital charges. This did not go well with them and expressed gross dissatisfaction. They paid the charges because they were desperate to get care for their loved one and secondly they had no one to complain to:

“On the day my wife was discharged, two men approach me and start to add-up the possible cost I may pay if it was in a private facilities or even other public facilities. And finally, they told me that I will not pay any for bed, for card and for services but I have to just give them a good-bye gift (money) so that they may make the discharging process very simple to me. A bit worried about the consequence and gave them ETB100.00 but they said the minimum pay is just ETB200.00. But no receipt for the payment.”

Relatives of those cases who need blood transfusion also had resentment on the manner blood issues was handled. The collected data indicates relatives’ doubt on how blood issue is handled. They are with the opinion that blood is systematically sold by the laboratory officers. An persuasive statement was:

“Anytime you go for blood in the lab they will tell you that there is no blood. Immediately, they will approach and advise you to give them some money to pay to a donor's blood replacement. If you give them money, you will get the blood, shortly. At times, they call someone who pretends to be a donor (commercial donor). We know that they sell blood just to make money on us.”

Another common testimony in the collected data is the relatives being very critical of the health workers' attitude; "*bad speech*", feeling of being talked to by the care providers in an unfriendly way or "*short speech*", feeling that words of the care providers was rude or undesirable. Relatives were more critical on female care-providers than their male counterpart. Patients and their relatives want to be treated with respect and dignity, and expect that when they ask questions it should be answered in a nice way. Exceptionally in one of the testimonies relatives were very pleased with a particular staff just because she talks to them nicely. Their patient died however but praised the nurse in no certain terms:

"The nurse we met was very nice. She greets us. She talked to us very nicely. She comes frequently to check the patient. She helps us with hot water. She allow us to see our patient. If all nurses were like that, people will be very happy."

Common in the testimonies were critical comments against the care-providers:

"My wife said she was hungry, I went and bought some food. I asked the nurse if she is allowed to eat. The nurse did not respond. I asked her the second time: she responded angrily that she doesn't know. I told her she should know because she was the one paid to do the job. The 'nurses' talked in a very bad way to us."

Highlighting these testimonies are important because they identify the vicissitude experiences by the relatives during the care seeking process and secondly it describes its relevance to them. They are not necessarily objectively correct; however, they serve to illustrate the users' perception of the health care delivery system. The health system should be sensitive to these concerns and must effort to address them if the trust and confidence of the population is to be ensured.

To recapitulate, a woman with postpartum haemorrhage or a baby with birth asphyxia, sepsis, or complications of preterm birth can die within hours or even minutes if appropriate care is not provided. Delayed attention to complications during labour leads not only to deaths but also to poor outcomes such as intrapartum stillbirths, neonatal illness and disability, obstetric fistula, and other long-term obstetric complications (Thaddeus & Maine 1994:1091-1110). The assessment of the three delays during

pregnancy in the present study suggests that apparently a pregnant woman in Ethiopia wait thirty-five hours on average or nearly one and a half day before they decided to go to the health facility for delivery. Once they decided to go, it took nearly 6 hours to reach the health facility; and, once she arrive the health facility, it took a pregnant mother more than 5 hours to receive the services at the health facility. Besides, in most of the 93 maternal death and 185 mothers of the deceased newborn babies cases, the death of the maternal or newborn cases were not due to one factor but an interaction of at least two of the three phases of delay. In only 7 of the 93 maternal cases and in 12 of the 185 mothers of the deceased newborn babies cases one phase of delay was identified; in 57 of maternal and in 109 mothers of the deceased newborn babies cases experienced two different phases of delay; whereas, in 29 of maternal and 64 of the deceased newborn babies cases subjected to all three phases of delay. However, in just one of the deceased newborn baby mother case, no phase of delay could be associated with the death.

The current hypothesis of the Ethiopian government appears to be that if facilities are provided and staffed, and if cost and transport barriers are overcome, more women will use facilities for delivery. A recent national report by the Human Development Resource Centre for DFID in Ethiopia, however, disclosed that many facilities in the country are hugely underutilised, especially for safe delivery. Based on this report, the Ethiopia's health system will not continue to make progress, nor be able to tackle key results such as maternal and newborn health, without now making a serious effort to address demand-side barriers (HDRC 2012:35). The findings of this study also indicate most maternal mortality and newborn deaths occur at home commonly because of delays in reaching care.

Access to skilled birth attendants (SBAs) is strongly recommended for all pregnant women so as to make sure a normal delivery is conducted well, related complications are recognised early and referred immediately to the appropriate healthcare facilities. Birth attendance by SBAs is considered as the “single most important factor in preventing maternal deaths”. However, birth with skilled attendance is low in Sub-Saharan Africa (47%) and the lowest (13%) is for Ethiopia, with really great number of maternal mortalities and newborn deaths. Many studies show that placing a midwife in a village could promote skilled attendants at birth in rural areas. For example, the Kenya Ministry of Health has collaborated with the United States Agency for

International Development (USAID) and the Population Council's Frontiers in Reproductive Health to scale up a Community-Based Midwifery program that enabled women to give birth at home safely or be referred to a hospital (Mannah, Warren, Kuria & Adegoke 2014:279). The ministry employed and trained committed retired or unemployed midwives living in rural areas to assist women during pregnancy and childbirth and to provide postnatal care in their homes to manage minor complications and to aid prompt referral to hospitals if needed. These midwives contributed to increasing the proportion of women assisted by skilled attendants in four districts of the Western Province of Kenya.

4.4.2 Selected maternal and newborn health care management gaps

During the course of data collection for the present study, the researcher attempted to explore some selected maternal and newborn health care managements such as blood transfusion services, management of hypertensive disorder and access to neonatal intensive care services in the selected study areas. Health care providers including nurses, midwives, doctors and laboratory personnel were interviewed. Besides, pregnant, labouring or newly delivered women (who needed blood, magnesium sulphate and neonatal intensive care [NIC] services) as well as their accompanies or relatives were interviewed. Observation methods were also utilised to see issues surrounding blood transfusion services, hypertensive disorder management and NIC services.

4.4.2.1 Blood transfusion management

In the present study, anaemia and obstetrical haemorrhage was identified as a very important cause of death with 25.6 and 24.8 percent of the death cases. Besides, a significant proportion of the cases had undergone a caesarean section (20.4 percent of hospital cases). What is common among these cases is that all needed blood for transfusion. Some were transfused and others not. Even among those transfused, delay in receiving prompt and adequate blood was an issue. In these six selected hospitals, blood is not readily available. This is actually true in most peripheral hospitals in the country and other developing countries in the world, (Tagny, Mbanya, Tapk & Lefrère 2008:1256-1261). It is now more than 40 years since the first World Health Assembly resolution WHA28.72 (WHO 1975:1-60); addressing the issue of blood

safety, equitable access to safe blood and blood products and their safe and rational use still remain major challenges. One of the factors responsible for the dramatic reduction in maternal mortality in developed countries has been the readily availability of blood for obstetric emergencies. In developing countries, where the majority of maternal deaths occur; however, only few health facilities have a well-organised transfusion services (Tagny et al 2008:1256-1261).

Attempts were made to identify main factors that have contributed to the problems in the blood transfusion services, more specifically shortages of blood for transfusion, in the study areas. These may include:

4.4.2.1.1 Lack of voluntary blood donors

In Ethiopia, blood is usually collected from incidental donors (usually a family member). In the hospitals, a passive strategy in the management of the transfusion services is adopted as the function of ensuring blood availability is relegated to the patients or their relatives. Directed blood donation where blood is collected, usually from relatives, to designated patients; replacement donation where relatives of patients who received transfusion are asked to repay the units of blood to the bank. Nonetheless, people in the study area are generally not willing to donate blood even to a relative or a loved one. In fact, this is true to most part of the country (Berhan & Berhan 2014a:105-117). Because of low awareness, many family members in Ethiopia are not volunteering to donate blood to their family members even on the verge of their relative's death. Donating blood is assumed to be dangerous. It is believed to undermine the health of the donor. Family members more often than not prefer to find somebody who can donate blood for a payment.

As a result, it is not uncommon for family members to pay more for a blood seller than the actual health service fee. 'Remunerated', 'professional' or 'commercialised' donation in which blood is donated on cash and carry basis. Relatives of the patient pay the cost of the blood donated. All these are practiced in the hospital. In the hospitals there is no systematic recruitment of blood donors so consequently commercial blood donation is the prevailing way blood is acquired. These days, it is becoming a business (one unit blood costing up to ETB 2,000; equivalent to USD 100-150) at unaffordable cost for patients and relatives. More strikingly, the researcher's attempt to analyse the situation

in the context of the national law, culminated by inability to find any law that allows or prohibits selling of blood.

Yet, the shortage of blood at the hospitals cannot be entirely blamed on the above factors. Certain operational issues in the hospital may be the main contributing factors and should be the discussion point. The World Health Assembly (WHO 1989) endorsed the application of the principle of voluntary, unremunerated blood donation in all communities. Fleming (2001:243-247) argued in favour of unremunerated blood donation for four reasons that it increases the supply of blood because society will donate as being a donor will be prestigious; the donated blood will be safer for the recipient as potential donors who realise that they have risk behaviour are generally willing to exclude themselves unlike the paid blood donors who will conceal their sexual risk behaviour rather than forfeit payment; paid blood donors are at higher risk of developing anaemia themselves as they may be poorly nourished; and fourthly unremunerated blood donation is cheaper for both health service users and health institutions.

Had there been a blood bank near to the hospitals and donating blood for free was advocated using mass media or other forum, the needy people would not have suffered from double trauma (the blood loss and the cash loss). In short, another review in this analysis has shown that maternal mortality due to haemorrhage was in increasing trend in the last three decades (Berhan & Berhan 2014b:22). Therefore, to make a difference in maternal and newborn health, establishing blood banks to at least in the zonal level has to be the Government's and its development partners' priority.

4.4.2.1.2 High prevalence of anaemia

The proportion of patients particularly women reporting to the hospital needing blood transfusion is overwhelming compared to the availability of blood in the hospital. In other words the demand is higher than the supply so leading to disequilibrium. Anaemia is very common in the study areas especially among women of reproductive age. The possible reasons for this high incidence of anaemia appears to be due to inadequate nutrition; high fertility rate; too many, too frequent and too early pregnancies; and, the endemic malaria situation in some part of the area. More strikingly, a 7-year cohort study in one of the study areas (region) – SNNP – Hawassa university referral hospital

also revealed that the proportion of overall severe anaemia increased from about 28% on admission to 41% at discharge (Crane et al 2000:101-105), which showed the high incidence of anaemia and inadequate blood transfusion due to inadequate blood in the bank. In this university based study, unlike reports from other countries, there were 50% perinatal deaths (38% stillbirth).

4.4.2.1.3 Low male involvement

In Ethiopia, pregnant women in particular and patients in general going to health institutions for care very frequently accompanied by older women. This is more common in the rural areas and particularly for maternity cases as pregnancy and childbirth are regarded entirely a female entity. This strains the transfusion services at the hospital. These women (accompanies) are unfit to donate blood and very few males accompany patients, more importantly pregnant women, to a health facilities.

4.4.2.2 Management of hypertensive disorder – Diazepam/Magnesium sulphate

In the present study, hypertensive disorders of pregnancy (pre-eclampsia/eclampsia) found to be among the top three direct causes of maternal mortality/morbidity and dictate its part in newborn or perinatal death/morbidity. Studies has also revealed that maternal mortality due to hypertensive disorders of pregnancy in Ethiopia is in increasing trend in the last decade (Berhan & Berhan 2014b:22). Unanimously, hypertensive disorders of pregnancy are also among the leading causes of newborn death and morbidity (Berhan & Berhan 2014c:30-34). During the verbal autopsy, it was learnt that there is a grave concern/gap for the intervention of pre-eclampsia, eclampsia and/or hypertensive disorder at both health office (administrative) level and at health facilities. As a result, among other essential drugs intervention for maternal and newborn health, Diazepam/magnesium sulphate is point of interest. In other words, as a strategy to reduce maternal and perinatal mortality, preventing or treating these two maternal/newborn life threatening obstetric complications is a priority.

In Ethiopia, for several decades the anticonvulsant drug used for women with hypertensive disorders of pregnancy was diazepam. Because of its adverse effects, and above all, because of its poor efficacy in preventing convulsion, the maternal and perinatal complications and deaths were very high. Some studies even assume that the

poor efficacy of diazepam has contributed its share to the high maternal and perinatal mortality and morbidity in Ethiopia (Berhan & Berhan 2014a:105-117). Historically, magnesium sulphate as anticonvulsant for hypertensive disorders of pregnancy was initially used widely in the 1990s in the United States of America. Later on, in almost all developed nations, it became the first drug of choice for preventing convulsion during pregnancy. Its popularity has increased not only because of its high efficacy in preventing convulsions and improving maternal and foetal survival but also because of its fewer side effects to the foetus and the mother (Tukur 2009:76-80; Altman, Carroli, Duley, Farrell, Moodley, Neilson & Smith; Magpie Trial Collaboration Group 2002:1877-1890; Duley, Gulmezoglu & Henderson-Smart 2007:1-74).

Health workers collectively witnessed that while they were using diazepam, pregnant women with hypertension were experiencing several episodes of convulsion even after the diazepam drip was initiated. But after the induction of Magnesium sulphate in 2012, they encountered convulsions very rarely. The only gaps noticed by senior health professionals is that health workers at health centres and district hospitals were not properly trained, and the antidote (calcium gluconate) was found on the odd occasion even in big hospitals. But now, Magnesium sulphate is unavailability for nearly the whole year; and, no one able to explain the 'why' at health facilities and at regional level. In Ethiopia, Magnesium sulphate is included in the essential drugs list. However, the distribution has been limited to public hospitals and few health centres.

Now a days, there are studies on the injection magnesium sulphate in eclampsia and severe pre-eclampsia patients at community level in a rural set up before referral to the hospital, before it is too late. For instance, Bangladesh has obtained remarkable achievements through use of magnesium sulphate at the community level at rural setting among the eclampsia and severe pre-eclampsia cases. Currently, the Bangladeshi government is collaborating with non-governmental organisations such as Engender Health and the Obstetrical and Gynaecology Society of Bangladesh to expand provision of magnesium sulphate by community-level service providers who can screen and detect pre-eclampsia and eclampsia and provide an initial dose of magnesium sulphate to eligible women before referring them to higher-level facilities in order to avoid unnecessary delay (Shamsuddin, Nahar, Nasrin, Nahar, Tamanna, Kabir, Alis & Anwary 2005:75-82).

4.4.2.3 Access to newborn intensive care services

For more than half a century, the only hospital that has established Neonatal Intensive Care Unit (NICU) in Ethiopia was only Tikur Anbessa Hospital in the capital. This unit (poorly equipped) has been functioning as a neonatal admission unit mainly for neonates delivered in the same hospital and occasionally for neonates referred from hospitals and health centres in the capital. With the support of the International Fund for Africa, two more NICUs (at Yekatit 12 and Ghandi Memorial Hospitals) were established in Addis in the last five years. It should also be noted that 4 university hospitals outside the capital (Mekele, Gondar, Hawassa and Jimma) have also established NICUs. However, their capacity to provide intensive neonatal care is very limited because of lack of essential medical equipment and neonatologist. There are also few public hospitals which have recently established NICUs (Debreberhan, Bishoftu and probably some more). And, the majority of the public hospitals have not yet established NICU. The question is, however, do we really need these high-tech NICU established hospitals to save the lives of the vast most newborn death in Ethiopia.

In this study, asphyxia, neonatal sepsis/infection and prematurity found to be the top three causes of newborn deaths (76 percent of newborn deaths). Most of these deaths are the result of home death without any help or delays to get appropriate treatment. Lower coverage of SBA correlates with higher neonatal mortality, with 77% of neonatal deaths occurring in countries where coverage of SBA is 50% or less. Simple treatments such as cleansing of the umbilical cord and promotion of immediate breastfeeding can prevent a significant portion of neonatal infections. Providing birth attendants with basic training and equipment (bag and mask) for neonatal resuscitation is a low-tech, low-cost opportunity for reducing intrapartum-related neonatal deaths. When approached together and incorporated into integrated programs, these interventions could save millions of lives at a lower cost than separate initiatives (Lassi, Majeed, Rashid, Yakoob & Bhutt 2013:3-53; Kerber et al 2007:1358-1369; Sines et al 2006:1-7). According to the UNICEF 2009 report (UNICEF 2009:118), every year more than 120,000 children die during the first month of life in Ethiopia; of these deaths, asphyxia alone, for instance, contributes to more than 23%. The argument is that a significant proportion of asphyxia related mortalities can be prevented by having a neonatal care services with basic equipment and trained health personnel, in the community.

In fact, taking the big neonatal service gap into account, the Ethiopian Federal Ministry of Health (FMOH) in collaboration with UNICEF and WHO has launched a Newborn Corner Initiative in 2009 that aims to curb the tragic situation with regard to neonatal health. The newborn corners were planned to be established in the health centres across the country. As a result, it was envisaged that this initiative will address gaps in preventing newborn morbidity and mortality in the country thereby ensuring standard newborn care immediately after birth in health facilities. So far, the progress in all regional states was reported as going well in terms of availing the minimum required equipment and supplies to make the newborn corners functional. However, most, if not all, of neonatal death toll as well as maternal mortalities are coming from home delivery; and, there is no clear strategies to ensure access to these neonatal service. Therefore, in addition to establishing newborn corners and NICU in public health facilities, a community midwife strategies with basic in-service trainings such as newborn resuscitation, infection prevention and kangaroo care should run in parallel with the establishment of NICUs.

In conclusion, the life-saving activity of most of the neonatal and maternal care cases may not necessary need physicians and hospitals or any facility setups which is actually in extremely very low proportion to the population ratios and lower than most of African countries. Beyond the number, the available hospitals were not well functional in terms of treating some of the common causes of maternal and perinatal mortality. For instance, sustainable water supply to ensure ordinary infection prevention is a major issue in most of the health facilities in Ethiopia. The cumulative effect has probably contributed to the high maternal and perinatal mortality in the last three decades in Ethiopia. Water supply appears to be more guaranteed at home. Electric supply, transport, cultural issues, etc. can easily be addressed through community midwife strategy with effective referral when needed. The government of Ethiopia needs to give due emphasis to meet the maternal and newborn health service needed by the community for the community. Availing essential services in a large scale (like infection prevention, PPH prevention, neonatal resuscitation and magnesium sulphate) should be given special emphasis.

Furthermore, many stillbirths and newborn deaths could be averted if more women were in good health, well-nourished, and received quality (life-saving) care during

pregnancy, labour and delivery, and if both mother and newborn received appropriate care in the postpartum period (Darmstadt et al 2005:977-988; Tinker 1997:15-20). Health policies and programs in the fields of maternal, newborn, and child health have generally focused on one issue alone. Targeting interventions to only one of these groups will obscure important linkages. For example, antenatal care and skilled birth attendance (SBA) not only address the three major causes of maternal mortality (bleeding, hypertensive diseases and infections), but also the three main causes of neonatal death (infections, complications arising from preterm birth and intrapartum-related neonatal deaths).

4.5 CONCLUSION

In this chapter, the views of the respondents on the determining factors which may cause maternal mortality and newborn deaths in the selected regional states and hospitals were analysed, presented, interpreted and discussed. Data were collected through confidential inquiry to investigate what happened in the health facility through the interview of health care provider; review of health records; and, verbal autopsy (VA) at the community or family level. To make an in-depth investigation and analysis of events surrounding each maternal mortality and newborn deaths case the 'path-to-death' notion was followed. People well knowledgeable about the deaths such as caregivers and next of kin were interviewed.

In order to give clear depiction of the data collection milieu, account of case identification process were also presented as part of the findings. Then, the findings, the interpretations and the discussions are concurrently organised in relation to the instruments used to collect data that were designed for the study (Appendices VI and VII) and related taxonomy forms (Appendices VIII). A broad aspect of factors that may contribute to the maternal mortality and newborn death were thoroughly dealt with. These demographic and socio-economic attributes, prenatal events, events during labour, delivery information, postnatal events, death information and finally potentially avoidable factors were identified.

Thus, from this information, conclusions and recommendations could be formulated as presented in the following chapter – Chapter 5.

CHAPTER 5

CONCEPT ANALYSIS

"Just as a concept becomes a unit when integrated with others into a wider concept, so a genus becomes a single unit, a species, when integrated with others into a wider genus."

Ayn Rand 1986

5.1 INTRODUCTION

Anchored in the reviewed literatures (chapter 2) and followed methodologies (chapter 3), chapter 4 presented analysis and interpretation of the testimonies and experiences of survived newborn mothers, family members of the deceased mothers, traditional birth attendants, health workers, etc. These empirical perspectives of the study laid the foundation for this chapter and led to the syntheses and identification of the core theme known as community-based care. As main part of this chapter, using Walker and Avant (2005:28) method, concept analysis of community-based care will be conducted in order to analyse and generate descriptions, definitions and to further explore the meaning of this concept in the context of preventing maternal mortality and newborn death. The concept analysis together with the empirical perspectives of the study and six aspects of Dickoff et al (1968:422) facilitated the development of a model for community-based prevention of maternal mortality and newborn death in Ethiopia.

5.2 CONCEPT ANALYSIS

Using the framework described by Walker and Avant (2005:28), Rodger and Knafli (2000:78), Chinn and Kramer (2008:192) and Wilson (1969:8) the researcher explicate the meaning of community-based care, identify the attributes and characteristics as well as its theoretical and practical application in preventing maternal mortality and newborn death. The aim of this analysis was to clarify the meaning of the concept 'community-based care' in order to be able to develop a community-based model to prevent the unacceptably high maternal mortality and newborn death in Ethiopia. Attempts were made to appropriately follow Wilson's (1969:8) 13-step procedure and Walker and

Avant (1995:40) 8-steps of concept analysis framework. In view of that, the following steps have been adapted:

- VIII. Select a concept
- IX. Determine the aims or purposes of analysis
- X. Identify all uses of concept that can be discovered
- XI. Determine the defining attributes
- XII. Identify cases studies: a model case, borderline cases, related cases, invented cases and illegitimate cases
- XIII. Identify antecedents and consequences
- XIV. Define empirical referents

5.2.1 Selecting concept of interest, relevance, importance and usefulness

The model starts with selecting a concept to be analysed. 'Community-based care' was selected as a core concept in this study because it was found to be the central idea or theme and all the other idea are related to it. This was described during literature review (chapter two). There are three types of questions entailed in concept selection, such as question of fact, value and of concept (Walker & Avant 1995:40). The present study focuses on the question of concept in order to identify the implications of the concept identified.

5.2.2 Why the concept analysis? – aims or purposes

The aims or purposes of concept analysis could be to distinguish between ordinary and scientific usage of the same concept, to clarify meaning of an existing concept, to add to existing theory, to develop an operational definition, or something similar (Walker & Avant 1995:40). Besides, concepts get meaning within a particular context. Wilson (1969:33) recommend that the analyst need to check who might use the concept such as the when, how and why as a way of identifying the context within which the concept may be used. 'Community-based care' has different interpretations in different context both globally and at national level. This means that the concept "Community-based care" can be used in a variety of settings. It is therefore important in this study to clarify the meaning of community-based care within the context of preventing maternal mortality and newborn death. In this study, thus, the concept community-based care

was drawn to clarify and describe the meaning of community-based care; to develop a theoretical definition of the concept Community-based care that have dictated the data collection process and the development and description of a community-based maternal and newborn care model for preventing maternal mortality and newborn death in Ethiopia; to discuss and interpret the results for concept analysis that would assist in developing and describing the model for preventing maternal mortality and newborn death in Ethiopia; and, the meaning of the concept clarified the basic elements, structure and functions of the concept 'Community-based care' (Chinn & Kramer 2008:192; Walker & Avant 2005:66).

5.2.3 Identify uses, characteristics or connotations of the concept

As the third step, Walker and Avant (1995:40) emphasise that it is important to identify all uses of the concept when collecting material for the analysis. Hereby, they actually refer to all uses of the term, i.e. the concept description. They state that because concepts are expressed by a word or a term in language, an analysis of a concept must, perforce, be an analysis of the descriptive word and its use (Walker & Avant 1995:38). To them, concept analysis is thus ultimately a careful examination and description of a word or a term and its uses in the language coupled with the explanation of how it is 'like' and 'not like' other related words. Thus, in order to accomplish the identification of the uses, characteristics and/or connotations of the concept, dictionaries, impression of colleagues and available literature on the subject is examined.

Dictionary definitions are authentic because they convey accepted ways in which words are used. This in turn can be useful in defining the scope of any subsequent analysis of the literatures. *Cambridge Advanced Learner's Dictionary* (2013, sv. "community-based") defined the term '**community-based**' as a term used to describe an activity that is organised and take place locally. *Oxford Dictionary of English* (2010, sv. "community-based") on the other hand defined it as "focused on or relating to a community". But more fittingly, *Webster's New World College Dictionary* (2014, sv. "community-based health") defined the phrase '**community-based health**' as care for all people who need health care assistance in their homes. According to this definition, an example of **community-based health care** is a visiting nurse who helps a patient in a wheel chair with bathing.

Generally, the concept of **community-based care** is ill-defined in dictionaries, however, *Medical Dictionary for the Health Professionals and Nursing* (2012:112); perhaps best defined, "**community-based care/practice**" as the provision of skilled therapy services within a client's own home or community, with the requirement that the therapist take into consideration the lifestyle of the client and the cultural and social characteristics of the client's community. The dictionary further explained that typically such a care or practice provides expert knowledge that is not otherwise availed to the client and ends when the needs calling it into existence have been met.

The term **community-based** has a wide range of meanings. The present study focus on four categories of community-based care implicit constructions: community as setting, community as target, community as agent, and community as resource.

As indicated by some of the studies reviewed by Merzel and D'Afflitti (2003:557-574), the term community-based care often refers to community as the setting for interventions. As setting, the community is primarily defined geographically and is the location in which interventions are implemented. Such interventions may be citywide, using mass media or other approaches, or may take place within community institutions, such as neighborhoods, schools, churches, work sites, voluntary agencies, or other organizations. Various levels of intervention may be employed, including educational or other strategies that involve individuals, families, social networks, organisations, and public policy. These community-based care or interventions may also engage community input through advisory committees or community coalitions that assist in tailoring interventions to specific target groups or to adapt programs to community characteristics. However, the focus of these community-based care is primarily on changing individuals' behaviors as a method for reducing the population's risk of disease. As a result, the target of change may be populations, but *population change* is defined as the aggregate of individual changes.

The term community-based care may also have a very different meaning, that of the community serving as the target of change. The community as target refers to the goal of creating healthy community environments through broad systemic changes in public policy and community-wide institutions and services. In this model, health status characteristics of the community are the targets of interventions, and community

changes, particularly changes thought to be related to health, are the desired outcomes. Several significant public health initiatives have adopted this model. For example, community indicators projects use data as a catalytic tool to go beyond using individual behaviors as primary outcomes (Coulton 1995:173-200). Indicators can range from the number of days exceeding environmental protection agency standards for air quality to the amount of park and recreation facility space per capita to the proportion of residents living below poverty levels (The Community Indicators Handbook 1997). Strategies are tied to selected indicators, and success is defined as improvement in the indicators over time.

A third model of “community-based care” is community as resource. This model is commonly applied in community-based health promotion because of the widely endorsed belief that a high degree of community ownership and participation is essential for sustained success in population-level health outcomes. These programs are aimed at marshaling a community’s internal resources or assets, often across community sectors, to strategically focus their attention on a selected set of priority health-related strategies. Whether a categorical health issue is predetermined or whether the community selects, perhaps within certain parameters, its own priorities, these kinds of interventions involve external resources and some degree of actors external to the community that aim to achieve health outcomes by working through a wide array of community institutions and resources. Examples of major public health initiatives that have applied this model include “healthy cities” initiatives within several states (Duhl & Lee 2000:107-295).

Finally, a fourth model of “community-based,” and the one least utilized in public health, is community as agent. Although closely linked to the model just described, the emphasis in this model is on respecting and reinforcing the natural adaptive, supportive, and developmental capacities of communities. In the language of Steckler, Israel, Dawson and Eng (1993:1-153), communities provide resources for meeting our day-to-day needs. These resources are provided through community institutions including families, informal social networks, neighborhoods, schools, the workplace, businesses, voluntary agencies, and political structures. These naturally occurring units of solution meet the needs of many, if not most, community members without the benefit of direct professional intervention. However, communities are defined as much by whom they

exclude as whom they include, and the network of relationships that defines communities may be under stress.

The goal of community-based programs in this model is to carefully work with these naturally occurring units of solution as our units of practice, or where and how we choose to intervene. This necessitates a careful assessment of community structures and processes, in advance, of any intervention. It also requires an insider's understanding of the community to identify and work with these naturally occurring units of solution to address community problems. Thus, the aim is to strengthen these units of solution to better meet the needs of community members. This approach may include strengthening community through neighborhood organisations and network linkages, including informal social networks, ties between individuals and the organisations that serve them, and connections among community organisations to strengthen their ability to collaborate. The model also necessitates addressing issues of common concern for the community, many or most of which are not directly health issues. In other words, this model necessitates starting where people are (Nyswander 1956:65-70).

The importance of these models of community-based interventions is that they reflect different conceptions of the nature of community, the role of public health in addressing community problems, and the relevance of different outcomes. When they are presented as pure types, it is understood that no one model is used exclusively with the practice of community-based health promotion. Although community as setting is obviously limited in its vision, community as agent can be regarded as romanticised, especially in light of the severe structural economic, social, and political deficits plaguing some communities. Moreover, Merzel and D'Afflitti (2003:557-574) illustrate the difficulties in summarising across program models with different strategies and expected outcomes. Although many of the earlier projects reviewed by Merzel and D'Afflitti (2003:557-574) were based on the idea of community as setting, many of the later projects are based on one of the other 3 models. The latter 3 models – community as target, community as resource, and community as agent – suggest that appropriate outcomes may not just be changes in individual behaviors but may also include changes in community capacity (Goodman, Speers, McLeroy, Fawcett, Kegler, Parker, Smith, Sterling & Wallerstein 1998:258-278; Norton, McLeroy, Burdine, Felix & Dorsey 2002:194-227). In fact, it may be argued that contemporary public health has 2 broad

goals: strengthening the health of our communities and building community capacity to address health-related issues.

5.2.4 Determine the defining attributes

Both Walker and Avant (2005:68) and Chinn and Kramer (2008:194) regard the fourth step as the "heart of concept analysis", i.e. determining the defining attributes or defining characteristics of the concept. When the analyst has identified all the different usages of the concept on various fields, the next step is to read through them to find characteristics that appear over and over again. The result of this activity is "a cluster of attributes that are the most frequently associated with the concept". Here again it must be noted that this is throughout a semasiological analysis process and with "concept" they actually mean the expression and its different meanings.

In the process of deterring the defining attributes of the concept community-based care in the context of preventing maternal mortality and newborn death in Ethiopia, the researcher made notes of the characteristics of the concept that appeared repeatedly. It enabled the researcher to name the occurrence of a specific phenomenon as differentiated from another similar or related one (Chinn & Kramer 2008:194; Walker & Avant 2005:68). According to Walker and Avant (2005), defining attributes, similar to signs and symptoms, are critical characteristics that help to differentiate one concept from another related concept and clarify its meaning. Three essential and defining attributes or characteristics have been identified for the concept Community-based care in the context of preventing maternal mortality and newborn death: -

5.2.4.1 Provision of home and/or community level skilled care

Provision of home and/or community level skilled care, i.e. interventions are available where and when they are most needed to significantly save lives;

5.2.4.2 Linking household, communities and facilities

Some (few) obstetric and neonatal complications cannot be prevented merely at home. Women and their infants must receive lifesaving care as soon as the complication happens, during referral and at appropriately equipped health facilities. These linkages

must be established and then maintained, evaluated, and redesigned over time and the situation changes.

5.2.4.3 Community participation and mobilisation

Community members assess their own health needs and develop and monitor their own solutions to identified problems.

Community-based care in the milieu of preventing maternal mortality and newborn death is, thus, defined as a home and/or community level skilled care with linkage to health facilities to avoid all forms of delays, and by the community, for the community.

5.2.5 Identify cases

As the fifth step, Walker and Avant (1995:42) advise the concept analyst to develop one or more model cases that represent a "real life" example of "the use of the concept that includes all the critical attributes of the concept". Besides, as the sixth step Walker and Avant include in their model an examination of additional cases. These originate from Wilson's model (1969:28-32), and are divided into borderline, related, contrary, invented, and illegitimate cases. Walker and Avant point out that as "analysis cannot be completed until there are no overlapping attributes and no contradictions between the defining attributes and the model case". The purpose is to assist to decide which characteristics or attributes best fit for the concept of interest and what counts as defining attributes as well as which do not count – making thus the model case stronger. However, not all of these additional cases are necessarily included in individual concept studies.

In order to further develop the concept of community-based care, in the maternal mortality and newborn death prevention framework, three categories of cases are provided. While cases may be invented or found in the literature, the identified cases in this analysis are derived from the findings of the verbal autopsy during the study; actual examples in the researcher's many years of practical work experiences with maternal and newborn care programmes; and of course, real life case models documented in the literatures (Mannah, et al 2014:279; Rosato, Laverack, Grabman, Tripathy, Nair, Mwansambo, Azad, Morrison, Bhutta, Perry et al 2008:962-971). Abbreviations used to

identify each case are fictitious and are not based on the study participant's actual names given that verbal autopsy data was collected and categorised by participants' code. The model case demonstrates all of the defining attributes of the concept while the borderline case contain most but not all of them. This helps to more fully articulate the concept's meaning. The final contrary case is a clear example of what the concept is not (Walker & Avant 2005:68).

5.2.5.1 Model case and analysis

Sister R.S. is a 62-years old retired midwife, who served for more than 30 years as a midwife in a western province district-hospital of Ethiopia. Now, after retirement, she back to her remote community, where she was born-in and grown-up. Her childhood community only knew her as a nurse but not as a midwife. Within short time of stay in the community, R.S. wonder the huge number of easily reversible and preventable maternal mortalities and newborn deaths. On various community gatherings, she raised and sell her Hati-hindu'in⁵ project idea. Women in communities also identify their own problems, collect their own data and opt (choose) her as their own community maternal and newborn health worker with open community involvement. Among other things, the community set up village funds and established transport schemes enabling access to secondary care. R.S. link up the Hati-hindu'in project with the health facility nearby so that they will be able to assist her and the community with supplies and equipments like ANC card, delivery kits, stethoscopes, blood pressure machines and so on. The health facilities also support them with immunisation, free FP commodities and general supplies like gloves. R.S. carries her delivery kits and assesses the woman and if she sees there is no complication, she conduct the delivery at their home. She work and the pregnant woman's relatives and the TBA's are around to support her. She also ensures that the TBA's gets what they usually get after assisting deliveries. They (R.S. and her community) work as a team with the Government of Ethiopia health facilities and offices. R.S. let them know what they are doing here by reporting. She gives their Kebele's⁶ maternal and newborn care statistics every month. Contact numbers of key health personnel and ambulance drivers were also given to her for easy access during referrals. When R.S. refer somebody, she give them a certain referral form. And then

⁵ Hati-hindu'in literally mean mothers shouldn't die

⁶ Kebele is a small administrative unit in Ethiopia with a population of about 5,000.

the health facilities also give her feedback to help her know when the woman comes back to the community, or if this and that has been done. Although the government announces free maternal and newborn care at all health facilities, R.S. understand that reaching health facilities, deliver and back to community is not easy to most pregnant women in this remote community with significant delays. Besides, R.S. knows that the community only supports births at home especially for first births and places a lot of significance on where and how placentas are disposed. Some also feel delivering in the village offers them privacy in a way in this society. So they like somebody like R.S. going to deliver them in their homes. R.S., now, established a wired-mothers set-up and write her phone number on each pregnant women's ANC cards and on health post as well as health centres doors, reside in the area and the community knows her very well. She usually called for home delivery anytime and in her past five years of community-based MNC services, there were almost no maternal mortality and newborn death in her community.

This model case fully demonstrates all three attributes of community-based care: provision of home and/or community level skilled care; linking household, communities and facilities; and, community participation and mobilisation. Health care returns to the community with referral to the health centers or Hospitals only when necessary. The health worker is an insider who lives in the community; understand its traditions and provides effective health care at a fee or that most can afford. Community-based care at its best combines the finest feature. Good quality care is available in the community from a friendly provider at an affordable cost. A referral system ensures that those who need health centre or hospital care are able to receive it. Prevention of ill health becomes the dominant theme. Through partnership it enables communities to share their skills and resources to every ones benefit. Although it may seem that community-based care is the most appropriate model, there are many who wish to anchor the process at hospital-based or facility-based care.

5.2.5.2 Borderline cases and analysis

T.U. is a 28-years old health extension worker in a remote Kebele of a western province district health-post, where she was born-in and grown-up. The Health Extension Programme was developed by the Ethiopian government in response to recognition that necessary basic health services in general and maternal and newborn care in particular

were not reaching people at grass roots level as originally envisioned in the health sector development programme (HSDP). Two government-salaried health extension workers per Kebele, hence, deployed to extend primary health care to the rural poor. Kebele Councils with Woreda Councils recruit young locally resident women who have completed grade 10 and speak the local language to become Health Extension Workers (HEWs). Those selected are given one year didactic and practical training and upon completion of training, are employed by the Woreda (district) Health Office. T.U., thus, is one of these health extension workers and work very hard in her community implementing the prescribed reproductive health strategy of informational campaigns and mobilisation efforts through educating communities regarding danger signs during pregnancy and child birth; and, establishing community referral mechanisms in her own community. T.U. gets very exciting community participation and government support. The community also clearly understand her messages on only delivering at health facility, using the good opportunity the Ethiopian government officially announce on free maternal and newborn care. Nevertheless, nearly 90% of the community still gives birth at home, without skilled birth attendant, usually assisted by older women in the family and/or traditional birth attendants. She realise that pregnant women were not able to delivery in the facility for various reason but among others, delays in making decision to go to health facilities, delays in reaching the health facility and delays in receiving appropriate care after reaching health facility are prominent. As a result, despite her effort, there is no significant change on maternal mortality and newborn death in her own community.

T.U.'s story exemplifies a borderline case, where only two of the three attributes of community-based care are realised. T.U. has now established good linkage of household, communities and facilities which promote all women and their infants must receive lifesaving care at appropriately equipped health facilities. Besides, community participation and mobilisation appears great. However, provision of home and/or community level skilled care was not attempted at all. Skilled care is not available where and when the community most needed to significantly save lives. Health care take place in the hospital or health centres at the convenience of the doctor or the health care workers, which may be classified as "facility-based care". The health worker is an outsider with specialist and scientific knowledge who tends to direct and dominate the treatment of the patient. Although the facility-based care appears free, it often will demand high fees which the poor can't afford. Although often effective, this approach

may be frightening, inconvenient and expensive, the poor (the majority) may never use it at all.

5.2.5.3 *Contrary case and analysis*

V.W. is a 58-years old traditional birth attendant (TBA) in a remote western province district of Ethiopia; where she spent all her life. V.W. gain the traditional wisdom from her grandmother; and have been assisting deliveries in her communities since the age of 40. In her community, almost all pregnancy and the event surrounding it are generally viewed as feminine issues, exclusive for women and the outcome of pregnancies and their sequela in her community are purely left to her. The government has never trained nor support her and think that training traditional birth attendant is waste of resource. However, they still want to control her practice. Assisting birth, thus, is V.W.'s life and basis of her livelihoods. For V.W, life or death is all about luck, God given number of dates and out of her control. She always pray before assisting any delivery and she has very great respect and value in her community for her services.

This final case reflects an absence of the attributes of community-based care. Health care take place in the community, according to the wishes and convenience of the people and the patients but without the essential skilled attendant. Traditional birth attendants or senior family members such as grandmother are the traditional source of wisdom. In serious situations, other health workers may be called-in. These are usually community members using traditional skills or knowledge. Payment is made in cash or in kind. Usually, but not always, at a level which the pregnant women or her family can afford. This system has value when no better alternative exists and when people's expectations are low. Many remedies bring comfort and some are effective. Today, many rural societies of Ethiopia still function largely on this system.

5.2.6 Identify antecedents and consequences

The seventh step in Walker and Avant's model is to identify antecedents and consequences. They define these as those events or incidents that happened prior to, or as a result of the "occurrence of the concept" as they express it. There appears to be a contradiction here, because - as they themselves pointed out earlier "concept is a mental image of a phenomenon" and "not the thing or action" (Walker & Avant

1995:24). Yet, what they should be talking about here are the events or activities that the concepts "refer to". Examination of the antecedents and consequences of the community-based MNC allows further refinement of the critical attributes, thus facilitating the formulation of the criteria for community-based care.

5.2.6.1 Antecedents

According to Chinn and Kramer (2008:195) and Walker and Avant (2005:73), antecedents are those events or incidents that should occur prior to the occurrence of the concept. Antecedents assisted the researcher to identify underlying assumptions about the concept "community-based care". In this study, the researcher identified the following antecedents:

5.2.6.1.1 SBA deployment in own community

These SBAs are not just skilled but best suited to work at community level because they understand their local customs. The criteria for recruitment should also be that the SBAs must be residing in that community. They should also give their contact details to clients, establish a wired mother's network and write their cell phone numbers on their doors and on clients' cards. The key point is that they have to make themselves more accessible to their clients and reduce the cost of paying for a taxi, minibus or motorbike/bicycle.

5.2.6.1.2 Linkage with health facilities

The community SBAs should be linked to health facilities which will give support and supply the SBAs with some basic commodities and consumables. These facilities will also help the SBAs with autoclaving of equipment and instruments. Contact numbers of key health personnel and ambulance drivers should be given to the SBAs for easy access during referrals. In addition, the health facilities involve the SBAs in some district health activities.

5.2.6.1.3 Regular reporting and feedback

The SBAs work in collaboration with their linked government health facilities and send a monthly report of their activities to the district health team. They also get feedback from the health facilities about referrals made. This helped in the provision of continuum of care on discharge.

5.2.6.1.4 Support from governmental and non-governmental organisations (NGOs)

The SBAs should be supported by government and NGOs with initial supply of delivery kits, supplies and family planning commodities. If the community must have to pay, this should be given to the SBAs at subsidised or discount prices.

5.2.6.2 Consequences

Consequences are those events or incidents that can occur as a result of the occurrence of a concept and that can often stimulate new ideas or avenues for research pertaining to certain concepts. These are the outcomes of the concept. Consequences assist the researcher to determine often neglected ideas, variables or relationships that might yield fruitful new research directions (Chinn & Kramer 2008:195; Walker & Avant 2005:73). Possible consequences of the concept community-based MNC include: -

5.2.6.2.1 Number of deliveries assisted by skilled birth attendants will increase

The findings of the study will provide evidence to assist the government in achieving the target of 90% of deliveries assisted by skilled birth attendants and to develop effective strategies for the improvement of maternal and newborn health. It will also serve as a model for other countries with inadequate number of skilled birth attendants.

5.2.6.2.2 Achieving sustainable development goals

Global targets for human health, development, and poverty reduction to be achieved have now put maternal and newborn mortality and morbidity on all health agendas than ever before. It is every woman's and newborn's right to have safe pregnancy and safe

delivery. Home and community-based interventions are effective in contributing to achieving the goals of saving maternal and neonatal lives.

5.2.6.2.3 Interlinked or teamwork

Teamwork results from a group of individuals who see themselves and who are seen by others as a social entity, who are inter-dependent because of the tasks they perform as members of a group, are embedded in one or more larger social system and who perform tasks that affect others (Guzzo & Dickson 1996:308). Gaudes, Hamilton-Bogart, Marsh and Robinson (2007:84), also acknowledge that effective team members are able to work interdependently, supporting each other, displaying group cohesiveness and group reliance, respect and trusting relationship and sharing the responsibility for their outcomes. Teamwork has been described as a dynamic process and an action that involves two or more participants or healthcare professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental efforts in assessing, planning, implementing and evaluating patient care” (Stone & Bailey 2007:259). The skilled birth attendants (community midwives), health extension workers, family members, traditional birth attendants, health facilities and health offices will work as a team, having regular meetings to discuss achievements and challenges. The skilled birth attendants will focus on safe child birth process, and sharing other workloads such as ANC, PNC and community mobilisations, etc. with Health extension workers, family members and traditional birth attendants who are trained and knowledgeable in including early recognition of complications and referrals. In well-established community-based care all will work as a team, displaying teamwork skills which includes the ability to resolve team conflicts and give effective group performance (Stone & Bailey 2007:258).

5.2.6.2.4 Immuned and empowered community will be created

Livingstone (2008:220) described empowerment as to authorise, enable, allow, permit, license or qualify. Once the community-based maternal and newborn care system is in place, the traditional birth attendants and family members will gain new knowledge and skills on how to care for the patients during the antenatal, intra-partum and postnatal period, as a result they will become confident to work together with the registered midwives. On the other hand the community midwives will gain new knowledge on how

to provide culturally congruent care to improve the standard of maternal and newborn care.

The pregnant women might receive culturally harmonious care in a friendly environment, the family members and traditional birth attendants will be authorised, allowed, permitted and qualified to provide midwifery care and the community midwives will experience job satisfaction resulting in the provision of culturally sensitive care (Funnell & Anderson 2004:127).

5.2.7 Define empirical referents

As the last step of concept analysis model, Chinn and Kramer (2008:196) and Walker and Avant (2005:73) defined empirical referents as classes or categories of actual phenomena that by their existence demonstrate the occurrence of the concept itself. More specifically, the critical attributes and their empirical referents in the real world are brought together and this is useful in practice because they provide "the clinician with clear, observable phenomena by which to 'diagnose' the existence of the concept in particular clients", as Walker and Avant (1995:46) express it.

Identification and defining of empirical referents helped the researcher to develop a new model because they have been linked to the theoretical base of the concept. As a result, it contributed to both content and construct validity of the model for community-based maternal and newborn care (Chinn & Kramer 2008:196; Walker & Avant 2005:73). In this study, in chapter four, the empirical referents have been identified from the health care experiences of deceased and survived pregnant women and their newborn children, family members, traditional birth attendants and different levels of health workers as regards to maternal and newborn care practices in the community. Besides, the details of empirical referents for categories of the related phenomena have been identified and described on chapter two which includes:

- The Three Delay Model (Thaddeus & Maine 1994:1091-1110).
- UNICEF 2009 conceptual framework for prevention maternal and neonatal mortality and morbidity.
- Continuum of maternal, newborn, and child care (Kerber et al 2007:1358-1369).

- Review of more than 25 years safe motherhood initiative; based on the October 2007 anniversary of the safe motherhood initiative.
- Growing evidences for use of community-based interventions to reduce maternal mortality and newborn death which includes:
 - Community-based management of postpartum haemorrhage (El-Refaey et al 1996:1257; Gulmezoglu et al 2001:689-695).
 - Community-based participatory maternal and newborn research (Shy 1997:479-484).
 - Community-based interventions based on community participation (Manandha, et al 2004:970-979; Mesko et al 2003:3).
 - Community-based family planning (Fosu 2007:733-820; Stanback et al 2007:768-773).
 - Community-based treatment of perinatal sepsis (Sazawal & Black 2003:547-556; Manandhar et al 2004:970-979).
 - Collaboration with traditional birth attendants (Sibley & Sipe 2004:51-60; Costello et al 2004:1166-1168).

5.3 CONCLUSION

A theoretical definition on community-based care, within the context of maternal and newborn health was formulated, based on the method of concept analysis. Challenges in maternal and newborn health demand the use of community-based care in order to attain quality assurance in maternal and child care to improve practice and to restore and maintain the credibility of the services in the eyes of the consumers of health care. It will force skilled birth attendants (SBA) to more effective, efficient and to practice responsibly with accountability. It is recommended that an empirical concept analysis of community-based care be conducted. It is also recommended that a community-based care model to avert maternal mortality and newborn death be developed based on these results of concept analysis.

CHAPTER 6

COMMUNITY-BASED MODEL FOR AVERTING MATERNAL MORTALITY AND NEWBORN DEATH IN ETHIOPIA

"You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete."

Buckminster Fuller; Good reads 2015

6.1 INTRODUCTION

The empirical findings of the study have identified factors which have limited access to maternal and newborn care for those who need it most. These factors includes long distances, financial constraints, poor communication and transport, weak referral links, and at times, low-quality care in health facilities and the like. An effective, convenient and affordable maternal and newborn health care service provision approach is needed to improve/ ensure survival. This should not just only focus on health facilities but give due emphasis to homes where more than 90% of deliveries as well as maternal and newborn fatalities are taking place. The purpose of the model, thus, was to increase women's access to skilled care during pregnancy, childbirth and post-partum within their communities so as to prevent the unjustified maternal mortality and newborn death in Ethiopia.

The development and description of a community-based maternal and newborn care model for preventing maternal mortality and newborn death in Ethiopia, based on the findings from empirical perspectives of the study as conceptualised following the six aspects of activity by Dickoff et al (1968:422):

6.2 AGENCY: WHO OR WHAT PERFORMS THE ACTIVITY?

The first aspect, an agent, is described by Dickoff et al (1968:425) as a person who performs an activity towards realisation of a goal. In this study, three set of agents who perform the activity, simultaneously or separately, towards prevention of maternal mortality and newborn death, in three different places are identified. These three groups of agents are mainly based on the physical location where maternal and newborn care

is provided, but not necessary refers to the level of care, skill and/or intensity of service delivery. However, en route for the purpose of the model, agents at home/community are the most important or crucial agent than the two others as the home/community agents are assumed to deliver services for about 90% of those who need it and act as centre of the presented community-based maternal and newborn care model. The three group of agents are: (i) Agents at home/community such as community midwife, health extension workers, family members and traditional birth attendants (ii) Agents during transportation such as a health worker who escort the pregnant women, ambulance drivers, community members, taxi drivers, etc. (iii) Agent at the health facilities such as midwives at health facilities, doctors, health officers, nurses, etc.

6.2.1 Agents at home/community

These are the primary agents at home and/or the community. Community midwives (CMs) and health extension workers (HEWs) are the prime agents who presumably address more than 90% of maternal and newborn cases. The community midwife ideally could be retired midwives or maternity-nurses but can also be young and unemployed or self-employed midwives, with a lot of clinical experience and are willing to work for their communities. Young graduates are obviously better than working with traditional birth attendants (TBAs) as young CMs also knew exactly what to do and when to refer complications but also must understand the culture, ideally to the extent of the traditional birth attendants. The Health Extension workers, on the other hand, are an already established structure, which was developed in response to recognition that necessary basic health services were not reaching people at grass roots level as originally envisioned in the health sector development programme (HSDP). The Ethiopian government initiated the Health Extension Program in 2003 as part of the Health Sector Development Program (HSDP) to improve equitable access to preventive, promotive and select curative health interventions through paid community level health extension workers (Koblinsky, Tain, Gaym, Karim, Carnell & Tesfaye 2010:105-109). However, achieving the set targets is a daunting task despite reaching the physical targets of two health extension workers per Kebele. Hence, adapting their terms of activities, aligning health extension workers with the community midwife will bring the intended goal. Besides, different kinds of community members such as, Traditional birth attendants (TBAs), family members, neighbours provides and support the maternal and newborn care process in various ways which may range from linking

pregnant women to the skilled care provider in the community/home (community midwife), preparing nutritious traditional food during pregnancy and after delivery, traditional and non-harmful practice during delivery, etc.

6.2.2 Agents during transportation

In the present community-based maternal and newborn care model, skilled maternal and newborn care fused to the community in accordance to the wishes and convenience of the people and the pregnant women; and yet, with timely referral to the clinic or hospitals only when necessary for the very few complicated cases which may need special facility and skills. The community-based maternal and newborn care, thus, must ensure that those who need health centre or hospital care are able to receive it – prevention of risky maternal and newborn state becomes the dominant theme. Hence, individuals – agents – who support during transport includes health workers who escort the pregnant women (could be the community midwife), ambulance drivers, local taxi/cart driver, relatives and/or neighbourhoods in case of shouldering the pregnant women. These are peoples who in one way or the other play role to prevent maternal mortality and newborn deaths in the community.

6.2.3 Agent at the health facilities

In the coined community-based maternal and newborn care model, health facilities are reasonably not primary place for maternal and newborn care. In other words, for 90% of the community, maternal and newborn health care returns to the community with just referral to the clinic or Hospitals only when necessary. However, a referral system ensures that those who need clinic or hospital care are able to receive it. Thus, health workers such as midwives, doctors, health officers, nurses, etc. who provide support at Health facility are the other group of agents. Facility (clinical) care, thus, consists of individuals who are oriented in case management of mothers and newborn babies with complications, which are typically provided through facility-based care at primary and referral sites. These services, such as emergency obstetric care, are the most challenging and costly to provide, but also have the highest potential to save lives. Clinical care should therefore be available for 24h per day, and providers must be adequately trained, equipped, and supervised. Above and beyond, normal childbirth also demands skilled clinical case management and continuous availability of health-

care professionals. Most importantly, as long as it is correctly set-up and adequately supervised, a good alignment of the community midwives and the health extension workers can offer home or community-based ante-partum, intra-partum and post-partum services, family planning counselling and services, HIV testing, health education and management of minor ailments which may respond to 90% of the communities quest.

6.3 RECIPIENT: WHO AND WHAT IS THE RECIPIENT OF THE ACTIVITY?

Recipient (patient), as the second aspect, relates to those who receive services or supports from the activity of an agent. In this study the recipients are pregnant women and neonates in Ethiopia as they receive care before, during and after delivery from several members of the community mentioned above such as community midwife, health extension workers, traditional birth attendants (TBAs), family members, neighbours who provide support at home; health workers such as midwives, nurses, doctors, health officers who provide support at Health facility; and, individuals who support during transport such as community health workers, ambulance drivers, local taxi/cart driver, relatives and neighbourhoods during the postnatal period.

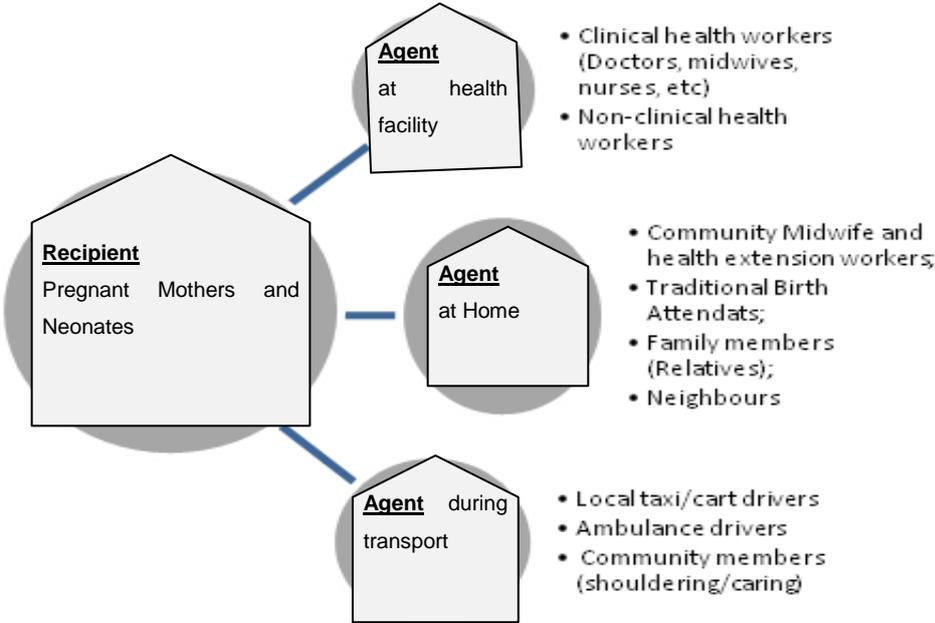


Figure 6.1: Agent and recipient of the maternal and newborn care

6.4 CONTEXT: IN WHAT CONTEXT IS THE ACTIVITY PERFORMED?

An activity is produced within the third aspect, *the context*, by the agent and received by the patient. In this study, three context in which effective prevention of maternal mortality and newborn death practices are identified. Namely: Home and/or in the community; en route to health facility; and, health facility context. Generally and currently, there a global and national movement of ensuring facility-based maternal and newborn care. Although, most of the health programmes are designed with a basic claim of "community-based" maternal and newborn care; practically, they are health facility-based. Despite different culture and set-up, the Ethiopian government community-based maternal and newborn care also appears to adopt this global strategy (MoH 2015a:4-29). With the current "Only facility based deliver" policy of the Ethiopian government, will "no woman should die while giving life" actually be achieved? An effective maternal and newborn health service provision context is needed to facilitate the transition between maternal and newborn care, preventive and curative to improve/ensure survival. This should not just only focus on health facilities context but give due emphasis to homes (traditional) context. In a country where the vast majority of delivery (nearly 90%) took place at home (CSA 2011:126, CSA 2014:45), outside the formal health sector, and very few are attended by qualified and skilled attendants; the maternal and newborn care context should returns to the community with referral to the clinic or Hospitals only when necessary.

6.4.1 Home and/or community context

In the presented model, household and/or the community-based care is the governing theme. Most of the essential maternal and newborn care such as ante-partum, intra-partum and post-partum services, family planning counselling and services, HIV testing, health education and management of minor ailments take place in the village/community, according to the wishes and convenience of the community. The health worker usually a community midwife or maternity-nurse (skilled birth attendant) is an insider who lives in the community; understand its traditions and provides effective maternal and newborn care at a fee that most or all can afford. The home/community context care is believed at its best combines the finest feature of Traditional/home-based and facility-based (modern) care. Good quality maternal and newborn care will be available in the community from a friendly provider at an affordable cost. A referral

system ensures that those who need clinic or hospital care are able to receive it. Prevention of maternal mortality and newborn death becomes the dominant theme. Although it may seem that community-based skilled maternal and newborn care is the most appropriate model, there are many who wish to anchor the process at facility-based care. The community midwives, with the support from the health extension workers, are the skilled source of wisdom. In serious situations, timely and efficient referral linkages established. These are usually community midwives providing culturally acceptable skilled interventions. Government can establish the financing system or community payments can be made in cash or in kind, at a level which the family members or the pregnant women can afford. The delivery processes gives comfort to the pregnant women and the family member and most importantly skilled and effective.

Health care returns to the community with referral to the clinic or hospitals only when necessary. The health worker usually a community midwife or health worker is an insider who lives in the community; understand its traditions and provides effective maternal and newborn care at a fee that most can afford. Community-based maternal and newborn care is believed at its best combines the finest feature of traditional/home-based and facility-based (modern) care. Good quality maternal and newborn care will be available in the community from a friendly provider at an affordable cost. A referral system ensures that those who need clinic or hospital care are able to receive it. Prevention of maternal mortality and newborn death becomes the dominant theme. Although it may seem that community-based skilled maternal and newborn care is the most appropriate model, there are many who wish to anchor the process at facility-based care. Will sustainable development goals for maternal and child health actually be achieved? Will community-based maternal and newborn care ever become the norm? This will depend on many factors specially how effective and sustainable Community-based maternal and newborn health Care programmes prove to be. Each successful program, however small, helps to tilt the balance in favour of community-based maternal and newborn care context.

6.4.2 During transportation context

In the present study, community-based maternal and newborn health care refers to where health care returns to the community with referral to the clinic or Hospitals only

when necessary. Now, if the referral of the pregnant women, the mother or the newborn baby to clinic or hospital is a necessity, they must be escorted appropriately. Anything can happen during transportation. So, a health worker usually a community midwife or a health worker preferably who is an insider who lives in the community; understand the traditions and can provides effective maternal and newborn care should ideally escort the pregnant women, the complicated women or the newborn baby to the health facilities. Besides, escorting by family or community members is important sources of support and comfort. On top of providing psychological support, in most remote part of Ethiopia, it will also ensure security as a trusted male, particularly, can accompany them for night-time deliveries (travel) and negotiate aspects of transport of facility or births in catchment area. This will have clinical implication for blood donation and enhance male involvement in maternal and newborn care. Ambulance and/or taxi drivers should be also oriented with the kind and level of care and support given to a pregnant women.

6.4.3 Health facility (clinical) context

In the bestowed community-based maternal and newborn care, as much as possible all deliveries are going to be assisted by skilled birth attendants at home and/or in their own community/village. Obviously, the maternal and newborn care take place in the hospital or clinic are generally made at the convenience of the doctor, midwife or other health care workers. The health worker is also an outsider with specialist and scientific knowledge who tends to direct and dominate the treatment of the patient. What's more, very often, access to this health care will demand high fees which the poor can't afford. Although often effective, this approach may be frightening, inconvenient and expensive. The poor may never use it at all. The home and/or community context maternal and newborn care, however, may not always find normal deliveries and some maternal and newborn cases are complicated which need specialised skills and equipment. Thus, the home and/or community care should be linked with health facilities at different levels. Contact number of key health personnel and ambulance drivers should be given to the community midwife or community health worker.

As it is depicted in the following figure (figure 6.2.), and in the presented community-based maternal and newborn care, most of the maternal and newborn care (about 90%)

will take place in the community or at home context, and health facility context and during transportations are also inevitable events.

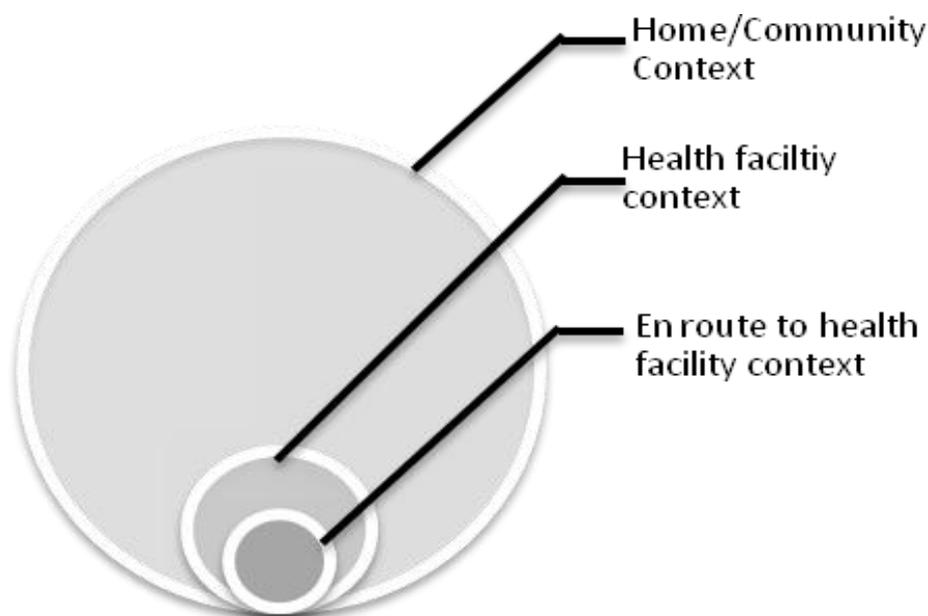


Figure 6.2: The level and context in which prevention of maternal mortality and newborn death should be practiced

6.5 PROCEDURE: WHAT IS THE GUIDING PROCEDURE, TECHNIQUE OR PROTOCOL OF THE ACTIVITY?

The fifth aspect, *the guiding procedure, technique, or protocol of the activity* involves several interlinked steps. These may include stakeholders consultative workshops, trainings, awareness campaigns, performance based incentives for traditional birth attendants and family members; team building and meetings between the family members, traditional birth attendants and the health workers (community midwives) to discuss their concerns, challenges and recommendations. The procedure should encourage community participation and involvement in the prevention of maternal mortality and newborn death and ensure protection and safety of pregnant women during the delivery period. A plan should also be designed which will address the process to be followed during implementation of the new way of community-based maternal and newborn service delivery. Figure 6.3 displays the procedures and protocols that revolve around during the use of the model.



Figure 6.3: Procedures and protocols that revolve around during the use of the model

6.5.1 Stakeholders consultative workshops

The first of the guiding procedure activities should be stakeholders consultative workshops on the new community-based maternal and newborn care model. Stakeholders' such as Ministry of Health, Ministry of women and Child Affair, Ethiopian midwifery associations, midwifery and/or nursing training institutions, Community leaders, and the like, consultation and consensus building workshop should be carried-out at various level (national, regional, district and community levels), targeting three sequential subjects: firstly, review maternal and newborn health status in Ethiopia; capitalising on the on-going and previous efforts to extend maternal and newborn services to home and community, specifically the health extension programme (HEP); secondly, review the key barriers and/or facilitators to use of maternal and newborn care services; with special attention to the findings of the three ever conducted national demographic and health survey that highlights money required for treatment; no female health provider; lack of transport (distance to a health facility and not wanting to go alone); attitudes towards provider; and no one to complete household chores; and finally or thirdly, the need of developing an applicable framework/model to improve maternal/newborn health status through community/home based maternal and newborn care model.

Currently, traditional maternal and newborn care is the first choice for about 90% of Ethiopian pregnant women and it is only about 10% that have some level of access to skilled birth attendants. There has been much talk from health workers about women dying in childbirth because in their opinion those women did not come to a health facility. It is high time to acknowledge the large proportion of women who die despite reaching a health facility for care. This is partly or mainly due to "delays" and in most instances the services that should save the life of those women with complication are not available or accessible or even if available it will be in a poor quality or standards. In other words the effectiveness and efficiency of the health system in addressing the health care needs of women with obstetrical complication is questionable. On the other hand, there is a clear global strategy on the importance of all pregnant women should have access to a skilled birth attendant who is able to manage normal delivery and who can recognise and manage obstetric complications, or refer on time if needed (Gabrysch & Campbell 2009:34; Lawn, Cousens & Zupan 2005:891-900; WHO 1999b:6-40). And more precisely, the World Bank publicised that if all births are attended by a Skilled Birth Attendant with access to a quality referral facility, 74% of maternal deaths and 63% of newborn deaths and disabilities could be averted (Wagstaff & Cleason 2004:12). But what does "all birth attended by skilled birth attendants" may refer to? Is this exclusively mean "all deliveries at health facilities context"?

The consultation and consensus formation workshops should address the convenience, affordability and effectiveness aspects, which was magnified during the empirical findings of this study. The "all deliveries at health facility" approach obviously assumes to give effective care in the hospitals or health centres (clinics) context. In this approach, the care takes place at the health facilities at the convenience of the health workers. The health workers are usually an outsiders with scientific knowledge who tends to direct and dominate the maternal and newborn care. Although often appears or assumed to be effective, this approach attested to be frightening, inconvenient and expensive to most Ethiopian pregnant mothers and their families. Most importantly, the vast Ethiopian poor may never use it at all. All existing evidences shows that almost all (nearly 90%) Ethiopians rely on the traditional maternal and newborn care context. The key quality of this (traditional) approach may include that the care takes place in the community, according to the wishes and convenience of the pregnant women and

her families and/or her people. Senior family members such as mother-in-law, grandmothers or older women are the traditional source of wisdom. In serious situations, other health workers may be called in. These are usually community members using traditional skills or knowledge. In all regional states, ethnic groups and districts; the Ethiopian communities have their own traditional birth attendants or practitioners. Payment is made in cash or in kind, usually but not always at a level which the pregnant woman or her family can afford. This approach appears to be continued as the Ethiopian people first choice, if we and/or the Ethiopian government may not be able to come with improved alternative. In this approach, many remedies bring comfort, but its level of effectiveness is obviously questionable. Thus, its barrier and facilitation effect should be part of the consultative workshop. Today, almost all rural Ethiopian societies still function largely on this maternal and newborn care approach.

Practically, with the basic understanding of the socio-cultural, geographic and economic situation of Ethiopia; moving a skilled birth attendant to the home of pregnant woman seems very handy than moving a pregnant woman to health facility. This may also warrant convenience for the entire community, in terms of affordability and effectiveness (good quality), too. In the presented community-based maternal and newborn care, the maternal and newborn care skilled provider (a community midwife) is an insider, who lives in the community, understands its traditions and provides the finest features of the health facility (contemporary) context and traditional care (at home) context. This may ensure availability of good quality of care, from a friendly provider at an affordable cost. Furthermore, home-based referral system ensures that those who need health centre or hospital care are able to receive it. Prevention of risky maternal and newborn state becomes the dominant theme. Although it may seem that this community/home-based care is the most appropriate model, there are many who wish to anchor the process at only facility based care context. Thus, the consultation of the workshop must have to be followed with clear consensus building. Indeed, WHO's model of health systems includes the community as a key component (Smith & Ovenden 2007:1-42; WHO 2008b:110). And gradually, strong community (home) services promote demand for skilled care at health facilities.

Table 6.1: Summary (matrix) of key inputs for the maternal and newborn care workshop/seminar in Ethiopia

	Traditional MNC approach	Health Facility MNC approach	Home/community MNC approach
Convenience	<ul style="list-style-type: none"> • Convenient • In the community 	<ul style="list-style-type: none"> • Inconvenient • In hospital/clinic 	<ul style="list-style-type: none"> • Convenient • In the Community + referral
Affordability	<ul style="list-style-type: none"> • Affordable • In cash or in kind 	<ul style="list-style-type: none"> • Expensive • High-fee 	<ul style="list-style-type: none"> • Affordable • Understands the finest features
Effectiveness	<ul style="list-style-type: none"> • Not effective • Traditional wisdom 	<ul style="list-style-type: none"> • Effective for the few who can afford it • Specialist and scientific 	<ul style="list-style-type: none"> • Effective • Good quality • Prevention of risk

6.5.2 Training

Understandably, to be qualified as a midwife or maternity ward nurse, a health worker in Ethiopia need to complete a diploma or a degree in midwifery or nursing. But to be a community midwife and assisting home delivery (away from clinical set-up) may requires excellent communication and 'people' skill. It may require the health workers the willingness to give up control (dominate), and stop being the being the boss on the pregnant women and her family. It also requires to give respect and credit to others; trust others; and, share knowledge and skills at every opportunity. These activities appears straight forward but practically they are not as simple as they seems. It needs to prepare the health workers, prepare the community and may be more. The findings of the study on the attitudes of the family members towards the health workers evidently suggest that the 'peoples' skills appears to be lacking. Training was identified as one of the community-based maternal and newborn care roll-out strategies. It also emerged as one of the procedures or protocols to be followed during community-based maternal and newborn care model within the six aspects of activity listed by Dickof, et al (1968:422). The following groups of people need to be trained in order to gain new knowledge and skills regarding the provision of community/home-based maternal and newborn care: community midwives or nurse on culturally congruent care; family members, traditional birth attendants and community-based healthcare providers on what they have to assist in the community-based maternal and newborn healthcare practices. Training might improve the standard of maternal and newborn care because it will be provided by culturally competent midwives, skilled family members, traditional birth attendants and community-based healthcare providers (Nagi, Ofili-Yebovi & Marsh 2005:1569-1573). According to Nagi et al (2005:1569-1573), training of traditional birth attendants and midwives on culturally congruent care proved to be an effective strategy

in the reduction of maternal and child mortality, because the family members and traditional birth attendants possess knowledge and skills on assessment, early recognition of complications and early referral for medical assistance.

6.5.3 Awareness campaigns

The empirical findings of the study have shown that if the pregnant women is meant to get skilled birth attendants, she must be transported to health facilities. The midwives, the community at large, the maternal and child health planners and most importantly the family members of a pregnant women are not aware of the new home/community-based skilled maternal and newborn care practices. This is because in all past experiences of the Ethiopian maternal and newborn care, all midwifery activities are almost entirely confined at the clinical (health facility) set-up. If the families of the pregnant women were not able to make at health facilities for one or the others reason, family members and traditional birth attendants are sources of the healthcare practices. Different level and assorted means of awareness campaigns emerged as a prerequisite to roll-out (Haynes, Weiser & Berry 2009:491-499). Haynes et al (2009:491-499) write that awareness campaigns might assist midwives, family members and traditional birth attendants to market and advertise their practices, establish rapport, initiate mutual and trusting relationship and gain recognition of each other's practices. For successful roll-out of the new community/home- based maternal and newborn care, awareness campaigns should be run as an initial step.

6.5.4 Performance-based incentives

In Ethiopia, despite the fact that most delivery is conducted by the family members and traditional birth attendants, they are not yet recognised as members of the multidisciplinary team directly involved in provision of maternal and newborn care. It was argued that it can be of utmost importance for the government, including the Department of Health recognise and accept the existence of the family members, traditional birth attendants and their effort regarding maternal and newborn care (Kerber et al 2007:1368).

It is evident that the family members and traditional birth attendants are working in isolation when providing maternal and newborn care, and that the health system

appears not even aware of the well-liked home-based practices employed during maternal and newborn care. This places the home-based maternal and newborn care at risk of complications and even death. In the roll-out of the model, performance based incentives for family members and traditional birth attendants for instance a bar of salt, soaps, cloths, etc. incentives rooted in the cultural practices for TBAs and for family members, who assist the community midwives in the provision of skilled care appears as an important strategy for community entry and provision of culturally sensitive skilled service provision (Kerber et al 2007:1368).

6.5.5 Team building

The traditional maternal and newborn care givers generally have been identified as major part of the maternal and newborn care problem. It is now high time to acknowledge their contribution and make the part of the solution and gradually motivate the family members and traditional birth attendants to work together with the health workers as a team. It is evident that teamwork is an effective strategy in ensuring quality care, as the team will have common purpose, clear goals, develop team skills, share information, support each other and hold the team accountable for output (Stone & Bailey 2007:259).

6.5.6 Periodic assemblies/meetings

The activities of maternal and newborn care starts earlier before birth, during labour and after delivery ideally for six weeks. These includes a variety of activities such as giving the pregnant women and her family advice on issues such as health eating, checking the health of the mother and baby during pregnancy, checking how labour is progressing, giving basic drugs, giving advice to families on feeding, bathing and general caring for the newborn baby and the mother, etc. It was suggested that for the new community-based maternal and newborn care to be successful there should be regular meetings between the health workers (community midwives), family members and traditional birth attendants, holding meetings on regular basis might assist both groups to establish rapport, get to know each other, develop mutual trust, maintain the initiated relationship, learn from each other, share common problems and discuss the achievements and challenges experienced during the provision of maternal and newborn care.

6.6 DYNAMICS – WHAT IS THE ENERGY SOURCE FOR THE ACTIVITY?

Dickoff et al (1968:431) described the fourth aspect, dynamics, as chemical, physical, biological or psychological power sources that can drive the activity towards the attainment of a goal. The dynamics for this study are displayed in figure 6.4 as follows:

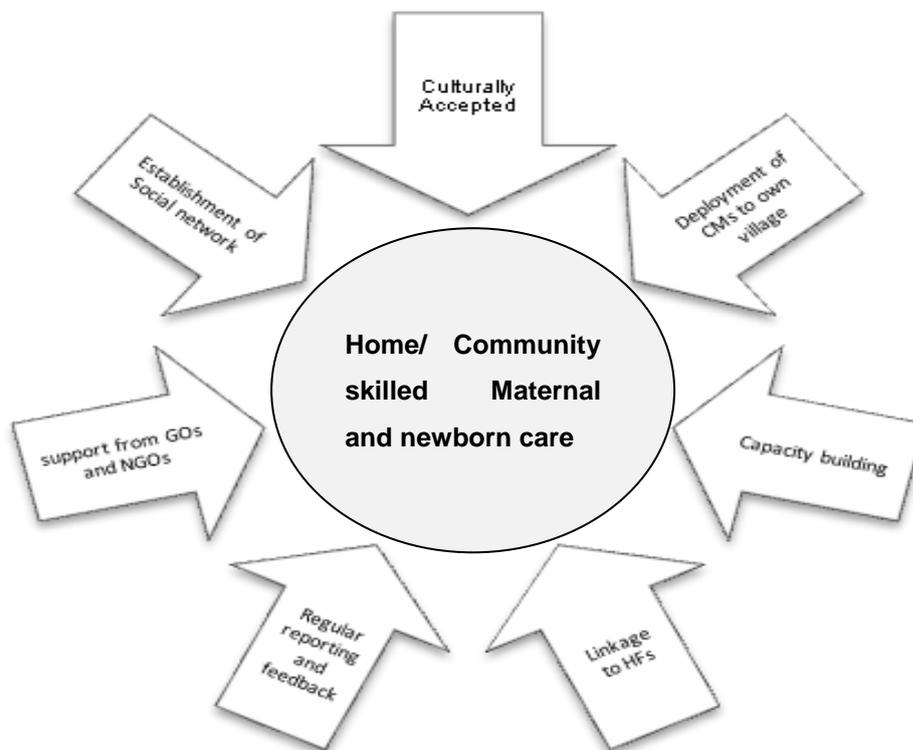


Figure 6.4: The dynamics – power sources that can drive the activity towards the attainment of the goal

In this model, almost all maternal and newborn health care returns to the community with referral to the clinic or Hospitals only when necessary. Thus, consideration of a number of dynamics and power bases is important for the community-based maternal and newborn care model. As depicted on figure 5.4., these may include:

6.6.1 Deployment in own community

The community midwives (CMs) should be the people best suited to work at their own community in a sense that they understand their local customs and high level of belongingness. One of the criteria for recruitment shall be that the community midwives must be residing in that community, who can also give contact details to clients and

wrote their cell phone numbers on their doors and on clients' cards. This makes the community midwives more accessible to their clients and will reduced the cost of paying for local taxi or any form of ambulatory services including transportation and hotel.

6.6.2 Culturally acceptable intervention

There is almost no room for misunderstanding between the community and the health workers in this model. The community midwives (CMs) assist women during childbirth, mainly in clients' homes. The community midwife offered an environment more conducive to childbirth and effective skilled birth attendant (SBA) in the community. Ideally, older women are more acquainted with the culture of the community. Almost all part of the country or each community has retired midwives and/or maternity nurses in the village. Using these retired midwives ensures more culturally acceptable intervention; being older women who command respect within their communities. Besides, the health worker (the community midwife) assist births in the clients own homestead rather than in health facility or health worker's homes which allowed relatives and the traditional birth attendants to be around to give emotional and social support during labour. Assisting births in clients' homes also allowed women and their relatives to dispose the placenta in a culturally acceptable manner. As an example, the study found a community which only supports births at home especially for first births and places a lot of significance on where and how placentas are disposed. These were highlighted to be major cultural barriers to facility birth. Thus, the community midwives can be called in the home, carrying a kit and assess the woman and if she/he see there is no complication, delivery can be conducted at home. Community midwives work and the pregnant woman's relatives are around to support them. Delivering in the village offers privacy in a way in the society. And if the community midwives are experienced (retired or skilled) and aged women, so the community like somebody like this going to deliver them in their homes providing the traditional birth attendants' convenience but also skilled delivery.

6.6.3 Capacity building of community midwives

Initial training of community midwives in the community emergency obstetric and newborn care (EmONC) and entrepreneur skills at the inception of the community midwifery service will definitely enhance the impact. The initial training potentially make

them (the community midwives) very enthusiastic and confident in performing their jobs in collaboration with the community and other health workers.

6.6.4 Linkage with health facilities

Community midwives should be linked to health facilities which will give support and supply to the community midwives with some basic commodities and consumables. These facilities are also to help community midwives with autoclaving of equipment and instruments. Contact numbers of key health personnel and ambulance drivers should also give to them for easy access during referrals.

6.6.5 Regular reporting and feedback

The community midwives shall work in collaboration with their linked public/government health facilities and send a monthly report of their activities to the district health team. The community midwives should also get feedback from the health facilities about referrals they make. This may help in the provision of continuum of care on discharge to help them know when the woman comes back to the community.

6.6.6 Support from governmental and non-governmental organisations (NGOs)

The community midwives should be supported by government or NGOs with initial supply of delivery kits, stethoscopes, blood pressure machines and so on supplies and family planning commodities.

6.6.7 Establishment of social network (cluster) and regular monthly meetings

The community midwives should also be encouraged to form social networks so that they may provide support to each other. The establishment of a social network may help them to meet every month to discuss their welfare. During these meetings they will also visit each other's facility, and to act as peer reviewers and auditors of the services and care rendered to clients.

6.7 TERMINUS: WHAT IS THE ENDPOINT OF THE ACTIVITY?

The final aspect of Dickoff et al (1968:431), the terminus, is the end point or purpose of the activity. In this study, it is the prevention of maternal mortality and newborn death in Ethiopia, and involves making the maternal and newborn care services convenient both culturally and accessibility - at home and referral if needed; affordable and understand the finest features of payment for the pregnant women; and effective, good quality and it also prevent risks, too. Figure 6.5 (below) displays the terminus or endpoint of the activity.

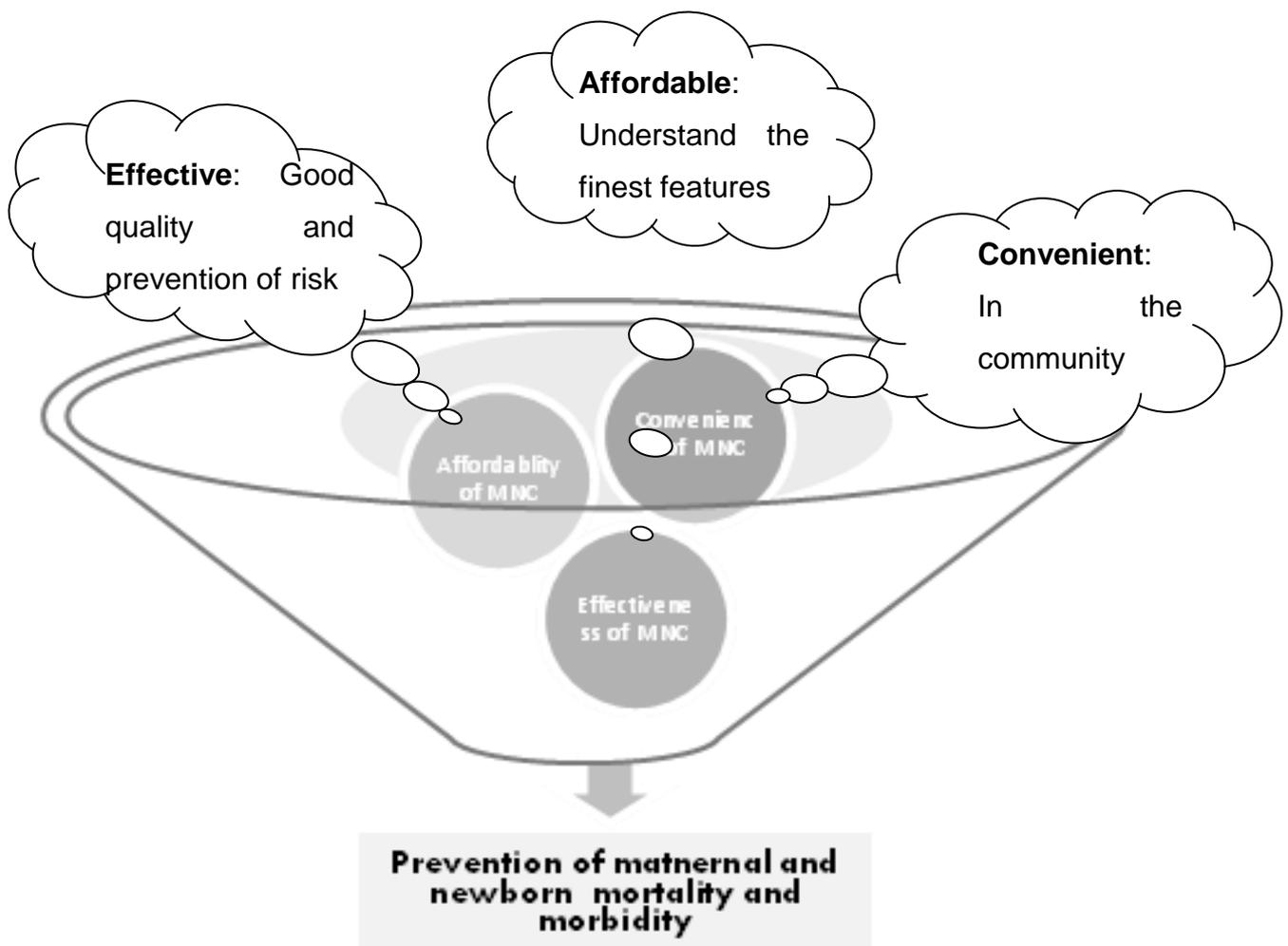


Figure 6.5: The terminus or endpoint of the activity

6.8 SCHEMATIC REPRESENTATION OF THE MODLE

Walker and Avant (2005:28) defined a model as any device used to represent something other than itself; it has been a graphic representation of a theory. They further stated that a model can be drawn mathematically, as an equation, or schematically using symbols and arrows, as in figure 6.6 (below).

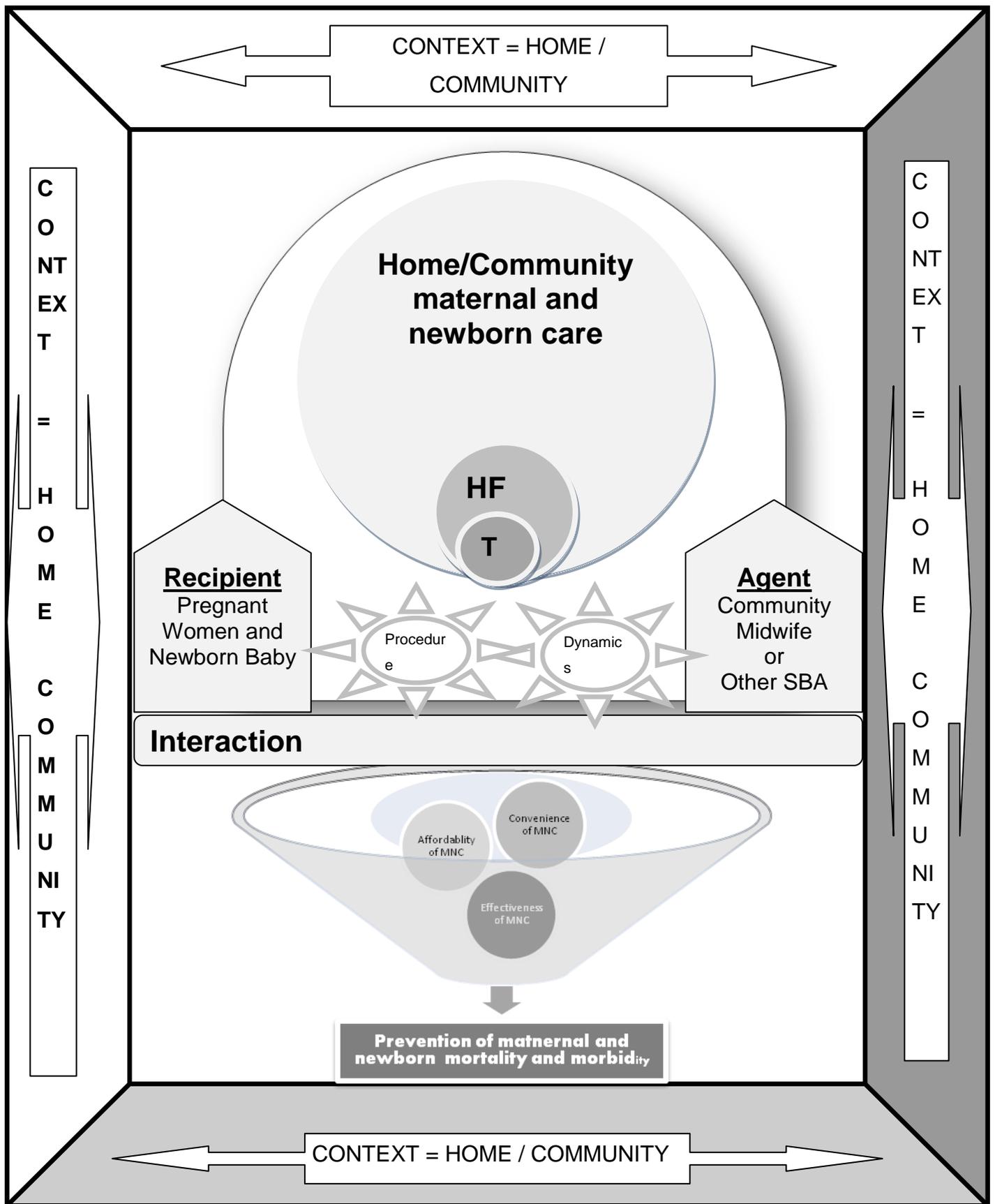


Figure 6.6: Model for preventing maternal mortality and newborn death in Ethiopia

Currently, in Ethiopia, the health system has established a vast network of health infrastructure that extends to rural areas with the establishment of over 15,000 health posts and deployment of over 30,000 health extension workers throughout the country. Although these unprecedented situations made health services more accessible than ever, it is yet to be exploited for improving rural women's access to clean and safe delivery and postpartum care (MoH 2015a:4-29; MoH 2015b:14-20). Lack of usage of delivery care in the country is related not only to accessibility but also acceptability of the services. In fact, the vast majority of women with home deliveries saw institutional delivery as "unnecessary" and a "non-customary practice". Therefore, instituting an innovative, culturally sensitive, and practically amenable strategy, deployment of a community midwife in alignment of the health extension worker, for instance, might be the best remedy, in this case. Using retired midwife-nurses as an entry may have also great potential to transfer knowledge and creating immune community.

The described and presented community-based model for preventing maternal mortality and newborn death in Ethiopia requires access to care provided by community midwife, families and communities including the traditional birth attendant; and by clinical services, if needed. Saving lives depends on high coverage and quality of home/community service-delivery, with functional linkages between levels of care in the health system and between service-delivery packages, so that the care provided at each time and place contributes to the effectiveness of all the linked packages. The health of mothers and newborn babies consists of sequential stages and transitions throughout the lifecycle. Every woman need services to help them to plan and space their pregnancies and to avoid or treat sexually transmitted infections. Pregnant women need antenatal care that is linked to safe childbirth care provided by skilled attendants. Both mothers and babies need postnatal care during the crucial 6 weeks after birth. Postnatal care should also link the mother to family-planning services and the baby to child health care. A married girl, or even at earlier age, need education and services for nutritional, sexual, and reproductive health” (Kerber et al 2007:1358-1369). If women and/or newborn babies experience unexpected complications or illness at any point, the health worker in the community (community midwife) facilitate timely care from household to hospital, with referral and timely emergency management.

The presented community-based model for averting maternal mortality and newborn death in Ethiopia can be effectively used over the dimension of time (throughout the

lifecycle), and over the dimension of place or level of care (Lawn & Kerber 2006:409-17). Over time, care before pregnancy (including family-planning services, education, and empowerment for adolescent girls) and during pregnancy can be given by health extension workers and community midwives. During childbirth and the days immediately afterwards, mothers and newborn babies are at highest risk of death. The empirical part of the present study and other studies also validated that over half of all maternal and neonatal deaths occur during this period (Stanton et al 2006:1487-1494). An effective community-based postnatal care for mothers and babies would facilitate the transition between maternal care and preventive and curative care to improve child survival.

The community-based model for preventing maternal mortality and newborn death over place includes the home, during transportation, and at health facility. An effective community-based maternal and newborn care would ensure that appropriate care are available wherever it was needed, and linked, where necessary, to other levels of care. In line with numerous studies in developing countries, the finding of this study confirm that, most deaths of newborn babies and maternal mortalities occur at home, commonly because of delays in reaching care (Thaddeus & Maine 1994:1091-1110; Lawn et al 2005:891-900; Ronsmans & Graham 2006:1189-1200). These are due to "the three delay"; namely, 1) Delay in decision to seek care: Lack of understanding of complications; Acceptance of maternal death; Low status of women; Socio-cultural barriers to seeking care: women's mobility, ability to command resources, decision making abilities, beliefs and practices surrounding childbirth and delivery, nutrition and education; 2) Delay in reaching care: Mountains, islands, rivers – poor organisation; and, 3) Delay in receiving care: Facilities, supplies, personnel; Poorly trained personnel with punitive attitudes; and Finances. Thus, the presented community-based model for preventing maternal mortality and newborn death is entrusted to address these and other root-causes of Ethiopian mothers and newborn deaths.

6.9 EVALUATION (CRITICAL REFLECTIONS) OF THE MODEL

The study was supervised by two senior experts in model development as well as quantitative and qualitative research. Both of them are professors of community health, experts in midwifery and nursing (clinical practice, management and education) and are versatile with related ethical and philosophical issues. Furthermore, the model was presented locally to five senior members of maternal and child health (MCH)

directorates at Ministry of Health (MoH) and other invited research experts, making the evaluation of the model meaningful and comprehensive. Besides, group of experts in mixed research methods and theory generation will evaluate the model during presentation at a seminar. The model was also evaluated on the basis of predetermined criteria of theory generation as described by (Chinn & Kramer 1991:129). The guidelines for critical reflection of theory from Chinn and Kramer (1995:119-135) were followed to evaluate this model:

Table 6.2: Evaluation (critical reflection) of Community maternal and newborn care model

How clear is the model?	The definitions through the process of concept analysis were done in order to ensure the semantic clarity
How simple is the model?	The overall structure of the community-based model for averting maternal mortality and newborn death could be followed by using the visual diagram. The major concepts of the model were defined and it was ensured that basic assumptions are consistent with each other. The model is simple because its use could avert maternal mortality and newborn death on top of improving midwifery practice.
How general is the model?	The breadth of scope and the purpose of the model could be used in community-midwifery setting and other health care settings with the aim of enhancing community verses health workers mutual participation and responsibility sharing, information sharing and empowering.
How accessible is this model?	The model would be accessible because it has attempted to explain the exiting experiences of maternal and newborn care and envisaged augment the community maternal and newborn care based on the basic principles of midwifery practices which would facilitate mutual participation and improve community-midwifery practice.
How important is the model?	Since the model is closely tied to the idea of its practical mission and vision, the community-based model for averting maternal mortality and newborn death in Ethiopia; if utilised, could significantly reduce the unacceptably high fatality cases. Besides, it improves the practice of midwifery by enhancing community mutual participation and responsibility sharing, information sharing and empowering during pregnancy and childbirth.
Does the model display the researcher's original contribution	The model was originally created by the researcher with the aim of averting the prevailing maternal mortality and newborn death in Ethiopia through culturally acceptable and community mutual participation during pregnancy and childbirth. Two promoters, who are senior experts in model development as well as quantitative and qualitative research, both of them are professors of community health, experts in midwifery and nursing (clinical practice, management and education) and are versatile with related ethical and philosophical issues. Furthermore, the model was presented locally to five senior members of maternal and child health (MCH) directorates at Ministry of Health (MoH) and other invited research experts, making the evaluation of the model meaningful and comprehensive. Besides, group of experts in mixed research methods and theory generation will evaluate the model during presentation at a seminar.

6.10 CONCLUSION

Chapter five focused on development and description of a model for preventing maternal mortality and newborn death in Ethiopia. Model development was based on the findings from concept analysis following Walker and Avant (2008:30); the empirical findings of the study and conceptual framework as guided by Dickoff et al (1968:422). The model was described under the following aspects: introduction, purpose, scope, components, and meaning of components and detailed description of the components. Chapter 7 will contemplate on conclusions, limitations and recommendations for further research.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

"And in the end it's not the years in your life that account. It's the life in your years."

Abraham Lincoln; Good reads 2015

7.1 INTRODUCTION

In the previous chapters the research design, methodologies employed, findings and discussions of the research was presented and followed by development of a community-based model to prevent maternal mortality and newborn death in Ethiopia. Furthermore, the study was established through review of literatures based on the research orientation. Presently, the aim of this chapter is to provide an overview of research findings, draw conclusions and recommendations, list the limitations and outline implications for further research.

The study was emanated from the evidence and recognition that many health problems are laid down in the critical period of childbearing – both for the mother and for the newborn child. Many more health concerns continue to unfold in the days and weeks after the birth. Nonetheless, global efforts to reduce deaths among women from complications related to pregnancy and childbirth have been less successful than other areas of human development – with the result that having a child remains among the most serious health risks for both the women and their newborn babies (WHO 2015; CSoA & PAI 2009: 61-70).

Many maternal mortalities and newborn deaths in Ethiopia, like in most of the developing countries, occur at home, outside the formal health sector, and few are attended by qualified medical professionals to give sensible consent of the death. In fact, high quality death registration data exists in only 23 of about 200 countries (WHO 2014b:71; Mathers et al 2005:171-177) and, more than two-thirds of deaths worldwide occur without any medical death certification (Baiden, Bawah, Biai, Binka, Boerma, Byass, Chandramohan, Chatterji, Engmann, Greet et al 2007:570-571). Statistical facts on the levels of death is important but not enough to identify what can be done to

prevent such unnecessary deaths. In other words, in order to stop the deaths, the right kind of information is needed upon which to base actions. Cause-specific death information are vitally important for health sector planning, including assessing programmatic needs, monitoring progress of interventions and reassessing health priorities (Thatte et al 2009:187-194; WHO 2014b:71). However, little is known about the causes of maternal and newborn mortalities in many developing countries because vital registration systems are lacking mainly caused by vast home delivery (WHO 2014b:71; Mathers et al 2005:171-177).

It was established from the literature that the burden and epidemiology of maternal mortality and newborn death in a context that there is inextricable link between mothers and newborns. The literature also revealed causes of maternal mortality and newborn death including some core reasons for slow progress in reducing maternal mortality and newborn deaths. Good interventions, actions and solutions (good practices) to achieve better outcomes in maternal and newborn health such as interventions based on community participation, family planning, treatment of perinatal sepsis, management of postnatal haemorrhage, collaboration with traditional birth attendants, and the need for large scale community-based maternal and newborn public health trails were part of the literature.

It was also established that low economic and social status of women and lack of access to and use of essential obstetric services are strong determinants of maternal mortality and newborn death (WHO 2010a:23-27). Low social status of women limits their access to economic resources and basic education and thus their ability to make decisions related to theirs and their babies' health and nutrition. This means maternal and newborn/Child mortality is a particularly sensitive indicator of inequality; WHO and UNICEF have called it a litmus test of the status of women, their access to health care and the adequacy of the health care system in responding adequately to their health care needs (UN 2010a; UN 2010b). Accordingly, information about the levels and trends of maternal and newborn mortality is needed not only for what it tells us about the risk of pregnancy and childbirth but also for what it implies about the women and her baby's health in general, their social and economic status. Thus maternal and newborn mortality is not merely a "health disadvantage" it is also a "social disadvantage".

It is against this background that the study was undertaken to determine and explore factors contributing to maternal mortalities and newborn deaths in Ethiopia in order to be able to develop a model to enhance the maternal and neonatal health service provision.

More explicitly the objectives of the study were to:

1. Explore socio-economic and cultural factors surrounding maternal mortality and newborn deaths.
2. Explore health service factors associated with maternal mortality and newborn death.
3. Describe the community approach best practices to enhance safe maternal and newborn birth.
4. Develop a community-based model for preventing maternal mortality and newborn death in Ethiopia – getting on with what works.

The "Three phases of Delay Model" (Thaddeus & Maine 1994:1091-1110) was chosen to classify factors associated with the maternal and newborn deaths in the present study. The model is based on the fact that about 75% of maternal and newborn deaths are a result of direct obstetric causes. These are direct causes of maternal death such as haemorrhage, obstructed labour, sepsis, eclampsia and abortion complications (Say et al 2014:S323-333; and, direct causes of neonatal death: sepsis/pneumonia, tetanus, diarrhoea, preterm, asphyxia, congenital anomalies and others (UN IGME 2014:12-15). Most of these deaths are preventable with prompt and adequate medical interventions. And implicitly, delays in reaching adequate care are prominent factors contributing to maternal and newborn deaths.

Now, this chapter presents the conclusions obtained from the results of the study and the recommendations to improve maternal and newborn health service provisions in Ethiopia. The chapter also clearly stipulates on the limitations of the study and forwards concluding remarks.

7.2 SYNOPSIS OF THE RESEARCH DESIGN AND METHODOLOGY

A retrospective mixed study design, combining both qualitative and quantitative methods was used to make an in depth investigation and analysis of the circumstances and events surrounding individual cases of maternal mortality and newborn deaths. Towards the purposes of this study, mixed methods research is defined as a research approach or methodology employing rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs (Creswell et al 2012:27). All interviews were transcribed and translated into English, categorised and analysed using a Grounded Theory (Green & Browne 2005:82-89).

The methods used are described comprehensively, including the context in which the data collection took place particularly the relationship between the research question and data collected (De Vos et al 2005:252). Based on the international standard, a tailored verbal autopsy and confidential inquiry techniques were utilised reviewing all maternal mortality and newborn death cases that occurred in six hospitals and their catchment area, found in the three largest regional states of Ethiopia during July 1st 2014 to June 30 2015. Each deceased case was reviewed following the “path to death” concept (for both maternal and newborn cases). In all the cases, the health records were retrieved and reviewed. Two groups of reviewers, with three members of obstetricians and three child health physicians in each, performed independent classification of cause of death and contributing factors to these deaths.

7.3 SUMMARY OF THE RESEARCH FINDINGS

7.3.1 General features of maternal mortalities and newborn deaths in the study area

In the present study, 133 mortality cases out of all the 142 cases identified from the study area for the purpose of the study were confirmed as maternal mortalities by all three maternal case reviewers. Conversely, 286 out of the 302 randomly selected neonatal cases were confirmed as newborn deaths by all three newborn case reviewers. All three agreed (from each cases) on a single cause of death in 110 (83%) of the deceased maternal cases, and in 223 (78%) of the deceased neonatal cases.

The agreement among the reviewers was higher in the classification of the 119 maternal and 262 newborn cases in which both verbal autopsy and case notes were available, with 89% for maternal and 84% for newborn cases, compared to 64% for the 14 maternal and 59% for the 24 newborn cases in which only case notes was available.

During the study period, from July 1, 2014 to June 30, 2015, the study found very high maternal mortality and newborn death in the study area with 502 and 766 maternal mortality ratio per 100,000 live birth; and, 34 and 51 neonatal death ratio per 1,000 live birth for hospital and the general community, respectively. However, there was relatively and unusually low hospital-based maternal mortality and newborn death ratios vis-a-vis the general community. It is highly possible that these public hospitals are under-pressure and there must have been significant number of unreported and/or under-reported cases. This is possibly as a result of the fact that during the time of this study, information about maternal mortality and newborn death in Ethiopia is needed not only for what it tells about but also for what it implies about the women's and their babies' health, social and economic status in general. As a result, it was highly sensitive and politicised area for study.

Fourteen percent of maternal mortality cases were their first pregnancies, 69% second to fifth pregnancy and another 17% sixth or higher pregnancy. The average number of the deceased women's pregnancies in this study was 4.1. The highest number of pregnancies recorded among the cases was 11.

Sixty-five percent of the randomly identified deceased babies were males and Thirty-five percent were females. Among total recorded deaths (N=286), 197 were live births and 89 were stillbirths. Among the live births, an overwhelming 71 percent of newborn deaths were during the first 7 days of life (early neonatal period), followed by 29 percent of deaths in the late neonatal period (8-28 days).

7.3.2 Socio-economic and cultural factors surrounding maternal mortality and newborn deaths

Most of the deceased maternal cases are very young, with the mean age of 26.56 years; and, mothers of the deceased newborn babies are even younger with more than half of them are below 24 years of age. The youngest among the deceased maternal

death cases was aged 15 years while the oldest was 45 years old giving an age range of 30 years.

Ninety-seven percent of deceased maternal cases were identified as 'ever married'. However, it is only 81.2% of the deceased women who were living together and/or having active marriage life at the time of their death. This means, nearly, one in every five women were not living with their life partner. The marital status of the deceased newborn babies mothers have also very similar percentile figures with 98% mothers of deceased newborn baby cases were identified as 'ever married'. And, it is once again only 81.47% of the deceased women who were living together and/or having active marriage life at the time of their newborn death.

Comparing their educational status, 71.4 percent of deceased mothers had never been to formal school and among those who had attended formal school, one in seven mothers had education less than or equal to grade 8 and one out of seven mothers had an education of more than grade 8. Comparing this figure with the national demographic figure, it may help to conclude that uneducated pregnant women are more susceptible to maternal mortality than the educated ones. At the time of the study 31 percent of the deceased mothers' newborn babies were survived. Besides, there was statistically significant positive association between maternal educational status ($r=0.494$, $n=286$, $P<0.01$) and their newborn babies survival. Nonetheless, husband of deceased mother are significantly better educated than the women.

Even though 71 percent of the deceased mothers have no formal education, and 85% have no employment record and remain as house wife, this study found that employment and economic level of the deceased women in the study increased with their educational level.

In most cases, men usually decide when and where to seek care and often provide the funds. And yet, in nearly half (47%) of the autopsied cases, the husband was not around to make the decision to seek care when complication developed. Furthermore, funds to seek care was not readily available for 82 percent of deceased maternal cases, when the complication developed. Generally, economic factors found to play an important role in the path to death.

7.3.3 Health service factors associated with maternal mortality and newborn death

Maternal mortality and newborn deaths are the consequence of a long and complex chain of events. Prevention of maternal mortality and newborn deaths therefore requires far-reaching social and economic changes beyond the premises of the health care delivery system. However, for a significant reduction in maternal mortality and newborn death to be realised the health care system in Ethiopia must assume its responsibilities to institute essential changes in both the structure and process of health care delivery services particularly for maternal and newborn health care.

The findings this study shows that antenatal care coverage is generally low. Forty-seven percent of maternal cases and 40 percent of the deceased newborn mothers evidently claimed that they had received ANC services during their last pregnancy. However, only 20 percent of these maternal cases and 16 percent of the deceased newborn mothers made four or more antenatal care visits during their pregnancy, with 53 percent of maternal cases and 60 percent of the deceased newborn mothers making no ANC visits at all. More strikingly, it was just 54 percent of these deceased women (maternal cases) that reported receiving antenatal care from a skilled provider (a doctor, or a nurse/midwife) during their pregnancy. The remaining 46 percent of pregnant women received antenatal care from health extension workers or trained health workers such as a health assistant. This drops the rate of deceased maternal cases that receive antenatal care from a skilled provider to only 26 percent.

Health centres and health posts were found to be the two major sources of ANC services for the deceased women. Correspondingly, the findings also show that among the deceased mothers and mothers of the deceased newborn babies who sought ANC services at least once, 73 and 77 percent had their weight taken, 86 and 81 percent had their blood pressure measured, 37 and 44 percent had their urine tested and 55 and 51 percent had their blood tested respectively. But when it comes to the deceased mothers and mothers of the deceased newborn babies who tested all the four test, the figures drop to only 25 and 20 percent respectively.

Substandard antenatal care can also be a major factor contributing to both low utilisation of ANC services and/or none attendance of antenatal clinic. Antenatal care is

effective if the services provided are of high quality – i.e. in conformity with standard guidelines or if perceived by the user as satisfactory. In a significant number of visits, various observations or investigations such as weight, height, blood pressure, and haemoglobin measurements were not performed.

Prenatal clinics are dreadfully not well organised as there are usually too many patients to be seen by very few staff. They do not have the time to extensively provide individualised care to the pregnant women. In a case of a woman that died of eclampsia, she had six regular prenatal care visits but had her blood pressure checked only twice. Almost all of cases (94%) failed to be classified by risk status of their pregnancy at the antenatal clinic and a significant proportion of these (76%) were at-risk according to the maternal health guidelines. Furthermore, in 88% of the cases recommended place of delivery was not stated during antenatal care visit. All these may expose the degree of the poor quality of antenatal care being provided.

Nearly 20 percent of the deceased maternal cases (26 respondents) and 21 percent of the deceased newborn mother case (60 respondents) said that the women had experienced complication during third trimester of pregnancy. This study has been evident that most obstetric complications occur around the time of delivery and was not predicted.

It is only fourteen percent of the mothers that is confirmed to receive two or more tetanus vaccine, less than ten percent of mothers received one tetanus vaccine, while one out of four mothers reported that they did not receive any tetanus vaccine during their last pregnancy.

The greatest proportion of deaths in the newborn was due to neonatal Infection (31.47 percent), birth asphyxia (24.37 percent), prematurity related (19.80 percent), low birth weight related (8.12 percent) and others (16.24 percent). The other category includes causes such as congenital anomaly (1.52 percent), hypothermia (1.02 percent), birth injury (0.51 percent), meconium aspiration syndrome (1.52 percent), respiratory distress syndrome (2.03 percent), severe jaundice (0.51 percent), others (3.55 percent), and unclassifiable causes (6 percent). Among the causes of deaths, birth asphyxia was found to be the most frequent in neonates dying on the day of birth, similarly, neonatal sepsis was the frequent cause of deaths in neonates more than 3 days old.

In this study, the majority of newborn deaths occurred at home, among males, and on the day of birth. The three leading causes of neonatal mortality in this study were: neonatal sepsis, birth asphyxia, and prematurity related. Death numbers was observed to be high on the day of birth and most deaths were attributed to birth asphyxia. Death due to neonatal sepsis was found to be particularly high on the third day of birth, and fairly distributed among the three regional states. A substantial proportion of deaths due to sepsis was observed after day 2, showing a declining trend afterwards.

Ninety-four (71 percent) of the maternal deaths were as a result of direct obstetric causes of which haemorrhage was the leading cause of the direct obstetric deaths accounting for 34 percent (32 of the cases). Nearly one in three of these 32 deaths (34.4 percent) were ante partum haemorrhage and 81.8 percent of them were due to abruption placenta. Thirty-one cases (33 percent) of the direct obstetric deaths were caused by sepsis and most of them (91 percent) were home deliveries conducted by both TBAs and relatives respectively. Indirect obstetric deaths accounted for 39 (29.3%) of the deaths and the predominant indirect deaths was due to anaemia in 34 of the cases. Anaemia appears to be a very important cause of maternal mortality and newborn death in the study area.

Ten (7.5%) of the deaths occurred during the ante partum period, 21 (15.8%) during labour and 102 (76.7%) during the postpartum period. Furthermore, of the postpartum deaths 38 (37.3%) occurred in less than 24 hours after delivery, 30 (29.4%) between one to two days after delivery, 34 (33.3%) occurred at least more than two days after delivery. Three of every four death generally found to be during postpartum period with the vast majority of death happening within the first two or three days. Further analysis of deaths by specific causes revealed that of the deaths due to haemorrhage 3 in every 5 death occurred in the postpartum period. More strikingly, 2 in every 3 of these deaths occurred in less than 24 hours after delivery and nearly 1 in 3 took place between one to two days after delivery. Of a separate 21 deaths due to haemorrhage, whose haemoglobin level was checked during prenatal care visits, 16 of them was haemoglobin 8 g/dl or less and in only two was their haemoglobin above 8 g/dl. In the same subgroup haemoglobin results after the complication developed was below 8 g/dl in 23 (71.9%) of the cases.

Analysis of the deaths due to anaemia also indicated striking results in that of the 21 cases that were fortunate to have their haemoglobin level checked during prenatal care visits, 13 in 21 haemoglobin was 8 g/dl or less and in 7 cases haemoglobin was above 8 g/dl. However, among the same cases that died due to anaemia, 26 out of 34 haemoglobin level was below 8 g/dl after the complication developed. haemoglobin level as low as 2.2 g/dl was recorded among these deceased mothers.

In this study, direct obstetric deaths accounted for the majority of deceased maternal cases. Haemorrhage in general and postpartum haemorrhage (PPH) in particular was the major cause of direct obstetric death. On the other hand, significant portion (1 in every 3) of the deaths due to haemorrhage was as a result of abruption placenta (ante-partum haemorrhage). Sepsis also take the lion share with haemorrhage as a direct cause of medical death for maternal mortality.

Forty of the one hundred thirty-three maternal cases (30%) and 101 of the 286 newborn mother's cases (35%) did not exhibit any attempt of decision for the process of seeking medical attention after the recognition of complication. They limited the whole labour and delivery process at home with an attempt for home deliver. For the remaining 93 deceased maternal and 185 mothers' of deceased newborn baby cases; the delay in time period range from one hour (the swiftest) and up to four days for both maternal and deceased newborn baby's mother cases. The average time in delay was thirty-five hours or nearly one and a half day with slight difference between the averages of maternal cases and newborn baby mothers with 37 and 34 hours respectively. Forty three percent of maternal and 36% of the deceased newborn baby's mother case respondents respectively said that they went to the health facilities 25-48 hours after the start of labour. Similarly, 22% of maternal and 19% of the deceased newborn baby's mother case respondents respectively went to the health facility after two days of the start of labour; and, 16% of maternal case respondents and 21% of mothers' of the deceased newborn babies took at least 24 hours of start of labour before they went to health facility.

In the present study, four key predisposing or aggravating factors identified under the initial phase of delay: Lack of understanding of complications to seeking care; traditional beliefs/cultural norm barriers to seeking care; concern about costs of care – barrier to seeking care; family's/community's attitude towards the health-care system.

About one out of ten respondents said that the pregnant women went on foot (walking); about one out of four said that the pregnant women went by shouldering using 'Qareza'⁷/ chair/ mini-bed or cart; and, nearly half of them said that they took some sort of vehicle such as bus/lorry/taxi/rickshaw, etc. Virtually half of mothers said that the distance between their home and the appropriate health facility was more than 20 kilometres and it is only about 15 percent of mothers said that the distance was less than 5 kilometres. Factors such as topography, connection with paved roads and availability of transportation facilities, all play a role in accessibility and in reaching the health facility. Nearly 55 percent of the mothers need up to six hours to reach the appropriate health facility/provider and the remaining about 45% need more than six hours to reach the appropriate health facility/provider. The average time needed to reach an appropriate health facility/ provider found to be 6.32 hours; whereas, the average distance was 26.97 km.

From the testimonies contained in the data collected the constant reasons identified resulting in a delay in reaching an appropriate obstetric care facility can be grouped into three subcategories: lack of transportation; chain of transfer up until appropriate source of care; and, prolonged transportation.

Almost all had experienced some level of delay in receiving prompt and adequate obstetric care. Surprisingly, more than 90 percent of the mothers received care after an hour of reaching the health facility. And more strikingly, one out of four mothers (maternal cases) and one out of three mothers of deceased newborn cases responded that it took them more than six hours to receive care. Generally, on average it was found to take a pregnant women about five hours before they receive appropriate care but after reaching health facilities.

Besides, from the data collected testimonies revealed relatives' perceived poor quality of care, provider and user interaction was not the enviable Health service factors were the most frequently identified contributing factors to maternal deaths in this study. It is therefore believed that improving the quality of and accessibility to emergency

⁷ 'Qareza' refers to stretcher made from bamboo, wood, hide, or other natural material. The patient is tied to the stretcher and covered with clothes. Four men at a time take turn to carry the stretcher. It needs to gather around 20 or more people from the village depending on the distance they will cover.

obstetrical care services will significantly contribute to the reduction of maternal deaths in the area.

Sepsis and birth asphyxia were the major causes of neonatal death. Half of all deaths (including stillbirths) occur by day 3, suggesting a need for proper coverage of ante-partum, intra-partum and early postnatal interventions. All mothers of survived asphyxiated newborns reported experiencing some form of complications during their last pregnancy (blurring of vision, convulsions, abnormal delivery, etc.).

Fifty-eight of the cases actually needed urgent blood transfusion but twenty-six of them were unable to be transfused because blood bags were not available in the hospital at that time. And most of those transfused, 21 (66%) had to pay money, in one way or the other, before blood was made available. Obstructions in receiving care at the hospital were more prominent among anaemia cases or those cases needing blood transfusion because money is needed before blood could be available, which was further analysed and discussed below.

7.3.4 The community approach best practices to enhance safe maternal and newborn birth

For both cases, the first-place to seek care was from a traditional birth attendant in 108 (81%) and in 237 (83%); followed by private clinics and health centres in 21 (16%) and in 43 (15%); and, hospitals in 4 (3%) and 6 (2%) of the deceased maternal and the deceased newborn babies mothers' cases respectively.

The mode of transportation to place where the first-care was sought ranges from no need of transportation (home based care) in 104 (78%) and in 231 (81%) of the deceased maternal and mothers' of the deceased newborn babies cases, respectively; to a cart, donkey, mule, horse, shouldering, or walk in 19 (14%) and in 42 (15%) of the deceased maternal and the deceased newborn babies mothers' cases, respectively; and, a motorised vehicle in 10 (8%) and 13 (5%) of the deceased maternal and the deceased newborn babies mothers' cases, respectively. The number of people who accompanied the deceased maternal cases and mothers of the deceased newborn babies to the health facilities was usually large more than five especially in the case of shouldering. However, in normal cases, the average number was two and in most

cases they were women. The average time for the women to reach the first place where care was sought ranges from about five minutes (calling the TBA from neighbour) while the longest time elapsed was about five hours (in the case of going to health facilities).

Although all the under consideration health centres and hospitals have at least one ambulance, ambulance services was not available to 76% pregnant women who need it. The patient and her relatives had to find their own means of transportation. In 3 out of 4 cases, the relatives had to hire a vehicle to take them to two or more different facilities they were referred to. The average distance from the deceased's place of residence to health centres is 30 kilometres and to the hospital is 56 kilometres. The shortest distance trekked to health facility was 3-5 kilometres while the furthest was up to 120 kilometres.

The assessment of the three delays during pregnancy in the present study suggests that apparently a pregnant woman in Ethiopia wait thirty-five hours on average or nearly one and a half day before they decided to go to the health facility for delivery. Once they decided to go, it took nearly 6 hours to reach the health facility; and, once she arrive the health facility, it took a pregnant mother more than 5 hours to receive the services at the health facility. Besides, in most of the 93 maternal death and 185 mothers of the deceased newborn babies cases, the death of the maternal or newborn cases were not due to one factor but an interaction of at least two of the three phases of delay. In only 7 of the 93 maternal cases and in 12 of the 185 mothers of the deceased newborn babies cases one phase of delay was identified; in 57 of maternal and in 109 mothers of the deceased newborn babies cases experienced two different phases of delay; whereas, in 29 of maternal and 64 of the deceased newborn babies cases subjected to all three phases of delay. However, in just one of the deceased newborn baby mother case, no phase of delay could be associated with the death.

7.3.5 A prototype model to enhance/strengthen health service provision to address the maternal mortality and neonatal death – getting on with what works

The findings of this study clearly indicates most maternal mortality and newborn deaths occur at home commonly because of delays in reaching care. The Ethiopia's health system will not continue to make progress, nor be able to tackle key results such as

maternal and newborn health, without now making a serious effort to address demand-side barriers.

An effective maternal and newborn health approach is needed to facilitate the transition between maternal and newborn care, preventive and curative to improve/ensure survival. This should not just only focus on health facilities but give due emphasis to homes. In a country where the vast majority of delivery (nearly 90%) took place at home (CSA 2011:126, CSA 2014:45), outside the formal health sector, and very few are attended by qualified and skilled attendants; these identified challenges of delays show just tip of the iceberg. With the current "Only facility based deliver" policy of the Ethiopian government, will "no woman should die while giving life" actually be achieved?

Thus, a model was developed according to Chinn and Kramer's (1995:81) approach to theory generation: initially, based on the empirical perspectives of the study which includes analysis and interpretation of the testimonies and experiences of survived newborn mothers', family members of the deceased mothers, traditional birth attendants and health workers, concept analysis was conducted embracing concept identification as well as concept definitions and classification. This was followed by, the identified concepts were compared to each other to show interrelationships and the classification of central and relational concepts was used as a framework for the model. Then, the structure and process of a model to prevent maternal mortality and newborn death were described; and, six aspects of Dickoff et al (1968:422) form the basis for development and description of a model for preventing maternal mortality and newborn deaths in Ethiopia. Description for operationalising the model for use were simultaneously presented.

7.4 CONCLUSIONS OF THE STUDY

- Maternal mortality and newborn deaths are the consequence of a long and complex chain of events. Prevention of maternal mortality and newborn deaths therefore requires far-reaching social, economic, service delivery changes beyond the premises of the health care delivery system. However, for a significant reduction in maternal mortality and newborn death to be realised the health care system in Ethiopia must assume its responsibilities to institute

essential changes in both the structure and process of health care delivery services particularly for maternal and newborn health care.

- This study found that there is very high maternal mortality and newborn death in the study area with 502 and 766 maternal mortality ratio per 100,000 live birth; and, 34 and 51 neonatal death ratio per 1,000 live birth for hospital and the general community, respectively. Although, the hospital-based figures relatively and unusually appears low, these maternal mortality and newborn death figures are among the highest levels by any standards and needs crucial intervention.
- Contextual exploration of causes of the maternal mortality and neonatal deaths and planning of appropriate interventions are crucial to reduce the maternal mortality and neonatal deaths in the country, the focus should be on Infection prevention, hemorrhage, hypertensive disorder and anemia for maternal cases and neonatal infection, asphyxia and prematurity related conditions for the newborn babies.
- Most of the deceased maternal cases are very young, with the mean age of 26.56 years; and, mothers of the deceased newborn babies are even younger with more than half of them are below 24 years of age. The youngest among the deceased maternal death cases was aged 15 years while the oldest was 45 years old giving an age range of 30 years. The high rate of pregnancy and maternal mortality among the age-group, 17–35 years, traditionally classified as the “safe age interval reiterates the ineffectiveness of the risk approach in maternal mortality and newborn reduction.
- Most of the deceased the women are not educated. On the other hand, there was statistically significant positive association between maternal educational status and their newborn babies’ survival. Besides, this study found that employment and economic level of the deceased women in the study increased with their educational level. Formal, informal or non-formal educational coverage should be the top priority particularly for the young girls in the remote areas.
- In most cases, men usually decide when and where to seek care and often provide the funds. And yet, in nearly half (47%) of the autopsied cases, the husband was not around to make the decision to seek care when complication developed. Furthermore, funds to seek care was not readily available for 82 percent of deceased maternal cases, when the complication developed. These all evidences call for women empowerment at all levels.

- Ministry of Health and respective regional health bureaus should ensure that maternal and newborn health care particularly emergency obstetric care services are made available close to the women and her newborn babies who are in greatest need of it. These are mostly refers to the rural community, who are essentially uneducated, poor, least powerful and neglected women. This therefore means that the peripheral and referral health facilities should be equipped with the required supplies, equipment and personnel.
- The experiences of the 133 maternal deaths shows the reality women and their relatives are confronted with in the process of seeking obstetric care services. Health care delivery and services in other part of the country seems not significantly different to what prevails in the study area. It is highly possible that women in those areas may have to overcome the same difficulties if they are to survive. It is therefore believed that most of the difficulties identified here could therefore be useful in devising and implementing effective interventions to combat maternal mortality throughout the country. These are to overcome the factors of delay in obtaining health care and to improve antenatal and obstetric care services.
- An important constituent of efforts to reduce health risks to mothers and children is increasing the proportion of babies that are delivered in health facilities. Most of these deaths could be prevented by ensuring emergency obstetric and newborn care and that all babies receive essential newborn care (ENC), including appropriate cord care, skin to skin, infection prevention, breast feeding. Nevertheless, significant proportion (nearly 90%) of women are delivery at home. Skilled birth attendant should not limit their service to the health facilities alone. Home-based skilled deliver system should be adopted to significantly reduce maternal mortality and newborn death rates.
- Ministry of health should also assure that maternal and newborn health services and emergency obstetric care services are of high quality, provided promptly and adequately. This calls for continuous monitoring and evaluation of maternal and newborn health care and emergency obstetrical care services. It also involves the scrutiny of all maternal mortality and newborn deaths and if possible “near-missed” cases in a quest to prevent the recurrence of the “avoidable factors”. It is therefore felt that improving the quality of obstetrical care services at the hospitals would not only improve safe motherhood but would be an important step in the reduction of maternal mortality and newborn deaths in the area.

- Almost half of all maternal mortality and newborn deaths occur by day 3, suggesting a need for proper coverage of ante-partum, intra-partum and early postnatal interventions.
- Delay in receiving prompt, adequate or the required medical care was a common problem encountered even after reaching an appropriate medical facility. However, even after reaching the obstetrical referral hospital these women do not receive prompt, adequate or appropriate obstetrical care. They are often subjected to unnecessary delays or obstructions before receiving care because of operational problems. Often the care provided is of poor quality and standard. Improving the quality of emergency obstetrical care services at the obstetrical referral hospital could be an important step in the reduction of maternal deaths in the area.

7.5 RECOMMENDATIONS

Maternal mortalities and newborn deaths are the consequence of a long and complex chain of events. Prevention of maternal mortality and newborn deaths therefore requires far-reaching social and economic changes beyond the premises of the health care delivery system. However, for a significant reduction in maternal mortality to be realised the health care system in Ethiopia must assume its responsibilities to institute essential changes in both the structure and process of health care delivery services particularly for maternal and newborn health care. It is felt that the recommendations below if implemented would be an important step in the reduction of maternal mortality and newborn death in Ethiopia and may help to prevent similar maternal mortalities and newborn deaths in the future.

7.5.1 Improving quality and access to emergency obstetric and newborn care

Provision of quality obstetric care services is a fundamental pillar in the reduction of maternal mortality and newborn death. However, the quality of obstetric care services being provided at the six hospitals and more importantly in three district hospitals requires urgent intervention. In that effect standard guidelines and protocols for the management of emergency cases need to be develop; essential supplies such as magnesium sulphate, gloves, intravenous fluids, blood bags, delivery sets to name but a few must be made available; transfusion services improve by ensuring blood

availability; electricity supply assured and above all medical doctors be readily available and accessible. Doctors of the maternity unit at the hospital should have a duty roster in place and when on call should be resident in the hospital rather than in their houses.

The Federal Ministry of Health and the Regional Health Bureaus should ensure that maternal and newborn health care particularly emergency obstetric and newborn care services are made available close to the women who are in greatest need of it. These are the rural women, the uneducated, the poor, the least powerful and the neglected women. This therefore means that the peripheral and referral health facilities should be equipped with the required supplies, equipment and personnel. Ministry of Health should also assure that maternal and newborn health services and emergency obstetric and newborn care services are of high quality, provided promptly and adequately. This calls for continuous monitoring and evaluation of maternal health care and emergency obstetrical and newborn care services. It also involves the scrutiny of all maternal mortalities and newborn deaths, and if possible “near-missed” cases in a quest to prevent the recurrence of the “avoidable factors”.

To improve access to essential obstetric care services, health centres should be fully operational and have the capacity to adequately provide all the functions of comprehensive obstetric care services. This will require putting in place the needed essential equipment, personnel and ensuring that both the theatre and the laboratory are fully operational. This if done will reduce the referrals and counter referrals that exists currently.

Contextual exploration of causes of the maternal mortality and neonatal deaths and planning of appropriate interventions are crucial to reduce the maternal mortality and neonatal deaths in the country, the focus should be on infection prevention, hemorrhage, hypertensive disorder and anemia for maternal cases and neonatal infection, asphyxia and prematurity related conditions for the newborn babies.

Promotion of institutional delivery along with strengthening of services at the health facility. Care seeking behavior should be promoted and existing links between communities and health facilities should be strengthened and the low service utilisation should be addressed.

7.5.2 Improving access and quality of maternal and newborn health services

7.5.2.1 Antenatal care registration

To improve early antenatal care registration a well-structured community health education strategy should be put in place. The strategy should target men and women, and reaching out people in the community and not focusing only on pregnant women during prenatal clinics. This will require the involvement of community leaders such as religious, women and youth leaders.

7.5.2.2 Quality of antenatal care services

Urgent action is needed to uplift the quality of prenatal care being provided. Basic equipment and supplies such as weighing scales, blood pressure machines, haemoglobin meters, urine testing kits and reagents to screen blood for syphilis must be made available in all health facilities. The poor staffing pattern observed particularly on the side of nurses and midwives deserves urgent action. A federal/regional registered midwife and if possible an additional second level midwife (an enrolled or community health midwife) should be in each health facility more particularly at the health post level.

In relation to this, another possible way to improve the quality of prenatal care services is, perhaps, to efficiently and effectively implement the WHO model for antenatal care (WHO 2002c:24). This model recommends fewer numbers of antenatal care visits and that investigations are performed on designated visits. This can facilitate the provision of a more focused care.

7.5.2.3 Transporting obstetric emergencies

The need for a road network that is not in good condition should not be overemphasised. In an effort to improve transport situation at community level, local commercial transport owners and community members need to be mobilised. Communities maternal and newborn health good practice should be scaled-up. Communities may require putting in place a system of transporting emergencies by establishing community funds to pay for emergency referrals to facilitate prompt

evacuation of cases. In a particular community in Oromiya regional state, a businessman made available his private car to any patient needing urgent medical attention.

Ministry of health should attempt to ensure that each health facility has an ambulance that is in good road condition, adequately fuelled and made accessible to patients who urgently need it. In the same vein, Ministry of Health should think of the need for extreme remote locations ambulances at the peripheral points where no other means of transportation is not available to facilitate quick access to obstetric referral facilities.

7.5.2.4 Transfusion service at hospitals

To improve blood availability at the hospital a well-organised system of transfusion services must to be adopted. This will require having a system in which active methods of recruiting new donors are devised and at the same time maintaining old and current donors. However, for blood to be readily available, “commercial blood donation” at the hospital must totally be discouraged or prohibited.

7.5.2.5 User fees

Women should have access to free obstetric and emergency obstetric care not only for a matter of good public health policy and practice but to promote human being – pregnancy and childbirth is the means by which the human race is propagated. User fees on diagnostic investigations such as ultra sound scanning need to be abolished as it act as an obstacle in getting care. Despite the fact that maternal and newborn health is free, practically it is either not free at all or the women still pay list of costs systematically. There are also no similar ways of work among public health facilities themselves. Urgent action should also be taken to address implementation of the policy and the disparity in charges that exist among public health facilities.

7.5.2.6 Monitoring and evaluation

Routine review of all maternal mortalities and newborn deaths and if possible near-missed cases should be instituted in an effort to identify the avoidable factors to maternal deaths. This is necessary in putting in place evidence-based interventions in

addressing maternal deaths. The involvement and active participation of well-focused; committed and technically competent people experienced in this field cannot be overemphasised. The availability and willingness of the senior health management to listen to the information revealed without taking judgment or punitive attitude must be ensured.

To have an ongoing monitoring of progress in the safe motherhood program in Ethiopia, indicators that can register changes in a relatively short period of time (for example, 3 to 5 years) is needed. The process indicators outlined by the United Nations agencies are the most appropriate as they can be obtained from data that are relatively inexpensive to gather.

7.5.2.7 Resource allocation

A call for reallocation of national resources is needed for the above mentioned strategies and interventions to be effectively and efficiently implemented. A larger share of the national budget should be allocated to the health sector and a high proportion of that be directed towards maternal and newborn health care services.

7.5.3 Enhancing community partnership in maternal and newborn health care

7.5.3.1 Danger signs

Community health education on danger signs of pregnancy, labour and after delivery should be carried out to reach as many people in the community as possible. It should target both men and women and specifically those significant figures in the family who make decisions on when and where to seek medical care such as family heads and mother in-laws. The information provided should also highlight where care is available.

7.5.3.2 Relationship between health personnel and users of the services

To assure a scaled-up and continued utilisation and prompt reporting to medical facilities, action is needed to improve providers' attitudes towards patients and their relatives. Care providers should treat patients and their relatives with respect,

understanding and dignity. Men should be enabled rather than restricted in participating in women's health issues.

Developing a mechanism to understand the behavior of mothers or service recipients, and ensuring that the health worker provides rapid and appropriate care should be a priority.

7.6 FUTURE RESEARCH

There is growing concern that Ethiopians are reluctant to donate blood. It is therefore necessary to carry out a qualitative study to assess or explore the public's perception surrounding blood transfusion and blood donation.

Another important area for research is the application of the United Nations guidelines on obstetric care to assess the availability, utilisation and quality of care for women with obstetric complications.

Antenatal care research to evaluate the current prenatal care services in the country is necessary. For over two decades now the same antenatal care strategy is being used in Ethiopia yet no significant gains has been registered. It is therefore time to carry out a thorough assessment of the antenatal care services. This is essential in improving the quality of the services.

7.7 OTHERS

In the long-term it would be necessary to invest on girls' education and improving the economic status of women in Ethiopia. Ministry of Health should attempt to ensure contraceptives are readily availability and accessibility and to promote use by women. Improving the road conditions and putting in place an effective and sustainable public transport system in the rural areas is needed. Inter-sectoral collaboration and action will be needed if any meaningful success is to be realised in maternal mortality and newborn reduction.

7.8 CONTRIBUTION TO THE BODY OF KNOWLEDGE

A prototype community-based model for preventing maternal mortality and newborn death in Ethiopia might contribute to the body of knowledge in nursing, specifically in midwifery, because it might address the root causes of maternal mortality and newborn death. Besides, midwives might be empowered with culturally competent knowledge and skills, leading to improvement of midwifery practice through provision of culturally congruent maternal and newborn care. Besides, the empirical perspective of the study has come with findings on the general features of maternal mortalities and newborn deaths in the study area; socio-economic and cultural factors surrounding maternal mortality and newborn deaths; health service factors associated with maternal mortality and newborn death; and, the community approach best practices to enhance safe maternal and newborn birth. This findings inevitably would contribute to the body of knowledge.

7.9 LIMITATION OF THE STUDY

Some key and general methodological limitations of the present study are highlighted below: -

7.9.1 The nature of verbal autopsy technique

Despite the fact that verbal autopsy approach in the classification of obstetric causes of death is increasing gaining popularity at least in developing countries (Soleman et al 2006:239-245; Danso et al 2013:67-101); its technique is not without limitations. Literature has criticised the method for misclassifying both maternal mortality and newborn deaths (Soleman et al 2006:239-245; Quigley, Chandramohan & Rodrigues 1999:1081-1087). And yet, in developing countries, conventional analysis of death certificates may not be feasible as many deaths occur without prior contact with the health system. Furthermore, at times operational problems such as lack of reliable stationery supplies in health institutions may make this method the only possible alternative.

7.9.2 Health facility-based studies

Maternal mortalities and neonatal deaths in this study has been identified using health facilities and health offices data as key bases along with contact tracing to community cases, and it was not possible for the team to trace the entire deaths in the selected zones. Health facility-based studies may be easier to carryout however; the results generated may not be representative of the entire population. For one reason there may be a group of people in the population that does not utilise the health system or another such as they may be different from the group of people that utilise the services.

7.9.3 Possibility of flawed classification of a disease

it is a possibility due to lack of gold standard to compare the findings (Anker 1997:1090-1096), and assignment of single cause of death can lead to overestimation of a particular cause (Anker, Black, Coldham, Kalter, Quigley, Ross & Snow 1999:1-83; Marsh, Sadruddin, Fikree, Krishnan & Darmstadt 2003:132-142; Kalter, Gray, Black & Gultiano 1990:380-386). It is possible that the mother and/or baby suffered from two separate conditions, and it is likely that it was the combination of the two that ultimately led to death. Other minor limitations could be related to the approach, physician's review, in addition to being cost ineffective and time consuming often faces the challenge of being inconsistent in terms of physician's diagnosis.

7.9.4 Quality of health facility data

Health facility data contained very important information that could potentially be used to measure and monitor progress in safe motherhood. However, the records and registers in such institutions are in most instances incomplete – missing records or the writings are illegible beyond comprehension. At times medical records may even lack standardisation as found in this study.

7.9.5 Sensitive issue

Another limitation of this study is that maternal mortality and newborn death is a very sensitive issue so generating correct information on events surrounding the death may at times be difficult. Furthermore, people can tell stories which may be complete,

incomplete or often over complete. After a fatal outcome, such as a maternal mortality and/or newborn death, people's stories may be formed by a wish to blame someone, or at least someone else.

7.9.6 Validity concern

In pursuit of assessing the extent of what was intended to be measured was actually measured; it was realised that the lack of a national language which is written or understood virtually by all in Ethiopia can have some effect on the validity of the study. The use of a translator in instances when the researcher or an assistant cannot speak the language spoken by a particular family; or when the family tried to speak the language spoken by the researcher to compromise the language problem may have caused distortion of information. For example, an Oromo speaking Amharic (local languages spoken in study area) or vice versa may have different meaning than an Amharic speaking Amharic or Oromo speaking Oromo. All these can bring undue language or interpretation problems and can affect validity. As the verbal autopsy questionnaires were in English language it was also noted that there are some English words which do not have a word for it in either Oromo or Amharic. In such cases the most similar word is used as a compromise, too. However, the piloting of the verbal autopsy questionnaires have to a large extent addressed these concerns as it illuminates such issues and made the principal investigator continually sensitive to them. Whenever a translator was used in the interview process the same question was asked repeated but differently just to check for validity. It must be remembered that this study had utilised two different approaches to collect data and furthermore it has also used multiple sources of data all these augment the validity of the study.

7.9.7 Reliability concern

While assessing the extent to which the measurement yields the same answer each time it is repeated, the pre-testing carried out has put into surface issues that effort to improve both validity as well as reliability. Using one main interviewer at all times tends to fastened consistency and by so doing improves reliability. Besides, the use of two different approaches combined with the used of multiple sources of information in this present study has also contributed to the reliability in this study. Recall bias is one of the key limitations of this study. Since the study tried to explore the causes of deaths

among deaths within a one-year duration, there exists a time delay between interview and death and it is possible that the findings of some of the interviews is limited due to recall bias. However, a recall period of 1 to 12 months is generally considered to be well acceptable (Soleman et al 2006:239-245; Chandramohan, Maude, Rodrigues, Hayes 1994:213-222; Mirza, Macharia, Wafula, Agwanda & Onyango 1990:693-698). Besides, it must be noted that the quality of recall may not even decline over period since a maternal mortality and newborn death are an unforgettable event.

7.10 CONCLUDING REMARKS

The purpose of the study was to eventually provide a prototype community-based model for improving the maternal and newborn health service provision. The study followed a mixed (both quantitative and qualitative) approach, and descriptive and exploratory design to analyse the identified variables.

Findings of the study contributed to further understanding of the socio-economic, cultural and health service factors surrounding maternal mortalities and newborn deaths; however, further work needs to be done in the study area in particular and throughout the country in general. The study revealed that access to skilled birth attendance and/or emergency obstetric and newborn care remains a huge challenge.

Regardless of the contraindicative factors in the maternal and newborn health service provision in the health facilities, the study indicated that almost all hospitalised case respondents expressed that their confidence on modern medical care prompted them to seek care from a medical facility and not from other alternatives. This may be a good sign of their trust on conventional medical care.

The findings of the study have implications for the key stakeholders such as the federal Ministry of Health, regional health bureaus in the respective regions, ministry of women and children affairs as well as social affairs, and the like. It is suggested that the relevant stakeholders in the country should discuss the issues and recommendations of the study with the view of addressing some of the critical issues presented.

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APPENDIXES

APPENDIX 1: UNIVERSITY OF SOUTH AFRICA ETHICAL CLEARANCE CERTIFICATE



**UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE**

REC-012714-039

HSHDC/428/2015

Date: 15 July 2015 Student No: 4712-118-1
Project Title: Development of a framework for the reduction of Maternal Mortalities and newborn deaths in Ethiopia.
Researcher: Yonas Regassa Guta
Degree: D Litt et Phil Code: DPCHS04
Supervisor: Prof PR Risenga
Qualification: D Cur
Joint Supervisor: -

DECISION OF COMMITTEE

Approved

Conditionally Approved

**Prof L Roets
CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE**

**Prof MM Moleki
ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES**

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES

APPENDIX 2: REQUEST FOR RESEARCH ETHICS CLEARANCE

Date July 20, 2015

**Federal Ministry of Science and Technology
National Research Ethics Review Committee (NRERC) of Ethiopia
Addis Ababa**

Subject: Request for Research Ethics Clearance

Dear Sir /Madam

My name is Yonas Regassa Guta. A decade ago, I confer **Master of Philosophy** Degree in International Community health from University of Oslo appealing NORAD's scholarship program for students with the highest academic achievement in developing countries. A bit earlier than that I studied behavioural and social sciences in my undergraduate study in Ethiopia. Besides, I was granted with Masters Level in Global Health from John Hopkins School of Public Health e-learning. I have also a post graduate diploma in HIV/AIDS (Sweden); post-graduate diploma in Nutrition (Norway); attend Certified Chartered Accountant (UK), etc. Furthermore, I have nearly **20 years of work experience** as mainly public health practitioner in various organizations such as the World Bank - Public Health Specialist (Consultant); Country Director for Maternity Worldwide; United Nations Population Fund (UNFPA) as Programme Officer for HIV/AIDS & Adolescent and Youth Reproductive health (AYRH); Christian Aid International (a UK and Ireland based organization) as East Africa and the Horn team, Ethiopia CO HIV/AIDS programme Manager; UNDP as Regional Program Coordinator; CARE international as programme team leader; Operation Mission for the Visually Impaired in Ethiopia (OMVIE) as project coordinator, etc. including University mentor and freelance consultant.

Currently, I am working my Ph.D. research. The title of my study is "**Maternal Mortality and Newborn Death in Ethiopia: An in-depth investigation into and developing a framework to reduce them**". The purpose of this study was to determine and explore factors contributing to maternal mortalities and newborn deaths in Ethiopia in order to be able to develop a framework to enhance/strengthen the maternal and neonatal health service provision. Thus, I'm collecting information on the causes of maternal and newborn death in the community. For my study, I need to collect information both in health facilities and specific participants in the community. I want to ask participants about the circumstances leading to the death of the deceased. Whatever information I collect will be kept strictly confidential. No information identifying the participants or the deceased will ever be released to anyone outside of this information-collection activity. Participation in this survey will be voluntary and participants can choose not to answer any individual question or all of the questions. Participants may also stop the interview completely at any time. However, we hope that participants will participate in this survey since the results will help the government and non-governmental development programmes working on maternal health to improve services for the people. For more information, please find attached a copy of the research proposal for your review.

Now, I'm requesting your respective office to give me a letter of research ethics clearance to pursue my studies in three regional states; namely, Oromiya, Amhara and Southern Nations and Nationalities (SNNP).

My kindest regards,

Sincerely truly,

Yonas Regassa Guta

E-mail: yonassreg@yahoo.com

Tel: +251 91 2603495

P. o. Box: 27474

Addis Ababa

Ethiopia

APPENDIX 3: PERMISSION OF RESEARCH FORM THE MINISTRY OF SCIENCE AND TECHNOLOGY



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የሳይንስና ቴክኖሎጂ ሚኒስቴር
**The Federal Democratic Republic of Ethiopia
Ministry of Science and Technology**

ቁጥር 3-10/072/2015
Ref. No.

ቀን Nov 23, 2015
Date

To: University of South Africa

South Africa

Re: Maternal Mortalities and Newborn Deaths in Ethiopia: An in-depth investigation into and developing a framework to reduce them

Dear Sir/Madam//Mr./Mrs./Dr,

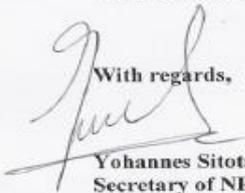
The National Research Ethics Review Committee (NRERC) has reviewed the aforementioned project protocol in an expedited manner. We are writing to advise you that NRERC has granted

Full Approval

To the above named project, for a period of one year (November 29, 2015- November 28, 2016). All your most recently submitted documents have been approved for use in this study. The study should comply with the standard international and national scientific and ethical guidelines. Any change to the approved protocol or consent material must be reviewed and approved through the amendment process prior to its implementation. In addition, any adverse or unanticipated events should be reported within 24-48 hours to the NRERC. Please ensure that you submit biannual progress report once in six months and annual renewal application 30 days prior to the expiry date.

We, therefore, request you as PI and your esteemed organization to ensure the commencement and conduct of the study accordingly and wish for the successful completion of the project.

With regards,


Yohannes Sitotaw
Secretary of NRERC



CC: Mr. Yonas Regassa (PI)
NRERC chairperson

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Web site: <http://www.most.gov.et>

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Fax +251-011-4-66 02 41

APPENDIX 4: REQUEST FOR SUPPORT LETTER TO ACCESS HEALTH FACILITY RECORD AND RESPECTIVE CARE GIVERS OF THE DECEASED

Date July 20, 2015

**Federal Ministry of Health
Maternal and Child Health Directorate
Addis Ababa**

Subject: Request for support letter to access health facility record and respective care givers of the deceased

Dear Sir /Madam

My name is Yonas Regassa Guta. A decade ago, I confer **Master of Philosophy** Degree in International Community health from University of Oslo appealing NORAD's scholarship program for students with the highest academic achievement in developing countries. A bit earlier than that I studied behavioural and social sciences in my undergraduate study in Ethiopia. Besides, I was granted with Masters Level in Global Health from John Hopkins School of Public Health e-learning. I have also a post graduate diploma in HIV/AIDS (Sweden); post-graduate diploma in Nutrition (Norway); attend Certified Chartered Accountant (UK), etc. Furthermore, I have nearly **20 years of work experience** as mainly public health practitioner in various organizations such as the World Bank - Public Health Specialist (Consultant); Country Director for Maternity Worldwide; United Nations Population Fund (UNFPA) as Programme Officer for HIV/AIDS & Adolescent and Youth Reproductive health (AYRH); Christian Aid International (a UK and Ireland based organization) as East Africa and the Horn team, Ethiopia CO HIV/AIDS programme Manager; UNDP as Regional Program Coordinator; CARE international as programme team leader; Operation Mission for the Visually Impaired in Ethiopia (OMVIE) as project coordinator, etc. including University mentor and freelance consultant.

Currently, I am working my Ph.D. research. The title of my study is "**Maternal Mortality and Newborn Death in Ethiopia: An in-depth investigation into and developing a framework to reduce them**". The purpose of this study was to determine and explore factors contributing to maternal mortalities and newborn deaths in Ethiopia in order to be able to develop a framework to enhance/strengthen the maternal and neonatal health service provision. Thus, I'm collecting information on the causes of maternal and newborn death in the community. For my study, I need to collect information both in health facilities and specific participants in the community. I want to ask participants about the circumstances leading to the death of the deceased. Whatever information I collect will be kept strictly confidential. No information identifying the participants or the deceased will ever be released to anyone outside of this information-collection activity. Participation in this survey will be voluntary and participants can choose not to answer any individual question or all of the questions. Participants may also stop the interview completely at any time. However, we hope that participants will participate in this survey since the results will help the government and non-governmental development programmes working on maternal health to improve services for the people. For more information, please find attached a copy of the research proposal for your review.

Now, I'm requesting your respective office to give me a letter of support to access health facility record and respective care givers of the deceased mothers and newborn to pursue my studies in three regional states; namely, Oromiya, Amhara and Southern Nations and Nationalities (SNNP).

My kindest regards,

Sincerely truly,
Yonas Regassa Guta

E-mail: yonassreg@yahoo.com
Tel: +251 91 2603495

P. o. Box: 27474
Addis Ababa
Ethiopia

APPENDIX 5: PERMISSION LETTER TO ACCESS HEALTH FACILITY RECORD FROM THE MOH

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Federal Democratic Republic of Ethiopia
 Ministry of Health

ቀን 4/12/2007
 Date
 ቁጥር 002119/44/44
 Ref No.

ለሳይንስና ቴክኖሎጂ ሚኒስቴር
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ጉዳይ:- ትብብር እንዲደረግላቸው ስለመጠየቅ

በUniversity of South Africa, College of Human Sciences የዶክተራል ጥናት ካንዲዳት የሆኑት አቶ ዮናስ ረጋሳ ጉታ በአማራጭ በደቡብ እና በአሮሚያ ክልሎች በተመረጡ ወረዳዎች ውስጥ "Development of a framework for the reduction of maternal mortalities and newborn deaths in Ethiopia" በሚል ርዕስ ጥናት ለማድረግ እንደመጡና ትብብር እንዲደረግላቸው በጁላይ 29/015 ዩኒቨርሲቲው ያፀደቀውን ፕሮግራም በማያያዝ ጠይቀውናል።

ስለሆነም የጥናቱ ውጤት እየተገበርነው ላለው የእናቶችና የጨቅላ ህፃናት የጤና ሁኔታ ማሻሻል ስራ እገዛ የሚያደርግ በመሆኑ ለስራቸው መቃናት በሚኒስቴር መሥሪያ ቤታችሁ አስፈላጊው እገዛና ድጋፍ እንዲደረግላቸው እንጠይቃለን።

ግልጻዎ/

- ☞ ለእናቶችና ህፃናት ጤና ዳይሬክቶሬት ጤና ጥበቃ
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ከሰላምታ ጋር
 አዲህ ተክሌ ለግዛቱ (ዶ/ር)
 የእናቶችና ህፃናት ጤና ዳይሬክቶሬት
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 251-(0)11-5159869 251-(0)11-5524549 Ethiopia
 251-(0)11-5518031

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 In reply Please Refer to our Ref. No.

APPENDIX 6: MATERNAL DEATH – VERBAL AUTOPSY QUESTIONNAIRE

Case Review Number:

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 Date of interview:

--	--	--	--	--	--

PART A: INTERVIEWER VISITS

QA01: Regional State:	Amhara.....1	Oromiya.....2	SNNPS.....3
QA02: Name of Reference person.....			
QA03: Residential site (Kebele):			
QA04: House number.....			
QA05 : Residential status of the deceased	Resident in enumeration area.....1		
	Body brought home for burial.....2		
	Home-coming for delivery (Child birth).....3		

Informed Consent Statement

Hello. My name is YonasRegassaGuta and I am working my Ph.D. research. Thus, I'm collecting information on the causes of maternal and newborn death in community. I would very much appreciate your participation in this effort. I want to ask you about the circumstances leading to the death of the deceased. Whatever information you provide will be kept strictly confidential. No information identifying you or the deceased will ever be released to anyone outside of this information-collection activity. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. You may also stop the interview completely at any time without any consequences at all. However, we hope that you will participate in this survey since the results will help the government and non-governmental development programmes working on maternal health to improve services for people. vis-a-vis

At this time, do you want to ask me anything about the purpose or content of this interview?

May I begin the interview now?

Signature of interviewee:..... Date:

Respondent agree to be interviewed1 Respondent does not agree to be interviewed.....2

PART B: SELECTION OF PEOPLE TO BE INTERVIEWED

No.	Questions and filters	Coding Categories	Skip to
QB01	Who was looking caring for the woman before her death? <i>More than one answer is possible</i> If Other relative, please specify _____	Husband 1 Mother 2 Mother-in-law 3 Father 4 Sister 5 Brother 6 Brother-in-law 7 Son 8 Daughter 9 TBA 10 Other relative 11 No relation 12	
QB02	Who was around at the time of the woman's death? If Other, please specify _____	Husband 1 Mother 2 Mother-in-law 3 Father 4 Sister 5 Brother 6 Brother-in-law 7 Son 8 Daughter 9 TBA 10 Other relative 11 No relation 12	
QB03	If woman was married and husband hasn't been mentioned: Ask: Was her husband around (i.e. in the village) just before she died?	Yes 1 No 2 Not married 3 Dead 4	

PART C: LISTING OF PEOPLE WHO PARTICIPATED IN THE INTERVIEW

Name	Relationship to woman	Present when the woman		When they joined/left the interview
		Ill	Died	

SECTION 1: BACKGROUND

No	Questions and filters	Coding Categories	Skip to
Q101	How long ago did the woman die? <i>(write down what is said and code in months)</i>	Months _ _	
Q102	How old was the woman when she died?	Years _ _ Don't know 9	
Q103	Where did the death occur? If at health facility, specify _____	Home 1 Health facility 2 During transport 3 Don't know 9	
Q104	Was the death due to an accident?	Yes 1 No 2 Don't know 9	
Q105	Do you know the cause of death? If Yes, specify _____	Yes 1 No 2	
Q106	Do you have a death certificate? If yes, ask permission for photocopying	Yes 1 No 2	
Q107	Do you know if the woman, before she died, had any long term medical problems? (i.e. hypertension, diabetes, epilepsy.....) If yes, specify: _____	Yes 1 No 2 Don't know 9	→Q109 →Q109
Q108	Was she on treatment for this illness? If yes, specify _____	Yes 1 No 2 Don't know 9	
Q109	What was her marital status? If married or living together, specify her husband Name _____	Never Married 1 Married /Living together 2 Widowed 3 Divorced 4 Separated 5 Don't know 6	
Q110	Has she ever been to school (formal education) <i>If yes: What was the highest level she attended</i> <i>(Unknown = 99)</i>	No formal education 1 Primary 2 Secondary 3 Technical 4 University 5 Don't know 9	
Q111	What was her occupation? , that is, what kind of work did s/he mainly do? Specify		
Q112	If married, answer the following questions 112 and 113 for her husband, otherwise for the head of the compound or household: What was the highest level of school he attended <i>(Unknown = 99)</i>	No formal education 1 Primary 2 Secondary 3 Technical 4 University 5 Don't know 9	
Q113	What is the husband's occupation? Specify		
Q114	Was she pregnant when she died?	Yes 1 No 2 Don't know 9	→Q117 →Q117
Q115	How long was she pregnant?	Months _ _ Weeks..... _ _ Don't know.....9	

Q116	How many pregnancies had she had, including this one?	Pregnancies _ _ Don't know.....9	
Q117	What was the outcome of her last pregnancy?	Live birth 1 Stillbirth 2 Abortion/miscarriage 3 Mother and child died after labor began 4 Mother died during pregnancy but before labor began 5	
Q118	How many days after giving birth did she die?	Days..... _ _ Don't know.....9	
	Is the child from this pregnancy still alive?	Yes 1 No 2 Don't know 9	

SECTION 2: FAMILY OR COMMUNITY'S ACCOUNT OF EVENTS AROUND THE WOMAN'S DEATH AND ILLNESS

Give an introduction explaining that we would like them to tell us what happened:

1. Around the woman's death (final hours)
2. From the time the woman started to become ill to her death

Try and create a time line based on what they say if the story is complicated (attached at back of survey).

SECTION 3: SYMPTOMS

Fill in based on history but if the material has not been covered ask the following questions:

Q301	How long had the woman been ill before she died? (Your best guess from what the reporters have said!!)		
Q302	What symptoms did the woman have when she died or just before she died? (What did she say and what did you observe?):		
Q303	What symptoms did the woman have when her illness started? (What did she say and what did you observe?):		

For deaths during pregnancy and prior to the onset of labour go to Section 4

For deaths during pregnancy but after onset of labour go to Section 5

For all other deaths go to Section 6

SECTION 4: DEATHS DURING PREGNANCY, PRIOR TO ONSET OF LABOUR (LAST 3 MONTHS OF PREGNANCY): SYMPTOMS

No	Questions and filters	Coding categories	Skip to
Q401	During the last 3 months of pregnancy, did she suffer from vaginal bleeding?	Yes 1 No 2 Don't know 9	
Q402	Did she suffer from smelly vaginal discharge?	Yes 1 No 2 Don't know 9	
Q403	Did she suffer from puffy face?	Yes 1 No 2 Don't know 9	
Q404	During the last 3 months of pregnancy, did she suffer from headache?	Yes 1 No 2 Don't know 9	
Q405	Did she suffer from blurred vision?	Yes 1 No 2 Don't know 9	
Q406	During the last 3 months of pregnancy, did she suffer from convulsion?	Yes 1 No 2 Don't know 9	
Q407	Did she suffer from febrile illness?	Yes 1 No 2 Don't know 9	
Q408	Did she suffer from severe abdominal pain that was not labour pain?	Yes 1 No 2 Don't know 9	
Q409	Did she suffer from pallor and shortness of breath (both present)?	Yes 1 No 2 Don't know 9	
Q410	Did she suffer from any other illness? Specify		
Q411	Did she have her blood pressure taken	Yes 1 No 2 Don't know 9	→Q413 →Q413
Q412	Did she tell you what the blood pressure results were? If told.....what was the result?	High 1 Normal 2 Weren't told 3 Don't know 9	
	<i>Questions about her final illness/death</i>		
Q413	During her final illness, was she bleeding from the vagina?	Yes 1 No 2 Don't know 9	→Q417 →Q417
Q414	Did the bleeding wet her clothes, the bed or the floor?	Yes 1 No 2 Don't know 9	
Q415	Was anything done to stop the bleeding? If Yes, specify _____	Yes 1 No 2 Don't know 9	
Q416	Was she in pain while bleeding?	Yes 1 No 2 Don't know 9	
Q417	Did she have any other episodes of bleeding during her pregnancy?	Yes 1 No 2 Don't know 9	→Q419 →Q419
Q418	Were they painful?	Yes 1 No 2 Don't know 9	
Q419	Did she have high fever during her final illness?	Yes 1 No 2 Don't know 9	

Q420	Did she have yellow discoloration of the eyes at the time of her death?	Yes 1 No 2 Don't know 9	
Q421	Was she short of breath at the time of death?	Yes 1 No 2 Don't know 9	
Q422	Had she been ill with another illness during this pregnancy? If yes, specify _____	Yes 1 No 2 Don't know 9	

SECTION 5: DEATHS DURING LABOUR, DELIVERY OR WITHIN 6 WEEKS AFTER DELIVERY: SYMPTOMS

No	Questions and filters	Coding categories	Skip to
Filter	<i>Only ask the questions in this section if the woman died during labour/delivery or within 6 weeks after delivery</i>		
	<i>I would now like to ask you some questions about the woman's last delivery (.make clear that the relatives should talk about the one that is related to the death)</i>		
Q501	Did she die during labour, but undelivered? Did the woman die before the baby was born?	Yes 1 No 2 Don't know 9	→Q505
Q502	Where did the delivery take place? If health facility, specify..... (Hospital, Health centre or Health post)	Home 1 On way to health facility 2 Health facility 3 During referral 4 Don't know 9	
Q503	Who assisted at her delivery?	No one (by herself) 1 Relative (not Health W.) 2 Traditional Birth Attendant 3 Health Extension Workers 4 Nurse/midwife 5 Doctor 6 Don't know 9	
Q504	What type of delivery was it? Specify instrument used.....	Normal 1 Instruments used 2 Caesarean Section 3 Don't know 9	
Q505	How many months pregnant was she when labour began?	Months __ (99= don't know)	
Q506	Was she in good health when labour began?	Yes 1 No 2 Don't know 9	
Q507	Was there excessive vaginal bleeding on the day labour started?	Yes 1 No 2 Don't know 9	
Q508	Was there excessive vaginal bleeding during labour before delivering the baby?	Yes 1 No 2 Don't know 9	
Q509	Was there excessive vaginal bleeding after delivering the baby	Yes 1 No 2 Don't know 9	→Q513 →Q513
Q510	Was anything done to stop the bleeding? If Yes, specify _____	Yes 1 No 2 Don't know 9	
Q511	Was she in pain while bleeding?	Yes 1 No 2 Don't know 9	→Q513 →Q513
Q512	Did the pains start before the labour pains?	Yes 1 No 2 Don't know 9	
Q513	Did she have a vaginal examination during her illness?	Yes 1 No 2 Don't know 9	→Q515 →Q515
Q514	Did the vaginal examination increase/cause bleeding?	Yes 1 No 2 Don't know 9	
Q515	Did she have any other episodes of bleeding during her pregnancy?	Yes 1 No 2 Don't know 9	→Q517 →Q517

Q516	Were they painful?	Yes 1 No 2 Don't know 9	
Q517	Did she have high fever during her final illness?	Yes 1 No 2 Don't know 9	
Q518	Did she have foul smelling discharge during her final illness?	Yes 1 No 2 Don't know 9	
Q519	Was she yellow at the time of her death?	Yes 1 No 2 Don't know 9	
Q520	Was she short of breath at the time of death?	Yes 1 No 2 Don't know 9	
Q521	Had she been ill with another illness during this pregnancy? If yes, specify _____	Yes 1 No 2 Don't know 9	
Q522	Was the placenta delivered?	Yes 1 No 2 Don't know 9	→Q525 →Q525
Q523	Did she have difficulty in delivering the placenta?	Yes 1 No 2 Don't know 9	
Q524	How long after birth of the child was the placenta delivered?	Hours __ (99= don't know)	
Q525	How long was she in labour for? Was she in labour for unusual long (more than 24 hours)?	Hours __ (99= don't know)	
Q526	How many days after giving birth did she die?	Days __ (99= don't know)	

Section 6: Health seeking behaviour/contributing factors

Q601	Between the woman falling ill and dying did she seek or did you take her to see anyone for treatment?	Yes 1 No 2 Don't know 9	
	Where did she go? Fill in table Q602- unprompted column		→602
	Did she go to see anyone else? Fill in table Q602- unprompted column		→602
	For all those not mentioned: ask whether they went to see: Fill in table Q602- prompted column		→602

Q602. Fill in table

	Unprompted	Prompted
VHW		
TBA		
Dispensary		
Health post		
Health Centre		
Hospital		
Private Doctor		
Pharmacist		
Drug seller		
Traditional healer		
Herbalist		
Other, specify _____		

I would like to ask you some more questions about events around the final illness and death of the woman

Q603	In this period did you take the woman to see anyone for treatment?	Yes 1 No 2 Don't know 9	→Q606
Q604	Why not? _____ Prompt: Did you take the woman to see any traditional healers? If yes: continue	Yes 1 No 2 Don't know 9	→Q614 →Q614
Q605	Who did you go to see? Prompt: Did you go to see anyone else?		
Q606	Who was involved in making the initial decision that the woman should go for treatment?		
Q607	What prompted you to send the woman for treatment? (for example, what symptoms)		
Q608	Once the decision was made to take the woman for treatment did the woman go straight away?	Yes 1 No 2 Don't know 9	→611
Q609	Why not?		
Q610	How long was the delay?		
Q611	Was it difficult to find the funds to send the woman for treatment?	Yes 1 No 2 Don't know 9	
Q612	Where did the funds come from for the woman to go for her treatment? (i.e. who paid?)		

Q613. Once the decision was made to seek care

	Centre 1	Centre 2	Centre 3
a. How did the woman get there?			
b. How long did it take to get there?			
c. If by car/bus/cart: Did you have to pay for transport? If YES: who paid & and how much?			
d. When you got tohow long did you have to wait before the woman was seen?			
e. Who did she see?			
f. What did they do?			
g. What did they tell you?			
h. How much did you have to pay?			
i. Did they ask you to go and buy anything? If YES: How much was spent? Where did the money come from?			
j. Did they refer the woman?			
k. If YES: Where to? Did you go? If YES: next column If NO: why not?			

I. What did you do next?			
--------------------------	--	--	--

All maternal deaths

<i>I'd like to ask some general questions about health seeking behavior during the woman's pregnancy</i>			
Q614	Did she ever go for antenatal care during her pregnancy?	Yes 1 No 2 Don't know 9	→619 →619
Q615	How many times did she go for antenatal care?	□□□ (99= unknown)	
Q616	Is the antenatal or other health card still available? <i>If yes, ask permission for photocopying</i>	Yes 1 No 2 Don't know 9	
Q617	Do you know where she was asked to deliver?	Yes 1 No 2 Don't know 9	→619 →619
Q618	Where?		
Q619	Apart from ANC visits did she ever go for health care during the last pregnancy?	Yes 1 No 2 Don't know 9	→622 →622
Q620	Who did she go to see? Specify: <i>(more than one answer possible)</i>	TBA 1 Nurse/midwife 2 Doctor 3 Pharmacies 4 Drug seller 5 Traditional healer 6 Herbalist 7 Don't know 9	
Q621	Why did she go there?		

Only for women who died after delivery

Q622	Did she ever go for postnatal care?	Yes 1 No 2 Don't know 9	→626 →626
Q623	Who did she go to see? Specify: <i>(more than one answer possible)</i>	TBA 1 Nurse/midwife 2 Doctor 3 Pharmacies 4 Drug seller 5 Traditional healer 6 Herbalist 7 Don't know 9	
Q624	Did she go for a routine visit or for a specific problem?	Specific 1 Routine 2 Don't know 9	→626 →626
Q625	What was the problem?		

All deaths

Q626	Does the family give permission to examine any health records pertaining the woman?	Yes 1 No 2 Don't know 9	
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Section 7: All suspected maternal deaths:

Questions about pregnancy history

Q701	How many times had the woman been pregnant in total (including the one during which she died)?	□□□ (99= unknown)	
Q702	How many live births did she have?	□□□ (99= unknown)	
Q703	How many stillbirths did she have?	□□□ (99= unknown)	

Q704	How many abortions/stillbirths did she have?	_ _ (99= unknown)	
Q705	What was the woman's age at first pregnancy?	Years _ _	

Any additional notes or comments not included in the survey:

	Reliability of interview	Good 1 Indifferent 2 Bad 3	
	Is there anyone else who should be interviewed?	Yes 1 No 2	
	If YES: Instructions on how to find them		

END OF QUESTIONNAIRE (FOR TIME LINE SEE NEXT PAGE)

TIME LINE FOR SYMPTOMS/TREATMENT FROM THEIR START UP TO DEATH

Symptoms/Complaints

Start of
Illness-----Death
(Time interval)

APPENDIX 7: NEWBORN DEATH – VERBAL AUTOPSY QUESTIONNAIRE

Case Review Number:

Date of interview:

Part A: Interviewer Visits

QA01: Regional State:	Amhara.....1 Oromiya.....2 SNNPS.....3
QA02: Name of the VA respondent.....	
QA03: Residential site (Kebele):	
QA04: House number.....	

Informed Consent Statement

My name is Yonas Regassa Guta. I am working my Ph.D. research. The purpose of this study was to determine and explore factors contributing to maternal mortalities and newborn deaths in Ethiopia in order to be able to develop a framework to enhance/strengthen the maternal and neonatal health service provision. Hence, I am collecting information on the causes of maternal and newborn death in community. I would very much appreciate your participation in this effort. I want to ask you about the circumstances leading to the death of the deceased. Whatever information you provide will be kept strictly confidential. No information identifying you or the deceased will ever be released to anyone outside of this information-collection activity. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. You may also stop the interview completely at any time without any consequences at all. However, we hope that you will participate in this survey since the results will help the government and non-governmental development programmes working on maternal health to improve services for people.

At this time, do you want to ask me anything about the purpose or content of this interview?

May I begin the interview now?

Signature _____ of _____ interviewee:..... Date: _____

Respondent agree to be interviewed1 Respondent does not agree to be interviewed.....2

PART B: SELECTION OF PEOPLE TO BE INTERVIEWED

No.	Questions and filters	Coding Categories	Skip to
	Name of the respondent	Name.....	
QB01	What is your relationship with the deceased baby?	Father 1 Mother 2 Sibling 3 Other relative 4 (Specify)..... No relation	
QB02	Did you live with the deceased in the period leading to her/his death?	Yes 1 No 2	

SECTION 1: INFORMATION ON THE DECEASED AND DATE/PLACE OF DEATH

No	Questions and filters	Coding Categories	Skip to
Q101	What was the name of the deceased?	Name.....	
Q102	Was the deceased female or male? Record '9' if don't know day or month Record '98' if don't know the year	Day..... __ __ Months..... __ __ Year..... __ __	
Q103	How old was the deceased when s/he died?	Age _____ in Days..... __ __	
Q104	When did s/he die? Record '9' if don't know day or month Record '98' if don't know the year	Day..... __ __ Months..... __ __ Year..... __ __	
Q105	Where did the death occur? If at health facility, specify _____	Home 1 Health facility 2 Don't know 9	

SECTION 2: RESPONDENTS ACCOUNT OF ILLNESS/EVENTS LEADING TO DEATH

Could you tell me about the illness/events that led to her/his death?

.....

.....

.....

.....

.....

Cause of death 1 according to respondent

.....

.....

Cause of death 2 according to respondent

.....

.....

SECTION 3: PREGNANCY HISTORY

No	Questions and filters	Coding Categories	Skip to
	I would like to ask you some questions concerning the mother and symptoms that the deceased had/showed at birth and shortly after. Some of these questions may not appear to be directly related to the baby's death. Please bear with me and answer all the questions. They will help us to get a clear picture of all possible symptoms that the deceased had.		
Q301	How many births, including stillbirths, did the baby's mother have before this baby?	Number of birth/stillbirth.. __ __ Don't know.....9	
Q302	How many weeks was the pregnancy when the baby was born?	Months..... __ __ Don't know.....9	
Q303	Did the pregnancy end earlier than expected?	Yes 1 No 2 Don't know 9	→Q305 →Q305
Q304	How many weeks before the expected date of delivery?	Yes 1 No 2	

		Don't know 9	
Q305-309	During the pregnancy did the mother suffer from any of the following known illnesses:	Yes 1 No 2 Don't know 9	
Q305	High blood pressure?	Yes 1 No 2 Don't know 9	
Q306	Heart disease?	Yes 1 No 2 Don't know 9	
Q307	Diabetes?	Yes 1 No 2 Don't know 9	
Q308	Epilepsy/convulsion?	Yes 1 No 2 Don't know 9	
Q309	Did she suffer from any other medically diagnosed illness? Specify.....		
Q310-319	During the last 3 months of pregnancy did the mother suffer from any of the following illnesses:		
Q310	Vaginal bleeding?	Yes 1 No 2 Don't know 9	
Q311	Smelly vaginal discharge?	Yes 1 No 2 Don't know 9	
Q312	Puffy face?	Yes 1 No 2 Don't know 9	
Q313	Headache?	Yes 1 No 2 Don't know 9	
Q314	Blurred vision?	Yes 1 No 2 Don't know 9	
Q315	Convulsion?	Yes 1 No 2 Don't know 9	
Q316	Febrile illness?	Yes 1 No 2 Don't know 9	
Q317	Severe abdominal pain that was not labor pain?	Yes 1 No 2 Don't know 9	
Q318	Pallor and shortness of breath (both present)?	Yes 1 No 2 Don't know 9	
Q319	Did she suffer from any other illness? Specify		
Q320	Was the child a single or multiple birth?	Singleton.....1 Twin.....2 Triple or more.....3 Don't know.....9	→Q401
Q321	What was the birth order of the child that died?	First.....1 Second.....2 Third or higher.....3 Don't know.....9	

SECTION 4: DELIVERY HISTORY

No	Questions and filters	Coding categories	Skip to
Q401	Where was the child born? If _____ health _____ facility, specify..... (Hospital, Health centre or Health post)	Home 1 On way to health facility 2 Health facility 3 During referral 4 Don't know 9	
Q402	Who assisted at her delivery?	No one (by herself) 1 Relative (not Health W.) 2 Traditional Birth Attendant 3 Health Extension Workers 4 Nurse/midwife 5 Doctor 6 Don't know 9	
Q402	When did the water break?	Before labour started 1 During labour 2 Don't know 9	
Q403	How many hours after the water broke was the baby born?	Less than 24 hours 1 24 hours or more 2 Don't know 9	
Q404	Was the water foul smelling?	Yes 1 No 2 Don't know 9	
Q405	Did the baby stop moving in the womb?	Yes 1 No 2 Don't know 9	→Q407 →Q407
Q406	When did the baby stop moving in the womb?	Before labour started 1 During labour 2 Don't know 9	
Q407	Did a birth attendant listen for fetal heart sounds during labour?	Yes 1 No 2 Don't know 9	→Q409 →Q409
Q408	Were fetal heart sounds present?	Yes 1 No 2 Don't know 9	
Q409	Was there excess bleeding on the day labor started?	Yes 1 No 2 Don't know 9	
Q410	Did the mother have a fever on the day labor started?	Yes 1 No 2 Don't know 9	
Q411	How long did the labor pains last?	Less than 12 hours 1 12-23 hours 2 24 hours or more 3 Don't know 9	
Q412	What type of delivery was it? Specify instruments used.....	Normal 1 Instruments used 2 Caesarean Section 3 Don't know 9	
Q413	Which part of the baby came first?	Head 1 Bottom 2 Feet 3 Arm/Hand 4 Other (Specify).....5 Don't know 9	
Q414	Did the umbilical cord come out before the baby was born?	Yes 1 No 2 Don't know 9	

SECTION 5: CONDITION THE BABY SOON AFTER BIRTH

No	Questions and filters	Coding categories	Skip to
Q501	At birth what was the size of the baby?	Smaller than normal 1 Normal 2 Larger than normal 3 Don't know 9	→Q505
Q502	Was the baby premature?	Yes 1 No 2 Don't know 9	→Q504 →Q504
Q503	How many months or weeks along was the pregnancy? Indicate period of pregnancy	Months Weeks Don't know 9	
Q504	What was the birth weight of the baby?	Kilograms .	

		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Don't know 9	
Q505	Was anything applied to the umbilical cord stump after birth?	Yes 1 No 2 Don't know 9	→Q507 →Q507
Q506	What was it? Specify		
Q507	Were there any signs of injury or broken bones?	Yes 1 No 2 Don't know 9	→Q509 →Q509
Q508	Where were the marks or signs of injury? Specify		
Q509	Was there any sign of paralysis?	Yes 1 No 2 Don't know 9	
Q510	Did the baby have any malformation?	Yes 1 No 2 Don't know 9	→Q512 →Q512
Q511	What kind of malformation did the baby have?	Swelling/defect on the back 1 Very large head 2 Very small head 3 Defect of lip and/or plate 4 Other malformation (Specify)..... ..5 Don't know 9	
Q512	What was the color of the baby at birth?	Normal 1 Pale 2 Blue 3 Don't know 9	
Q513	Did the baby breathe after birth, even a little?	Yes 1 No 2 Don't know 9	
Q514	Did the baby given assistance to breathe?	Yes 1 No 2 Don't know 9	
Q515	Did the baby ever cry after birth, even a little?	Yes 1 No 2 Don't know 9	
Q516	Did the baby move, even a little?	Yes 1 No 2 Don't know 9	
Q517	Check 513, 515 and 516 for codes 'No' All three codes 'No': The baby don't breath, The baby don't cry, The baby don't move	Other	→Q601
Q518	If the baby did not cry, breath or move, was it born dead?	Yes 1 No 2 Don't know 9	→Q601 →Q601
Q519	Was the baby macerated, that is, showed signs of decay?	Yes 1 No 2 Don't know 9	→Q801 →Q801 →Q801

SECTION 6: HISTORY OF INJURIES/ACCIDENTS

Q601	Did the baby suffer from any injury or accident that led to her/his death?	Yes 1 No 2 Don't know 9	→604 →604
Q602	What kind of injury or accident did the baby suffer?	Road traffic accident 1 Fall 2 Drowning 3 Poisoning 4 Burn 5 Violent/Assault 6 Other 7 (Specify)..... Don't know 9	
Q603	Was the injury or accident intentionally inflicted by someone else?	Yes 1 No 2 Don't know 9	
Q604	Did the baby suffer from any animal/insect bite that led to her/his death?	Yes 1 No 2 Don't know 9	→701 →701
Q605	What type of animal/insect?	Dog 1 Snake 2 Insect 3 Other 4 (Specify)..... Don't know 9	

SECTION 7: NEONATAL ILLNESS HISTORY

Q701	Was the baby ever able to suckle or bottle-feed?	Yes 1 No 2 Don't know 9	→Q705 →Q705
Q702	How soon after birth did the baby suckle or bottle-feed?	Hours __ Days __ Don't know 9	
Q703	Did the baby stop suckling or bottle-feeding?	Yes 1 No 2 Don't know 9	→Q705 →Q705
Q704	How many days after birth did the baby stop suckling or bottle-feeding?	Days __ Don't know 9	
Q705	Was the breastfeeding exclusive?	Yes 1 No 2 Don't know 9	
Q706	Did the baby have convulsions?	Yes 1 No 2 Don't know 9	→708 →708
Q707	How soon after birth did the convulsions start?	Days __ Don't know 9	
Q708	Did the baby become stiff and arched backwards?	Yes 1 No 2 Don't know 9	

Q709	Did the child have bulging of the fontanelle?	Yes 1 No 2 Don't know 9	→711 →711
Q710	How many days after birth did the baby have the bulging?	Days __ __ Don't know 9	
Q711	Did the baby become unresponsive or unconscious?	Yes 1 No 2 Don't know 9	→713 →713
Q712	How many days after birth did the baby become unresponsive or unconscious?	Days __ __ Don't know 9	
Q713	Did the baby have a fever?	Yes 1 No 2 Don't know 9	→715 →715
Q714	How many days after birth did the baby have a fever?	Days __ __ Don't know 9	
Q715	Did the baby become cold to the touch?	Yes 1 No 2 Don't know 9	→717 →717
Q716	How many days after birth did the baby become cold to the touch?	Days __ __ Don't know 9	
Q717	Did the baby have a cough?	Yes 1 No 2 Don't know 9	→719 →719
Q718	How many days after birth did the baby start to cough?	Days __ __ Don't know 9	
Q719	Did the baby have fast breathing?	Yes 1 No 2 Don't know 9	→721 →721
Q720	How many days after birth did the baby start breathing fast?	Days __ __ Don't know 9	
Q721	Did the baby have difficulty breathing?	Yes 1 No 2 Don't know 9	→726 →726
Q722	How many days after birth did the baby start having difficulty in breathing?	Days __ __ Don't know 9	
Q723	Did the baby have chest indrawing?	Yes 1 No 2 Don't know 9	
Q724	Did the baby have grunting? DEMONSTRATE	Yes 1 No 2 Don't know 9	
Q725	Did the baby have flaring of the nostrils?	Yes 1 No 2 Don't know 9	
Q726	Did the baby have diarrhea?	Yes 1 No 2 Don't know 9	→730 →730
Q727	How many days after birth did the baby have diarrhea?	Days __ __ Don't know 9	
Q728	When the diarrhea was most severe, how many times did the baby pass stools in a day?	Number __ __ Don't know 9	

Q729	Was there blood in the stools?	Yes 1 No 2 Don't know 9	
Q730	Did the baby have vomiting?	Yes 1 No 2 Don't know 9	→733 →733
Q731	How many days after birth did vomiting start?	Days _ _ Don't know 9	
Q732	When the vomiting was most severe, how many times did the baby vomit in a day?	No. of times a day _ Don't know 9	
Q733	Did the baby have abdominal distension?	Yes 1 No 2 Don't know 9	→735 →735
Q734	How many days after birth did the baby have abdominal distension?	Days _ _ Don't know 9	
Q735	Did the baby have redness or discharge from the umbilical cord stump?	Yes 1 No 2 Don't know 9	
Q736	Did the baby have a pustular skin rash?	Yes 1 No 2 Don't know 9	
Q737	Did the baby have yellow palms or soles?	Yes 1 No 2 Don't know 9	→801 →801
Q738	How many days after birth did the yellow palms or soles begin?	Days _ _ Don't know 9	
Q739	For how many days did the baby have yellow palms or soles?	Days _ _ Don't know 9	

SECTION 8: MOTHER'S HEALTH AND CONTEXTUAL FACTORS

Q801	What was the age of the mother at the time the baby died?	Years _ _ Don't know 9	
Q802	Did the mother receive antenatal care?	Yes 1 No 2 Don't know 9	
Q803	Did the mother receive tetanus toxoid (TT) vaccine?	Yes 1 No 2 Don't know 9	→805 →805
Q804	How many doses?	No. of doses _ _ Don't know 9	
Q805	How is the mother's health now?	Healthy 1 Ill (Sick) 2 Not alive 3 Don't know 9	

SECTION 9: TREATMENT AND HEALTH SERVICE USE FOR THE FINAL ILLNESS

Q901	Did the baby receive any treatment for the illness that led to death?	Yes 1 No 2 Don't know 9	→Q1001 →Q1001
Q902	Can you please list the treatments the baby was given for the illness that led to death? COPY FROM PRESCRIPTION/DISCHARGE NOTES IF AVAILABLE		
Q903	Please tell me at which of the following places or facilities the baby received treatment during the illness that led to death: Specify: <i>(more than one answer possible)</i>	Home 1 Traditional Healer 2 Government Health Facilities 3 Private Health Facilities 4 Pharmacy, Drug seller, Store 5 Traditional healer 6 Herbalist 7 Others (Specify)..... 8 Don't know 9	
Q904	In the month before death, how many contacts with formal health services did the baby have?	No. of contacts _ _ Don't know 9	
Q905	Did a health care worker tell you the cause of death?	Yes 1 No 2 Don't know 9	→Q1001 →Q1001
Q906	What did the health care worker say?		

SECTION 10: DATA ABSTRACTED FROM DEATH CERTIFICATE (IF ANY):

Q1001	Do you have a death certificate for the baby?	Yes 1 No 2 Don't know 9	→Q1101 →Q1101
Q1001	Can I see the death certificate? If yes, 1. Copy day, month and year of death from the death certificate 2. Copy day, month and year of issue of the death certificate	Yes 1 No 2	
Q1001	RECORD THE CAUSE OF DEATH FROM THE FIRST (TOP) LINE OF THE DEATH CERTIFICATE:		
Q1001	RECORD THE CAUSE OF DEATH FROM THE SECOND LINE OF THE DEATH CERTIFICATE (IF ANY):		

Q1001	RECORD THE CAUSE OF DEATH FROM THE THIRD LINE OF THE DEATH CERTIFICATE (IF ANY):
	RECORD THE CAUSE OF DEATH FROM THE FOURTH LINE OF THE DEATH CERTIFICATE (IF ANY):

SECTION 11: DATA ABSTRACTED FROM OTHER HEALTH RECORDS):

Q1001	Other health records available?	Yes 1 No 2	
Q1001	Burial permit (cause of death)		
Q1001	Postmortem results (cause of death)		
Q1001	MCH/ANC card (Relevant information)		
	Hospital prescription (Relevant information)		
	Treatment cards (Relevant information)		
	Hospital discharge (Relevant information)		
	Laboratory results (Relevant information)		
	Other hospital documents (Specify)		

Any additional notes, observations or comments not included in the survey:

	Reliability of interview	Good 1 Indifferent 2 Bad 3	
	Is there anyone else who should be interviewed?	Yes 1 No 2	
	If YES: Instructions on how to find them		

END OF QUESTIONNAIRE

APPENDIX 8: Maternal Deaths Taxonomy form Verbal Autopsy

Cause of death

Initials of reviewer |__|__|

Survey number. |__|__|__|

Name of deceased _____

Date review |__|__|/|__|__|__|/|__|__|__|__|

Suspected maternal death within 42 days post-partum (ICD 9): Yes/No

Suspected maternal death within 1 year post-partum (ICD 10): Yes/No

	Categories	Underlying cause(s)
Suspected maternal death	Direct cause	Level 1..... Level 2.....
	Indirect cause	Hepatitis Malaria TB Anemia Heart disease AIDS Injuries Other_____ Unknown
Suspected non maternal death	21 Chronic liver disease 22 Chronic renal disease 23 Diabetes 24 Malignancy 25 Maternal 26 Stroke 27 Under-nutrition 28Other_____ 29 Unknown	

Additional Comments

.....

B. Checklist contributing factors

Initials of reviewer |_|_|

Survey number. |_|_|_|

Name of deceased _____

Date review |_|_|/|_|_|_|_|/|_|_|_|_|

Summary contributing factors MORE THAN ONE ANSWER POSSIBLE		Importance of factor	
Level 1	Level 2	Probably would have avoided death	Possibly would have avoided death
Perception of illness in the community	Other perception of the disease		
	Not recognizing severity of the problem		
	Lack of knowledge of treatment-possibilities		
Decision making	Delay in decision-making process		
	Essential people in decision-making process not available		
	Disagreement in decision-making		
Resource constraints	Lack of transport		
	Lack of money		
Access to care	Delay in reaching health facility		
	Delay in getting to see professional health staff		
	Obstructions in getting care		
Quality of care	Substandard primary care		
	Substandard obstetric referral care		

Additional Comments

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APPENDIX 9: CONSENT FORM FOR THE DECEASED MOTHER'S/NEWBORN CARE GIVER

Dear sir/madam:

My name is Yonas Regassa Guta. I am conducting Ph.D. research as a student at the University of South Africa. The purpose of this study was to determine and explore factors contributing to maternal mortalities and newborn deaths in Ethiopia in order to be able to develop a framework to enhance/strengthen the maternal and neonatal health service provision. Hence, I am collecting information on the causes of maternal and newborn death in the community. I would very much appreciate your participation in this effort. I want to ask you about the circumstances leading to death of the mother and the newborn baby. Whatever information you provide will be kept strictly confidential. No information identifying you or the deceased will ever be released to anyone outside of this information-collection activity. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. You may also stop the interview completely at any time without any consequences at all. However, we hope that you will participate in this survey since the results will help the government and non-governmental development programmes working on maternal health to improve services for people.

At this time, do you want to ask me anything about the purpose or content of this interview? If you may have any, you are most welcome.

I agree to all the information mentioned above

Signature of the participant

The researcher:

Yonas Regassa Guta

Ph.D. in Health Studies
University of South Africa