

**STRATEGIES TO IMPROVE MATERNAL AND NEW-BORN CARE REFERRAL
SYSTEMS**

by

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submitted in accordance with the requirements

for the degree of

DOCTOR OF LITERATURE AND PHILOSOPHY

in the subject

HEALTH STUDIES

at the

UNIVERSITY OF SOUTH AFRICA

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NOVEMBER 2019

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DECLARATION

I declare that the thesis entitled “**STRATEGIES TO IMPROVE MATERNAL AND NEW-BORN CARE REFERRAL SYSTEMS**” 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.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.



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STRATEGIES TO IMPROVE MATERNAL AND NEW-BORN CARE REFERRAL SYSTEMS

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ABSTRACT

Maternal and newborn health is one of the main indicators of a good health system. The study wished to develop a strategy to improve the referral system for maternal and newborn care. To identify issues for improvement, the researcher explored the appropriateness of referrals, referral pathways and challenges, and provider costs for maternal and newborn care at health centres and hospitals levels. The researcher selected a sequential explanatory mixed method research design. Two primary hospitals and six health centres were purposively selected for participation.

The first phase collected quantitative data by reviewing the health facilities' medical records for services provided and health service costing, respectively. Data collection covered one Ethiopian fiscal year (8 July 2017 to 7 July 2018). Based on the existing human resource arrangement and care needs, the health service costing found that a single midwife at health centre level spent half of the expected time for delivery care. The cost estimates of various types of care delivery care indicated that delivery care at health centre and hospital levels cost \$27.5 to \$30.2, and \$34.7 to \$37.8, respectively. The primary hospitals incurred four times the cost for newborn intensive care units and Caesarean sections compared to normal delivery care.

In the second phase, the researcher collected qualitative data from 26 purposively selected key informants in interviews. The findings indicated that the selected hospitals and health centres had a referral system, but several factors impeded its effective implementation. Knowledge of referral pathways determined the referral practices at the lower level of the system. The number of inappropriate referrals to primary hospitals indicated a need to mobilize and educate the community on the services available and

protocols of care. In general, most referrals could have been managed at health centre level.

Emergency medical transportation is a critical component of the referral system; delays in transportation determine the outcome of care at hospital level. Ambulance management was generally poor, lacked a tracking system, and was negatively affected by confusion and lack of coordination between facilities. The available ambulances were not well equipped or well-staffed for emergency management. Moreover, there were frequent breakdowns due to limited budget for maintenance and running costs.

The quality of maternal care depends on the quality of the labour monitoring. However, partograph utilization was not consistently practised. Admitted cases were not properly monitored because of the high caseload and limited supervision support. In many cases, healthcare professionals tended to “treat charts” rather than promote evidence-based practice while providing care. The quality of practice was challenged by insecurity in the working environment but strengthened by good teamwork and available consultation support. The implementation of the existing referral system depended on the people involved; the use of performance indicators; follow up by management, and an accountability framework.

The findings of the two phases of the study and review of other countries’ experiences on the identified problems, led to the development of draft strategy and then a consultation with relevant experts produced the final strategy. The strategy includes interventions to improve the practices at the sending and receiving facilities as well as suggestions to improve the communication, transportation and overall governance system. Then, taking into consideration all the phases of the study, the researcher makes recommendations for practice and further research.

KEY CONCEPTS

Emergency obstetrics; newborn care; quality of care; referral system; strategies to improve referral system; health service cost; referral governance.

ACKNOWLEDGEMENTS

It is said that no feast comes to the table on its own feet. Likewise, no dissertation is the work of one person, therefore my heartfelt thanks and appreciation to all the following without whose support and contribution this study would not be what it is:

- Prof BL Dolamo, my supervisor, for her guidance, support and encouragement throughout the study.
- The Department of Health Studies Higher Degrees Committee of the University of South Africa, for permission to conduct the study.
- The Southern Nations and Nationalities Peoples Region's Health Bureau, the Zone Health Departments, and the management of the selected hospitals and facilities, for permission to conduct the study in their facilities.
- Selam Seyoum, for her support, understanding and taking the huge family responsibility during this course of journey, and Yohana and Nahom, our children, for their love, obedience and laughter.
- Fekadu Desta and Yehualawork Eshete, my parents, for their example, encouragement, continued follow up and confidence in me.
- My Colleagues at office, Zergu Tafesse, Agegneghu Sendeku, Tadelech Sinamo, Ermias Lerebo, Mulushewa Lemma, Habtamu Abdissa, Mesele Damte, Hailemariam Segni, and Eden Assefa, for their invaluable input and sharing their extra time, experience in the data collection, analysis and strategy development.
- The respondents, for sharing their time, experience, frustrations and perceptions.
- Abdulfetha Ali and Desalegn Lamiso, for their assistance with data collection.
- Bekele Belayhun and Ismael Ali for making data management and analysis seem so easy.
- Rina Coetzer, for professionally and patiently formatting and finalising the dissertation.
- lauma Cooper, for professionally and critically editing the dissertation.

Dedication

*To all the family educating, transporting, scrubs wearing,
foetal monitoring, cervix checking, contraction timing,
labour coaching, baby catching, life delivering health
work force.*

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LIST OF ABBREVIATIONS

| | |
|--------|-----------------------------------------------------|
| ANC | Antenatal Care |
| BEmONC | Basic Emergency Obstetric and Newborn Care |
| CEO | Chief Executive Officer |
| CEmONC | Comprehensive Emergency Obstetric and Newborn Care |
| CSA | Central Statistical Authority |
| FHR | Foetal Heart Rate |
| FMOH | Federal Ministry of Health |
| GA | Gestational Age |
| HC | Health Center |
| HEW | Health Extension Worker |
| HIV | Human Immunodeficiency Virus |
| HSS | Health systems strengthening |
| HO | Health Officer |
| HP | Health Post |
| HSTP | Health Sector Transformation Plan |
| MDGs | Millennium Development Goals |
| MDSR | Maternal Death Surveillance and Response |
| MCH | Maternal and Child Health |
| MNH | Maternal and Newborn Health |
| NICU | Newborn Intensive Care Unit |
| OR | Operations Room |
| PAC | Post-Abortion Care |
| PHCU | Primary Health Care Unit |
| PHCF | Primary Health Care Facilities |
| PMT | Performance Monitoring Team |
| PNC | Postnatal Care |
| PPH | Post-partum Haemorrhage |
| PROM | Premature Rupture of Membrane |
| QoC | Quality of Care |
| RH | Rhesus |
| RHB | Regional Health Bureau |
| SDGs | Sustainable Development Goals |
| SNNPR | Southern Nations, Nationalities, and Peoples Region |
| SPHMMC | Saint Paul's Hospital Millennium Medical College |
| SVD | Spontaneous Vaginal Delivery |
| TOT | Training-of-Trainer |
| TWG | Technical Working Group |
| UNDP | United Nations Development Program |
| VDRL | Venereal Disease Research Laboratory |
| WHO | World Health Organization |
| WRA | White Ribbon Alliance |
| ZHD | Zonal Health Department |

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Every year approximately 303,000 maternal deaths occur globally, with a disproportionate burden of these in Sub-Saharan Africa and Asia (Moran, Jolivet, Chou, DalGLISH, Hill, Ramsey, Rawlins & Say 2016:2). A 45% and 24% reduction in maternal and neonatal mortality was achieved between 1990 and 2013, respectively (Campbell, Sochas, Cometto & Matthews 2016:126). However, this significant decline in maternal and newborn mortality was uneven among various social strata (Baker, Peterson, Marchant, Mbaruku, Temu, Manzi & Hanson 2015:380) and did not achieve the Millennium Development Goals (MDGs) target of a reduction of the maternal mortality ratio (MMR) by 75% by 2015 (Moran et al 2016:2).

The eight MDGs (2005-2015) were replaced with the 17 sustainable development goals (SDGs) at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The SDGs are based on the principle of 'leaving no one behind' and designed to achieve a better and more sustainable future for all, with no poverty and hunger, good health and well-being, quality education, clean water and sanitation, clean energy, and climate action, amongst other goals. Sustainable development goal (SDG) 3: good health and well-being includes working towards the reduction of the global maternal and neonatal mortality rate (NMR) to achieve an MMR of less than 70 per 100,000 live births, and an NMR of less than 12 per 1,000 live births by 2030 (UNDP 2012).

Globally, half of all maternal deaths, one-third of stillbirths and one quarter of neonatal deaths are due to delivery-related complications (Pasha, Saleem, Ali, Goudar, Garces, Esamai, Patel, Chomba, Althabe, F, Moore, Harrison, Berrueta, Hambidge, Krebs, Hibberd, Carlo, Kodkany, Derman, Liechty, Koso-Thomas, McClure & Goldenberg 2015:8). In sub-Saharan Africa, where the majority of maternal and newborn problems exist and healthcare systems are weak, reducing the burden of the problems has been

difficult as the availability and quality of care are heterogeneous and often inadequate (Huchon, Arsenault, Tourigny, Coulibaly, Traore, Dumont & Fournier 2014:50). In Tanzania, weak health systems were not able to enhance effective coverage to reach all mothers and newborns with key interventions (Baker et al 2015:380). In Sri Lanka, mothers and neonates accessing the health service, especially in low-resource settings, received poor quality care and were thus exposed to preventable childbirth-related harm (Patabendige & Senanayake 2015:12).

In Malawi, poor quality clinical care affected health service utilisation and other problems by discouraging women from institutional delivery, encouraging mothers to bypass facilities with a bad reputation or delay seeking care and then arriving in critical condition (Bradley, Kamwendo, Chipeta, Chimwaza, De Pinho & McAuliffe 2015:67). Poor quality care eroded community trust and confidence and delayed the decision to seek care when complications arose (Bradley et al 2015:66).

An effective referral system is a critical component of the health system for the reduction of maternal mortality and morbidity due to obstetric complications (Chaturvedi, Randive, Diwan & De Costa 2014:1). The actions of lower-level health facilities with limited capacity affect the time required to complete the referral process for emergency case management. A study in Nigeria found that four-fifths (81%) of near misses were in serious condition upon arrival at the hospital (Adeoye, Ijarotimi & Fatusi 2015:83). An effective referral system should have formal communication and transport systems, capable receiving facilities, protocols for sending and receiving facilities, and take accountability for providers' performance (Tiruneh, Karim, Avan, Zemichael, Wereta, Wickremasinghe, Keweti, Kebede & Betemariam 2018:4). Suboptimal primary care referrals negatively impact patients and the system itself (Bosch, Escoda, Nicolás, Coloma, Fernández, Coca & López-Soto 2014:76).

1.2 BACKGROUND TO THE RESEARCH PROBLEM

Ethiopia has high maternal and neonatal mortality rates, with a maternal mortality ratio of 412 per 100,000 live births and a neonatal mortality of 29/1000 live births (CSA [Ethiopia] & ICF 2017:124, 252). Maternal complications and death significantly affect the ability of newborns to survive and thrive (Austin, Langer, Salam, Lassi, Das & Bhutta 2014:S1). The reduction of maternal mortality is beneficial for both mother and newborn

and depends on the availability of high-quality delivery care and a functioning referral system (Dewana, Gebremariam, Abdulahi, Fikadu & Facha 2017:31).

Austin et al (2014: S3) describe maternal and newborn care as care that is safe, effective, patient-centred, timely, efficient and equitable. In addition, health services need to be provided at different levels depending on the type of intervention patients require, and an effective referral system should be in place to ensure a close relationship between all levels of the health system (Ajwant 2013:713; WHO 2008a:1).

The WHO (2008a:2) defines a referral as “a process in which a health worker at a one level of the health system, having insufficient resources (drugs, equipment, skills) to manage a clinical condition, seeks the assistance of a better or differently resourced facility at the same or higher level to assist in, or take over the management of the client’s case”. The health system determinants and general determinants influence the design and functioning of a referral system. Health system determinants include but are not limited to capabilities of lower levels; availability of specialised personnel or trained providers, and organisational arrangements. General determinants include population size and density; terrain and distances between facilities; pattern and burden of disease; demand for and ability to pay for referral care (WHO 2008a:1).

Little or no coordination between different types of health facilities with consequent poorly developed referral linkages results in negative consequences for mothers and newborns (Hodgins 2013:149). In Mozambique, Chavane, Bailey, Loquiha, Dgedge, Aerts and Temmerman (2018:6) found that investment was required to strengthen referral linkages and build the capacity of facilities to rapidly diagnose and manage pregnancy-related complications. In remote rural areas in Uganda, Accorsi, Somigiana, Solomon, Ademe, Woldegebriel, Almaz, Zemedu, Manenti, Tibebe, Farese, Seifu, Menozzi and Putoto (2017:6) found strong communication and an ambulance-based referral system for EmONC highly cost effective.

In 2016, the institutional birth rate in Ethiopia was 26%, which was an improvement on previous years, but still ranked among the lowest in the world (Windsma, Vermeiden, Braat, Tsegaye, Gaym, Van den Akker & Stekelenburg 2017:1). Several factors contributed to low service utilisation including sociodemographic, cultural and communal

factors, limited access to health facilities, and poor quality of care in health facilities (Windsma et al 2017:1).

In 2017, the overall quality of delivery service was found to have fallen far below the recommended standards in some settings (Dewana et al 2017:35). Shortages of skilled human resources, infrastructure, drugs, supplies, equipment, and infection prevention materials were found in most health facilities. In addition, unrecorded and low correct partograph recordings were observed (Dewana et al 2017:35). The perception that services delivered at health centres were of poor quality led mothers to bypass primary health care centres and seek care from hospitals. Bypassing a midlevel facility resulted in higher costs and subsequent underutilisation of lower level health care facilities. The importance of strengthening the health care system to provide BEmONC at lower levels, even though the functionality differed, led the Ethiopian Government to upgrade the capacities of rural health centres to provide the required services (Tiruneh et al 2018:3).

1.3 STATEMENT OF THE PROBLEM

The Federal Ministry of Health (FMOH) of Ethiopia has expanded health facilities across the country. A lack of coordination between facilities, however, has negatively affected communities' trust and the efficiency of health service delivery (FMOH 2015a:41). The following factors impact negatively on the existing referral systems:

- Many primary hospitals' budgets are depleted before the end of each fiscal year and some request high running costs.
- Limited and varied utilisation of services provided at health centre level within the catchment areas of hospitals, which could also be linked to inefficient use of available resources (e.g. drugs, skilled health care providers).
- High client volumes at hospitals, which should have been managed at health centres, which could result in staff demotivation and burnout, and ultimately poor-quality service.
- High transportation and other direct and indirect costs and poor treatment at hospital level could affect future service seeking.
- Lack of or untimely communication between facilities is an important factor in saving maternal and newborn lives.

The above factors motivated the researcher to conduct the study to describe and explore factors responsible for inappropriate referrals and develop a strategy to improve effective coordination among health facilities.

1.4 PURPOSE OF THE STUDY

The purpose of the study was to formulate strategies to improve maternal and newborn health care referrals in the health system in Ethiopia.

1.4.1 Research objectives

In order to achieve the purpose, the objectives of the study were to:

- Map out a path, procedures and reasons for maternal and newborn care referrals among various levels of facilities.
- Estimate the proportion of inappropriate referrals within the primary level care facilities.
- Cost maternal and newborn care related services at various levels of the health system.
- Analyse the effects of current referral practices in the health system.
- Identify and reach consensus on key strategies to improve referrals in the health system.

1.4.2 Research questions

The study wished to answer the following questions:

- What is the route of referral services for maternal and newborn care?
- What proportion of mothers or newborns is referred to other facilities for appropriate reasons?
- What is the cost of material and newborn care related services at various levels of the health system – primary hospital and health centres?
- What problems do primary hospitals face due to referrals in the health system?

- What strategies can be introduced in the system to improve the referral system for maternal and newborn care?

1.5 SIGNIFICANCE OF THE STUDY

The expansion of primary health care facilities (PHCFs) and increasing numbers of cases presenting for care have made quality of services a major issue in Ethiopia. The quality of care at lower levels and communication between health facilities and professionals and interaction with clients emphasise the need to observe normal referral procedures at all levels. A breach of procedure at any stage has implications for providers and patients.

Identifying issues at various levels of care highlighted key focal areas. The developed referral improvement strategy should assist programme managers and service providers to respond to patients' needs, improve quality of care and promote efficient use of human and financial resources at lower levels of the PHC provision.

1.6 THEORETICAL FOUNDATIONS OF THE STUDY

A conceptual framework deepens understanding of the phenomenon under study and is crucial for knowledge on the phenomenon (Polit & Beck 2017:264; Grove, Burns & Gray 2013:117). A theory is a set of defined and interrelated concepts about a phenomenon and developed from abstract thoughts, findings, and lived experiences (Grove, Burns & Gray 2013:117). This study was based on Donabedian's (1988) model and Jahn and De Brouwere's (2001) referral chain model.

1.6.1 Donabedian's (1988) model

Quality of health care is becoming ever more important as access to institutional services, particularly antenatal and delivery care has significantly increased (Austin et al 2014:S3). As services are not provided at only one level or type of health facility, an appropriate referral service is part of quality health care. Quality of care can also be analysed using the Donabedian's (1988) conceptual model. The model has three categories: structure, process, and outcomes. Structure describes the context in which care is delivered, including hospital buildings, staff, financing, and equipment. Process

encompasses the transactions between patients and providers throughout the delivery of health care. Outcomes embody the effects of healthcare on the health status of patients and populations (Donabedian 1988:1745). This study used a modified version of Donabedian's model, which focused on the structure, including the role of multiple factors in the structure, namely community, facility and districts (Austin et al 2014:S4).

1.6.2 Referral chain model

The referral chain model has three components, namely sender, transport and receiver (Jahn & De Brouwere 2001:229). At the sender facilities, risk assessment, availability of referral guideline, quality of care, clinical judgement and availability of transportation were important factors. At the receiver facilities, quality of care, financial accessibility and preferential treatment were important factors to consider in the referral chain model (Chaturvedi et al 2014:2).

1.7 RESEARCH METHODOLOGY

This section briefly describes the research design and methodology used in the study. Chapter 3 describes the research design and methodology in detail.

1.7.1 Research design

A research design is the "overall plan for addressing a research question, including the specifications for enhancing the integrity of the study" (Polit & Beck 2017:12). The researcher used a mixed methods design for the study. Mixed method studies use a combination of qualitative and quantitative methods (Creswell & Creswell 2018:14; Parahoo 2014:81). The researcher conducted the study in two phases. Quantitative data was collected in phase 1 and qualitative data in phase 2. The researcher then developed the strategies to improve mother and neonatal referrals in the health system based on the quantitative and qualitative findings.

1.7.2 Research methodology

Research methodology is the plan for conducting the specific steps of a study (Groves et al 2013:230). The methodology includes the setting, population, sampling and sample, and data collection and analysis.

1.7.2.1 Study setting

A setting refers to the “physical site or location used to conduct a study and in which data collection takes place” (Polit & Beck 2017:743). The study was conducted in Addis Ababa, the capital city of Ethiopia. The health sector in Ethiopia is a three-tier health care delivery system. The first tier or level is a *woreda* or district health system comprising a primary hospital (with a population coverage of 60,000-100,000 people), health centres (PHC facilities serving a population of 15,000-25,000) and their satellite health posts (serving 3,000-5,000) that are connected to each other by a referral system (FMoH 2010:4). This study focused on first level health care delivery, especially maternal and newborn services.

1.7.2.2 Population

A population is “the entire aggregate of cases in which a researcher is interested” (Polit & Beck 2017:273). The researcher used two populations, namely records and participants.

- **Quantitative phase – Medical record review and health service costing**

In the quantitative phase, the population consisted of the primary hospital and health centre maternal and newborn records. With regards to health service costing, the maternal and newborn related services provided in the selected sites were costed.

- **Qualitative phase – Key informant interviews**

In the qualitative phase, the population consisted of health care workers providing direct MNH care at delivery and newborn intensive care units (NICUs) in sites.

1.7.3 Sample and sampling

A sample refers to a subset of a population (individuals, elements or objects) or a group selected to act as representatives of the population (Polit & Beck 2017:275). Sampling is the process of selecting participants, events, behaviours, or other elements that represent the population being studied (Grove et al 2013:357). In this study, the researcher selected a sample of sites, records and participants (informants).

1.7.3.1 Site sampling

The researcher used multistage sampling, a form of cluster sampling, to select the sites (Bordens & Abbott 2011:285). The researcher randomly selected the Southern Nations and Nationalities People's Region from the four clusters of regional states in Ethiopia. After selecting the region, based on the last Ethiopian Fiscal Year's instructional delivery performance, the researcher listed the primary hospitals in the region. Taking the median of performance, the primary hospitals formed two strata – high performing (above the median) and low performing (below the median). Two primary hospitals were randomly selected for the study. Based on the projected catchment population size, the two hospitals were expected to serve a population of 446,102 residing in two selected *woredas* in 2017.

Each of the primary hospitals had six (6) health centres in their catchment area. To select health centres, *kebeles* (villages) were divided into urban/city and rural, and two sites and one from urban and two from rural were randomly selected. Two hospitals and six health centres were included for facility level in phase 2 and phase 3 of the study.

1.7.3.2 Data source sampling

The researcher selected a sample of medical records for review and financial records for costing, and health care professionals for interviews.

- *Medical record review*

Using a case extraction sheet, all mothers and sick neonates who visited the selected facilities at delivery and NICU rooms from 8 July 2017 to 7 July 2018 were recorded.

Then, in consultation with the facility management, hospital catchment *kebeles* (villages) were identified. Cases who visited the facility from those *kebeles* (villages) were considered for detailed case reviews.

The sample size was determined by means of a single population proportion formula, using the following assumptions: hospital level delivery as 26.2% ($p=0.262$) (CSA [Ethiopia] & ICF 2017:149), level of significance as 5% ($\alpha=0.05$), $Z_{\alpha/2}=1.96$ and margin of error as 4% ($d=0.04$). Adding the design effect of 1.5 made the total sample size and 10% of non-response rate, the total size was 766 (Bruce, Pope & Stanistreet 2018:160). For the delivery case review, this number was proportionally distributed between the two selected facilities. For the sick neonates, all the sick neonates admitted in the NICU who fulfilled the inclusion criteria were considered for the study.

- *Health services costing*

Financial records and professionals working in the finance department of the selected primary hospitals and health centres were consulted to collect information on service costs during the last Ethiopian fiscal year.

- *Key informant interviews*

The researcher used purposive sampling to select the health workers working in the MCH department and management team of the selected hospitals and health centres and involved in the referral process.

1.7.4 Data collection

Data collection is the process of collecting information (data) related to research questions in a systematic way to address a research problem (Polit & Beck 2017:725). Three data-collection instruments were developed in English for data collection:

- Quantitative – Medical record review
- Quantitative – Health service costing
- Qualitative – Interviews with health workers

Data was collected as follows:

- *Medical record review*

The data extraction sheet contained pre-identified variables to be extracted from the medical records.

- *Service costing*

The researcher used a customised instrument based on the Federal Ministry of Health's Management Science for Health (MSH) core plus tool and National Health Accounts tool. This instrument captured all the costs related to service provision as well as common costs, such as staff salaries and benefits and other indirect costs, including equipment. The instrument included the number of cases that visited the facilities and demographic characteristics of the catchment population. The information assisted the researcher to divide common costs between MNH-related and other services.

- *Key informant interview guide*

The researcher developed the interview guide based on the Donabedian and referral chain models and the literature review. The guide collected information from the health workers working at the selected health centres and primary hospitals.

1.8 VALIDITY AND RELIABILITY

The quality of a research instrument is determined by its validity and reliability. Validity refers to the degree to which an instrument accurately measures what it is intended to measure (Goodman & Thompson 2017:142; Polit & Beck 2017:582). Reliability refers to "the likelihood that the instrument will obtain the same results time after time" (Goodman & Thompson 2017:142). Reliability refers to the degree of consistency or dependability with which the instrument measures the attributes it is designed to measure (Burns et al 2013:389).

1.8.1 Validity and reliability in the quantitative phase (medical record review and health service costing)

In the quantitative phase, the researcher ensured internal and external validity. Internal validity refers to how well a study is conducted, and confounding factors are controlled. External validity refers to the generalisability of the findings of the study to a larger population (Goodman & Thompson 2017:201). The researcher developed the instruments to generate valid information on the topic under study (Bordens & Abbott 2011:276-277).

The reliability of a data-collection instrument is concerned with stability and consistency. The stability of a questionnaire is the degree to which it produces similar results on being administered twice. If the same variable is measured under the same conditions, a reliable instrument will produce identical measurements and the measuring instrument will yield consistent numerical results each time it is applied (Polit & Beck 2017:331-332).

The researcher developed the quantitative and qualitative data-collection instruments based on the two models and the literature review. The researcher trained two data collectors in administering the questionnaires (Bordens & Abbott 2011:276).

1.8.2 Validity and reliability in the qualitative phase

In qualitative studies, the purpose of validity is to gain a deeper understanding of the phenomenon under study (Polit & Beck 2017:219). Internal and external validity in this case ensured the trustworthiness of the study. Trustworthiness refers to the confidence that qualitative researchers have in their data, using the strategies of credibility, dependability, confirmability, and transferability (Creswell & Creswell 2018:199). In addition, triangulation increased fidelity of the data interpretation by using multiple data-collection methods and sources (Kolb 2012:85).

1.9 DATA ORGANISATION AND ANALYSIS

Data analysis is the systematic organisation and synthesis of data to establish order, structure and meaning to qualitative data collected (Polit & Beck 2017:725; Botma et al 2010:220). Data analysis started during data collection.

1.9.1 Cleaning of the data sets

The researcher prepared a code book for the first phase – medical record review. The code book is a master copy of the questionnaire, with the question number, the question, the full range of valid codes including missing and 'do not apply' values written in it. Data cleaning was done at two levels: data entry level (controlled data entry), and simple frequency running and comparing findings. Based on the findings of the frequency tables, errors that occurred during data collection, coding and input were eliminated. In addition, missing values, skips, range checks and checks for inconsistency were made. There are two types of missing values: first, when a question is deliberately blank because it did not apply to the individual respondent (the respondent legitimately skipped it and was 'routed' round it); second, when a reply was expected but not given, which is known as an 'inadequate' response (Bowling 2014:372-379).

1.9.2 Quantitative data analysis

Once the data had been cleaned, using Stata version 11, the first step was to produce descriptive statistics, which helped to describe the findings and assess any skewness. Based on the distribution, data was further decoded, and measures of comparison made as required (Bowling 2014:381).

1.9.3 Qualitative data analysis

The qualitative data analysis commenced with reading and re-reading the transcribed interviews to identify contents and partners. Emerging themes and categories were identified, and a coding structure then prepared. The researcher used ATLAS.ti computer program for data organisation (Creswell & Creswell 2018:192). The

researcher identified themes, sub-themes and categories in order to map relationships between them (Tolley, Ulin, Mack, Robinson & Succop 2016:205).

1.10 STRATEGY FORMULATION

The researcher following a step wise approach developed and formulated key strategies to improve referrals in the health care system. The first step was understanding the issues around the existing practices with regards to referral system. During the second phases of the study, participants of the study were requested to provide suggestions for the problems they face. Based on the findings, the researcher further explored experiences at various countries and drafted a strategy to address the identified issues. Then, comments from service providers and programme managers were considered to refine the strategies.

1.11 ETHICAL CONSIDERATIONS

Ethics deals with matters of right and wrong. When humans are used as study participants, care must be taken in ensuring that their rights are protected (Polit & Beck 2017:748). Accordingly, the researcher obtained permission to conduct the study, obtained informed consent from the participants, and observed the ethical principles of beneficence, respect for human dignity, and justice (Polit & Beck 2017:748).

- **Permission**

The researcher obtained ethical approval and permission to conduct the study from the Department of Health Studies Higher Degrees Committee of the University of South Africa. Permission to conduct the study was also obtained from the Southern Nations and Nationalities Peoples Region's Health Bureau, the Zone Health Departments, and the management of the selected hospitals and facilities (Annexures 1 and 2).

- **Beneficence**

The principle of beneficence states that one should do good and, above all, do no harm (Grove et al 2016:98). The researcher assured the participants of the benefit of the findings and strategies to health care service.

- **Respect for human dignity**

Respect for human dignity refers to the right to self-determination and full disclosure (Polit & Beck 2017:173). The researcher explained the purpose, nature and significance of the study to the participants in the languages familiar to them. The participants were informed that participation was voluntary and that they could withdraw from the study at any time if they wished to do so. The participants were given the opportunity to ask any questions, and an information leaflet and informed consent form to sign. Once participants verbally agreed to participate, they were asked to sign the informed consent form.

- **Justice**

The principle of justice refers to the right to privacy and the right to fair treatment (Polit & Beck 2012:174). The researcher assured the participants of privacy, confidentiality and anonymity, and treated all the participants with respect and fairly. The researcher assured the participants that all the data would be treated with strict confidentiality and kept under lock and key, accessible only to the researcher.

1.12 DEFINITION OF KEY CONCEPTS

For the purposes of this study, the following key terms were used as defined below.

Health system. A health system consists of all organisations, people and actions whose primary intent is to promote, restore or maintain health (WHO 2011). In this study, the health system referred to the selected health care facilities and participants.

Referral. Referral is a process by which a health worker transfers the responsibility of care temporarily or permanently to another health professional or social worker or to the community in response to its inability or limitation to provide the necessary care (FMOH 2010:1).

Appropriateness of referral. The appropriateness of referrals can be defined by their distinct attributes, namely referral necessity, destination and quality (Blundell, Clarke & Mays 2010:184):

- Referral necessity refers to whether a patient with given characteristics is believed to be suitable for referral.
- Referral destination (or level) is associated with where or to whom the patient should be referred.
- Referral quality (or process) refers to aspects of how a referral is carried out, including factors such as whether investigations had been undertaken before referral, or information exchanged, and the level of patient involvement in the referral decision.

Fulfilling three of the attributes makes the referral *appropriate* but missing one of the elements makes the referral *inappropriate*.

Self-referral. Self-referral referred to ones made by patients themselves. Self-referrals meant presentation to the referral facilities by individual patients (Walter & Ajwant 2013:713).

Maternal and newborn (neonatal) care. This referred to care provided to the mother and newborn during delivery and neonatal period (birth to 28 days of life).

Health workers. This referred to the health professionals and non-health professionals (E.g. ambulance drivers) who do have contacts with the patient while implementing the referral system.

1.13 STRUCTURE OF THE DISSERTATION

The dissertation consists of seven chapters.

Chapter 1: Orientation to the study

This chapter introduces the background to and purpose of the study as well as the theoretical framework, research design and methodology and ethical considerations of the study.

Chapter 2: Literature review

This chapter discusses the literature review conducted for the study on maternal and newborn health issues and service delivery to mothers and newborns; coordination of health service delivery points, and the theoretical framework of the study.

Chapter 3: Research design and methodology

This chapter discusses the research design and methodology used in the study.

Chapter 4: Quantitative data analysis and interpretation and findings

This chapter discusses the quantitative data analysis and findings.

Chapter 5: Qualitative data analysis and interpretation and findings

This chapter discusses the qualitative data analysis and presents the findings.

Chapter 6: Development of strategy to improve referral system

This chapter describes the development of a strategy to improve referral systems at primary health care level.

Chapter 7: Conclusion and recommendations

This chapter summarises the findings and conclusions of the study and makes recommendations for further research.

1.14 CONCLUSION

This chapter described the research problem, purpose, research design and methodology, and ethical considerations of the study and defined key terms. As described in this chapter, the maternal and new-born care requires coordination of care between various levels of health care facilities as some of the problems are not predictable as well as the lower facilities are not capable of providing all the required

care. The chapter also outlined how mixed method study design was used to explore the situations and identify factors affecting coordination of care between facilities. Then, this chapter described the process of strategy development to respond to the problems identified.

Chapter 2 discusses the literature review conducted for the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 1 introduced the study and outlined the problem, purpose, research design and methodology of the study. This chapter discusses the literature review conducted for the study. A literature review is a source of information to develop study protocol and analysis of the findings (Grave et al 2013:608). The literature review covered the global maternal and newborn health status; major causes of maternal and newborn ill-health; quality of maternal and newborn care; referral systems; common indicators for referrals; causes of adverse outcomes at referral facilities; health care delivery systems, and maternal and newborn health in Ethiopia.

2.2 GLOBAL SITUATION OF MATERNAL AND NEWBORN HEALTH

A positive pregnancy experience encompasses a series of steps for maintaining physical and sociocultural normality, maintaining a healthy pregnancy for mother and baby, having an effective transition to positive labour and birth, and achieving positive motherhood (WHO 2016a::20). Maternal mortality remains unacceptably high, however, with approximately 303,000 maternal deaths occurring each year (Moran et al 2016:2). Although maternal and newborn mortality has been substantially reduced worldwide in recent years, progress has been uneven (Baker et al 2015:380). Moreover, sustainable development goal (SDG) 3: good health and well-being includes working towards the reduction of the global maternal and neonatal mortality rate to achieve an MMR of less than 70 per 100,000 live births, and an NMR of less than 12 per 1,000 live births by 2030 (UNDP 2012). Maternal mortality and maternal morbidity are serious health problems. In Malawi and Pakistan, for every woman who died, an estimated 20 or 30 women suffered non life-threatening maternal morbidity related to pregnancy and childbirth (Zafar, Jean-Baptiste, Rahman, Neilson & Van den Broek 2015:2).

In 2015, an estimated 2.6 million babies were stillborn (WHO 2016a:19). A stillbirth is defined as “a birth without signs of life (heartbeat, respiration or movement), with the

lower gestational age limit generally from 20 to 28 weeks” (Goldenberg, Saleem, Pasha, Harrison & McClure 2016:135). Most stillbirths occur in low- and middle-income countries (LMICs). Low socio-economic status, less education, women with a history of pregnancy losses or with complicated pregnancies, including multiple gestations, were identified as factors contributing to still birth. In addition, the quality of care at or near to the time of delivery is an important factor (McClure, Saleem, Goudar, Moore, Garces, Esamai, Patel, Patel, Chomba, Althabe, Pasha, Kodkany, Bose, Berreuta, Liechty, Hambidge, Krebs, Derman, Hibberd, Buekens, Manasyan, Carlo, Wallace, Koso-Thoma & Goldenberg 2015:2).

Low birth weight is another adverse effect of pregnancy. The WHO (2016a:1) defines low birth weight as “the weight at birth of less than 2500 grams”. Low birth weight infants are approximately 20 times more likely to die than heavier babies (Jacobs, Judd & Bhutta 2016:2). In 2010, 11.1% of all live births globally were preterm. Preterm birth contributes significantly to perinatal death and other neonatal adverse outcomes (Miyazaki, Garcia, Ota, Swa, Oladapo & Mori 2016:1).

2.3 MAJOR CAUSES OF MATERNAL AND NEWBORN ILL-HEALTH

Over 75% of maternal deaths are due to direct obstetric causes, such as severe bleeding, infection, complications of unsafe abortion, eclampsia, and obstructed labour (Lassi & Bhutta 2015:6). More than 40% of maternal deaths occur during the intrapartum period, and 45% of all maternal deaths during the postpartum period occur within the first 24 hours after delivery (Brenner, De Allegri, Gabrysch, Chinkhumba, Sarker & Muula 2015:2). These direct causes are preventable yet intrapartum care remains suboptimal in providing timely and appropriate administration of effective interventions to prevent and manage complications (Oladapo, Souza, Bohren, Tunçalp, Vogel, Fawole, Mugerwa & Gülmezoglu 2015:2).

Stillbirth is another problem in relation to maternal and newborn health. In low-middle income countries, the risk of stillbirth is related to lack of access to antenatal care and to quality obstetric care (McClure et al 2015:2). Since different conditions cause stillbirth, there is no single intervention to substantially reduce stillbirths. During antenatal care, some interventions prevent the occurrence of stillbirth but the biggest reductions occur through interventions while providing intrapartum care (Goldenberg et al 2016:135).

The majority of early neonatal deaths in LMICs were due to birth asphyxia (i.e., newborns' failure to initiate or maintain regular breathing at birth from various causes), prematurity, and septic infections (Brenner et al 2015:2). Major conditions contributing to infections include sepsis, pneumonia, meningitis and diarrhoea (Opiyo & English 2015:8). Between 25% and 45% of neonatal deaths occur within the first 24 hours, and close to 90% of deaths occur within the first 48 hours of newborn life (Brenner et al 2015:2). In Pakistan and other LMICs, delivery complications are responsible for 50% of all maternal deaths, 34% of stillbirths and 25% of neonatal deaths (Pasha et al 2015:8). In developing countries, most maternal, perinatal and neonatal deaths and morbidities occur at home because the majority of women give birth at home without the presence of skilled birth attendance (Lassi & Bhutta 2015:6).

Reducing maternal mortality and morbidity remains a major challenge in Sub-Saharan Africa as the availability and quality of care are heterogeneous and often inadequate (Huchon et al 2014:56). The high burden is attributable to patient and health system factors, including inability to recognise an impending complication, failure to reach an appropriate level of care in a timely manner, lack of appropriate care provision at the facility or to iatrogenic causes, such as from unsafe labour augmentation or unhygienic care practices (Pasha et al 2015:8). In addition, the availability of skilled health workers determines the provision of appropriate care (Opiyo & English 2015:8).

In many lower-income countries, limited access to safe and timely caesarean section is a major barrier to improving delivery outcomes (Vogel et al 2015: e260). Often health workers are compelled to practise evidence-based labour management in overcrowded and under-resourced health facilities (Oladapo et al 2015:2).

Caesarean delivery rates increased globally between 2004 and 2011, consequently the proportion of individuals with scarred uteri also increased (Vogel et al 2015: e267). In a study with 2,478 patients in a referral hospital in Dar es Salaam, Tanzania, Litorp, Rööst, Kidanto, Nyström and Essén (2016:183-187) found that previous caesarean delivery was not a risk factor for severe maternal outcomes or adverse perinatal outcomes. However, the participating individuals may have constituted a healthy group. Litorp et al (2016:187) stress that there could have been differences in terms of healthcare-seeking behaviour, referral mechanisms, extra partum monitoring and

clinical decision-making. Repeat caesarean deliveries are often more complicated than the first caesarean delivery, and have been associated with adhesion development, long operation times, injuries to the bladder and bowel, and blood transfusions. Avoiding medically unnecessary caesarean sections, unnecessary labour augmentation and encouraging a trial of vaginal birth after first caesarean sections may help reduce the increased rate of caesarean sections (Vogel, Moore, Timmins, Khan, Defar, Hadush, Terefe, Ba-Thike, Than, Makuwani, Mbaruku, Mrisho, Mugerwa, Ritchie, Rashid, Straus, GuÈlmezoglu, 2016a:8).

There is slow progress in preventing stillbirths and perinatal deaths. In order to identify the cause of perinatal deaths there is a need for a unifying global system (Allanson, Tunçalp, Gardosi, Pattinson, Erwich, Flenady, Frøen, Neilson, Chou, Mathai, Saya & Gülmezoglua 2016:79). To achieve the SDG targets, it is important to increase the coverage of quality essential services and simultaneously address the underlying social, political and economic determinants of maternal health across all settings (Moran et al 2016:2). The planning of interventions to improve maternal and perinatal health should consider local factors (Litorp et al 2016:187).

2.4 MAJOR INTERVENTIONS TO ADDRESS MATERNAL AND NEWBORN HEALTH-RELATED PROBLEMS

Maternal and newborn health (MNH) care includes activities whose primary purpose is to restore, improve and maintain the health of women and their newborns (Ebener, Guerra-Arias, Campbell, Tatem, Moran, Johnson, Fogstad, Stenberg, Neal, Bailey, Porter & Matthews 2015:19). Attaining these goals requires intensive interventions among various cycles of human life. The time around delivery and the postnatal period are the most critical period for both mother and newborn (Pasha et al 2015:8). Availability of services is important and services need to be accessible to women, acceptable to them and their families, and of good quality (Ebener et al 2015:20). Poor quality care is one of the factors that discourage women from utilising care (Campbell et al 2016:126). Campbell et al (2016:126) stress embracing the Global Strategy on Human Resources for Health and urgent action across high- and low-income countries together with a responsible accountability framework with measurable indicators.

2.4.1 Institution-based childbirth

Institution-based childbirth is a key strategy to reduce maternal and perinatal morbidity and mortality. However, poor quality of care at health facilities is a barrier to pregnant women and their families accessing skilled care. Rosen, Lynam, Carr, Reis, Ricca, Bazant, Bartlett et al (2015:306) point out that without improved quality of care provision, efforts to increase use of facility-based maternity care in low income countries will not succeed. Bartlett, Weissman, Gubin, Patton-Molitors and Friberg (2014:e98550) conducted a simulation of possible maternal, foetal, and newborn lives and costs saved by scaling up midwifery and obstetrics services, including family planning, in 58 LMICs. The study found that scaling up midwifery and obstetric interventions together could achieve a 79% decrease in maternal deaths, particularly when family planning services were included (Bartlett et al 2014).

Clinical care, from the start of labour to the early post-natal period, can be provided as routine or emergency care. Routine care includes identification, monitoring and management of non-complicated pregnancies and deliveries. Emergency care includes stabilising and life-saving clinical interventions, and the timely arrangement for effective referral of mother or newborn to higher levels of care (Brenner et al 2015:3). Both care processes have two preconditions: seeking skilled care from facilities and delivering high quality care to prevent and address complications that may arise (Rosen et al 2015:307).

In 2015, the WHO proposed the use of the Robson 10-group classification as a global standard for assessing, monitoring and comparing caesarean section rates within and between health care facilities. Robson's system classifies all women into one of 10 groups on the basis of five parameters: obstetric history (parity and previous caesarean section), onset of labour (spontaneous, induced, or caesarean section before onset of labour), foetal presentation or lie (cephalic, breech, or transverse), number of neonates, and gestational age (preterm or term) (Vogel et al 2015: e261). Depending on the nature of the pregnancy, BEmONC and CEmONC services might be needed. Globally, about 15% of expected births result in life-threatening complications (Otolorin, Gomez, Currie, Thapa & Dao 2015:S46).

2.4.2 Emergency obstetric and newborn care

There is general consensus on the need to include universally available and accessible good quality emergency obstetric care (EmOC) in health systems, and the presence of a professional skilled birth attendant at all births (Gropi, Somigliana, Pisani, Ika, Mabor, Akec, Nhial & Mading 2015:58). Signal functions of emergency obstetric and neonatal care (EmONC) provide information about life-saving interventions during labour management (Owens, Semrau, Mbeve, Musokotwane, Grogan, Maine & Hamer 2015:53). The concept of emergency obstetric and neonatal care provides a framework for the delivery of evidence-based clinical services (Olorin et al 2015:S47).

There is a need to expand the original seven signal functions to encompass activities related to routine care for mothers and newborns. Routine care helps providers to predict, prevent and intervene early to mitigate life-threatening complications. The functions include infection prevention and management for both mother and infant; monitoring and management of labour using the partograph; active management of the third stage of labour, and infant thermal protection, feeding, and HIV prevention (Olorin et al 2015:1S46-S53). Universal access to EmONC is considered essential to reduce maternal mortality, but the health system should also ensure that all pregnant women and newborns with complications have rapid access to well-functioning facilities that include a broad range of services and settings (Olorin et al 2015:S48).

2.4.3 Labour monitoring

There is general agreement that the identification and appropriate management of women at high risk of labour complications require cautious monitoring of progress throughout labour and childbirth, and timely application of effective maternal and newborn interventions. The partograph, a tool for this purpose, is poorly utilised in most low and middle-income countries (Bohren, Oladapo, Tunçalp, Wendland, Vogel, Tikkanen, Fawole, Mugerwa, Souza, Bahl, Gulmezoglu & WHO BOLD Research Group 2015:2). In LMICs the effective use of a partograph requires a supportive culture, adequate staffing and supplies (Ollerhead & Osrin 2014:285).

2.5 QUALITY OF MATERNAL AND NEWBORN CARE

This section discusses quality of maternal and newborn care under Donabedian's (1988) model; institution-based delivery and quality of care; human resources and quality of care; respectful maternal care, and quality of care and service utilisation.

2.5.1 Donabedian's (1988) model

Donabedian's model defines quality of care (QoC) in three categories: structure, process, and outcomes. Structure describes the context in which care is delivered, including hospital buildings, staff, financing, and equipment. Process encompasses the transactions between patients and providers throughout the delivery of health care. Outcomes embody the effects of healthcare on the health status of patients and populations (Donabedian 1988:1745).

In their study on the quality of facility-based labour and delivery care processes in Sub-Saharan Africa, Tripathi, Stanton, Strobino and Bartlett (2015:3) included medicines, equipment and provider training as part of structure; delivery of clinical procedures and treatment and client-provider interpersonal relationships as process, and changes in health status and patient satisfaction as outcomes. Triparthi, Stanton, Strobino and Bartlett (2015:4) found that process factors (provider and intervention) were associated with an 80-fold increase in risk of avoidable perinatal death, but structure factors (facility and context) increased the risk by 11-fold. Substandard practices by health workers in low resource settings required urgent attention to decrease maternal and perinatal deaths (Merali, Lipsitz, Hevelone, Gawande, Lashoher, Agrawal & Spector 2014:280). Oladapo et al (2015:2) emphasise that improving the quality of care during labour and childbirth is the most cost-effective strategy to save lives.

2.5.2 Institution-based delivery and quality of care

In Sri Lanka, a developing country, poor quality care during institutional births was one of the main contributing factors to the high rate of preventable maternal and neonatal morbidity and mortality (Patabendige & Senanayake 2015:12). Addressing the barrier of poor-quality care at health facilities is crucial to reduce the rates of maternal and perinatal mortality (Oladapo et al 2015:2; Campbell et al 2016:127). Improving quality of

care further requires appropriate use of effective clinical and non-clinical interventions that are sensitive to women's values and preferences, strengthened health infrastructure, and respectful attitudes of health providers (Vogel, Bohren, Tuncalp Oladapo & Gülmezoglu 2016a:672).

2.5.3 Human resources and quality of care

The human resource aspect of the health system is critical because quality, respectful care or clinical practice is channelled through health workers. Quality health care is dependent on skilled health care workers (Campbell et al 2016:127). To increase service utilisation requires improved quality service delivery. In a rural district of Kenya, healthcare workers in 21 public health facilities formed improvement teams to examine performance gaps in service delivery, identify the causes of the gaps and develop and implement changes to address the gaps (Mwaniki, Vaid, Chome, Amolo, Tawfik & Kwale Improvement Coaches 2014:18). The study found that quality care required the availability of health care workers with the necessary knowledge and skills to diagnose and treat the presenting illness; appropriate resources to attend to the situation, and efficient facilities to ensure clients received consistent care. Most importantly, health care workers at the facilities had to have the right behavioural attributes to offer empathetic and culturally sensitive care with respect (Mwaniki et al 2014:18).

Critical shortages of skilled staff are a major bottleneck in the provision of timely and quality obstetric and neonatal care. In a study of the impact of staff shortages on obstetric health care workers and quality of care in Malawi, Bradley et al (2015:65-71) found that staff shortages contributed to the persistently high maternal mortality rates. Obstetric staff found the shortage of staff and of time to perform their work stressful and demotivating, resulting in sub-standard care and poor attitudes towards patients. The use of less trained staff to cover shortages and reduced staff on night shift further exacerbated the problem. Staffing establishments were not linked to demand per health facility (number of cases coming to a facility), but allocated staff according to health facility type (Bradley et al 2015:66-71). In Mali, Huchon et al (2014:50) found that contextual factors such as the skills of surrounding co-workers, workload, access to clinical guidelines, feedback, and leadership also influenced workers' level of knowledge and skills.

2.5.4 Respectful maternity care

In a cross-sectional study, Rosen et al (2015:306) assessed quality of care, especially respectful maternity care of health facilities in Ethiopia, Kenya, Madagascar, Rwanda and Tanzania. Quality of care encompassed structure, processes of care, and outcomes. Structure included necessary medicines, equipment, and provider training while outcomes were changes in health status and patient satisfaction. Processes of care included delivery of clinical procedures and treatments, and client-provider interpersonal relationship.

Poor client-provider interpersonal communication during maternity care at health facilities in low resource settings was a barrier to accessing skilled care. Women and their families indicated rude and uncaring provider attitudes, lack of privacy, delays in care, abandonment and neglect as forms of disrespect (Rosen et al 2015:307). The study concluded that failure to adopt a patient-centred approach and a lack of health system resources were barriers for effective interventions to promote respectful care and health facility utilisation (Rosen et al 2015:307).

The White Ribbon Alliance (WRA) (2011) published the Respectful Maternity Care Charter, which listed the rights of childbearing women, including the right to information; privacy and confidentiality; to be treated with dignity and respect, and equitable care. Many women experience disrespectful, abusive or neglectful treatment during childbirth in facilities. This can deter women from seeking and using maternal health care services and can have implication for their health and well-being. The WHO is committed to promoting the rights of women and to promoting access to safe, timely and respectful care during childbirth (WHO 2014:1). Vogel et al (2016b:1) examined barriers, facilitators and priorities for implementation of the WHO maternal and perinatal health guidelines in four lower-income countries and emphasise the need for a patient-centred approach and adequate resources.

Disrespect and abuse may occur throughout maternity care, but women are more vulnerable during childbirth. Newborns are also vulnerable to neglect and disrespect and the needs of families who experience stillbirth require attention (Sacks & Kinney 2015:2). There are several types and categories of disrespect and abuse in childbirth, including physical abuse, non-consented care, non-confidential care, non-dignified care,

discrimination, abandonment of care, and detention in facilities (Sheferaw, Mengesha & Wase 2016:68).

2.5.5 Quality of care and service utilisation

Service utilisation and prevention of maternal and neonatal morbidity and mortality are dependent on the quality of care provided during childbirth. In secondary level public health facilities in Uttar Pradesh, India, the focus of health care leaders was to increase service availability. However, maintaining the quality of care is critical to enhance effective service utilisation and improved health service outcomes (Bhattacharyya, Issac, Rajbangshi, Srivastava & Avan 2015:422).

In Malawi, poor quality clinical care and disrespect discouraged women from facility-based delivery, encouraged them to bypass facilities with a bad reputation, or to delay seeking care and then arrive in critical condition. In addition, it eroded community trust and confidence in the health system, and delayed the decision to seek care when complications arose (Bradley et al 2015:66-67).

2.6 COORDINATION BETWEEN FACILITIES – REFERRAL SYSTEM

The reduction of maternal mortality depends on the availability of quality delivery care and a functioning referral system (Dewana et al 2017:31). Health services need to be provided at different levels, depending on the type of intervention patients require, and an effective referral system should be in place to ensure a close relationship between all levels of the health system (WHO 2008a). Little or no coordination between different types of health facilities with consequent poorly developed referral linkages results in negative consequences for mothers and newborns (Hodgins 2013:149).

This section discusses Jahn and De Brouwere's (2001) referral chain model; referral system; common indicators for referrals; inappropriate referral; health workers' competence in sender facilities; communication in the referral system; factors for delay in travel and causes of adverse outcomes at receiver facilities.

2.6.1 Referral chain model

Jahn and de Brouwere's (2001) referral chain model has three main components: sender, transport and receiver. At the sender facility, risk assessment, availability of referral guideline, quality of care, clinical judgement, and availability of transportation are important factors. At the receiver facility, quality of care, financial accessibility, and preferential treatment are important factors (Chaturvedi et al 2014:2).

2.6.2 Referral system

Health systems strengthening (HSS) is an important interventional approach for strengthening the referral system (Adeoye et al 2015:86). The term "referral" indicates health workers' recommendation that patients or clients seek care at higher-level facilities. Given the nature of the emergency care system, reductions in maternal mortality and morbidity are not possible without an effective referral system (Chaturvedi et al 2014:1-2).

In Uttar Pradesh, India, Bhattacharyya et al (2015:421) found coordination between lower and higher-level facilities for appropriate care was weak. According to standard care procedure, clients need to be examined and provided immediate management at the primary level facility (sender) before being sent to another facility (receiver). However, these procedures were not followed. Clients were either just examined or tried normal delivery and were sent to referral facilities without any management. In addition, clients usually approached the facility directly due to proximity, familiarity with the facility or on others' advice (Bhattacharyya et al 2015:424).

2.6.3 Common indications for referrals

In their study in Madhya Pradesh Province, India, Chaturvedi et al (2014:4) found that at primary health care level only 9.4% of mothers came from other facilities and the rest were self-referred. Of the referred in mothers, 60% belonged to families living below the poverty line; 4% were grand multiparas, and 35% had had a caesarean section delivery. The reasons for referral included prolonged labour due to obstruction or malposition (39%); rupture of membrane (13%); haemorrhage (8%), and pre/eclampsia (7%). A

further reason for referral was facility dysfunctionality, such as non-availability of staff, or power and water shortages at sending facilities (7%) (Chaturvedi et al 2014:4).

2.6.4 Inappropriate referral

In settings with weak referral structures, due to inappropriate referral practices, hospital level maternal and newborn mortality is often higher (Brenner et al 2015:3). Ineffective referral systems result in negative patient experiences, unnecessary high costs and a burden on the health system (Bosch et al 2014:76). The appropriateness of referrals can be defined by their distinct attributes: referral necessity, referral destination and referral quality (Blundell et al 2010:184).

2.6.5 Health workers' competence in sender facility

Deficiency of obstetric competence of healthcare providers at sender facilities could increase the risk of obstetric complications and delay the timely referral of women to referral facilities. In Mali, working in a rural referral health centre was associated with lower obstetric competency regardless of professional qualification (Huchon et al 2014:57-58).

In Nigeria, Adeoye et al (2015:84) and Afolaranmi, Hassan, Filibus, Al-Mansur, Lagi, Kumbak, Daboer and Chirdan (2018:5) stressed that health workers should demonstrate commitment to practise active rather than passive referral of women. Active referrals involve proactive participation and support of the referring facility and personnel in ensuring that referred individuals access emergency care (Adeoye et al 2015:84).

2.6.6 Communication in the referral system

In a study to assess the quality of referrals for surgery to a tertiary hospital in Ghana and identify ways to improve access to timely care, Gyedu, Baah, Boakye, Ohene-Yeboah, Otupiri and Stewart (2015:76) found that the use of structured forms for patient referral from one level of care to the next improved effective communication of essential information. A study in Brazil and Colombia found that the absence of basic clinical information, such as reason for referral and specialist comment in counter-referral forms

was a serious problem (Vargas, Mogollón-Pérez, De Paepe, Da Silva, Unger & Vázquez 2015:5). In Gyedu, et als' (2015:76) study, only 39% to 58% patients had complete documentation especially patient's medical history or treatment received for the condition being referred.

2.6.7 Factors in delay in travel

In Herat, Afghanistan Hirose, Borchert, Cox, Alkozai and Filippi (2015:7) compared reported travel time against expected travel time to reach the nearby facility. The study found that women residing in urban areas, difficulty in obtaining transportation or a community's lack of a vehicle, husband's participation in community activities, having people to rely on in case of long-term emergency, lower wealth quartile and ANC attendance were associated with delay in health care. In addition, women with rupture of the uterus and severe infection were delayed by between 4 and 12 hours compared to women with PPH, respectively (Hirose et al 2015:7).

2.6.8 Causes of adverse outcomes at receiving facility

In Madhya Pradesh Province, India, Chaturvedi et al (2014) found obstructed labour was the most common indication for referral, but the most common causes of death among the referred cases were haemorrhage and eclampsia. This indicated a likelihood of inefficiencies in emergency management in these cases (Chaturvedi et al 2014:6).

2.7 MATERNAL AND NEWBORN HEALTH IN ETHIOPIA

This section discusses Ethiopia's health care system.

2.7.1 Health care delivery system

The health care delivery system in Ethiopia is a three-tier system. The primary level health care delivery system in rural settings includes five health posts linked to one health centre and then a primary hospital. The health centres are considered primary contacts of care. Secondary level health care includes general hospitals, and tertiary level health care includes tertiary hospitals. Figure 2.1 illustrates Ethiopia's health care system.

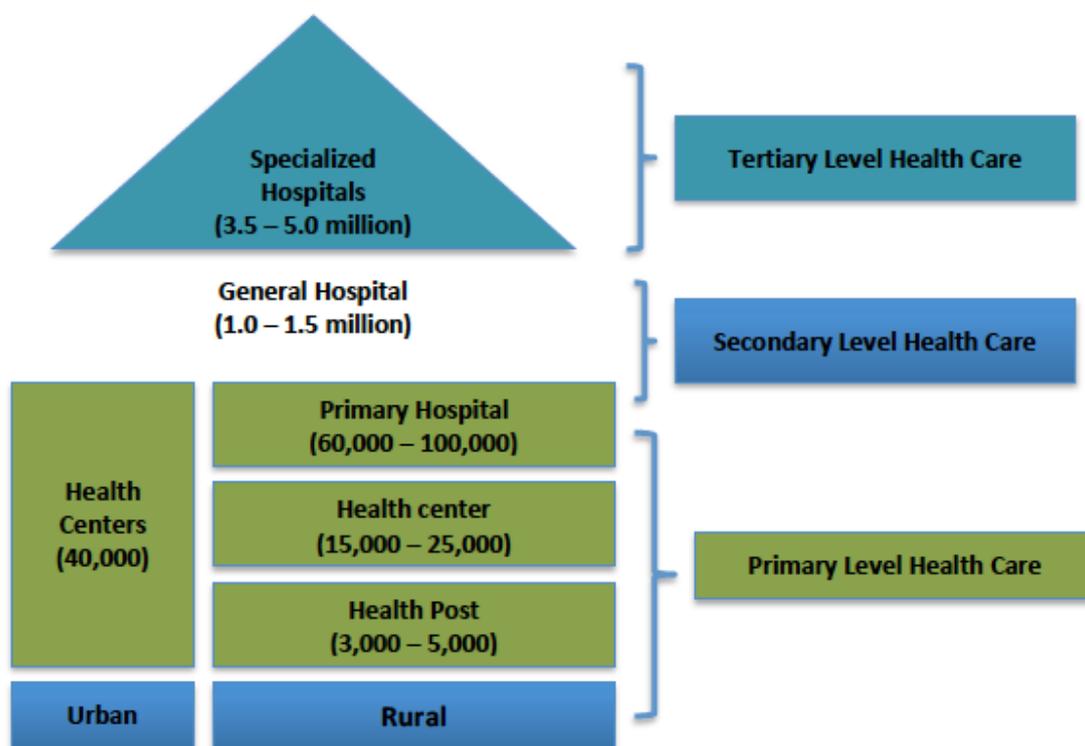


Figure 2.1 Ethiopian health system tiers

Source: FMOH (2015:142)

2.7.2 Maternal and newborn health status

Ethiopia has one of the highest maternal mortality rates in the world (Hailu & Berhe 2014:1). Ethiopia was among the 10 high burden countries that accounted for 58% of global maternal deaths from 1990 to 2013 (Sheferaw et al 2016:2). In 2013, most of the maternal mortalities occurred during the postpartum period and among 20-29 year-old mothers (Tessema, Laurence, Melaku, Misganaw, Woldie, Hiruye, Amare, Lakew, Zeleke & Deribew 2017:7). The four main causes of maternal mortality were obstructed labour/uterine rupture (36%), haemorrhage (22%), hypertensive disorders of pregnancy (19%), and sepsis/infection (13%) (Berhan & Berhan 2014:23).

In 2015, the FMOH (2015:12) reported that 44% of under-5 deaths occurred within the first 28 days of life; 75% of newborn deaths occurred in the first week of life, and 25% to 40% of deaths occurred within the first 24 hours. The most common causes of death were prematurity (37%), infection (28%), and asphyxia (24%). Despite Ethiopia's reductions in infant and under-5 mortality rates and achievement of MDG three years before 2015, the reduction in neonatal mortality was not as impressive. Neonatal mortality remained stagnant between 2005 and 2015 (FMOH 2015b:12).

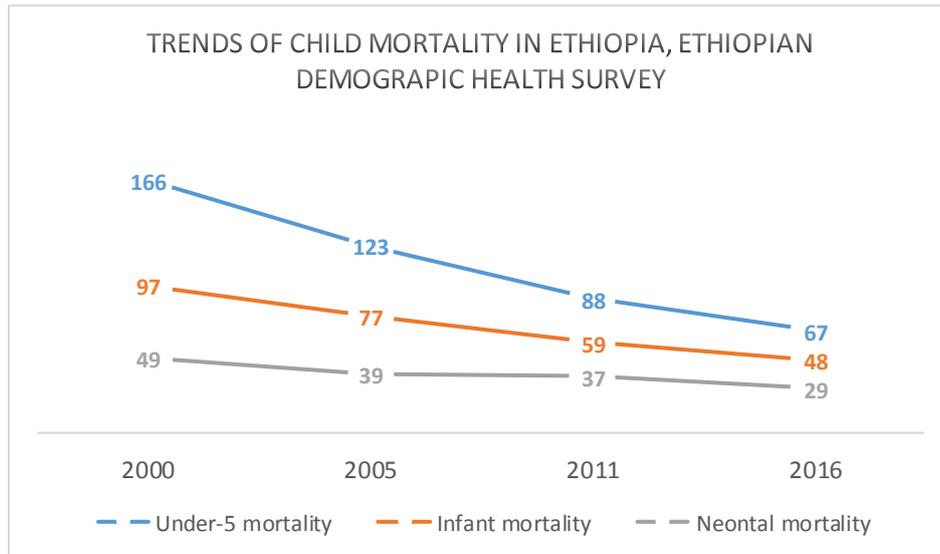


Figure 2.2 Trends in mortality rates in Ethiopia

Source: Ethiopian Demographic and Health Survey (EDHS) (2016:124)

2.7.3 Interventions to improve maternal and newborn health

All women need to have access to high quality delivery care with at least three key elements: skilled care at birth, emergency obstetric care in case of complications, and a functioning referral system (Dewana et al 2017:31). Although the number of women in Ethiopia who gave birth at a facility rose, the institutional birth rate of 26% in 2016 ranked among the lowest in the world (Windsma et al 2017:1). This low coverage could be attributed to individual and cultural factors and health systems-related factors. To address these problems, the Government of Ethiopia introduced various community level structures to promote institutional delivery and early post-natal care, amongst others. In addition, expansion of health facilities at rural level further improved service coverage (Windsma et al 2017:1). The Government also launched Maternal Death Surveillance and Response (MDSR) and Respectful Maternity Care (RMC) to mitigate delays in receiving quality maternal health services (Tessema et al 2017:2).

In order to improve access to BEmONC services, the Government of Ethiopia upgraded the capability of health centres at primary health care level (Tiruneh et al 2018:3). Poor quality of care was observed at all health facilities due to shortages of human resources, infrastructure, drugs, supplies and equipment; lack of transportation;

unrecorded and low correct partograph recording, and lower infection prevention practices (Dewana et al 2017:35).

In Mozambique, Chavane et al (2018:6) found that investment was needed to strengthen referral linkages and secure hospital and health centre readiness to rapidly diagnose and manage pregnancy-related complications. This is also true for Ethiopia.

2.8 CONCLUSION

This chapter discussed the literature review conducted for the study. The literature review outlined the global trends with regards to the maternal and new-born health situation, major causes of ill health and proven strategies to improve the situation. Then, it described the meaning of quality of care, a model to better understand the components of quality of care, and the health system and patient perspectives with regards to quality of care. It also included situations with regards to coordination of care and a model to outline major components of the referral system. Later, the chapter described the maternal and new-born care situation, the health care tier system and the major MNH care related efforts in Ethiopia.

Chapter 3 discusses the research design and methodology of the study.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Chapter 2 discussed the literature review conducted for the study. This chapter discusses the research design and methodology of the study. The research design and method chapter outline the type of the research approach and methods, the phases of the study in which the population, sampling and data collection methods are clearly described, and data cleaning and analysis techniques are included.

3.2 RESEARCH DESIGN

A research design is a set of logical steps taken by the researcher to answer the research questions (Brink et al 2012:217). Burns et al (2013:195) refer to a research design as a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings. Polit and Beck (2017:273) describe a research design as “the overall plan for addressing a research question, including the specifications for enhancing the integrity of the study”.

The three main research designs are qualitative, quantitative, and mixed method. The three are not discrete and thus should not be considered mutually exclusive with rigid boundaries (Creswell & Creswell 2018:3). The researcher used a sequential explanatory mixed methods design for the study (Creswell & Creswell 2018:14; Parahoo 2014:81).

3.2.1 Mixed methods

Mixed method studies use a combination of qualitative and quantitative methods (Creswell & Creswell 2018:14; Parahoo 2014:81). Mixed methods research combines qualitative and quantitative approaches to complement each other to provide comprehensive data (Bowling 2014:419). The researcher conducted the study in two phases and collected quantitative data in phase 1 and qualitative data in phase 2

(Creswell & Creswell 2018:14; Parahoo 2014:81). The researcher then developed the strategies to improve mother and neonatal referrals in the health system based on the quantitative and qualitative findings. Using the two methods provided different perspectives and allowed the researcher to explore the complex issues in the health system more deeply.

3.2.2 Quantitative

Polit and Beck (2017:76) describe quantitative research as a “set of orderly and disciplined procedures used to gain knowledge”. Quantitative studies use deductive reasoning to test assumptions in the real world. The findings are thus grounded in reality rather than the researcher’s personal views (Polit & Beck 2017:76). Quantitative research uses methods employing measurement to record and investigate aspects of social reality. Quantitative research, also referred to as “empirical research”, uses numerical data whereby the information is statistically analysed (Polit & Beck 2012:76). It aims at establishing the relationship between observations in the data collected using mathematical and statistical operations. The approach is appropriate in situations in which there is pre-existing knowledge and aims at documenting prevalence or testing hypotheses (Bowling 2014:235). Quantitative research can employ experimental or survey designs. This study used a survey design.

A survey design describes a population’s trends, attitudes and opinions or tests the relationship between variables or predictive relationship between variables over time by studying a sample of the target population (Creswell & Creswell 2018:147). A survey design can be longitudinal/analytical or cross-sectional/descriptive (Creswell & Creswell 2018:149). A descriptive survey wishes to describe populations, to study associations between variables, and to establish trends. Accordingly, it is designed to measure certain events and behaviours in the population of interest and descriptive measures are calculated from the collected data (Creswell & Creswell 2018:149; Bowling 2014:237). In this study, the researcher employed retrospective descriptive measures. Retrospective studies examine past behaviour, attitudes and events. Most cross-sectional studies are retrospective and also use secondary data from existing sources of data, such as routinely collected statistics in hospital and disease registers, such as medical records (Bowling 2014:236-239).

In phase 1 of the study, the researcher collected data from two sources of secondary data from the selected primary hospitals and health centres, namely medical records and costing records.

3.2.3 Qualitative

Qualitative research is the investigation of phenomena, typically in an in-depth and holistic fashion, through the collection of rich narrative materials using a flexible research design (Polit & Beck 2017:739). Qualitative research is “a systematic, subjective methodological approach used to describe life experiences and give them meaning” (Burns et al 2013:57).

Qualitative research is a means of exploring and understanding the meaning individuals and groups ascribe to social problems (Creswell & Creswell 2018:147; Merriam & Tisdell 2016:24). According to Burns et al (2013:57), qualitative research is a systematic subjective approach used to describe life experiences and situations to give them meaning. Qualitative studies examine participants’ knowledge and practices and consider their perceptions and practices in the field.

In phase 2 of the study, the researcher collected qualitative data from the participants by means of key informant interviews (Leavy 2017:135).

3.3 RESEARCH METHODOLOGY

Polit and Beck (2017:271) describe research methodology as the “steps, procedures and strategies taken to investigate the problem being studied and to analyse the collected data”. Research methods are “the techniques researchers use to structure a study and to gather and analyse information relevant to the research question” (Polit & Beck 2017:271). The methodology included the study setting, population, sample, and data collection and analysis.

3.3.1 Study setting

A setting refers to the “physical site or location used to conduct a study and in which data collection takes place” (Polit & Beck 2017:743). The study was conducted in

selected zones of Southern Nations and Nationalities Peoples regional state of Ethiopia. The health sector in Ethiopia is a three-tier health care delivery system. The first tier or level is a *woreda* or district health system comprising a primary hospital (with a population coverage of 60,000-100,000 people), health centres (PHC facilities serving a population of 15,000-25,000) and their satellite health posts (serving 3,000-5,000) that are connected to each other by a referral system (FMoH 2010:4). Convenience, cost, ethical considerations, research questions and other factors affect the selection of study settings (Creswell & Creswell 2018:121; Bordens & Abbott 2018:169). This study focused on first level health care delivery, especially maternal and newborn services.

3.3.2 Population

A population is “the entire aggregate of cases in which a researcher is interested” (Polit & Beck 2017:273). The researcher used two populations, namely records and participants.

In the quantitative phase, the population consisted of the maternal and newborn records of the selected primary hospitals and health centres. Regarding health service costing, the costs of maternal and newborn-related services provided in the selected sites were examined. The study population was drawn from the selected primary hospitals’ and health centres’ records. To answer the research questions, recently delivered mothers and sick neonates’ medical records were the target population of interest (Saks & Allsop 2013:173). A list of mothers and sick neonates who visited the selected primary hospitals and health centres between 8 July 2017 and 7 July 2018 were entered in the case extraction sheet. Two service delivery points, namely delivery and newborn intensive care units (NICUs), were considered in preparing a list of cases. In the qualitative phase, the population consisted of health care workers providing direct MNH care at delivery and newborn intensive care units (NICUs) in the selected sites.

3.3.3 Sample and sampling

A sample refers to a subset of a population (individuals, elements or objects) or a group selected to act as representatives of the population (Polit & Beck 2017:275). Sampling is the process of selecting participants, events, behaviours, or other elements that

represent the population being studied (Burns et al 2013:357). In this study, the researcher selected a sample of sites, records and participants (informants).

3.3.3.1 Site sampling

The researcher used multistage sampling, a form of cluster sampling, to select the sites (Bordens & Abbott 2018:293). The researcher randomly selected the Southern Nations and Nationalities People's Region from the four clusters of regional states in Ethiopia. After selecting the region, the researcher listed the primary hospitals in the region. Taking the median of performance, the primary hospitals formed two strata – high performing (above the median) and low performing (below the median). Then the hospitals in each stratum were listed and one primary hospital from each stratum was randomly selected. Two primary hospitals were randomly selected for the study. Based on the projected catchment population size, the two hospitals were expected to serve a population of 446,102 residing in two selected *woredas* in 2017.

Each of the primary hospitals had six (6) health centres in their catchment area. To select health centres, *kebeles* (villages) were divided into urban/city and rural, and two sites and one from urban and two from rural were randomly selected. Two hospitals and six health centres were included for facility level study.

3.3.3.2 Data source sampling

A list of mothers and sick neonates who visited delivery and newborn intensive care units (NICUs) units of the selected primary hospitals within the period from 8 July 2017 to 7 July 2018 were registered in the case extraction sheet. Then, in consultation with the facility management, hospital catchment *kebeles* (villages) were identified. Cases who visited the facility from those *kebeles* (villages) were considered for detailed case reviews.

The sample size was determined by means of a single population proportion formula, using the following assumptions: hospital level delivery as 26.2% ($p=0.262$) (CSA [Ethiopia] & ICF 2017:149), level of significance as 5% ($\alpha=0.05$), $Z_{\alpha/2}=1.96$ and margin of error as 4% ($d=0.04$). Adding the design effect of 1.5 made the total sample size and 10% of non-response rate, the total size was 766 (Bruce et al 2018:160). For the

delivery case review, this number was proportionally distributed between the two selected facilities. For the sick neonates, all the sick neonates admitted in the NICU, who met the inclusion criteria, were considered for the study.

3.3.3.3 *Health services costing*

Financial records and professionals working in the finance department of the selected primary hospitals and health centres were consulted to collect information on service costs during the last Ethiopian fiscal year.

3.3.3.4 *Key informant interviews*

The researcher used purposive sampling to select health workers working in the MCH department and NICU who provided MNH-related care at the selected hospitals and health centres and involved in referral process.

3.3.4 Quantitative data collection

Data collection is the process of collecting information (data) related to research questions in a systematic way to address a research problem (Polit & Beck 2017:725). The researcher collected quantitative data from the medical records and health service costing records, and qualitative data from the health workers.

3.3.4.1 *Medical records*

A medical record contains patient information, including age, condition, care, medication and other data. The researcher reviewed the registers available at the primary hospitals and health centres to document the patients' backgrounds, care elements and outcomes of the services provided at delivery, and newborn intensive care units (NICUs).

3.3.4.2 *Health service costing*

Cost is an integral aspect of any economic evaluation. Consequently, it is necessary to consider what costs or expenses should be examined. All the information tools should

be customised to collect information on relevant costs (Franklin, Lomas, Walker & Young 2019:631-634). Costing is rarely straightforward and thus requires accurate and comprehensive data elements and explicit cost categorisations (Bowling 2014:143). Costing in a developing country, like Ethiopia, is not an easy task and the researcher followed a step-by-step approach to estimate the cost of MNH-related service delivery expenses (Hendriks, Kundu, Boers, Bolarinwa, Te Pas, Akande, Agbede, Gomez, Redekop, Schultsz & Tan 2014:2).

Cost refers to expenditure required to manage facilities and provide direct patient care and involves variable and fixed expenses (Hendriks et al 2014:4; Adler, Yi, Li, McBroom, Hauck, Sammer, Jones, Shaw & Claassen 2018:68). Fixed costs are all expenses that do not change with business volumes (e.g., management salaries and benefits as well as depreciation of equipment and buildings). Variable costs refer to all expenditure that depends on the volume of patient flow for health facility cases (e.g., nursing and other direct patient care salaries, benefits, supplies, and drugs) (Adler et al 2018:68). In this study, the researcher considered variable costs from the providers' perspective at the primary hospitals and health centre levels. In addition, the researcher considered a bottom-up approach where the number of cases for each type of care led to the estimation (Hendriks et al 2014:4).

3.3.4.3 Quantitative data-collection instruments and administration

The researcher developed two data-collection instruments in English to collect data from the medical records and the health service costing records. The researcher adapted a customised instrument based on the FMOH's examination cards and registry book for medical record review and National Health Accounts tool and Management Science for Health (MSH) core plus tool for the health service costing. The instruments contained pre-identified variables. The medical records instrument captured a summary of referral information, description of the cases presented, diagnosis of cases, and outcomes of care from the facility registers. The costing instrument captured all the costs related to service provision as well as common costs, such as staff salaries and benefits and other indirect costs. The number of cases that visited the facilities and demographic characteristics of the catchment population were also included. The information assisted the researcher to divide common costs between MNH-related and other services.

To be included in the study, the following inclusion criteria applied:

- Mothers and newborns residing in the *woreda*
- Units: Delivery and NICU
- Mothers and newborns admitted for any maternal and newborn care services delivered in the selected hospitals and health centres

The following exclusion criteria applied:

- Mothers and newborns residing in *kebeles* without catchment health centres
- Mothers and newborns with no record of *kebele/village*
- No patient chart attached to the record

The researcher selected and trained data collectors who had completed a bachelor's degree in health studies to assist with data collection and explained the components of the data-collection sheets to them. The trained data collectors, then, reviewed patient records and patient cards which fulfilled the inclusion criteria and filled the information in the extraction sheets. For the health service costing, the trained data collectors collected the cost data from the selected facilities. In addition, the researcher collected data on the costs of some internationally procured programme drugs. The researcher supervised the data-collection process and provided required support. In addition, for responding to the question of referral appropriateness, two health workers, who are BEmONC trainers, reviewed the collected data and decided whether the specific case could be managed at health centres or not.

Using an access-based data entry sheet, the researcher stored the collected data. The researcher checked the data entry regularly and provided on-site support to improve the quality of data entry. The researcher took samples from the entered data and checked for consistency. The researcher performed data cleaning before data analysis. Data entry was controlled with sufficient conditions (Stewart 2016:55). A codebook was used for controlled data entry from the medical records. The codebook included the question number, the question, the full range of valid codes including missing and 'do not apply' values (Bowling 2014:372).

A simple frequency running, and comparison of findings was used as the second data quality check. The data check revealed the accuracy of data entry (any typing errors), missing data (non-response), and outlier figures (Stewart 2016:56-57). Based on the findings of the frequency tables, errors in data collection and entry were eliminated. In addition, missing values were checked for accuracy and treated appropriately (Bowling 2014:372-379). Two options were considered in this stage: analysing the remaining data (when the missing data was minimal), and excluding the incomplete variable (when the variable was not important for answering the research question) (Stewart 2016:56).

3.3.5 Quantitative data analysis

After cleaning, a step-by-step approach to test the hypothesis was employed using the Stata version 11 program (Bruce et al 2018:508). The researcher with the help of statistician summarised the data and presented the results in a contingency table, stated the null hypothesis and alternate hypothesis for the sample estimate, tested the hypothesis for comparison using either Chi-square or Fisher exact test, assessed the probability (P-value) and decided whether to accept or reject the null hypothesis.

Table 3.1 Assumptions for services provided at the selected hospitals and health centres

| Cost assumptions | Service types | | | | | | Common administration costs |
|------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Direct – Technical | | | Common – Technical | | | |
| | Delivery | Newborn corner | NICU | Laboratory and Imaging | Pharmacy | OR | |
| Facility types | Health centres and hospitals | Health centres | Hospitals | Health centres and hospitals | Health centres and hospitals | Hospitals | Health centres and hospitals |
| Personnel costs | Share of staff at MCH departments | Share of staff at MCH departments | NICU team | Share of time of professionals |
| Other cost items considered | Lab reagents, drugs and supplies used | Lab reagents, drugs and supplies used | Lab reagents, drugs and supplies used | NA | NA | NA | Share of general costs (Facility running costs, training, travel, services, maintenance costs, temporary staff, clothes and sheets, miscellaneous payments) |
| Basis for cost share | Number contact minutes for delivery care out of the total MCH contact minutes | Number contact minutes for delivery care out of the total MCH contact minutes | NA | Proportion of MNH-related cases out of the total cases | Proportion of MNH-related cases out of the total cases | Proportion of MNH-related cases out of the total cases | Number contact minutes for MNH care out of the total contact minutes |
| Analysis result | Total costs for the service | Total costs for the service | Total costs for the service | Share of MNH care from the total cost | Share of MNH care from the total cost | Share of MNH care from the total cost | Share of MNH care from the total cost |

NA = Not applicable. Contact minutes = Number of cases multiplied by average stay at the facility for the service

MNH-related cases = Delivery and newborn care

3.3.6 Qualitative data collection

In the qualitative phase, the population consisted of health care workers providing direct MNH care at delivery and NICUs in the selected sites. The researcher obtained staff lists at the selected sites and purposively selected the participants from the lists. Purposive sampling was used to select participants who could provide information-rich data (Merriam & Tisdell 2016:96; Saks & Allsop 2013:173). The researcher selected 34 health workers providing MNH care at delivery and in NICUs as participants (Polit & Beck 2017:705). Due to information saturation, a total of 26 individuals were interviewed in this study.

3.3.6.1 *Data-collection instrument and administration*

The researcher developed a semi-structured interview guide (questionnaire) based on the Donabedian and referral chain models and the literature review (Creswell & Creswell 2018:191; Merriam & Tisdell 2016:106). The interview guide collected information from the participants and covered the respondents' demographic information; competency of the workforce; prevalence of severe and complicated cases; adequacy of supplies and equipment; referrals; communication; emergency medical transportation, and service. The interview guide was translated into Amharic, a local language spoken and understood by most people in Ethiopia, for the interview. The Amharic version was translated back to English to check whether the concepts were kept in translation.

The actual data collection followed similar steps to entry for the first phase. Approvals of entry were sought from the facility managers and woreda health office heads. The researcher conducted interviews and audio recorded the interviews with the participants' permission. In addition, the interviewer took notes during the interviews (Polit & Beck 2017:716). On average, each interview took 32 minutes.

3.3.6.2 *Data analysis*

Qualitative research is interpretative and involves researchers in a close relationship with the participants (Creswell & Creswell 2018:183). Qualitative data analysis commences with data collection and involves specific to general steps (Merriam &

Tisdell 2016:197; Creswell & Creswell 2018:193). The researcher organised and prepared the data. First, the researcher transcribed the interviews verbatim and compared the transcriptions with the recordings. The researcher read all the transcriptions carefully to get an overall picture and jotted down ideas as they came to mind in order to develop codes (Creswell & Creswell 2018:196). Coding is a process of organising data by bracketing chunks and writing a word representing a category in the margin. It requires breaking sentences into segments and labelling them using participants' actual language (Tracy 2013:189).

The researcher identified topics and themes that emerged from the data in the transcriptions. Topics that related to each other were grouped together and themes identified. The researcher wrote topics next to appropriate segments of text, checking to see whether new themes emerged. The topics were turned into categories by finding descriptive wording, final abbreviations for categories, and arranging them alphabetically. Codes were formulated for each theme developed. The researcher used the computer software program ATLAS ti to code the data (Tracy 2013:188).

The researcher used inductive and deductive data analysis techniques for the qualitative data analysis. A bottom-up approach was used to build patterns, categories and themes to organise abstract units of information (Creswell & Creswell 2018:181). The researcher used deductive analysis to decide on the need to collect additional data and to review categories and themes for comparison and relationships (Polit & Beck 2017:757). Figure 3.1 depicts the qualitative data analysis process.

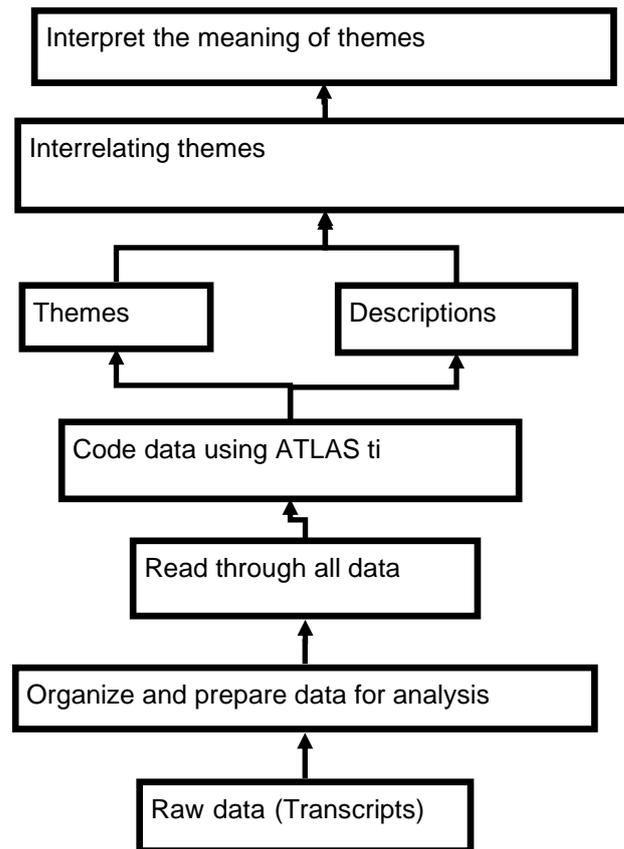


Figure 3.1 Qualitative data analysis
 Source: Creswell & Creswell (2018:194)

Chapters 4 and 5 discuss the quantitative and qualitative data analysis and interpretation, and results.

3.4 VALIDITY AND RELIABILITY

The quality of a research instrument is determined by its validity and reliability. Validity refers to the degree to which an instrument accurately measures what it is intended to measure (Goodman & Thompson 2017:142; Polit & Beck 2017:582). Reliability refers to “the likelihood that the instrument will obtain the same results time after time” (Goodman & Thompson 2017:142). Reliability refers to the degree of consistency or dependability with which the instrument measures the attributes it is designed to measure (Burns et al 2013:389). In this study, the researcher developed the quantitative and qualitative data-collection instruments based on models and the literature review.

3.4.1 Quantitative phase

In the quantitative phase, the researcher ensured internal and external validity. Internal validity refers to how well a study is conducted, and confounding factors are controlled. External validity refers to the generalisability of the findings of the study to a larger population (Goodman & Thompson 2017:201). The researcher developed the data-collection instruments to generate valid information on the topic under study (Bordens & Abbott 2018:276-277). For this purpose, the researcher adapted a customised instrument based on the FMOH's records and tools and Management Science for Health (MSH) core plus tool and National Health Accounts tool. The instruments contained pre-identified variables. The medical records instrument captured a summary of referral information, description of the cases presented, diagnosis of cases, and outcomes of care. The researcher trained two data collectors in administering the instruments.

Construct validity refers to the degree to which a study measures all the characteristics of a concept. Construct validity depends on the proficiency of the researcher to conceptually define and then operationally define the study variables (Burns et al 2013:674).

The reliability of a data-collection instrument is concerned with stability and consistency (Polit & Beck 2017:331-332). The stability of a questionnaire is the degree to which it produces similar results on being administered twice. If the same variable is measured under the same conditions, a reliable instrument will produce identical measurements and the measuring instrument will yield consistent numerical results each time it is applied (Burns & Grove 2007:396).

3.4.2 Qualitative phase

In qualitative studies, the purpose of validity is to gain a deeper understanding of the phenomenon under study (Polit & Beck 2017:219). Internal and external validity in this case ensured the trustworthiness of the study. Trustworthiness refers to the confidence that qualitative researchers have in their data, using the strategies of credibility, dependability, confirmability, and transferability (Polit & Beck 2014:220; Creswell & Creswell 2018:199). In addition, triangulation increased the fidelity of the data interpretation by using multiple data-collection methods and sources (Kolb 2012:85).

Internal validity refers to how well a study is conducted, and confounding factors are controlled (Goodman & Thompson 2017:201). Moreover, the instruments were developed to generate valid information (Bordens & Abbott 2018:276). External validity signifies the generalisability of the findings of the study to a larger population (Goodman & Thompson 2017:201). Meticulous steps were taken to identify the participants to reflect the reality on the ground. The internal validity of a study is critical to the level of confidence in its conclusion and applicability to similar samples or populations (Bordens & Abbott 2018:276). For content and construct validity, the researcher developed the data-collection instruments based on existing instruments, two models and the literature review. For establishing the criterion-related validity of the data-collection instruments, the results were compared to other studies and results were triangulated using various methods. Content validity refers to whether the items or questions measure what the instrument is supposed to measure (Polit & Beck 2017:450). Content validity refers to the extent to which the instrument represents the factors of the study.

Reliability refers to “the degree of consistency or dependability with which the instrument measures the attribute it is designed to measure. If the instrument is reliable, the results will be the same each time the test is repeated” (Polit & Beck 2017:194). Reliability refers to the reproducibility and consistency of the research instruments (Bowling 2014:170).

Trustworthiness refers to the confidence that qualitative researchers have in their data, using the strategies of credibility, dependability, confirmability, and transferability (Polit & Beck 2014:220; Kumar 2011:184).

Credibility refers to the believability of the results from the participants’ perspective. Accordingly, the researcher ensured that the results reflected the participants’ experiences and views (Polit & Beck 2017:787). Dependability refers to the achievement of similar results if the study were conducted again (Kumar 2011:184). Triangulation ensured the dependability and transferability of the study findings (Merriam & Tisdell 2016:252). Transferability refers to the degree to which the results of qualitative research can be generalised or transferred to other contexts or settings (Kumar 2011:184). The scope and detailed descriptions of the steps of the study ensured the generalisability of the results to other settings (Merriam & Tisdell

2016:254). Confirmability refers to the degree to which the results could be confirmed by other independent reviewers (Polit & Beck 2017:788; Kumar 2011:184). The interview transcriptions and audio recordings served as evidence of the participants' views.

Triangulation, the researcher-participant interaction and clear presentation of the findings ensured the trustworthiness of the study (Kolb 2012:85; Creswell & Creswell 2018:200-201).

3.5 ETHICAL CONSIDERATIONS

Ethics deals with matters of right and wrong. When humans are used as study participants, care must be taken in ensuring that their rights are protected (Polit & Beck 2017:748). Accordingly, the researcher obtained permission to conduct the study, obtained informed consent from the participants, and observed the ethical principles of beneficence, respect for human dignity, and justice (Polit & Beck 2017:748; Bowling 2014:183).

- **Permission**

The researcher obtained ethical approval and permission to conduct the study from the Department of Health Studies Higher Degrees Committee of the University of South Africa. Permission to conduct the study was also obtained from the Southern Nations and Nationalities Peoples Region's Health Bureau, the zone health departments, and the management of the selected hospitals and facilities (see Annexures 1 and 2).

- **Beneficence**

The principle of beneficence states that one should do good and, above all, do no harm (Burns & Grove 2007:165). The researcher assured the participants of the benefit of the findings and strategies to health care service.

- **Respect for human dignity**

Respect for human dignity refers to the right to self-determination and full disclosure (Polit & Beck 2017:173). The researcher explained the purpose, nature and significance of the study to the participants in the languages familiar to them. The participants were informed that participation was voluntary and that they could withdraw from the study at any time if they wished to do so. The participants were given the opportunity to ask any questions, and an information leaflet and informed consent form to sign. Once participants verbally agreed to participate, they were asked to sign the informed consent form.

- **Justice**

The principle of justice refers to the right to privacy and the right to fair treatment (Polit & Beck 2017:174). The researcher assured the participants of privacy, confidentiality and anonymity, and treated all the participants with respect and fairly. The researcher assured the participants that all the data would be treated with strict confidentiality and kept under lock and key, accessible only to the researcher.

3.6 STRATEGY DEVELOPMENT

In today's constantly changing environment, any organisation should continuously review strategic choices and decisions (Weissenberger-Eibl, Almeida & Seuss 2019:16). The expansion of primary health care facilities and increasing numbers of cases presenting for care have made quality of services a major issue in Ethiopia. The quality of care at lower levels and communication between health facilities and professionals and interaction with clients emphasise the need for optimal referral procedures at all levels. Accordingly, the purpose of the study was to formulate strategies to improve maternal and newborn health care referrals in the health system in Ethiopia.

Developing strategies to improve referrals in the health system in Ethiopia required several steps. After identifying problems, barriers and issues that required attention in the current referral system, the researcher conducted a literature review to examine the situation and experiences of other countries and their solutions. The researcher

interviewed selected health workers in the hospitals and health centres included in the study to obtain their experiences and perceptions of the situation and suggestions on possible solutions and strategies. The drafted referral improvement strategy was checked whether it assist programme managers and service providers to respond to patients' needs, improve quality of care and promote efficient use of human and financial resources at lower levels of the PHC provision. In addition, the improvement ideas were reorganized to fit into the Donabedian's model of quality and Jahn and De Brouwere's (2001) referral chain model. Donabedian's model has three components: structure, process, and outcomes, and the referral chain model's three components are sender, transport and receiver.

The first draft of the strategies showed the importance of the interplay among the components of the referral chain model (sender, communication and receiver) and quality framework (input, process and outcomes) and the required support structures and processes to govern the referral system. The researcher consulted selected health workers on the draft strategies. Based on the feedback received, the researcher then finalised the strategies.

3.7 CONCLUSION

This chapter described the research design and methodology of the study. The chapter started by defining the research design used – Mixed method. The chapter clearly outlined the two phases of the study. In the first phase of the study, 869 medical record reviews, and health service costing in relation to maternal and new-born care were done. In the second phase of the study, 26 health workers were interviewed as key informants. Following a step wise approach of data analysis, both the first and the second phases of the study, utilized computer-based data analysis software. The chapter also described ethical considerations made and steps followed to develop the strategies.

Chapter 4 discusses the quantitative data analysis and interpretation, and results.

CHAPTER 4

QUANTITATIVE DATA ANALYSIS AND INTERPRETATION, AND FINDINGS

4.1 INTRODUCTION

This chapter describes the results from the quantitative data analysis and interpretation in line with the overall purpose and objectives of the study. The purpose of the study was to formulate strategies to improve maternal and newborn health care referrals in the health system in Ethiopia. In order to achieve the purpose, the objectives of the study were to:

- Map out a path, procedures and reasons for maternal and newborn care referrals among various levels of facilities.
- Estimate the proportion of inappropriate referrals within the primary level care facilities.
- Cost maternal and newborn care related services at various levels of the health system.
- Analyse the effects of current referral practices in the health system.
- Identify and reach consensus on key strategies to improve referrals in the health system.

4.2 FLOW OF CASE REVIEWS

The total number of cases was divided between the two hospitals based on the previous year's reported number of institution-based deliveries. The number of reviewed cases covered 95% of the calculated sample size of the study. Figure 4.1 presents the number of reviewed cases from the two selected hospitals.

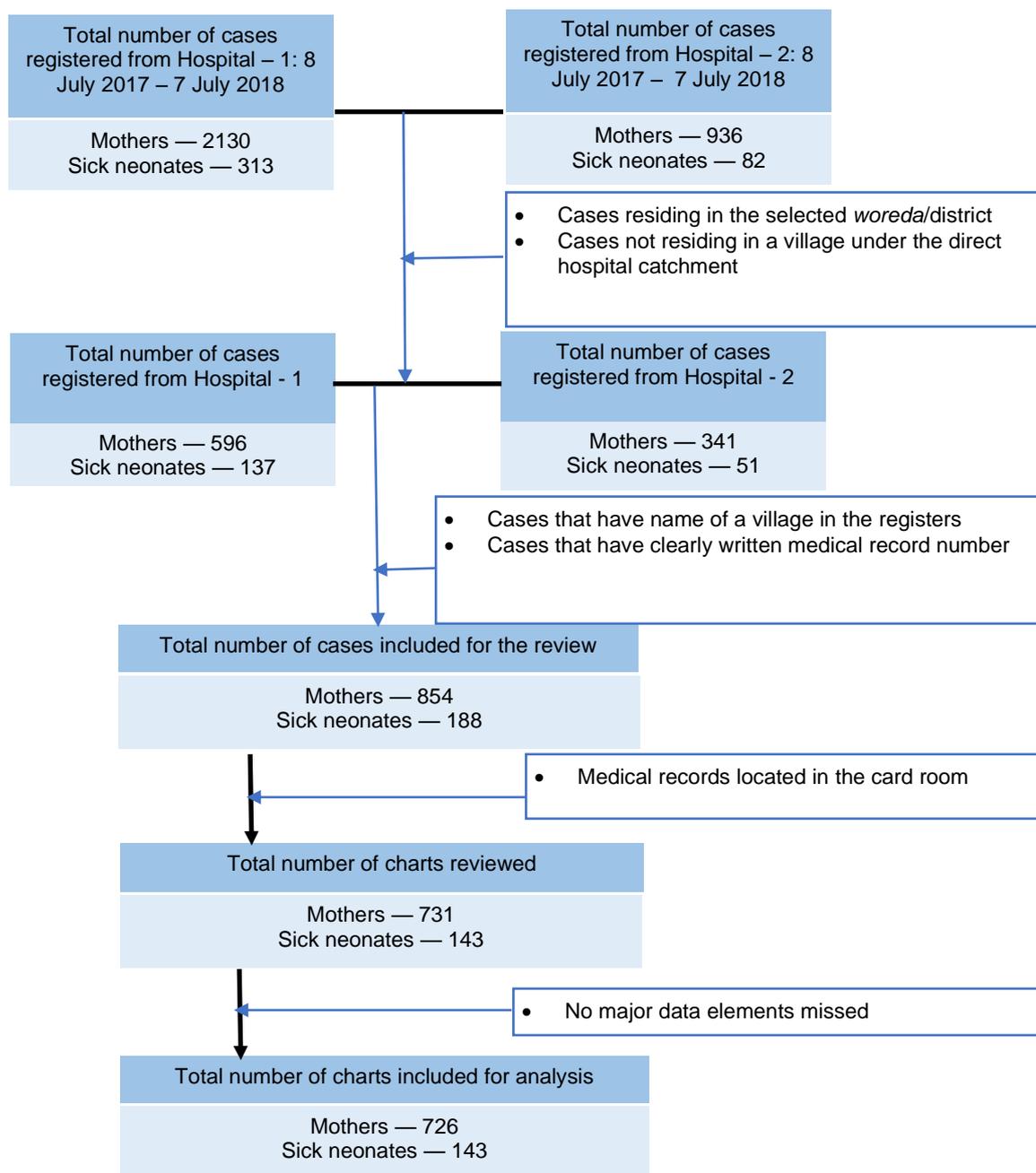


Figure 4.1 Flow of case review

4.3 DATA MANAGEMENT AND ANALYSIS

Data management includes careful organisation and preparation for use of data. Organisation of data encompasses code plan, data entry, checking, editing, tables and analysis (Islam & Al-Shiha 2018:27). Polit and Beck (2012:725) define data analysis as “the systematic organisation and synthesis of research data”. Data analysis involves

classifying, organising, summarising and describing the data in meaningful terms to provide information.

4.3.1 Data management

The first step in data management was the development of a codebook. The book provided a list of all the variables, including the exact wording of each question for easy reference (Curtis & Drennan 2013:380). The extracted data sheets were checked for accuracy and stored in a safe place for easy retrieval and use. The data management consisted of four steps: coding, entry, cleaning and identifying missing data.

4.3.1.1 Data coding

A three-digit number code was assigned to each extracted data sheet and the code together with the name of facility and *woreda* served as a unique identifier of the case. The unique identifier facilitated tracking the data and identifying the facility where the data was collected. In addition, a Stata syntax file was created to track any recoding of variables and addition of codes (Curtis & Drennan 2013:380).

4.3.1.2 Data entry

The data collected were entered into a spreadsheet. The data from the spreadsheet was transferred to the Stata statistical software program – version 14. An experienced data entry clerk entered data every day. A backup file was retained periodically when the data entry was done (Bordens & Abbott 2018:397).

4.3.1.3 Data cleaning

Data cleaning started while entering the data into the data entry form. Simple descriptive frequencies were run after data entry to check quality and completeness. Cross-tabulation of variables was done to check for logical errors (Curtis & Drennan 2013:380).

4.3.1.4 Missing data

The review of cases and case entry frequently reveals missing information. There are three kinds of missing variables: no records in the registers; not properly entered, and not ascertained. The groups could be further divided into “not ascertained information” and “not applicable information” (Floyd & Fowler 2014:128). The missing data in all the variables were analysed to determine whether they adversely impacted the results or not (Curtis & Drennan 2013:380). In most cases, the missing information did not adversely affect the result and was significant in only few cases. Missing data that had no impact were excluded from the analysis, and minimally significant data were dropped from the analysis.

4.3.2 Data analysis

Data coding was followed by data analysis to generate estimates and arrive at conclusions (Whaley 2014:129). Statistical analysis of both primary and secondary data generated results using descriptive and inferential statistics (Curtis & Drennan 2013:382; Whaley 2014:156).

4.3.2.1 Computer-based data analysis

A statistician analysed the data using the Stata software program version 14 and descriptive and inferential statistics and presented the results in frequency tables, cross-tabulation and χ^2 test results between the dependent and independent variables. The P-value was used to determine the probability that observed differences between the two groups might be due to chance. The most frequently used significance level (P-value) was equal to 0.05 or 5%. A P-value of less than or equal to 0.05 at 95% confidence interval for this study had statistically significant difference (Bordens & Abbott 2018:439).

4.3.2.2 Descriptive statistics

Descriptive statistics use numbers to summarise the properties of the entire distribution and discover patterns in the data (Bordens & Abbott 2018:397). The results from the

medical record review were presented in tables and graphs using frequencies and proportions.

4.3.2.3 Measures of comparison

The Chi-square (χ^2) test compares and tests associations of frequencies and proportions. The test answers such questions as “is there a difference in the frequencies among the groups” (test of equality of proportions among groups), and tests whether there is an association among the groups (test of association among groups) or not. The test does not indicate the direction of any association. If the frequency in any cell is small (<5), the test conclusion is not accurate. In such cases, an alternate procedure, the Fisher’s exact test is used (Bruce et al 2018:208-225).

4.4 FINDINGS FROM MEDICAL RECORD REVIEW

4.4.1 Description of the reviewed cases

A total of 869 medical records (83.54% mothers and 16.46% neonates) of patients who visited the selected primary hospitals for care at delivery and neonatal intensive care units were reviewed (see Table 4.1).

Table 4.1 Number of cases reviewed (N=869)

| Service providing case team | Freq | Per | Cum |
|-----------------------------|------------|---------------|--------|
| Delivery room | 726 | 83.54 | 83.54 |
| NICU | 143 | 16.46 | 100.00 |
| Total | 869 | 100.00 | |

A total of 726 mothers visited the primary hospitals for delivery care, but the age of 716 mothers was registered in the medical record. The mean age of the mothers was 25.1 (± 5.3). Of the mothers, 31.15% (n=223) were 25 to 29 years old; 29.89% (n=214) were 20 to 24 years old; 18.44% (n=132) were 30-34; 12.29% (n=88) were 15-19; 7.26% (n=52) were 35-39, and 0.98% (n=7) were 40-45 years old (see Table 4.2).

Table 4.2 Age distribution of reviewed cases (N=716)

| Maternal age group | Freq | Perc | Cum |
|---------------------------|-------------|---------------|------------|
| 15-19 | 88 | 12.29 | 12.29 |
| 20-24 | 214 | 29.89 | 42.18 |
| 25-29 | 223 | 31.15 | 73.32 |
| 30-34 | 132 | 18.44 | 91.76 |
| 35-39 | 52 | 7.26 | 99.02 |
| 40-45 | 7 | 0.98 | 100.00 |
| Total | 716 | 100.00 | |

The registered number of gravidity and parity of the mothers managed at the selected hospitals was reviewed. Of the reviewed cases, 37.61% (n=264) were primigravida; 35.61% (n=250) were gravida 2 to 3, and 26.78% (n=188) were gravida four and above (see Table 4.3). Regarding parity, 38.43% (n=269) were nullipara; 46.0% (n=322) were para 1-3, and 15.57% (n=109) were para 4 and above (see Table 4.4).

Table 4.3 Gravidity of reviewed cases (N=702)

| Gravidity | Freq | Perc | Cum |
|------------------------|-------------|---------------|------------|
| Primigravida | 264 | 37.61 | 37.61 |
| Gravida 2 to 3 | 250 | 35.61 | 73.22 |
| Gravida four and above | 188 | 26.78 | 100.00 |
| Total | 702 | 100.00 | |

Table 4.4 Parity of reviewed cases (N=700)

| Parity | Freq | Perc | Cum |
|---------------------|-------------|---------------|------------|
| Nullipara | 269 | 38.43 | 38.43 |
| Para 1 to 3 | 322 | 46.00 | 84.43 |
| Para four and above | 109 | 15.57 | 100.00 |
| Total | 700 | 100.00 | |

The case review revealed that only 80% of patient cards had a recorded GA. Regarding the gestational age of the reviewed cases, 76.31% (n=438) were at 37-40 weeks; 17.25% (n=99) were less than 37 weeks, and 6.45% (n=37) were less than 40 weeks (see Table 4.5).

Table 4.5 Gestational age of the reviewed cases (N=574)

| Gestational age | Freq | Perc | Cum |
|------------------------|-------------|---------------|------------|
| <37 Weeks | 99 | 17.25 | 17.25 |
| 37-40 Weeks | 438 | 76.31 | 93.55 |
| >40 Weeks | 37 | 6.45 | 100.00 |
| Total | 574 | 100.00 | |

4.4.2 Referral for health service care

Referral is the process of coordinated movement of health care seekers to reach a high-level care within a short period of time (Biswas, Anderson, Doraiswamy, Abdullah, Purno, Rahman & Halim 2018:367). Unless referral is well managed, it increases the workload and utilises substantial health care resources both at the source of the referrals and the referral-level facilities (WHO 2018b: 58). Ensuring emergency obstetric care services and quick referral during the perinatal period can also help reduce maternal deaths (Biswas et al 2018:367). Elmusharaf, Byrne, AbuAgl, Rahim, Manandhar, Sondorp and O'Donovan (2017:1) identified four types of referral pathways:

- Late referral when the referral decision by the first professional is not made in time.
- Zigzagging referral when a delivering woman is referred back and forth between two healthcare providers.
- Multiple referrals when the patient visits several healthcare facilities before reaching the appropriate facility able to provide the required services.
- Bypassing healthcare facilities when the women go directly to the perceived functioning facility.

These pathways can be facilitated by either the women themselves or the providers.

The case review revealed that of the cases, 61.10% (n=531) visited the hospital on their own without referrals and 38.90% (n=338) were referred (see Table 4.6).

Table 4.6 Referrals among reviewed cases (N=869)

| Referred case | Freq | Percent | Cum |
|---------------|------------|---------------|--------|
| Yes | 338 | 38.90 | 38.90 |
| No | 531 | 61.10 | 100.00 |
| Total | 869 | 100.00 | |

In their study on patterns and determinants of pathways to reach comprehensive emergency obstetric and neonatal care (CEmONC) in South Sudan, Elmusharaf et al (2017:12) found that most of the participants who delivered at hospitals with childbirth facilities were self-referred.

4.4.2.1 Distance from referring facility

The distance to reach health facilities is a critical factor for the outcome of any health service. In Ethiopia, many people travel long distances to reach primary hospitals. The study estimated the average travel time between residence to the primary hospitals if the case uses ambulance for their travel. The review indicated that of the cases, 55.33% (n=187) had travelled between 40 and 60 minutes to the hospital; 20.41% (n=69) travelled less than 20 minutes; 18.64% (n=63) travelled 20-40 minutes, and 5.62% (n=19) travelled over 60 minutes to reach the hospital (See table 4.7).

Table 4.7 Estimated travel time to the primary hospital (N=338)

| Time to hospital by ambulance (min) | Freq | Percent | Cum |
|-------------------------------------|------------|---------------|--------|
| <20 | 69 | 20.41 | 20.41 |
| 20-40 | 63 | 18.64 | 39.05 |
| 40-60 | 187 | 55.33 | 94.38 |
| >60 | 19 | 5.62 | 100.00 |
| Total | 338 | 100.00 | |

4.4.2.2 Referral communication

Communication between the sending and receiving facility is an important component of referral. The government of Ethiopia introduced referral slips for the sending facilities to fill in the client information, reason for referral, possible diagnosis, investigations done, and any treatment given before referral. The selected cases were reviewed for the

availability of any communication material, and completeness of the information in the slip. The study found that 63.61% (n=215) of the reviewed medical records had referral slips in the file, and 36.39% (n=123) did not (see Table 4.8).

Table 4.8 Availability of referral slips in the patient file (N=338)

| Referral slips attached | Freq | Percent | Cum |
|-------------------------|------------|---------------|--------|
| Yes | 215 | 63.61 | 63.61 |
| No | 123 | 36.39 | 100.00 |
| Total | 338 | 100.00 | |

The type of investigations and treatments started at the referring facility should be written clearly in the referral slip. The study found that the lab investigations done at the referring facility were written in 50.70% (n=109) of the files and not written in 49.30% (n=106) of the files (see Table 4.9). The treatment given at the referring facility was written in 26.51% (n=57) of the files and not written in 73.49% (n=158) of the files (see Table 4.10).

Table 4.9 Lab investigations done at referring facility written on the referral slip (N=215)

| Lab investigations done at referring facility were written | Freq | Percent | Cum |
|------------------------------------------------------------|------------|---------------|--------|
| Yes | 109 | 50.70 | 50.70 |
| No | 106 | 49.30 | 100.00 |
| Total | 215 | 100.00 | |

Table 4.10 Treatment given at referring facility written on the referral slip (N=215)

| Treatment given at referring facility was written | Freq | Percent | Cum |
|---------------------------------------------------|------------|---------------|--------|
| Yes | 57 | 26.51 | 38.60 |
| No | 158 | 73.49 | 100.00 |
| Total | 215 | 100.00 | |

In their study on obstetrics referrals at Saint Paul's Hospital Millennium Medical College (SPHMMC) in Addis Ababa, Ethiopia, Abdella, Meskelu, Teklu and Bekele (2019:9) found that basic investigations (blood group, HGB & HIV) were documented in the referral paper for 60% of clients and type of treatment given indicated on the referral paper for 75.6% clients.

4.4.2.3 Reasons for referrals

The health professional's decision is the starting point for referral. Health professionals are responsible for identifying cases and the reasons that require referral. In this study, 31.63% (n=56) of the mothers and 53.49% (n=23) of the neonates referred had reasons for referral recorded in the referral slip, and 68.37% (n=121) of the mothers and 46.51% (n=20) of the neonates did not (see Table 4.11).

Table 4.11 Proportion of cases sent with probable cause identified (N=177)

| Cause for referral established | Delivery | | NICU | |
|--------------------------------|------------|---------------|-----------|---------------|
| | Freq | Percent | Freq | Percent |
| Yes | 56 | 31.63 | 23 | 53.49 |
| No | 121 | 68.37 | 20 | 46.51 |
| Total | 177 | 100.00 | 43 | 100.00 |

The reasons for referral of the mothers were prolonged labour (48.21%; n=27); haemorrhage (10.71%; n=6); PROM (8.93%; n=5); malpresentation (8.93%; n=5), and 'other' (unspecified) (23.22%; n=13) (see Table 4.12). For the neonates, the reasons for referral were unable to breathe/fast breathing (34.8%; n=8); failure to suck breast (26.09%; n=6); low birth weight (21.74%; n=5), and 'other' (unspecified) (17.38%; n=4) (see Table 4.13).

Table 4.12 Main reasons for maternal referral (N=56)

| Reasons for referral | Freq | Percent | Cum |
|----------------------|-----------|---------------|--------|
| Prolonged labour | 27 | 48.21 | 48.21 |
| Haemorrhage | 6 | 10.71 | 58.92 |
| PROM | 5 | 8.93 | 67.85 |
| Malpresentation | 5 | 8.93 | 76.78 |
| Other | 13 | 23.22 | 100.00 |
| Total | 56 | 100.00 | |

Table 4.13 Main reasons for neonatal referral (N=23)

| Reasons for referral | Freq | Percent | Cum |
|----------------------------------|-----------|---------------|--------|
| Unable to breathe/fast breathing | 8 | 34.78 | 34.78 |
| Failure to suck breast | 6 | 26.09 | 60.87 |
| Low birth weight | 5 | 21.74 | 82.61 |
| Others | 4 | 17.38 | 100.00 |
| Total | 23 | 100.00 | |

A study in rural Tanzania found that the common causes for maternal referrals were prolonged labour (31%); pre-eclampsia (18%); post-partum haemorrhage (PPH) due to retained placenta (11%); premature rupture of membrane (PROM) (9%), and severe anaemia, breech presentation and twin pregnancy (18%) (Biswas et al 2018:372). In their study in Addis Ababa, Ethiopia, Abdella et al (2019:9) found that the main reasons for referral were prolonged/obstructed labour, premature rupture of the foetal membrane, pregnancy-induced hypertension, and abortion.

4.4.2.4 Transportation for referral

Transportation between facilities during referral is an important component of the system. Transportation of cases can happen between facilities either by using public transport or ambulance services. The government of Ethiopia purchased and distributed ambulances to public health facilities. Of the reviewed cases, 67.4% (n=145) had information about ambulance services. Majority (93.10%; n=135) used ambulance, and 6.90% (n=10) did not (see Table 4.14).

Table 4.14 Use of ambulance for transportation (N=145)

| Ambulance used | Freq | Percent | Cum |
|----------------|------------|---------------|--------|
| Yes | 135 | 93.10 | 93.33 |
| No | 10 | 6.90 | 100.00 |
| Total | 145 | 100.00 | |

The study examined whether health professionals accompanied referrals from the sending facilities. Only 44.19% (n=95) recorded whether the case was accompanied by health workers or not. Of the reviewed records, 30.53% (n=29) were accompanied by health workers from the health centres, and 69.47% (n=66) were not (see Table 4.15).

Table 4.15 Referral accompanied by health professional from the sending facility (N=95)

| Referral accompanied by health professional | Freq | Percent | Cum |
|----------------------------------------------------|-------------|----------------|------------|
| Yes | 29 | 30.53 | 30.53 |
| No | 66 | 69.47 | 100.00 |
| Total | 95 | 100.00 | |

4.4.3 Delivery care at receiving facility

Referred cases require extra attention when they reach the receiving facility. Quality of care includes the completeness of care, which could be affected by the availability of resources. Thus, when there is a shortage of resources, referred cases, which can be serious cases compared to walk-in clients, require priority for complete care. The differences in care between referred and non-referred clients are discussed next.

4.4.3.1 Care at admission

4.4.3.1.1 Vital signs at admission

The first step before taking any history is taking the required vital signs and registering them in the patient card, namely measuring temperature, respiratory rate, pulse rate and blood pressure. These measurements should be taken on admission of all cases visiting a physician. The study examined whether the four necessary vital signs were taken and/or recorded properly among the referred and non-referred cases (see Table 4.16).

Table 4.16 Association between referral status and vital signs (N=725)

| Vital signs | Referred case | | | X ² | P-value |
|-------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| Temperature | | | | | |
| Yes | 217 (76.41%) | 368 (83.45%) | 585 (80.69%) | 5.4 | 0.02 |
| No | 67 (23.59%) | 73 (16.55%) | 140 (19.31%) | | |
| Total | 284 (100%) | 441 (100%) | 725 (100%) | | |
| Respiratory rate | | | | | |
| Yes | 229 (80.92%) | 369 (83.67%) | 598 (82.60%) | 0/91 | 0.34 |
| No | 54 (19.08%) | 72 (16.33%) | 126 (17.40%) | | |
| Total | 283 (100%) | 441 (100%) | 724 (100%) | | |
| Pulse rate | | | | | |
| Yes | 263 (92.93%) | 392 (88.89%) | 655 (90.47%) | 3.23 | 0.07 |
| No | 20 (11.39%) | 49 (11.11%) | 69 (9.53%) | | |
| Total | 283 (100%) | 441 (100%) | 724 (100%) | | |
| Blood pressure | | | | | |
| Yes | 274 (96.348%) | 412 (93.42%) | 686 (94.62%) | 3.2 | 0.08 |
| No | 10 (3.52%) | 29 (6.58%) | 39 (5.38%) | | |
| Total | 284 (100%) | 441 (100%) | 725 (100%) | | |

Table 4.16 shows that in 76.41% (n=217) of referred cases and 83.45% (n=368) of non-referred cases, the patient's temperature was taken and recorded. In 23.59% (n=67) of referred cases and 16.55% (n=73) of non-referred cases, this was not done. In 80.92% (n=229) of referred cases and 83.67% (n=369) of non-referred cases, the respiratory rate was taken and recorded. In 19.08% (n=54) of referred cases and 16.33% (n=72) of non-referred cases, this was not done. In 92.93% (n=263) of referred cases and 88.89% (n=392) of non-referred cases, the pulse rate was taken and recorded. In 11.39% (n=20) of referred cases and 11.11% (n=49) of non-referred cases, this was not done. In addition, in 96.348% (n=274) of referred cases and 93.42% (n=412) of non-referred cases, blood pressure was taken and recorded. In 3.52% (n=10) of referred cases and 6.58% (n=10) of non-referred cases, this was not done.

The results showed that these practices were not done properly. The difference between the two groups regarding vital sign measurement, however, showed no significant difference except for body temperature.

4.4.3.1.2 Measurements at admission

Measuring mothers who present at hospital for delivery care is a key part of physical examination to decide on the management of the issue presented. The study examined whether maternal physical measurements were taken (see Table 4.17).

Table 4.17 Association between maternal physical measurements and referral status (N=724)

| Measurements | Referred case | | | X ² | P-value |
|------------------------------------|-------------------|-------------------|-------------------|----------------|---------------|
| | Yes | No | Total | | |
| Gestational age | | | | | |
| Yes | 223 (78.80%) | 351 (79.59%) | 574 (79.28%) | 0.07 | 0.79 |
| No | 60 (21.20%) | 90 (20.41%) | 150 (20.72%) | | |
| Total | 283 (100%) | 241 (100%) | 724 (100%) | | |
| Mid upper arm circumference | | | | | |
| Yes | 0 (0%) | 3 (0.68%) | 3 (0.41%) | | Fisher (0.29) |
| No | 283 (100%) | 438 (99.32%) | 721 (99.59%) | | |
| Total | 283 (100%) | 441 (100%) | 724 (100%) | | |
| Weight | | | | | |
| Yes | 1 (0.35%) | 5 (1.13%) | 6 (0.83%) | | Fisher (0.41) |
| No | 282 (99.65%) | 436 (98.87%) | 718 (98.75%) | | |
| Total | 158 (100%) | 241 (100%) | 724 (100%) | | |
| Height | | | | | |
| Yes | 0 | 2(0.45%) | 2 (0.28%) | | Fisher (0.52) |
| No | 283 (100%) | 439 (99.55%) | 722 (99.72%) | | |
| Total | 283 (100%) | 441 (100%) | 724 (100%) | | |

The study found that gestational age was measured in 78.80% (n=223) of referred cases and 79.59% (n=351) of non-referred cases. In 0% (n=0) of referred cases and 0.68% (n=3) of non-referred cases, mid upper arm circumference was measured. In 100% (n=283) of referred cases and 99.32% (n=438) of non-referred cases, this was not done. In 0.35% (n=1) of referred cases and 1.13% (n=5) of non-referred cases, maternal weight was measured. In 99.65% (n=282) of referred cases and 98.87% (n=436) of non-referred cases, this was not done. In 0% (n=0) of referred cases and 0.45% (n=2) of non-referred cases, maternal height was measured. In 100% (n=283) of referred cases and 99.55% (n=439) of non-referred cases, this was not done. The difference between the referred and non-referred cases for any of the measurements was not significant.

4.4.3.1.3 Abdominal examinations at admission

The abdominal examination presents opportunities to identify the lie of the foetus, which is an important predictor to decide on possible management of the case. In this study, in most cases lie was done and recorded in the patient card. There was no significant difference between referred and non-referred cases at $X^2=3.6$ and P-value=0.059. Regarding presentation, most cases were checked for presentation. However, there was a significant difference between the referred cases and non-referred cases at $X^2=7.6$ and P-value=0.006.

4.4.3.1.4 Pelvic examinations at admission

Pelvic examination is a critical step to further understand the case presented for delivery care. As presented in Table 4.18, significant proportion of reviewed records have information about all the examination, except vaginal discharge. Only 80.6% of records had information about vaginal discharge. The result shows that there was a clear difference between referred and non-referred cases for pelvic examinations for cervical dilatation, descent, and moulding.

Table 4.18 Association between referral status and physical examinations at admission (N=726)

| Check for | Referred case | | | X ² | P-value |
|----------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| Vaginal discharge | | | | | |
| Yes | 115 (48.32%) | 63 (18.16%) | 178 (30.43%) | 60.67 | 0.0000 |
| No | 123 (51.68%) | 284 (81.84%) | 407 (69.57%) | | |
| Total | 238 (100%) | 347 (100%) | 585 (100%) | | |
| Ruptured membrane | | | | | |
| Yes | 213 (75.00%) | 306 (69.39%) | 519 (71.59%) | 2.68 | 0.102 |
| No | 71 (25.00%) | 135 (30.61%) | 206 (28.41%) | | |
| Total | 284 (100%) | 441 (100%) | 725 (100%) | | |
| Cervical dilatation | | | | | |
| Yes | 225 (79.23%) | 300 (67.87%) | 525 (72.31%) | 11.13 | 0.001 |
| No | 59 (20.77%) | 142 (32.13%) | 201 (27.69%) | | |
| Total | 284 (100%) | 442 (100%) | 726 (100%) | | |
| Descent | | | | | |
| Yes | 184 (64.79%) | 218 (49.32%) | 402 (55.37%) | 16.74 | 0.000 |
| No | 100 (35.21%) | 224 (50.68%) | 324 (44.63%) | | |
| Total | 284 (100%) | 442 (100%) | 726 (100%) | | |
| Moulding | | | | | |
| Yes | 83 (30.18%) | 82 (19.20%) | 165 (23.50%) | 11.21 | 0.001 |
| No | 192 (69.82%) | 345 (80.80%) | 537 (76.58%) | | |
| Total | 275 (100%) | 427 (100%) | 702 (100%) | | |
| Presentation | | | | | |
| Yes | 273 (96.13 %) | 401 (90.72%) | 674 (92.84%) | 7.59 | 0.006 |
| No | 11 (3.87 %) | 41 (9.28%) | 52 (7.16%) | | |
| Total | 284 (100%) | 242 (100%) | 726 (100%) | | |
| Lie | | | | | |
| Yes | 267 (94.01%) | 397 (90.02%) | 664 (91.59%) | 3.57 | 0.059 |
| No | 17 (5.99%) | 44 (9.98%) | 61 (8.41%) | | |
| Total | 284 (100%) | 441 (100%) | 725 (100%) | | |

4.4.3.1.5 Physical examinations at admission

Pallor and jaundice are two common checks during physical examinations. The results indicated that pallor was checked in 12.05% (n=20) of referred cases and 30.35% (n=78) of non-referred cases. In 87.95% (n=146) of referred cases and 69.65% (n=179) non-referred cases, pallor was not checked (see Table 4.19). In 12.65% (n=21) of referred cases and 30.23% (n=78) of non-referred cases, jaundice was checked. In 87.35% (n=145) of referred cases and 69.77% (n=180) of non-referred cases, jaundice was not checked (see Table 4.20). The study found that the difference between referred

and non-referred cases was significant for both checks – pallor ($X^2 = 18.98$ and P-value = 0.000) and jaundice ($X^2 = 17.4$ and P-value = 0.000).

Table 4.19 Physical examinations for Pallor between referred and non-referred cases (N=423)

| Examinations | Referred case | | Total | X ² | P-value |
|---------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Pallor | | | | | |
| Yes | 20 (12.05%) | 78 (30.35%) | 98 (23.17%) | 18.98 | 0.000 |
| No | 146 (87.95%) | 179 (69.65%) | 325 (76.83%) | | |
| Total | 166 (100%) | 257 (100%) | 423 (100%) | | |

Table 4.20 Physical examinations for Jaundice between referred and non-referred cases (N=424)

| Examinations | Referred case | | Total | X ² | P-value |
|-----------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Jaundice | | | | | |
| Yes | 21 (12.65%) | 78 (30.23%) | 99 (23.35%) | 17.4 | 0.000 |
| No | 145 (87.35%) | 180 (69.77%) | 325 (76.77%) | | |
| Total | 166 (100%) | 258 (100%) | 424 (100%) | | |

4.4.3.1.6 Laboratory investigations at admission

Laboratory investigations done during the antenatal period and delivery care should be filled in on the patient card. These help health professionals decide on the management of the case and ensure the prevention of common illnesses that can be transmitted to the child. As presented below, of the reviewed records, the information about the laboratory tests were ascertained on more than 90% of reviewed cases. Table 4.21 lists the percentage and number of referred and non-referred cases regarding HIV, hepatitis, VDRL, RH factor, urine and haemoglobin analysis.

Table 4.21 Association of referral status and laboratory tests at hospital level (N=726)

| Laboratory test types | Referred case | | | X ² | P-value |
|-----------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| HIV | | | | | |
| Test was done | 184 (71.32%) | 300 (72.99%) | 484 (72.35%) | 0.22 | 0.64 |
| Test was not done | 74 (28.68%) | 111 (27.01%) | 185 (27.65%) | | |
| Total | 258 (100%) | 411 (100%) | 669 (100%) | | |
| Hepatitis | | | | | |
| Test was done | 166 (64.34%) | 252 (61.31%) | 418 (62.48%) | 0.62 | 0.43 |
| Test was not done | 92 (35.66%) | 159 (38.69%) | 251 (37.52%) | | |
| Total | 258 (100%) | 411 (100%) | 669 (100%) | | |
| VDRL | | | | | |
| Test was done | 156 (60.47%) | 237 (57.66%) | 393 (58.74%) | 0.51 | 0.47 |
| Test was not done | 102 (39.53%) | 174 (42.34%) | 276 (41.26%) | | |
| Total | 258 (100%) | 441 (100%) | 669 (100%) | | |
| RH factor | | | | | |
| Test was done | 174 (67.44%) | 256 (62.29%) | 430 (64.28%) | 1.83 | 0.18 |
| Test was not done | 84 (32.56%) | 55 (37.71%) | 239 (35.72%) | | |
| Total | 258 (100%) | 411 (100%) | 669 (100%) | | |
| Urine analysis | | | | | |
| Test was done | 172 (66.41%) | 277 (67.23%) | 449 (66.92%) | 0.05 | 0.84 |
| Test was not done | 87 (33.59%) | 135 (32.77%) | 222 (33.08%) | | |
| Total | 259 (100%) | 412 (100%) | 671 (100%) | | |
| Haemoglobin | | | | | |
| Test was done | 124 (47.15%) | 197 (47.82%) | 321 (47.56%) | 0.03 | 0.87 |
| Test was not done | 139 (52.85%) | 215 (52.18%) | 354 (52.44%) | | |
| Total | 263 (100%) | 412 (100%) | 675 (100%) | | |

Haemoglobin test is an important marker, given the high prevalence of haemorrhage during labour and post-partum, and the high level of anaemia among pregnant women in Ethiopia (CSA [Ethiopia] & ICF 2016:199). Urine analysis, HIV and RH factor tests were performed in most cases. The study found no significant differences between referred and non-referred cases in respect of the laboratory tests.

4.4.3.2 Use of partograph for labour monitoring

A partograph is a simple, low-cost monitoring tool for intrapartum care (WHO 2018a: 50; Markos & Bogale 2015:2). Utilisation of a partograph is vital to guide health workers to identify abnormal labour and to implement the appropriate management and improve the quality of intrapartum care, maternal health and birth outcomes (Khan, Billah, Mannan, Mannan, Begum, Khan, Islam, Ahasan, Rahman, George, Arifeen, Meena,

Rashid, Iftekhhar, Graft-Johnson 2018:19). The WHO recommends consistent use of a partograph to reduce maternal and neonatal mortality, especially in developing countries (Fujita, Mukumbuta, Chavuma & Ohashi 2015:191).

4.4.3.2.1 Documentation of partograph

The WHO recommends the use of partographs in monitoring all labour (Markos & Bogale 2015:1). Accordingly, various countries have introduced either paper or electronic version of the tool or both. In Ethiopia, most of the public facilities implement the paper-based tool. The study examined whether the partograph was attached to the record or patient's card (see Table 4.22).

Table 4.22 Documentation of partograph in the medical record (N=711)

| Is the partograph attached to the record/patient card? | Referred case | | Total | X ² | P-value |
|--------------------------------------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Yes | 233 (84.73%) | 311 (71.33%) | 544 (76.51%) | 16.84 | 0.000 |
| No | 42 (15.27%) | 125 (28.67%) | 167 (23.49%) | | |
| Total | 275 (100%) | 436 (100%) | 711 (100%) | | |

Table 4.20 indicates that 84.73% (n=233) of the referred cases and 71.33% (n=311) of the non-referred cases had the partograph attached to the record or patient's card. Of the referred cases, 15.27% (n=42) and 28.6% (n=125) of the non-referred cases did not have the partograph. There was a significant difference between referred and non-referred cases at X²=16.84 and P-value=0.000.

In their study in public health institutions of Bale Zone, Ethiopia, Markos and Bogale (2015:3) found that 67.3% of the reviewed medical records had partograph forms, and many of the forms were not fully completed. A study on partograph utilisation for referral of abnormal labour in primary health care facilities in Bangladesh found that partographs were only used in 3% of all deliveries conducted in health facilities (Khan et al 2018:20).

4.4.3.2.2 When to start record?

Partograph recording should be started during the active stage of labour. The WHO (2016a: 66) defines the active stage of labour as “when the mother has a cervical dilatation of greater or equal to 4 cm”. In this study, partograph recording started in the active phase in 53.10% (n=120) of referred cases and 59.80% (n=80) of non-referred cases; in near to full dilatation in 44.69% (n=101) in referred cases and 38.21% (n=115) of non-referred cases, and in the latent phase in 2.21% (n=5) of referred cases and 1.99% (n=6) of non-referred cases (see Table 4.23). There was no significant difference between referred and non-referred cases as to when the partograph was started at P-value 0.31.

Table 4.23 Starting time of partograph record (N=527)

| First cervical dilatation record | Referred case | | Total | X ² | P-value |
|----------------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Latent phase (<4 cms) | 5 (2.21%) | 6 (1.99%) | 11 (2.09%) | 2.37 | 0.31 |
| Active phase (4-8 cms) | 120 (53.10%) | 80 (59.80%) | 300 (56.93%) | | |
| Near to full dilatation (>8 cms) | 101 (44.69%) | 115 (38.21%) | 216 (40.99%) | | |
| Total | 226 (100%) | 301 (100%) | 527 (100%) | | |

4.4.3.2.3 Completeness of the partograph

The WHO recommends appropriate intervals for monitoring vital signs and labour progress on the partograph: foetal heart rate (FHR) and uterine contraction (every thirty minutes), monitoring of temperature and urine output (every two hours), and monitoring of state of liquor/amniotic fluid, moulding of foetal skull, cervical dilatation, descent of foetal head, and maternal blood pressure (every four hours) (Khan et al 2018:24).

This study analysed the practice of monitoring of vital signs and labour progress signs. The time between the start of the partograph and delivery was calculated as length of stay and the number of records was checked against the standard measurement for each type of vital or labour progress monitoring sign. The study examined the proportion of appropriate records and the practice between referred and non-referred cases.

4.4.3.2.3.1 Maternal vital signs

Blood pressure, and temperature should be measured regularly. Table 4.24 and Table 4.25 present the results for the number of maternal and foetal vital signs recorded as expected.

Table 4.24 Number of maternal blood pressure recorded as expected (N=514)

| Examinations | Referred case | | Total | X ² | P-value |
|--------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Blood pressure | | | | | |
| Examined as required | 123 (55.66%) | 151 (51.54%) | 274 (53.31%) | 0.86 | 0.35 |
| Not examined as required | 98 (44.34%) | 142 (48.46%) | 240 (46.69%) | | |
| Total | 221 (100%) | 293 (100%) | 514 (100%) | | |

Table 4.25 Number of maternal temperatures recorded as expected (N=254)

| Examinations | Referred case | | Total | X ² | P-value |
|--------------------------|------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Temperature | | | | | |
| Examined as required | 45 (53.57%) | 78 (45.88%) | 123 (48.43 %) | 1.33 | 0.25 |
| Not examined as required | 39 (46.43%) | 92 (54.12%) | 131 (51.57%) | | |
| Total | 84 (100%) | 170 (100%) | 254 (100%) | | |

Regarding blood pressure, 55.66% (n=123) of referred cases and 51.54% (n=151) of non-referred cases were examined; 44.34% (n=98) of referred cases and 48.6% (n=142) of non-referred cases were not examined. Regarding temperature, 53.57% (n=45) of referred cases and 45.88% (n=78) of non-referred cases were examined; 46.43% (n=39) of referred cases and 54.12% (n=92) of non-referred cases were not examined.

A study in Bale revealed that less than 10% of cases' blood pressure were recorded in the partograph (Markos & Bogale 2015:5). A study at a primary health centre in Zambia found that body temperature (59.1%), and blood pressure (93.7%) were measured as expected (Fujita et al 2015:194). In their study of partograph utilisation as a decision-making tool for referral of abnormal labour in primary health care facilities in Bangladesh, Khan et al (2018:26) reported that only 3% of cases recorded maternal pulse rate.

4.4.3.2.3.2 Labour investigations

Labour investigations done while the mother is in labour are important to identify pregnancy-related problems, such as pregnancy-induced hypertension. These follow-ups include checking for urine volume and for protein and acetone in the urine. Table 4.26 indicates the laboratory tests that were found in the study.

Table 4.26 Laboratory tests recorded on a partograph (N=544)

| Tests | Referred case | | | X ² | P-value |
|----------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| Urine volume | | | | | |
| Done | 0 | 1 (0.32%) | 1 (0.78%) | | |
| Not done | 233 (100%) | 310 (99.68%) | 543 (99.82%) | | |
| Total | 233 (100%) | 311 (100%) | 544 (100%) | | |
| Urine protein | | | | | |
| Done | 7 (3.00%) | 48 (15.43%) | 55 (10.11%) | | |
| Not done | 226 (97.00%) | 263 (84.57%) | 489 (89.89%) | 22.65 | 0.000 |
| Total | 233 (100%) | 311 (100%) | 544 (100%) | | |
| Urine acetone | | | | | |
| Done | 7 (3.00%) | 45 (14.47%) | 52 (9.56%) | | |
| Not done | 226 (97.00%) | 266 (85.53%) | 492 (90.44%) | 20.25 | 0.000 |
| Total | 233 (100%) | 311 (100%) | 544 (100%) | | |

Regarding urine volume, 0% (n=0) of referred cases and 0.32% (n=1) of non-referred cases were tested; 100% (N=233) of referred cases and 99.68% (n=310) of non-referred of non-referred cases were not tested. Regarding urine protein, 3.00% (n=7) of referred cases and 15.43% (n=48) of non-referred cases were tested; 97.00% (n=226) of referred cases and 15.43% (n=48) of non-referred cases were not tested. Regarding urine acetone, 3.00% (n=7) of referred cases and 14.47% (n=45) of non-referred cases were tested; 97.00% (n=226) of referred cases and 85.53% (n=266) of non-referred cases were not tested.

4.4.3.2.3.3 Pelvic examination

Digital vaginal examination at intervals of four hours is recommended for routine assessment of active first stage of labour in low-risk women (WHO 2018a: 78). Every examination should check for cervical dilatation, descent and moulding of foetal skull.

Table 4.27, Table 4.28 and Table 4.29 presents the findings for the respective examinations.

Table 4.27 Number of cases examined for cervical dilatation appropriately (N=525)

| Examinations | Referred case | | | X ² | P-value |
|--------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| Examined as required | 65 (28.89%) | 89 (29.67%) | 154 (29.35%) | 0.038 | 0.85 |
| Not examined as required | 160 (71.11%) | 211 (70.33%) | 371 (70.67%) | | |
| Total | 225 (100%) | 300 (100%) | 525 (100%) | | |

Table 4.28 Number of cases examined for foetal skulls moulding appropriately (N=189)

| Examinations | Referred case | | | X ² | P-value |
|--------------------------|------------------|------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| Examined as required | 41 (44.57 %) | 56 (57.73%) | 97 (51.32%) | 3.3 | 0.07 |
| Not examined as required | 51 (55.43 %) | 41 (42.27%) | 92 (48.68%) | | |
| Total | 92 (100%) | 97 (100%) | 189 (100%) | | |

Table 4.29 Number of cases examined for Foetal decent appropriately (N=402)

| Examinations | Referred case | | | X ² | P-value |
|--------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | Total | | |
| Examined as required | 54 (29.35%) | 69 (31.65 %) | 123 (30.60%) | 0.25 | 0.62 |
| Not examined as required | 130 (70.65 %) | 149 (68.35%) | 279 (69.40%) | | |
| Total | 184 (100%) | 218 (100%) | 402 (100%) | | |

Regarding cervical dilatation examination, 28.89% (n=65) of referred cases and 29.67% (n=89) of non-referred cases were examined; 71.11% (n=160) of referred cases and 70.33% (n=211) of non-referred cases were not. Regarding moulding, 44.57% (n=41) of referred cases and 57.73% (n=56) of non-referred cases were examined; 55.43% (n=51) of referred cases and 42.27% (n=41) of non-referred cases were not. Regarding descent, 29.35% (n=54) of referred cases and 31.65% (n=69) of non-referred cases

were examined; 70.65% (n=130) of referred cases and 68.35% (n=149) of non-referred cases were not. The study revealed no significant differences between the findings.

4.4.3.2.3.4 Abdominal examination

The abdominal examination which should be documented includes uterine contractions and foetal heartbeat (FHB). Those vital signs are important components of partograph monitoring and should be done every 30 minutes. Table 4.30 and Table 4.31 present the results of abdominal examinations.

Table 4.30 Practice of abdominal examinations for Foetal health beat (N=523)

| Examinations | Referred case | | Total | X ² | P-value |
|--------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Examined as required | 0 | 0 | 0 | | |
| Not examined as required | 219 (100%) | 304 (100%) | 523 (100%) | | |
| Total | 219 (100%) | 304 (100%) | 523 (100%) | | |

Table 4.31 Practice of abdominal examinations for uterine contractions (N=485)

| Examinations | Referred case | | Total | X ² | P-value |
|--------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Examined as required | 8 (3.81%) | 9 (3.27%) | 17 (3.51%) | 0.10 | 0.75 |
| Not examined as required | 202 (96.19%) | 266 (96.73%) | 468 (96.48%) | | |
| Total | 210 (100%) | 275 (100%) | 485 (100%) | | |

Regarding foetal heartbeat, the examination was not done in any cases. Regarding uterine contractions, 3.81% (n=8) of referred cases and 3.27% (n=9) of non-referred cases were examined; 96.19% (n=202) of referred cases and 96.73% (n=266) of non-referred cases were not examined. There was no significant difference between the referred and non-referred cases for uterine contraction – X²=0.10 and P-value=0.75.

In their study in Bale Zone, Ethiopia, Markos and Bogale (2015:5) found that very few partographs documented uterine contraction and foetal heart rate. At a primary health centre in Zambia, Fujita et al (2015:194) found a high rate of recording of both parameters. A cross-sectional study of partograph utilisation for referral of abnormal

labour in primary health care facilities of Bangladesh found foetal heart rate documented in 61% of cases (Khan et al 2018:26).

4.4.3.3 Outcome of labour

The study revealed that the average length of stay from admission to delivery was close to eight hours at the hospital. As a general guide, the mother is expected to stay at the hospital for an additional 24 hours after spontaneous vaginal delivery (SVD) in the hospital. The average total length of stay at hospital then would be 32 hours. Generally, however, most deliveries are spontaneous and do not require extra management. Table 4.32 presents the findings in the study.

Table 4.32 Mode of delivery among reviewed cases (N=674)

| Mode of delivery | Referred case | | Total |
|--------------------|-------------------|-------------------|-------------------|
| | Yes | No | |
| SVD | 162 (64.80%) | 330 (77.83%) | 492 (73.00%) |
| C/s | 22 (8.80%) | 13 (3.07%) | 35 (5.19%) |
| Forceps | 4 (1.60%) | 6 (1.42%) | 10 (1.48%) |
| Vacuum | 2 (0.80%) | 4 (0.94%) | 6 (0.89%) |
| SVD and episiotomy | 55 (22.00%) | 53 (12.50%) | 108 (16.02%) |
| Total | 250 (100%) | 424 (100%) | 674 (100%) |

Regarding delivery, 64.80% (n=162) of referred cases and 77.83% (n=330) of non-referred cases were SVD, while 22.0% (n=55) of referred cases and 12.50% (n=53) of non-referred cases were SVD and episiotomy; 8.80% (n=22) of referred cases and 3.07% (n=13) of non-referred cases, were caesarean sections. Finally, 1.60% (n=4) of referred cases and 1.42% (n=6) of non-referred cases, were forceps delivery, and 0.80% (n=2) of referred cases and 0.94% (n=4) non-referred cases, were vacuum delivery. Between 2011 and 2015, the caesarean section rate in Ethiopia was 2% of live births (CSA [Ethiopia] & ICF 2016:138).

The study revealed that most of the admitted labour cases resulted in live births and the mothers were stable after delivery. Table 4.33 and Table 4.34 present the maternal and newborn condition.

Table 4.33 Maternal condition after delivery (N=706)

| Conditions after delivery | Referred case | | Total |
|---------------------------|-------------------|-------------------|-------------------|
| | Yes | No | |
| Stable | 273 (99.27%) | 431 (100%) | 704 (99.72%) |
| Unstable and referred | 1(0.83%) | 0 | 1 (0.14%) |
| Died | 1(0.36%) | 0 | 1 (0.14%) |
| Total | 275 (100%) | 431 (100%) | 706 (100%) |

Table 4.34 Newborn birth outcome (N=302)

| Newborn birth outcome | Referred case | | Total |
|-----------------------|-------------------|-------------------|-------------------|
| | Yes | No | |
| Alive | 103 (88.79%) | 174 (93.55%) | 277 (91.72%) |
| Stillbirth | 13 (11.21%) | 12 (6.45%) | 25 (8.28%) |
| Total | 116 (100%) | 186 (100%) | 302 (100%) |

Regarding maternal status after delivery, 99.27% (n=273) of the referred cases and 100% (N=431) of the non-referred cases were stable after delivery. Regarding newborn birth outcomes, 88.79% (n=103) of the referred cases and 93.55% (n=174) of the non-referred cases were live births; 11.21% (n=13) of the referred cases and 6.45% (n=12) of the non-referred cases were stillbirths.

4.4.4 Experience of care at neonatal intensive care unit (NICU)

Neonates requiring critical medical attention are usually admitted to the neonatal intensive care unit (NICU) (Chow, Chow, Popovic, Lam, Popovic, Merrick, Stashefsky Margalit, Lam, Milakovic, Chow & Popovic 2015:1). In Ethiopia, these units are established at hospital level to address problems in relation to newborns (FMOH 2015b:41). NICUs at primary hospitals are equipped with the necessary equipment essential for treating and preventing common causes of neonatal illness, namely jaundice, and hypothermia. In addition, NICUs are supplied with drugs and supplies for treating infections. Human resources availability is dependent on the national availability of human resources and accessibility of the hospital. However, on average about five health professionals trained in NICU are required.

4.4.4.1 Chief complaints for admission

The three main complaints for which newborns presented to the NICU were difficulty of breathing, failure to suck breast, and fever (see Table 4.35).

Table 4.35 Chief complaints at admission (N=143)

| Chief complaint | Referred case | | Total |
|------------------------------|------------------|------------------|-------------------|
| | Yes | No | |
| Fast/difficulty of breathing | 19 (35.19%) | 25 (28.09%) | 44 (30.77%) |
| Failure to suck | 22 (40.74%) | 22 (24.72%) | 44 (30.77%) |
| Fever | 3 (5.56%) | 15 (16.85%) | 18 (12.59%) |
| Low birth weight | 4 (7.41%) | 9 (10.11%) | 13 (9.05%) |
| Cough | 1 (1.85%) | 7 (7.87%) | 8 (5.59%) |
| Preterm | 2 (3.75%) | 1 (1.12%) | 3 (2.10%) |
| Skin rash | 0(0%) | 5 (5.62%) | 5 (3.50%) |
| Other | 3 (5.56%) | 5 (5.62%) | 8 (5.59%) |
| Total | 54 (100%) | 89 (100%) | 143 (100%) |

Regarding difficulty in breathing, 35.19% (n=19) of referred cases and 28.09% (n=25) of non-referred cases, were admitted to NICU. Regarding failure to suck, 40.74% (n=22) of referred cases and 24.72% (n=22) of non-referred cases, were admitted to NICU. Regarding fever, 5.56% (n=3) of referred cases and 16.85% (n=15) of non-referred cases, were admitted to NICU.

4.4.4.2 Patients characteristics at admission

Measurement of foetal weight and vital signs are common practice at admission. This study found that the majority of the neonates were under 2 days old when admitted and had either a normal or a low birth weight (see Table 4.36 and Table 4.37).

Table 4.36 Admitted neonates' age (N=143)

| Newborn age (days) | Referred case | | Total | X ² | P-value |
|----------------------------|------------------|------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Less than 2 days | 44 (81.48%) | 37 (66.07%) | 108 (75.52%) | 2.17 | 0.34 |
| Two to seven days | 5 (9.26%) | 9 (10.11%) | 14 (9.79%) | | |
| Eight to twenty-eight days | 5 (9.26%) | 16 (17.98%) | 21 (14.69%) | | |
| Total | 54 (100%) | 89 (100%) | 143 (100%) | | |

Table 4.37 Neonates' weight at admission (N=132)

| Weight at admission | Referred case | | Total | X ² | P-value |
|-----------------------|------------------|------------------|-------------------|----------------|--------------------------|
| | Yes | No | | | |
| Very low birth weight | 1 (1.92%) | 3 (3.75%) | 4 (3.03%) | | 0.80 (Fisher's Exact) |
| Low birth weight | 12 (23.08%) | 23 (28.75%) | 35 (26.52%) | | |
| Normal birth weight | 30 (57.69%) | 42 (52.50%) | 72 (54.55%) | | |
| Big baby | 9 (17.31%) | 12 (15.00%) | 21 (15.91%) | | |
| Total | 52 (100%) | 80 (100%) | 132 (100%) | | |

Regarding neonates' age at admission to NICU, 81.48% (n=44) of referred cases and 66.07% (n=37) of non-referred cases were under 2 days old. Regarding weight, 57.69% (n=30) of referred cases and 52.50% (n=42) of non-referred cases were normal birth weight, while 23.08% (n=12) of referred cases and 28.75% (n=23) of non-referred cases, were low birth weight. There was no significant difference in age at admission between referred and non-referred cases ($X^2=2.2$ and $P\text{-value}=0.34$). Regarding low and very low birth weight, there was also no significant difference between referred and non-referred cases.

In their study in a rural NICU in Uganda, Hedstrom, Ryan, Otai, Nyonyintono, McAdams, Lester and Batra (2014:4) found that the majority of admitted neonates had a birth weight between 1.5 and 4 kg. An assessment of neonatal care in clinical training facilities in Kenya found that 52% had normal birth weight (2500-<4000 g) while 32% were low birth weight (1500-<2500 g) (Aluvaala, Nyamai, Were, Wasunna, Kosgei, Karumbi, Gathara & English 2015:44).

The survival of the neonate depends on the quality of medical care (Chow et al 2015:2). At admission health professionals are expected to take vital signs of newborns. High and low temperatures show problems in neonates. Neonates should have an axillary temperature between 36.5 and 37.5 (FMOH 2014:208). As to respiratory rate, a child under 2 months old should have a respiratory rate of between 30 and 60 breaths per minute (FMOH 2014:207). The heart rate per minute should be between 120 and 160 for a normal neonate (FMOH 2014:208). Table 4.38, Table 4.39 and Table 4.40 present the neonates' vital signs at admission.

Table 4.38 Neonates' body temperature at admission (N=139)

| Vital signs | Referred case | | Total | X ² | P-value |
|--------------|------------------|------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Temperature | | | | | |
| <36.5 | 32 (60.38%) | 51 (59.30%) | 83 (59.71%) | 0.42 | 0.81 |
| 36.5-37.5 | 12 (22.64%) | 23 (26.74%) | 35 (25.18%) | | |
| >37.5 | 9 (16.98%) | 12 (13.95%) | 21 (15.11%) | | |
| Total | 53 (100%) | 86 (100%) | 139 (100%) | | |

Table 4.39 Neonates' respiratory rate at admission (N=134)

| Vital signs | Referred case | | Total | X ² | P-value |
|------------------|------------------|------------------|-------------------|----------------|---------------------------|
| | Yes | No | | | |
| Respiratory rate | | | Total | | |
| <30 | 0 | 2 (2.41%) | 2 (1.49%) | | 0.083 (Fisher's Exact) |
| 30-60 | 27 (52.94%) | 56 (67.47%) | 83 (61.94%) | | |
| >60 | 24 (47.06%) | 25 (30.12%) | 49 (36.57%) | | |
| Total | 51 (100%) | 83 (100%) | 134 (100%) | | |

Table 4.40 Neonates' heartbeat at admission (N=123)

| Vital signs | Referred case | | Total | X ² | P-value |
|----------------|------------------|------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Heartbeat rate | | | Total | | |
| <120 | 8 (17.39%) | 7 (9.09%) | 15 (12.20%) | 7.67 | 0.02 |
| 120-160 | 29 (63.04%) | 65 (84.42%) | 94 (76.42%) | | |
| >160 | 9 (19.57%) | 5 (6.49%) | 14 (11.38%) | | |
| Total | 46 (100%) | 77 (100%) | 123 (100%) | | |

Regarding the neonates' temperature, 60.38% (n=32) of referred cases and 59.30% (n=51) of non-referred cases, had a temperature of <36.5; 22.64% (n=12) of referred cases and 26.74% (n=23) of non-referred cases had a temperature of 36.5-37.5 and 16.98% (n=12) of referred cases and 13.95% (n=12) of non-referred cases had a temperature of >37.5. Regarding respiratory rate, 0% (n=0) of referred cases and 2.41% (n=2) of non-referred cases, had a respiratory rate of 30-60, and 47.06% (n=24) of referred cases and 30.12% (n=25) had a respiratory rate of >60. Regarding heart rate, 17.39% (n=8) of referred cases and 9.09% (n=7) of non-referred cases had a Heartbeat rate of <120, 63.04% (n=29) of referred cases and 84.42% (n=65) of non-referred cases, had a Heartbeat rate of 120-160, and 19.57% (n=9) of referred cases and 6.49% (n=5) had a Heartbeat rate of >160.

The study found a significant difference between referred and non-referred cases regarding heart rate (Chi-square=7.7 and P-value=0.02).

4.4.4.3 Intrapartum history

The history of delivery should also be documented at the NICU. The intrapartum history is important in terms of identifying risk factors in the neonate. Table 4.41 lists the admitted neonates' place of delivery.

Table 4.41 Admitted neonates' place of delivery (N=91)

| Place of delivery | Referred case | | Total | X ² | P-value |
|-----------------------|------------------|------------------|------------------|----------------|---------------------------|
| | Yes | No | | | |
| Home delivery | 2 (5.00%) | 5 (9.80%) | 7 (7.69%) | | 0.000 (Fisher's exact) |
| Same facility as NICU | 10 (25.00%) | 31 (60.78%) | 41 (45.05%) | | |
| Other facilities | 28 (70.00%) | 15 (29.41%) | 43 (47.25%) | | |
| Total | 40 (100%) | 51 (100%) | 91 (100%) | | |

Regarding place of delivery of neonates admitted to NICU, 25.00% (n=10) of referred cases and 60.78% (n=31) of non-referred cases were delivered in the same facility as the NICU; 70% (n=28) of referred cases and 29.41% (n=15) of non-referred cases were delivered at other facilities. Place of delivery is one of the factors that influence the referral status of neonates. The study found a significant association between place of delivery and referral status at P-value = 0.000.

Taking note of the mode of delivery is important as it may impact on the newborn's health (Lomax 2015:295). The study found no significant difference between referred and non-referred cases at P-value=0.43.

The APGAR score at one and five minutes is also a predicator of the outcome of the care provided at NICU (see Table 4.42). However, recording the APGAR is not well practised.

Table 4.42 Neonates' APGAR score at one and five minutes after birth (N=58)

| APGAR score | Referred case | | Total | X ² | P-value |
|---------------------|------------------|------------------|------------------|----------------|--------------------------|
| | Yes | No | | | |
| One minute | | | | | |
| 0-3 | 0 (0%) | 1 (2.44%) | 1 (1.72%) | | 0.71 (Fisher's exact) |
| 4-10 | 17 (100%) | 40 (97.56%) | 57 (98.28%) | | |
| Total | 17 (100%) | 41 (100%) | 58 (100%) | | |
| Five minutes | | | | | |
| 0-6 | 1 (5.88%) | 4 (9.76%) | 5 (8.62%) | | 0.54 (Fisher's exact) |
| 7-10 | 16 (94.12%) | 37 (90.24%) | 53 (91.38%) | | |
| Total | 17 (100%) | 41 (100%) | 58 (100%) | | |

Regarding the APGAR score, 100% (n=17) of referred cases and 97.56% (n=40) of non-referred cases, were recorded at 4-10 minutes; 94.12% (n=16) of referred cases and 90.24% (n=37) of non-referred cases were recorded at 7-10 minutes.

The mother's gestational age at delivery is an important indicator that should be documented and reviewed for planning and management (see Table 4.43).

Table 4.43 Neonates' gestational age (N=115)

| Gestational age | Referred case | | Total | X ² | P-value |
|-----------------|------------------|-----------------|-------------------|----------------|---------------------------|
| | Yes | No | | | |
| <37 weeks | 8 (16.67%) | 16 (23.88%) | 24 (20.87%) | | 0.198 (Fisher's Exact) |
| 37-40 weeks | 35 (72.92%) | 49 (73.13%) | 84 (73.04%) | | |
| >40 weeks | 5 (10.42%) | 2 (2.99%) | 7 (6.09%) | | |
| Total | 48 (100%) | 67(100%) | 115 (100%) | | |

Regarding gestational age, 72.92% (n=35) of referred cases and 73.13% (n=49) of non-referred cases were born at 37-40 weeks; 16.67% (n=8) of referred cases and 23.88% (n=16) of non-referred cases were born at <37 weeks, and 10.42% (n=5) of referred cases and 2.99% (n=2) of non-referred cases were born at >40 weeks. The study found no significant difference between referred and non-referred cases at P-value= 0.198. In their study in a rural NICU in Uganda, Hedstrom et al (2014:4) found that 36.5% of admitted cases were preterm (gestational age <37 weeks).

The birth weight is another factor that can expose children to illnesses during the first month of life and later. Table 4.44 presents the neonates' birth weight.

Table 4.44 Neonates' birth weight recorded (N=98)

| Birth weight | Referred case | | Total | X ² | P-value |
|-----------------------|------------------|------------------|------------------|----------------|---------------------------|
| | Yes | No | | | |
| Very low birth weight | 3 (9.09%) | 1 (1.54%) | 4 (4.08%) | | 0.279 (Fisher's Exact) |
| Low birth weight | 9 (27.27%) | 20 (30.77%) | 29 (29.59%) | | |
| Normal birth weight | 19 (57.58%) | 42 (64.62%) | 61 (62.24%) | | |
| Big baby | 2 (6.06%) | 2 (3.08%) | 4 (4.08%) | | |
| Total | 21 (100%) | 65 (100%) | 98 (100%) | | |

Regarding birth weight, 57.58% (n=19) of referred cases and 64.62% (n=42) of non-referred cases had a normal birth weight; 27.27% (n=9) of referred cases and 30.77% (n=20) of non-referred cases, had a low birth weight, and 9.09% (n=3) of referred cases and 1.54% (n=1) of non-referred cases, had a very low birth weight. The study found no significant difference between referred and non-referred cases at P-value=0.28.

In an assessment of neonatal care in clinical training facilities in Kenya, Aluvaala et al (2015:44) found that 52% of cases had normal birth weight (2500-<4000 g), 49% of cases were preterm babies (<37 weeks' gestation) and most neonatal admissions (66%) followed spontaneous vaginal delivery.

4.4.4.4 Main causes of newborn illness and admission to NICU

The common causes of newborn illness in Ethiopia include prematurity, infection and asphyxia (FMOH 2015b:14). Table 4.36 presents the main causes of neonatal illness and admission to NICU (see Table 4.45).

Table 4.45 Main causes of neonatal illness and reason for admission (N=272)

| Main causes of illness and admission | Referred case | | Total |
|--------------------------------------|------------------|-------------------|-------------------|
| | Yes | No | |
| Sepsis | 38 (40.00%) | 62 (35.03%) | 100 (36.76%) |
| Low birth weight | 16 (16.84%) | 30 (16.95%) | 46 (16.91%) |
| Respiratory distress | 9 (9.47%) | 19 (10.73%) | 28 (10.29%) |
| Perinatal asphyxia | 9 (9.47%) | 15 (8.47%) | 24 (8.82%) |
| Congenital malformation | 9 (9.47%) | 18 (10.17%) | 27 (9.93%) |
| Prematurity | 7 (7.37%) | 15 (8.47%) | 22 (8.08%) |
| Other | 7 (7.37%) | 18 (10.17%) | 25 (9.19%) |
| Total | 95 (100%) | 177 (100%) | 272 (100%) |

Regarding the main reasons for neonates' admission to NICU, 40.00% (n=38) of the referred cases and 35.03% (n=62) of non-referred cases, were admitted for sepsis; 16.84% (n=16) of referred cases and 16.95% (n=30) of non-referred cases, were admitted for low birth weight, and 9.47% (n=9) of referred cases and 10.73% (n=19) of non-referred cases, were admitted for respiratory distress.

In their study in Kenya, Aluvaala et al (2015:46) found that birth asphyxia, prematurity/low birth weight and neonatal sepsis were the main reasons for admission to NICU. Hedstrom et al (2014:4) found infection, prematurity, respiratory distress, and asphyxia were the main reasons for admission in a rural Ugandan NICU.

4.4.4.5 Length of stay in NICU

The study examined the neonates' length of stay in NICU. Most of the records indicated the discharge date. Table 4.46 indicates the neonates' length of stay in the NICU.

Table 4.46 Length of stay in NICU (N=114)

| Length of stay in NICU | Referred case | | Total | X ² | P-value |
|------------------------|------------------|------------------|-------------------|----------------|---------------------------|
| | Yes | No | | | |
| Less than 2 days | 4 (10.53%) | 11 (14.47%) | 15 (13.16%) | | 0.877 (Fisher's Exact) |
| 2-7 days | 22 (57.89%) | 41 (53.95%) | 63 (55.26%) | | |
| Longer than 7 days | 12 (31.58%) | 24 (31.58%) | 36 (31.58%) | | |
| Total | 38 (100%) | 76 (100%) | 114 (100%) | | |

Regarding length of stay in the NICU, 57.89% (n=22) of referred cases and 53.95% (n=41) of non-referred cases remained in NICU for 2-7 days, and 31.58% (n=12) of non-referred cases, remained longer than 7 days. The study found no significant difference between length of stay and referral status at P-value = 0.877. The average length of stay for all neonates was 6.7 days.

The study found that many records did not indicate discharge status. Presenting findings based on a few records did not reflect the real situation and the variable was dropped. Mortality rates in NICUs vary from country to country (Chow et al 2015:3; Aluvaala et al 2015:45). In their study in a rural Ugandan NICU, Hedstrom et al (2014:6)

found a need to improve referral systems and facility-based care for sick infants to decrease early neonatal mortality.

4.4.5 Appropriateness of referral

Referral of patients, which is a transfer of responsibility to provide services and care to the client to another facility, happens for various reasons. One of the reasons is inappropriate referral. Inappropriate referral is frequently due to patient and facility factors. Facility factors include unavailability of services due to supplies, commodities and providers. From the patient perspective, bypassing the primary contact facility is a common phenomenon in various non-regulated service delivery points. As a result of such factors, hospitals are increasingly involved with the provision of care for normal deliveries that should have been managed at the primary care level (Lagrou, Zachariah, Bissell, Van Overloop, Nasim, Wagma, Kakar, Caluwaerts, Plecker, Fricke, Van den Bergh 2018:5).

The study examined the appropriateness of referrals (see Table 4.47).

Table 4.47 Appropriateness of referral by case team (N=861)

| Can this case be managed at health centre level? | Case team | | Total | X ² | P-value |
|--------------------------------------------------|---------------------|-------------------|-------------------|----------------|---------|
| | Delivery | NICU | | | |
| Yes | 533 (74.23%) | 30 (20.98%) | 563 (65.39%) | 149.44 | 0.000 |
| No | 185 (25.77%) | 113 (79.02%) | 298 (34.61%) | | |
| Total | 718 (100.0%) | 143 (100%) | 861 (100%) | | |

The study found that many deliveries which should have been managed at health centre level were managed by hospitals. Three quarters of cases (74.23%; n=533) who visited the selected hospitals could have been managed at the health centre level, and 185 (25.77%) delivery cases were appropriate for hospital level care. On contrary to this, 20.98% (n=30) of neonates admitted at NICU could have been managed at health centres level and 79.02% (113) were appropriate for hospital level care.

The study found a significant association between appropriateness of referrals and service delivery unit at Chi-square=149.0 and P-value=0.000 (see Table 4.48). An inventory of the referred cases revealed that approximately 41.3% and 30.1% of

referred and non-referred cases, respectively, were appropriate for hospital level care. The difference between the two groups was found to be significant at $X^2=10.84$ and $p\text{-value}=0.001$.

Table 4.48 Appropriateness of referral by referral status (N=861)

| Can case be managed at health centre level? | Referred cases | | Total | X ² | P-value |
|---------------------------------------------|-------------------|-------------------|-------------------|----------------|---------|
| | Yes | No | | | |
| Yes | 196 (58.68%) | 367 (69.64%) | 563 (65.39%) | 10.84 | 0.001 |
| No | 138 (41.32%) | 160 (30.36%) | 298 (34.61%) | | |
| Total | 334 (100%) | 527 (100%) | 861 (100%) | | |

A study in Nigeria revealed that many patients bypassed primary health care facilities to the next level and many cases from health centres were sent to hospitals inappropriately (Koce, Randhawa & Ochieng 2019:2). Self-referral and underutilisation of lower-level facilities, whether initiated by users or lower-level healthcare providers, can result in congestion of hospitals, and poor quality of care and subsequent death of mothers and neonates (Elmusharaf et al 2017:12-13).

4.4.6 Overview of main findings from the medical record review

A total of 869 medical records (83.5% mothers and 16.5% neonates) of patients who visited the selected primary hospitals for care at delivery and neonatal intensive care units were reviewed.

A total of 726 mothers visited the primary hospitals for delivery care. The mean age of the mothers was 25.1 years old. The case review revealed that only 80% of patient cards had a recorded GA. Of the reviewed cases, 37.61% were primigravida and 76.31% (n=438) were at 37-40 weeks.

Referral is the process of coordinated movement of health care seekers to reach a high-level care within a short period of time (Biswas et al 2018:367). Unless referral is well managed, it increases the workload and utilises substantial health care resources both at the source of the referrals and the referral-level facilities (WHO 2018b: 58). Ensuring emergency obstetric care services and quick referral during the perinatal period can help reduce maternal deaths (Biswas et al 2018:367). The study found that of the cases, 61.10% visited the hospital on their own without referrals and 38.9% were referred.

Communication between the sending and receiving facility is an important component of referral. Referral slips from the sending facility are part of the referral communication. The study found that 63.5% of the reviewed records had referral slips. Of the referral slips, 50.7% indicated the type of investigations done and 30.2% indicated the treatment given at the sending facility.

The distance to reach health facilities is a critical factor for the outcome of any health service. Consequently, transportation is an important determinant in the referral system. In Ethiopia, the Ministry of Health provided several ambulances for primary health care services. The study found that of the cases, 55.33% had travelled between 40 and 60 minutes to the hospital by ambulance; 20.41% travelled less than 20 minutes; 18.64% travelled 20-40 minutes, and 5.62% travelled over 60 minutes to reach the hospital by ambulance. The review indicated that 44.4% of referrals were accompanied by health professionals.

The health professional's decision is the starting point for referral. Health professionals are responsible for identifying cases and the reasons that require referral. In this study, 31.63% of the mothers and 53.49% of the neonates referred had reasons for referral recorded in the referral slip, and 68.37% of the mothers and 46.51% of the neonates did not. The reasons for referral of the mothers were prolonged labour (48.21%); haemorrhage (10.71%); PROM (8.93%); malpresentation (8.93%), and 'other' (unspecified) (23.22%). For the neonates, the reasons for referral were unable to breathe/fast breathing (34.8%); failure to suck breast (26.09%); low birth weight (21.74%), and 'other' (unspecified) (17.38%).

The attention given by the receiving facility to the referred cases can be demonstrated by the completeness of care and follow-ups. The study examined whether the four necessary vital signs were taken and/or recorded properly among the referred and non-referred cases. The review indicated that in most referred and non-referred cases, the mother's temperature, pulse rate, blood pressure and gestational age were taken and recorded. Regarding measuring the mothers for delivery care, there was no significant difference between the referred and non-referred cases for gestational age and lie. For presentation, however, there was a significant difference between the referred and non-referred cases at $X^2=7.6$ and $P\text{-value}=0.006$.

Labour monitoring using a partograph is one of the key processes for better labour outcome. A partograph is a simple, low-cost monitoring tool for intrapartum care (WHO 2018a:50; Markos & Bogale 2015:2). Utilisation of a partograph is vital to guide health workers to identify abnormal labour and to implement the appropriate management and improve the quality of intrapartum care, maternal health and birth outcomes (Khan et al 2018:19). The WHO recommends consistent use of a partograph to reduce maternal and neonatal mortality, especially in developing countries (Fujita et al 2015:191). The study found that 84.73% of the referred cases and 71.33% of the non-referred cases had the partograph attached to the record or patient's card. There was a significant difference between referred and non-referred cases at $X^2=16.84$ and $P\text{-value}=0.000$.

The study analysed the practice of monitoring of vital signs and labour progress signs. The time between the start of the partograph and delivery was calculated as length of stay. The average length of stay for delivery care was 32 hours in the hospital. There was no significant difference in mode of delivery between referred and non-referred cases and the outcome. Regarding delivery, 64.80% of referred cases and 77.83% of non-referred cases were SVD. Between 2011 and 2015, the caesarean section rate in Ethiopia was 2% of live births (CSA [Ethiopia] & ICF 2016:138). Regarding maternal status after delivery, 99.27% of the referred cases and 100% of the non-referred cases were stable after delivery. Regarding newborn birth outcomes, 88.79% of the referred cases and 93.55% of the non-referred cases were live births; 11.21% of the referred cases and 6.45% of the non-referred cases were stillbirths.

Neonates requiring critical medical attention are usually admitted to the neonatal intensive care unit (NICU) (Chow et al 2015:1). The three main complaints for which newborns presented to the NICU were difficulty in breathing, failure to suck breast, and fever. Regarding difficulty in breathing, 35.19% of referred cases and 28.09% of non-referred cases, were admitted to NICU. Regarding failure to suck, 40.74% of referred cases and 24.72% of non-referred cases were admitted to NICU. Regarding fever, 5.56% of referred cases and 16.85% of non-referred cases were admitted to NICU. Regarding the neonates, 75.5% were less than two days old and 76.3% were born at term. The median length of stay at NICU was 6.7 days and no significant difference was observed between the referred and non-referred cases. The discharge status of the neonate was poorly recorded, and therefore not included for analysis.

The APGAR score at one and five minutes is also a predictor of the outcome of the care provided at NICU. However, recording the APGAR is not well practised. Regarding the APGAR score, 100% of referred cases and 97.56% of non-referred cases, were recorded at 4-10 minutes; 94.12% of referred cases and 90.24% of non-referred cases were recorded at 7-10 minutes.

Regarding birth weight, 57.58% of referred cases and 64.62% of non-referred cases had a normal birth weight; 27.27% of referred cases and 30.77% of non-referred cases, had a low birth weight, and 9.09% of referred cases and 1.54% of non-referred cases, had a very low birth weight. The study found no significant difference between referred and non-referred cases at P-value=0.28.

The study found a significant association between appropriateness of referrals and service delivery unit at Chi-square=149.0 and P-value=0.000. An inventory of the referred cases revealed that approximately 41.3% and 30.1% of referred and non-referred cases, respectively, were appropriate for hospital level care. The difference between the two groups was found to be significant at $X^2=10.84$ and p-value=0.001.

4.5 FINDINGS FROM HEALTH SERVICE COSTING

4.5.1 Description of facilities

The study examined the health service costing of the selected two primary hospitals and six health centres that provide MNH care. The primary hospitals included in the medical record review had 10 health centres under their catchment *woredas*. The facilities were established to provide services to these catchment populations. On average, the primary hospitals and health centres were expected to provide services to 100,000 and 25,000 people, respectively. The study found that the primary hospitals and health centres provided services to 211,889 and 35,314 people, respectively.

4.5.1.1 Staffing

Primary hospitals and health centres should be staffed according to national and regional standards. Based on these standards, Table 4.49 presents the average availability of staff in the selected facilities.

Table 4.49 Staffing matrix by type of health facility

| S. No | Profession | Health Centre | | | Primary Hospital | | |
|--------------|-------------------------------------------|---------------|--------------------------|-------------|------------------|-------------------------|-------------|
| | | Standard | Average filled positions | % of filled | Standard | Average filled position | % of filled |
| 1 | MD | 1 | 0 | 0% | 4 | 8.5 | 213% |
| 2 | HO | 2 | 4 | 200% | 2 | 9 | 450% |
| 3 | Nurse (BSc + Dip) | 5 | 15 | 300% | 25 | 46 | 184% |
| 4 | Midwives | 3 | 3 | 100% | 4 | 10 | 250% |
| 5 | Ophthalmic nurse | 1 | 0 | 0% | 1 | 0.5 | 50% |
| 6 | Psychiatric nurse | 1 | 0 | 0% | 1 | 0 | 0% |
| 7 | Laboratory technician/technologist | 2 | 2 | 100% | 6 | 9 | 150% |
| 8 | Pharmacist/pharmacy technician (druggist) | 3 | 1 | 33% | 6 | 7 | 117% |
| 9 | Environmental health | 1 | 0.3 | 30% | 1 | 1 | 100% |
| 10 | Health information | 1 | 2 | 200% | 1 | 2 | 200% |
| 11 | Cleaners | 5 | 5 | 100% | 15 | 20 | 133% |
| 12 | Reception/archive | 6 | 8 | 133% | 8 | 11 | 138% |
| 13 | Maintenance officer | 1 | 0.5 | 50% | 3 | 3 | 100% |
| 14 | Morgue attendant | 1 | 0 | 0% | 1 | 0 | 0% |
| 15 | Dental professional | 2 | 0 | 0% | 2 | 0 | 0% |
| 16 | Radiology professional/radiographer | 1 | 0 | 0% | 3 | 1.5 | 50% |
| 17 | Physiotherapist | 1 | 0 | 0% | 1 | 0 | 0% |
| 18 | Emergency surgical officer | NA | NA | NA | 1 | 2 | 200% |
| 19 | BSc Anaesthetist/nurse anaesthetist | NA | NA | NA | 2 | 1 | 50% |
| 20 | Medical equipment maintenance technician | NA | NA | NA | 1 | 1 | 100% |
| 21 | Food and dietary | NA | NA | NA | 10 | 10 | 100% |
| 22 | Social workers | NA | NA | NA | 1 | 0 | 0% |
| 23 | Complaint handling officer | NA | NA | NA | 1 | 0 | 0% |
| 24 | CEO | NA | NA | NA | 1 | 1 | 100% |
| Total | | 37 | 41 | 117% | 101 | 144 | 143% |

Table 4.49 presents the available staff type and number compared to the minimum expected number of staff included in the regional health bureau's standard. Beyond the standard, however, if facilities need additional staff, the governing board of the facilities can approve additional posts and number of staff. The table shows that in terms of the standard there was a critical shortage of pharmacists, medical doctors, ophthalmic

nurses and psychiatric nurses at health centre level. At hospital level, there was a critical shortage of sub-specialty nursing professionals, such as ophthalmic nurses, dentists, and physiotherapists. However, most of the technical staff who directly provided maternal and newborn care services at the health centres and hospitals had more than the standard qualifications. It should be noted that the standards were based on a primary hospital providing services to 100,000 people.

4.5.2 Cost elements

In this study, the cost of drugs and supplies for treatment and supplies and reagents to be used for labour services prepared in two scenarios – high and low. The high scenario considered purchase of the items from private suppliers and the low considered purchase of the items from the government drug supply agency. All the cost data covered the period from 8 July 2017 to 7 July 2018.

4.5.2.1 Human resources-related expenses

The public sector recruits health facility level staff based on the standard developed by the regional government and the capacity of the facilities. The staff expenses included staff salary, benefits, and overtime payment. The expenses were disaggregated by various departments within the facility. Table 4.50 shows that the hospital level expenses were 6.4 times the health centre expenses.

Table 4.50 Human resource expenses by type of facility

| Staff type | Health Centre | | Primary Hospital | |
|---------------------------------------------------|--------------------------|--------------------------------------------------|--------------------------|--------------------------------------------------|
| | Average payment (Annual) | Average number of staff (Last month of the year) | Average payment (Annual) | Average number of staff (Last month of the year) |
| Admin - General | 419,648.02 | 16 | 1,759,668.45 | 54 |
| Technical - General | 120,577.53 | 3 | 1,068,333.74 | 15 |
| Technical - MCH | 243,347.30 | 5 | 1,027,100.94 | 10 |
| Technical - NICU | NA | NA | 167,564.52 | 5 |
| Technical - Non MCH | 554,260.81 | 11 | 4,351,569.39 | 76 |
| Technical - OR | NA | NA | 177,151.18 | 8 |
| Total staff | | 34 | | 166 |
| Total payment (Birr) | 1,337,833.66 | | 8,551,388.22 | |
| Total Payment (USD) 1 USD = 27.30 Birr | 49,004.87 | | 313,237.66 | |

4.5.2.2 Common administrative costs

The public finance management standard of the public system sets budget code for the administration-related expenses. The expenditure reports of the selected facilities were reviewed, and average expenditures analysed. Table 4.51 presents the administrative costs for the selected facilities. The major expenses at facility level were vehicle running and travel costs.

Table 4.51 Common administrative costs by type of facility

| Type of expense | Average annual expenditure at Health Centre (Birr) | Average annual expenditure at Primary Hospital (Birr) |
|-----------------------------------------|----------------------------------------------------|-------------------------------------------------------|
| Staff and office supplies and furniture | 9,050 (11.2%) | 277,033 (52.5%) |
| Food and food items | 5,417 (6.7%) | 40,000 (7.6%) |
| Vehicle running costs | 28,650 (11.2%) | 103,900 (19.7%) |
| Travel | 17,146 (35.6%) | 27,000 (5.1%) |
| Contractual services | 9,898 (12.3%) | 45,142 (8.6%) |
| Utilities | 10,428 (12.9%) | 31,333 (5.9%) |
| Miscellaneous payments | - | 3,333 (0.6%) |
| Total (in Birr) | 80,589 (100%) | 527,742 (100%) |
| Total (in USD) | 2,951.98 | 19,331.21 |

4.5.2.3 Direct clinical care costs

Direct clinical care costs include the average cost for medication, tests and supplies used while providing the services to the cases visiting the various levels of health facilities. The costs were estimated according to the proportion of cases utilising the common drugs and supplies while receiving care and the costs were extracted from the most recent goods receiving notes of the selected facilities.

4.5.2.3.1 Direct delivery and essential newborn care costs at health centre level

The direct service costs of providing BEmONC at health centres were estimated (see Table 4.52). In addition, the total average expenditures at the health centre level were estimated based on the unit cost and the average number of cases that visited the health centres in the study period. The result showed that the costs ranged from 303–376 birr per case which resulted in an annual average cost of 465,290–577,990 birrs.

Compared to the three cost drivers for this direct care costs, drugs contributed 67% of the total cost.

Table 4.52 Delivery and essential newborn care at health centres

| Inputs | Annual direct service costs | | | | | | | |
|---------------------------------------------|-----------------------------|----------------|---------------|---------------|---------------|----------------|----------------|----------------|
| | Drugs | | Supplies | | Labour tests | | Total | |
| | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate |
| Average unit cost estimate | 204 | 256 | 42 | 48 | 57 | 72 | 303 | 376 |
| Average number of cases (annual) | 1,537 | 1,537 | 1,537 | 1,537 | 1,537 | 1,537 | 1,537 | 1,537 |
| Total annual cost estimate (in Birr) | 313,162 | 393,788 | 64,400 | 73,330 | 87,728 | 110,872 | 465,290 | 577,990 |
| Total annual cost estimate (in USD) | 11,471 | 14,424 | 2,359 | 2,686 | 3,213 | 4,061 | 17,044 | 21,172 |

4.5.2.3.2 *Direct delivery and newborn care costs at primary hospital level*

Primary hospitals provide services for mothers and newborns. As they are expected to provide CEmONC services as well as routine delivery care, C-section and NICU facilities should exist. Tables 4.53 to 4.55 present the costs for delivery care including C-section and NICU services at primary hospital level. The total direct costs for delivery care which include C-section and essential newborn care services, cost a hospital about 374 – 459 birr per visit. This, in turn, resulted in an average expenditure estimate of 1,097,185 –1,348,025 birr. The major cost driver for this type of care at hospital level was drugs, which represented 53% of the expenditure.

Table 4.53 Delivery and essential newborn care at primary hospitals

| Inputs | Annual direct service costs (Birr) | | | | | | | |
|---------------------------------------------|------------------------------------|----------------|----------------|----------------|------------------|----------------|------------------|------------------|
| | Drugs | | Supplies | | Laboratory tests | | Total | |
| | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate |
| Average unit cost estimate | 197 | 248 | 114 | 132 | 62 | 79 | 374 | 459 |
| Average number of cases (annual) | 2,934 | 2,934 | 2,934 | 2,934 | 2,934 | 2,934 | 2,934 | 2,934 |
| Total annual cost estimate (In Birr) | 578,538 | 728,714 | 335,477 | 386,855 | 183,170 | 232,455 | 1,097,185 | 1,348,025 |
| Total annual cost estimate (In USD) | 21,192 | 26,693 | 12,289 | 14,171 | 6,710 | 8,515 | 40,190 | 49,378 |

At primary hospital level, the additional service is the availability of caesarean section. This service is the main reason for establishing primary hospitals at the lower levels of the health care tier in Ethiopia. This study wished to identify cost elements for direct Caesarean services, which resulted in the unit cost ranging from 1,652 to 2,039. The 5% Caesarean rate in the study resulted in a cost of 161,940 to 199,857 birr in the primary hospitals.

Table 4.54 Caesarean section direct service costs at primary hospital

| Inputs | Annual direct service costs (Birr) | | | | | | | |
|---------------------------------------------|------------------------------------|---------------|---------------|---------------|------------------|---------------|----------------|----------------|
| | Drug | | Supplies | | Laboratory tests | | Total | |
| | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate |
| Average unit cost estimate | 681 | 875 | 845 | 1,008 | 127 | 157 | 1,652 | 2,039 |
| Average number of cases (annual) | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| Total annual cost estimate (in Birr) | 66,691 | 85,732 | 82,792 | 98,738 | 12,456 | 15,388 | 161,940 | 199,857 |
| Total annual cost estimate (in USD) | 2,443 | 3,140 | 3,033 | 3,617 | 456 | 564 | 5,932 | 7,321 |

Regarding Neonate Intensive Care Unit, on average each child required from 324 to 399 birr. This resulted in an annual expense ranging from 59,346 to 72,968 birr. The major cost driver of this service was drugs which represented less than half of the unit cost.

Table 4.55 Neonate Intensive Care Unit at primary hospital

| Inputs | Annual Direct Service costs | | | | | | | |
|---------------------------------------------|-----------------------------|---------------|---------------|---------------|------------------|---------------|---------------|---------------|
| | Drugs | | Supplies | | Laboratory tests | | Total | |
| | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate | Low estimate | High estimate |
| Average unit cost estimate | 168 | 195 | 115 | 154 | 42 | 50 | 324 | 399 |
| Average number of cases (annual) | 183 | 183 | 183 | 183 | 183 | 183 | 183 | 183 |
| Total annual cost estimate (in Birr) | 30,657 | 35,704 | 21,081 | 28,108 | 7,608 | 9,156 | 59,346 | 72,968 |
| Total annual cost estimate (in USD) | 1,123 | 1,308 | 772 | 1,030 | 279 | 335 | 2,174 | 2,673 |

4.5.3 Service statistics

The health care system in Ethiopia generates reports from each facility every quarter. The researcher collected and analysed the four quarterly reports for the period from 8 July 2017 to 7 July 2018/Ethiopian fiscal year. The analysis generated the average number of cases that visited the health facilities for various service types. As some of the services require longer stays (contact time with the health worker) at health facilities, the average length of time (in minutes) required to provide the services was also sought from professionals who provide services to those clients.

The data analysis revealed a significant difference when average stay at facility and contact time with health providers were factored in while calculating the caseload share of each department in the facility. Delivery care based on the number of cases represented 10% and 5% of cases visited health centres and hospitals, respectively.

However, when contact time was considered for the actual numbers, delivery care represented 87% and 26% of case-contact hours at health centres and hospitals, respectively. Although some general costs might not be greatly affected due to the patient’s longer stay in the facility, it was important to note this difference when dividing the common costs.

Table 4.56 Average number of clients by type of facility and major service category

| Type of care | Health Centre | | Primary Hospital | |
|--------------|---------------------------|----------------------------|---------------------------|----------------------------|
| | Average number of clients | Average case-contact hours | Average number of clients | Average case-contact hours |
| Delivery | 1,537.17 (9.6%) | 36,614.75 (87.1%) | 2933.5 (5.2%) | 70588.08 (26.0%) |
| MCH | 3,024.5 (18.8%) | 1,369.32 (3.3%) | 5816.5 (10.4%) | 3371.42 (1.2%) |
| Other care | 11,490.5 (71.6%) | 4,043.08 (9.6%) | 47116.75 (83.9%) | 128748.5 (47.5%) |
| OR - C/S | NA | NA | 97.5 (0.2%) | 7020 (2.6%) |
| NICU | NA | NA | 183 (0.3%) | 61488 (23%) |
| Total | 16,052.17 (100%) | 42,027.15 (100%) | 56,147.25 (100%) | 27,1216 (100%) |

4.5.4 Case load

4.5.4.1 Case load estimated by number of cases visited

This analysis compared the available number of staff in each case team/service type by the number of clients who visited the service delivery unit. The Ministry of Health makes various recommendations in this regard. For example, 4 to 6 nurses per hospital are expected to provide care for newborns in the NICU wards (FMOH 2015b:41). In addition, assuming an average length of stay for hospital level delivery (1.3 days) and NICU services (6.7 days) as found in this study and 2 days for delivery care at health centre level, the caseload on each health professional assigned to each department was analysed. The study found that a single midwife provided care to 4 mothers and 2 mothers at health centres and hospitals, respectively. Considering the available human resources and caseload, one midwife only spent 2 and 4 hours with a single patient per day at health centre and hospital level, respectively. At the NICU level, however, a nurse provided services to an average of one neonate per day.

Table 4.57 Patient caseload at various health care units of health centres and hospitals

| Type professional in the service delivery unit | Health Centre | | Primary Hospital | |
|------------------------------------------------|-------------------------|------------------------------------------|-------------------------|------------------------------------------|
| | Number of professionals | Number of cases per professional per day | Number of professionals | Number of cases per professional per day |
| Technical - MCH | | | | |
| GP | 0 | | 1 | 1:6.7 |
| Midwife | 2 | 1:4.2 | 8 | 1:1.8 |
| Nurse | 3 | 1:2.8 | 2 | 1:1.6 |
| Technical - NICU | | | | |
| Health officer | NA | NA | 1 | 1:3 |
| Nurse | NA | NA | 5 | 1:0.6 |

4.5.4.2 Caseload estimated by expected care packages

Inputs for the caseload analysis were sought by identifying the major care steps, prevalence of cases, and the average length time needed to provide for each care. Based on these assumptions, the study identified the length of time needed for each case. Then the researcher identified the expected number of professionals required to provide the services.

Apart from providers' skills and infrastructure, provision of quality care depends on the length of time spent on a single patient. Based on the recommended time for each delivery and essential newborn care step, the study found that at health centre level a total of 4 health officers/general practitioners (GPs), 13 midwives/nurses and 2 laboratory technicians were required to deliver quality care. At the primary hospital level, the study showed the need for 6 health officers/GPs, 24 midwives/nurses, 6 laboratory technicians, 1 anaesthetist and 3 surgical officers. ICU-trained nurses are less readily available in resource-limited regions (Tripathi, Kaur et al 2015:3), but four nurses are required to provide the required services at the NICU of primary hospitals.

Table 4.58 Number of professionals required at health centre level for Basic Emergency Obstetrics and Newborn Care (BEmONC)

| Major care steps | Profession | | | |
|--------------------------------------------------------------|--------------|-------------------|--------------------------|--------------|
| | GP/HO | Nurse/ Midwife | Laboratory Technician | Pharmacist |
| Health centre - delivery care | | | | |
| Examination and labour monitoring | 6 | 60 | 30 | 0 |
| Normal delivery management | 9 | 54 | 0 | 3 |
| Instrumental delivery | 0 | 0 | 0 | 0 |
| Essential newborn care | 5 | 48 | 0 | 0 |
| Other preventive measures - newborn | 0 | 0 | 0 | 0 |
| Neonatal resuscitation | 0 | 0 | 0 | 0 |
| KMC | 1 | 1 | 0 | 0 |
| Postnatal checks | 5 | 5 | 0 | 0 |
| Last examinations/checks | 1 | 5 | 0 | 0 |
| Referral for complications | 0 | 0 | 0 | 0 |
| Discharge | 0 | 0 | 0 | 0 |
| Total professional time required (minutes) | 27 | 173 | 30 | 3 |
| Average number of cases seen (annual) | 1,537 | 1,537 | 1,537 | 1,537 |
| Total length of time required (hours) | 5,228 | 33,305 | 5,764 | 519 |
| Average number of professionals required per facility | 1.79 | 11.41 | 2 | 0.2 |

Table 4.59 Number of health professionals required at hospital level for services provided at Newborn Intensive Care Unit

| Major care step - NICU | Profession | | |
|--------------------------------------------------------------|--------------|-------------------|-------------|
| | GP/HO | Nurse/ Midwife | Lab asst |
| Examinations and investigations | 2.5 | 35.0 | 15.0 |
| Preparation for management | 3.7 | 65.0 | 0.0 |
| Administration of medication | 0.3 | 30.0 | 0.0 |
| Neonatal resuscitation | 1.0 | 12.5 | 0.0 |
| KMC | 0.4 | 50.0 | 0.0 |
| Phototherapy | 0.1 | 15.0 | 0.0 |
| Monitoring of the neonate | 1.8 | 90.0 | 0.0 |
| Referral for complications | 0.5 | 0.8 | 0.0 |
| Total professional time required (minutes) | 10.2 | 298.3 | 15.0 |
| Average number of cases seen (annual) | 350 | 350 | 350 |
| Total length of time required (hours) | 447.3 | 13,048 | 656 |
| Average number of professionals required per facility | 0.15 | 4.47 | 0.22 |

Table 4.60 Number and type of professionals required at primary hospitals for Comprehensive Emergency Obstetrics and Newborn Care (CEmONC)

| Major care steps | Profession | | | | | |
|--------------------------------------------------------------|--------------|-------------------|--------------------------|----------------|------------------|-------------------------------------------------|
| | GP/HO | Nurse/ Midwife | Laboratory Technician | Pharmaci st | Anaesthetis t | Integrated Emergency Surgical Officers |
| Examination and labour monitoring | 4 | 54 | 15 | 0 | 0 | 2 |
| Normal delivery management | 8 | 51 | 0 | 3 | 0 | 6 |
| Labour induction | 1 | 1 | 0 | 0 | 0 | 0 |
| Instrumental delivery | 0 | 0 | 0 | 0 | 0 | 0 |
| Caesarean section | 0 | 0 | 0 | 0 | 6 | 2 |
| Other preventive activities - newborn | 0 | 1 | 0 | 0 | 0 | 0 |
| Essential newborn care | 4 | 43 | 0 | 0 | 0 | 0 |
| Complication management | 0 | 2 | 0 | 0 | 0 | 0 |
| Last examinations/checks | 2 | 10 | 0 | 0 | 0 | 3 |
| Referral for complications | 0 | 0 | 0 | 0 | 0 | 0 |
| Total professional time required (minutes) | 19 | 162 | 15 | 3 | 6 | 13 |
| Average number of cases seen (annual) | 2,934 | 2,934 | 2,934 | 2,934 | 2,934 | 2,934 |
| Total length of time required (hours) | 7,139 | 59,575 | 5,501 | 1,175 | 2,201 | 4,749 |
| Average number of professionals required per facility | 2.44 | 20.40 | 1.88 | 0.40 | 0.75 | 1.63 |

4.5.5 Cost of services

Costs associated with the use of the services can be obtained by multiplying the number of services provided by their respective unit prices (Laxy, Wilson, Boothby & Griffin 2017:1290). To estimate the unit cost, the researcher included the contact hours of the clients within the facility for the service, different types of cost elements, personnel costs, and drugs and supply costs. As the number of cases varied by level of health facility, the results are presented by type of health facility.

4.5.5.1 Health centre level

The study extracted the total number of deliveries at health centre level and multiplied it by the average unit cost to generate the expenditure of the health system to provide the MNH care at the health centre level. Based on the analysis of the collected data, delivery care and essential newborn care at health centre for one case cost from birr 752 (\$27.5) to 825 (\$30.2). A study in Rwanda reported \$84.61 for services at BEmONC facilities (Hatcher, Shaikh, Fazli, Zaidi & Riaz 2014:4).

Table 4.61 Delivery and essential newborn care costs at health centre level

| Cost drivers | Inputs - Health Centre | | | | Annual costs | | Cost per case | |
|------------------------------|------------------------|------------|--------------------------|------------|------------------|------------------|---------------|-------------|
| | Number of cases | Proportion | Case-contacts (in hours) | Proportion | Minimum | Maximum | Minimum | Maximum |
| Direct technical costs | 1,537 | 100% | 36,615 | 100% | 708,637 | 821,338 | 461 | 534 |
| General administrative costs | 1,537 | 9.6% | 36,615 | 87.1% | 500,237 | 500,237 | 283 | 283 |
| General technical costs | 1,537 | 9.6% | 36,615 | 87.1% | 120,578 | 120,578 | 8 | 8 |
| Total (In Birr) | | | | | 1,329,452 | 1,442,153 | 752 | 825 |
| Total (In USD) | | | | | 48,697.9 | 52,826.1 | 27.5 | 30.2 |

4.5.5.2 Primary hospital level

The total number of deliveries at primary hospital level was multiplied by the average unit cost to provide MNH care. The result showed that delivery and essential newborn care service at primary hospital costs from birr 946 (\$34.7) to 1031 (\$37.8). A single Caesarean service at the primary hospital costs birr 4,089 (\$149.8) to 4,476 (\$164.0). The WHO (2018a:58) reported that caesarean sections at hospitals in low-income countries cost (US\$ 162) which is four times higher than vaginal childbirth costs (US\$ 40). In this study, the estimated service costs were equivalent to the WHO estimate.

Table 4.62 Cost of delivery and essential newborn care costs at primary hospital level

| Cost drivers | Inputs - Primary Hospital | | | | Annual costs | | Cost per case | |
|-------------------------|---------------------------|------------|--------------------------|------------|--------------|-----------|---------------|--------------|
| | Number of cases | Proportion | Case-contacts (in hours) | Proportion | Minimum | Maximum | Minimum | Maximum |
| Direct technical costs | 2,934 | 100% | 70,588 | 100% | 2,124,286 | 2,375,126 | 724 | 810 |
| General admin costs | 2,934 | 5.2% | 70,588 | 26.0% | 2,287,410 | 2,287,410 | 203 | 203 |
| General technical costs | 2,934 | 5.2% | 70,588 | 26.0% | 1,068,334 | 1,068,334 | 19 | 19 |
| Total (in Birr) | | | | | 5,480,030 | 5,730,870 | 946 | 1,031 |
| Total (in USD) | | | | | 200,733.7 | 209,922.0 | 34.7 | 37.8 |

Table 4.63 Cost of caesarean section at primary hospital level

| Cost drivers | Inputs - Primary Hospital | | | | Annual costs | | Cost per case | |
|-------------------------|---------------------------|------------|--------------------------|------------|--------------|-----------|---------------|--------------|
| | Number of cases | Proportion | Case-contacts (in hours) | Proportion | Minimum | Maximum | Minimum | Maximum |
| Direct technical costs | 98 | 100% | 7,020 | 100% | 339,091 | 377,009 | 3,460 | 3,847 |
| General admin costs | 98 | 0.2% | 7,020 | 3% | 2,287,410 | 2,287,410 | 607 | 607 |
| General technical costs | 98 | 0.2% | 7,020 | 3% | 1,068,334 | 1,068,334 | 22 | 22 |
| Total (in Birr) | | | | | 3,694,835 | 3,732,753 | 4,089 | 4,476 |
| Total (in USD) | | | | | 135,341.9 | 136,730.9 | 149.8 | 164.0 |

Critical care is expensive in high- and low-income countries. Despite the cost, a short duration of critical care to treat acute, life-threatening, and curable illnesses has a great impact on mortality (Turner, Nielsen, Jamal, Von Saint André-von Arnim & Musa 2016:5). This study estimated the average unit cost from birr 4132 (\$151.4) to 4207 (\$154.1).

Table 4.64 Cost of newborn intensive care unit costs at primary hospital level

| Cost drivers | Inputs - Primary Hospital | | | | Annual cost | | Cost per case | |
|-------------------------|---------------------------|------------|--------------------------|------------|------------------|------------------|---------------|--------------|
| | Number of cases | Proportion | Case-contacts (in hours) | Proportion | Minimum | Maximum | Minimum | Maximum |
| Direct technical costs | 183 | 100% | 61,488 | 100% | 226,911 | 240,532 | 1,240 | 1,314 |
| General admin costs | 183 | 0.3% | 61,488 | 23% | 2,287,410 | 2,287,410 | 2,875 | 2,875 |
| General technical costs | 183 | 0.3% | 61,488 | 23% | 1,068,334 | 1,068,334 | 18 | 18 |
| Total (in Birr) | | | | | 3,582,655 | 3,596,276 | 4,132 | 4,207 |
| Total (in USD) | | | | | 31,232.8 | 31,731.7 | 151.4 | 154.1 |

4.5.6 Overview of findings from health service costing

Two primary hospitals and six health centres were included in this health service costing exercise. The study found that the selected facilities provided more than the expected norm. On average, the health centres provided services to 35,314 people and the primary hospitals provided care to 211,889 people. The findings show that the number of health professionals assigned to the Delivery and NICU rooms were more than the standard. Since the size of the catchment populations for the hospitals was more than double the standard, the number of professionals should also have matched this. The researcher is of the opinion that this mismatch may have contributed to a reduction of quality of care. The critical shortage of pharmacists and technical staff may have influenced forecasting needs and the timely request of drugs and supplies. This, in turn, may have increased the referrals due shortages of drugs.

The human resources-related expenses in the health sector included staff salaries, benefits and overtime/duty payments. A comparison of the expenses indicated that hospital expenditure was 6.4 times higher than health centre expenditure. Similarly, the hospitals' administration costs were 6.5 times higher than those of the health centres. Regarding the direct clinical care costs, three cost drivers: drugs, supplies and laboratory tests were considered. The cost drivers varied according to health facility type.

The service statistics/number of visits was an important factor in dividing general costs among various departments. However, some types of care required longer stays at the facility level and thus the effect of contact-hours/stay had to be considered in the analysis. The proportion of delivery care, for instance, was influenced by this factor. At health centre level, the number of cases that visited the facility accounted for 10% of cases. However, the contact for each visit accounted for 87% of cases. As the use of general administration costs depended on the length of stay or contact, use of the contact-case load was an important consideration.

Health providers' caseload was analysed in two ways: number of visits and length of stay and expected care steps for quality care. The former analysis considered the already available human resources in the facilities and number of cases and showed that one midwife spent an average of 2 and 4 hours on a single patient per day at health centre and primary hospital level, respectively. The second analysis based on the length of time required to spend on a single patient revealed that one midwife should spend 3.2 and 3.3 hours at health centre and primary hospital level, respectively. This analysis showed that a midwife had nearly half the time required to provide quality delivery care to a single case at health centre level. Based on this analysis, the workload was greater at health centres than hospitals.

This study found that delivery care at health centre level cost from \$27.5 to \$30.2 dollars and at hospital level from \$34.7 to \$37.8; Caesarean section service at primary hospitals costs \$149.8 to \$164.0, and NICU care cost from \$151.4 to \$154.1.

4.6 CONCLUSION

This chapter presented the results from the first phase of the study. The results covered findings from 869 medical record review and health service costing from 8 facilities (two primary hospitals and six health centres). This chapter described the major findings in relation to the characteristics and their experience of mothers and new-borns visited the hospitals from July 08, 2017 to July 07, 2018. For the same period, costs incurred by the health facilities, both at the health centres and primary hospital levels, to provide maternal and new-born related cares were included.

Chapter 5 presents the qualitative data analysis from phase 2 of the study.

CHAPTER 5

QUALITATIVE DATA ANALYSIS AND INTERPRETATION, AND FINDINGS

5.1 INTRODUCTION

Chapter 4 discussed the quantitative data analysis and findings from phase 1 of the study. This chapter discusses the qualitative data analysis and findings from phase 2.

The purpose of the study was to formulate strategies to improve maternal and newborn health care referrals in the health system in Ethiopia. The quantitative phase examined the procedures and reasons for maternal and newborn care referrals and proportion of inappropriate referrals and estimated the cost of maternal and newborn care-related services at the various levels of the health system. The aim of the qualitative phase was to analyse the effects of current referral practices and develop key strategies to improve referrals in the health system.

The researcher visited the sites to explain the purpose, methods and period of the study to the heads and managers of the facilities and the participants. This allowed the researcher to meet the participants, explain the purpose of the study and allow them to ask questions (Yin 2016:159). The researcher became familiar with the facilities and was able to make allowance for potential unforeseen circumstances.

5.2 DATA COLLECTION

Data collection is the process of collecting information (data) related to research questions in a systematic way to address a research problem (Polit & Beck 2017:725). Qualitative research investigates phenomena, typically in an in-depth and holistic fashion, by collecting rich narrative materials using a flexible research design (Polit & Beck 2017:739). In qualitative studies, researchers explore and describe individuals' and groups' life experiences and situations and the meaning they ascribe to social problems (Creswell & Creswell 2018:147; Merriam & Tisdell 2016:24). Qualitative

studies examine participants' knowledge and practices and consider their perceptions and practices in the field.

In phase 2, the researcher collected qualitative data from the participants by means of key informant interviews (Leavy 2017:135; Yin 2016:169). The researcher used purposive sampling to select health workers working in the MCH department who provided MNH-related care at the selected hospitals and health centres. The researcher obtained staff lists at the selected sites and purposively selected the participants from the lists. Purposive sampling was used to select participants who could provide information-rich data (Merriam & Tisdell 2016:96; Saks & Allsop 2013:173). The participants were service providers at delivery rooms and NICU and people involved in the referral processes.

The researcher developed a semi-structured interview guide (questionnaire) based on the Donabedian and referral chain models and the literature review (Creswell & Creswell 2018:191; Merriam & Tisdell 2016:106; Taylor 2017:551). The instrument consisted of closed and open-ended questions and allowed the researcher to use probing questions when necessary (Yin 2016:178; Merriam & Tisdell 2016:106). The interview guide covered the respondents' demographic information and work experience; competency of the workforce; prevalence of severe and complicated cases; adequacy of supplies and equipment; referrals; communication; emergency medical transportation, and service. The researcher collected data until saturation was reached. Data saturation was reached after 26 interviews, when no new data emerged. The interviews were conducted in Amharic and were tape-recorded with the participants' permission.

5.3 DATA ANALYSIS

Flick (cited in Merriam & Tisdell 2016:589) describes the process of data analysis as the "classification and interpretation of linguistic (or visual) material to make statements about implicit and explicit dimensions and structures of meaning-making in the material and what is represented in it". Qualitative research is interpretative and involves researchers in a close relationship with the participants (Creswell & Creswell 2018:183). Qualitative data analysis commences with data collection and involves specific to general steps (Merriam & Tisdell 2016:197; Creswell & Creswell 2018:193). The

researcher organised and prepared the data. First, the researcher transcribed the interviews verbatim and compared the transcriptions with the recordings. The researcher read all the transcriptions carefully to get an overall picture and jotted down ideas as they came to mind in order to develop codes (Creswell & Creswell 2018:196). Coding is a process of organising data by bracketing chunks and writing a word representing a category in the margin. It requires breaking sentences into segments and labelling them using participants' actual language (Tracy 2013:189).

The researcher identified topics and themes that emerged from the data in the transcriptions. Topics that related to each other were grouped together and themes identified. The researcher wrote topics next to appropriate segments of text, checking to see whether new themes emerged. The topics were turned into categories by finding descriptive wording, final abbreviations for categories, and arranging them alphabetically. Codes were formulated for each theme developed. The researcher used the computer software program ATLAS ti to code the data (Tracy 2013:188).

The researcher used inductive and deductive data analysis techniques for the qualitative data analysis. A bottom-up approach was used to build patterns, categories and themes to organise abstract units of information (Creswell & Creswell 2018:181).

5.4 FINDINGS

The findings are discussed according to the themes that emerged from the data.

5.4.1 Respondents' gender and qualification

Of the respondents, 61.54% (n=16) were male and 38.46% (n=10) were female. Of the respondents, 46% (n=12) had a BSc degree; 38.46% (n=10) had a Diploma in Nursing; 7.69% (n=2) had an MSc degree, and 7.69% (n=2) had a certificate in short health related trainings (see Table 5.1). The mean number of months in their current position was 31.2 months.

Table 5.1 Respondents' gender and qualification

| Qualification | Gender | | Total |
|---------------|--------------------|--------------------|------------------|
| | Female | Male | |
| BSc | 4 (33.33%) | 8 (66.67%) | 12 (100%) |
| Certificate | 1 (50.0%) | 1 (50.0%) | 2 (100%) |
| Diploma | 5 (50.0%) | 5 (50%) | 10 (100%) |
| MSc | 0 (0%) | 2 (100%) | 2 (100%) |
| Total | 10 (38.46%) | 16 (61.54%) | 26 (100%) |

5.4.2 Theme 1: Capability of identifying appropriate cases for referral

5.4.2.1 Category 1: Prior relationship with the health centre

Health workers establish prior relationships with mothers during the antenatal (ANC) period. Interactions with mothers help health workers establish good rapport with them and identify potential risks. Strong working relationships between health extension workers and midwives at health center level facilitate to establish relationships with mothers. According to a respondent,

The first and fourth ANC are provided at health centre level. The fourth ANC is used to better counsel to the mother and her family about birth preparation and labour signs. As we do not have maternity homes, we try to make sure mothers are coming when they are close to labour. Even though we inform them to come late, if they come early, we find some rooms at the health centre and allow them to stay there.

As various studies indicated planning for delivery care is often done during ante natal period. Thus women's experience and the relationship established with the provider at ANC is a great factor in helping the mother stick to birth preparedness and complication readiness (BPCR) plan (Jayanthi, Suresh & Padmanaban 2015:12). As the study conducted in South Sudan found women who received health education on BPCR were more likely to have delivered in the presence of a skilled birth attendant (Izudi, Akwang, McCoy, Bajunirwe & Kadengye 2019:81). If ANC is not well utilized to assist the mother to plan for BPCR, as the study conducted in the North-western Ethiopia, very few

(24.1%) of ANC clients prepared for birth and ready for any complication (Bitew, Awoke & Chekol 2016: 3).

5.4.2.2 Category 2: High caseload at health centre level

The health centres provide services to a designated catchment population of approximately 25,000. Most of the visited facilities provided services to the wider catchment population, and an increasing number of clients for institution-based care for various reasons. The number of health workers providing the services did not match the increasing visits to the health centres and some health workers were not available due to meetings and training. According to a respondent,

The caseload is not as our plan. People are coming from neighbouring *kebeles* and *woredas*. The plan is to provide services for 20 mothers per week, but we may have more than 20 and sometimes up to 40. When there is no case, we at least have some teens.

High caseloads compromise quality of time and care. A study in Tanzania found that a single midwife attended to childbirth assistance (11%), recording (35%), explanation (20%) and direct care (19%). The time allocation for monitoring labour accounted for 15%, including FHR monitoring at 2%, vaginal examination at 2%, abdominal palpation at 3%, and measurement of mother's vital signs at 8% (Fujita et al 2015:194). Shortage of staff and inadequate skill mix often result in delayed care if not denial of care (Bhattacharyya et al 2015:431).

5.4.2.3 Category 3: Competent health workforce

The respondents stressed that health workers' competence is related to their skills. According to the respondents, short-term BEmONC in-service training, weekly peer mentorship and team consultations were available but limited to one staff member assigned to health centres and regular updates were not available. The respondents emphasised the need for improvement after training. According to a respondent,

I think we are sending the appropriate cases now. For example, when we compare it to the last year's performance, there are lots of improvements. There were lots of referrals, but now when the health workers get experience and some of them are trained in BEmONC, they are now easily diagnose and refer appropriate cases.

The lack of skills was also linked to wrong diagnosis for referral, complications such as referred hypothermia in newborn cases, lack of clarity in referral slips, limited pre-referral management and delays in referral. The respondents underlined that not having required skills undermined providers' confidence and increased inappropriate care practices. One respondent stated,

The person who is referring may not be capable of diagnosing and writing referral slips. In some of the health centres, where they have GPs, it is better. In other facilities, you may find wrong information in the referral slip.

The availability of technically competent health providers was identified as one of the factors for seeking institutional delivery (Mahato, Teijlingen, Simkhada & Angell 2017:40). There is a need to strengthen midwifery education, practice and skills in Ethiopia by means of in-service training (Austin, Gulema, Belizan, Colaci, Kndall, Tebeka, Hailemariam, Bekele, Tadesse, Berhane & Langer 2015:5; Yigzaw, Carr, Stekelenburg, Van Roosmalen, Gibson, Gelagay & Admassu 2016:181). In low- and middle-income countries, women's perceptions of health providers' competence at BEmONC facilities also determined their choice of facility for care (Mahato et al 2017:59).

5.4.2.4 Category 4: Prevalence of severe and complicated cases

Severe and complicated cases requiring advanced care should be sent to hospitals where operative care and intensive care units are available. According to the respondents, the common problems for referral among mothers included prolonged labour, malpresentation, pre-eclampsia/eclampsia, bleeding, prolonged PROM, and non-reassuring foetal heartbeat. Regarding neonates, the most common clinical reasons were hypothermia, unable to suck breast, asphyxia, and very low birth weight. The respondents frequently doubted diagnoses related to prolonged labour, non-

reassuring foetal heartbeat and hypothermia. According to the respondents, misdiagnosis or mismanagement at the initial stage of newborn's life usually caused these diagnoses.

Some of the cases sent were without any problem. That is the burden to the family. Some of the cases may be sent as prolonged labour, but they may still be at the latent phase. In addition, those family members give us trouble as they were sent as if they have a problem.

A study in Northern India identified the most common clinical indications for referral as preterm labour (30.6%), pregnancy-induced hypertension (17%), foetal distress (10.6%), previous caesarean section (10%), malpresentation (8.5%), and non-progress of labour (8%) and severe anaemia (5.08%) (Kant, Kaur, Malhotra, Haldar & Goel 2018:137). In Mozambique, Adolphson, Axemo and Högberg (2016:99) found that midwives had limited resources to help women with serious problems and complications, and needed a functional referral system. A system to establish functional linkages between facilities is critical to address such limitations (Koblinsky, Moyer, Calvert, Campbell, Campbell, Feigl, Graham, Hatt, Hodgins, Matthews, McDougall, Moran, Nandakumar, Langar 2016:2308).

5.4.2.5 Category 5: Logistical limitations led to referrals

Due to logistical limitations, health centre staff referred cases to the next level of the referral system, namely hospitals or nearby facility. The reasons included shortage of power, lack of water, limited space and equipment, shortage of supplies and drugs, and laboratory reagents. The respondents reported that there was limited practice of introducing alternative power and water sources at health centre level. Lack of laboratory services also forced health workers to rely solely on physical examination and thus empirical treatment, which led to unnecessary referral and practices at the health centre level. The respondents described the situation and health workers' frustration at health centres. According to respondents,

We do not have any of the important supplies: glucose, vitamin A, calcium gluconate, hydralazine, epileptic drugs, option B for HIV positives, Misoprostol. The shortage is because of the budget limitation. It is annoying that because of these simple items, we are referring cases to other places.

Water shortage is a serious problem in our facility. We [health workers] sometimes forced to fetch waters from the water points in the community. As there is shortage, we are using them economically. Often, we tend to refer cases for shortage it, and sometimes the mothers deliver here, they may leave the facility without washing their body.

Lack of availability of necessary equipment, drugs or important procedures at facilities were factors that impacted negatively on quality of care. In addition, non-availability of neonatal intensive care unit (ICU) (56%), non-availability of caesarean section (43.9%), and non-availability of blood bank (5.6%) were the main reasons for referral in Haryana, North India (Kant et al 2018:137).

5.4.2.6 Category 6: Motivated health workforce

The respondents pointed out that many factors affected health workers' motivation, such as availability of necessary materials and equipment, and relationships with the community. The respondents indicated that low salaries, untimely payments of benefit packages, exclusion of some health workers from benefit packages, a poor inter-professional support structure, and relationships among staff members affected their motivation. According to respondents,

There are lots of challenges. They pay me very small. I have a third-grade driving licence, let alone as civil servant, but if I drive for a private company, I can easily earn more than this. Imagine, I also work 24 hours. We also do not have any benefit packages. They also say we are eligible for *per diem* when we go to hospitals, and for your surprise, I also do not get those payments on time.

The health centre has a standard. We have 13 health workers now. There are people on maternity leave, and one is breast-feeding. We only have 8 active staff. Five of the staff are expected to support health posts. How does anyone think the remaining health workers provide the required quality services? With all these limitations, we provide services 24/7. Sometimes services are provided with no protective device and receive no duty payments. On top of this, we only have one midwife and other health workers are assigned to provide the services in the delivery case team. However, as per the government guidance, the risk payment is only paid to the midwife. My third point is in relation to the referral services. The health centre does not have a phone and we are using our personal phone, but we are not reimbursed for this.

In relation to the health system support, the respondents added that less equipped facilities, lack of essential drugs and supplies, management's inability to establish good relationships among staff and impartiality of the facility management were factors influencing staff motivation at the health centre level. According to respondents,

The management is not strong. It is biased. I expect the management to be fair to all. Some of the decisions are based on your relationship with the management. Many of the staff are wanting to leave the facility early.

I usually ask the health officers. They tell me that when we enter delivery case team, the midwives are not happy. The midwives, on the other hand, say that the health officers should have fixed schedules. In addition, all the drugs and supplies at the delivery room are taken in the name of the midwives and the health officers may not be as cautious as we are. I think if they work in a committee and if we have a strong referral committee, they can easily work together.

The respondents also referred to the relationship with the community. Most of the respondents underlined that the mainstay of their commitment to serve was their relationship with the community. The respondents indicated that blessing that followed quality care and outcomes, the willingness of the community to contribute to improve the service, and their acceptance of the health workers' advice were key factors in their motivation.

The respondents indicated that health workers' motivation was key to further improve the quality of service provided at the health centre level. Some factors that affected motivation included long contact hours with clients; clean work environment; share of costs borne by clients due to unavailability of drugs and supplies; strong follow up of the referred cases, and minimal or no negligent practices. According to respondents,

When they send the patient, if possible, they ask the phone numbers of the health workers at hospital level. If not, they take the phone number of the attendant and check the status of the referral. The follow up includes where they referred and follow if there are further referrals. We also have a copy of the referral paper and we also have a referral registry to document the referred cases.

When we have a mothers' forum and referrals, we spend money from ours. When we take mothers at night, we may be forced to spend the night at other people's house or hospital.

A study in a Kabul maternity home in Afghanistan underlined the relationship between management and staff as a factor for staff employment and development opportunities. The opportunity to attend training, acquire skills, and even employment were more dependent on connections than need, motivation, or ability (Arnold, Van Teijlingen, Ryan & Holloway 2015:264).

5.4.3 Theme 2: Proper initiation of the referral process determines the outcome

5.4.3.1 Category 1: Knowledge of referral pathways

Referral by health workers or self-referral was determined by knowledge of referral pathways in the health system. The referral pathway, which was partly directed by the availability of a referral directory, was affected by the community's knowledge of the available services at various levels of the health system. The respondents identified various factors pushing mothers to go to hospitals directly: limited knowledge of services provided at health centres, advice from family and community members and private facilities, distance, and topography. According to a respondent,

There are some cases coming from home. People residing in the town, the mothers directly bring the neonate here and review the case. Together with the health extension workers, we are educating the community during pregnant mothers' forums about service availability.

Health workers' knowledge of the services provided at neighbouring health centres and referral hospitals was an important factor affecting the referral system. Regular update of the referral directory, including contact persons and available services in each referral facility, was identified an important factor in knowledge of the referral pathways. In addition, the respondents stated that proactive communication from the hospitals to health centres avoided unnecessary multiple referrals due to unavailability of services or logistical problems at the referral hospitals. One respondent pointed out,

When the generator fails and depletes the reagents for certain investigations, we call to the heads of the health centres so that they directly refer cases to the general hospital. This helps to reduce the delay which may happen due to multiple referrals.

A study on the referral system of primary health centres in Plateau State, North Central Nigeria found that people with a good understanding of the referral system made 6.2 times more referrals than those with little knowledge or understanding of the concept of referral (Afolaranmi et al 2018:7).

5.4.3.2 Category 2: Referral communication between facilities

As part of the referral system, a health centre is expected to assign a referral focal person and a hospital needs to establish a referral liaison office. The referral focal person is called whenever there is a referral. At health centre level, however, high caseloads, minimal communication facilities, no dedicated room, limited functionality of referral committee, and no accountability framework especially during night shifts are obstacles to this function. The limited functionality of the referral focal person has created problems in initiating the initial call before referral and making sure all the necessary documentation and assignment of health workers with the referral case was done. According to a respondent,

The health centres do not value the importance of the referral focal person. They just assign the focal person for the sake of fulfilling the standard. This person should communicate before any referral. If the person is not trained, he should take the training properly. This function is so important, and I think this should receive the needed attention from the *woreda* health office and the health centre management. I know of people who travelled from facility to facility for the sake of services and died in due course. If proper communication is placed before referral, this may not be the case.

Communication plays an important role in interprofessional collaboration. It is a core process in which people working at different levels of the health system share information for improving outcomes of care (Karam, Brault, Van Durme & Macq 2018:73). Karam et al (2012:77) emphasise that patient-centred care is a core principle in any communication between individuals or organisations. In Ethiopia, communication between facilities is expected to happen and be facilitated through the liaison officer or referral coordinator of both sending and receiving facilities (Austin et al 2015:4). At Saint Paul's Hospital Millennium Medical College in Addis Ababa, Abdella et al (2019:9) found that only 31.4% of referrals were sent to the hospital with prior notification.

5.4.3.3 Category 3: Preparation for referral

Preparation for referral is a stepwise approach, which includes deciding on referral, preparing a patient, preparing a referral slip and recording the case in the register. The decision on referral should be a team effort and the referral committee that should be established at the health centre level should make the decision. However, the time of referral and availability of team members challenge the functionality of this team. In addition, after the placement of the general practitioners at the health centre level, they are the ones who decide on referrals. Patient preparation requires knowledge of the case and confidence in the established diagnosis. Moreover, proper counselling is also an important component to make sure the patient and her family accept referral. Considering these factors, the respondents perceived that the patient preparation had not been done properly. According to a respondent,

The pre-referral management is a problem. For example, for eclampsia cases they are expected to send the patient after giving the loading dose, but they just send the patient without any pre-referral management or writing it in the referral paper. Once the protein and blood pressures are raised, they are expected to start the loading dose and send. The other thing is when the mother has any bleeding, they need to secure IV, but they just send the case like other cases.

The availability of formats and registers, the competence of the health workers, the caseload and availability of the referral committee influenced documentation of cases and referral paper preparation. The positive practice reported by the hospitals was that all referred cases had referral slips or papers prepared by the health centre staff. However, in some of the referral slips, especially when the health workers at health centre level used plain paper, much of the required information was missing. According to respondents,

The person who is managing the case completes the referral slip and then I register the case in the referral register. The slip is filled by the person who takes the history.

As they were not properly trained, we are making some efforts to improve the completion of referral slips. For example, if the case is diagnosed as perinatal asphyxia, they should at least record the APGAR score. We have learnt that when we repeatedly question them to complete the referral slip, it is good to note that there may be a capacity limitation and thus completely stop using the slip.

In a review of referrals between public sector health centres in India, Singh, Doyle, Campbell, Mathew and Murthy (2016:13) found the common reasons for non-compliance with referrals were cost (100%), lack of follow-up after reaching the institution (92.4%), TBA advised against it (92.4%), non-availability of transport (79.4%), previous bad experience (74.6%), and patients considering their symptoms as normal (61.1%). Additional factors for ineffective referrals included inadequate referral communication and record maintenance, and absence of standard guidelines for referral, facilities and monitoring of referrals for obstetric care. Moreover, complicated cases were not adequately stabilised nor were they given first-line treatment before referral (Singh et al 2016:19). A study conducted in Addis Ababa found that the pre-referral management was poor. For example, 72.3% of prolonged/obstructed labour

patients were transferred without intravenous access lines; 75.4% of patients with premature rupture of foetal membranes were not given antibiotics before referral, 79.5% of pre-eclampsia/eclampsia cases were not provided with magnesium sulphate as seizure prophylaxis, and 60.8% of foetal distress patients were referred without securing intravenous lines for resuscitation (Abdella et al 2019:10).

A study on the quality of obstetric referral services for institutional births in Madhya Pradesh Province, India found that most referred mothers had slips, but inadequate details of treatment provided and progress of the labour were provided (Chaturvedi et al 2014:7). In their review of referrals between public sector health institutions for women with obstetric high risk, complications or emergencies in India, Singh et al (2016:17) found compliance with referral was better with an accompanier from the referring institution or where the nurse arranged for the transport and communicated about the case to the higher-level institution.

5.4.4 Theme 3: Emergency medical transportation

5.4.4.1 Category 1: Ambulance availability

Each *woreda* has one or two ambulances to provide emergency medical transportation services. However, ambulance availability depended on enough budget for maintenance and running costs, accessibility of the sites, other assignments given by the *woreda* health office to the ambulance, and order of calls by various users. According to a respondent,

The *woreda* does not have enough vehicles and they use the ambulance for other purposes as well. For example, we support the health office in material distribution.

In a rural area of Burundi with high maternal mortality, the availability of an ambulance referral network was found to be a cost-effective strategy to improve access to emergency obstetric and neonatal services (Tayler-Smith, Zachariah, Manzi, Van den Boogaard, Nyandwi, Reid, De Plecker, Lambert, Nicolai, Goetghebuer, Christiaens, Ndelema, Kabangu, Manirampa, & Harries 2013:999). In Mozambique, Adolphson et al (2016:99) found that midwives in remote areas reported that it was not always possible

to reach the people in charge of ambulances, ambulance services were not timely, and the ambulances did not always arrive. This forced the midwives to devise flexible solutions to the transportation problems. In Addis Ababa, Ethiopia, Abdella et al (2019:9) found that many referred cases were transferred by public ambulances from the health facilities, but 63% of the ambulances had no resuscitation facilities.

5.4.4.2 Category 2: Alternative for ambulance

When an ambulance is not available, the community and the health workers find other alternatives to transport the mother or the newborn to the hospital. Sometimes the health workers are forced to advise mothers and their family to transport the patient by means of traditional ambulances, and *Bajaj*. The youth and family members use locally prepared stretcher transport to take the mother to the main road and wait for public transport, or the ambulance. Furthermore, the health workers may request any available vehicle from different government offices or neighbouring *woredas*. According to a respondent,

The ambulances are working well now. But when I was at the health centre, there were cases that I sent them by traditional ambulance which is a locally made stretcher and carried by some selected community members. Traditional ambulances were also used when the phone was not working. Using the traditional ambulance, they walked for 1 to 2 hours to the hospitals.

A study conducted in Ghana showed that provision of women friendly ambulance services increase delivery care utilization at hospitals (Ganle, Fitzpatrick, Otupiri & Parker 2016:9). However, transportation facilities in many, rural and urban alike, are difficult. Noting these challenges free ambulatory services, or at least a system that reimburse women with transport costs is introduced in Ghana (Ganle et al 2016:10). India also introduced alternatives for ambulance transport; such as, carts, bicycle or motorcycle (Bhattacharyya, Issac, Rajbangshi, Srivastava & Avan 2015:424).

5.4.4.3 Category 3: Equipped ambulance

The quality of ambulance services is determined by who is going with the patient as well as to what extent the vehicle is equipped. The respondents stated that sometimes

referral cases were not accompanied by health workers from the health centres, but by family members. The family members were given some main precautionary instructions and things to follow while travelling with the patient. According to a respondent,

In many of the cases, only the driver brings the referred case. But, on rare occasions, we have the health worker. If we have one or two referrals with the health workers, that is good. For example, we had two referrals yesterday, and the driver only brought them. They only just secured IV line and sent the mothers with the driver.

Some of the participating health workers at the health centres said that due to the caseload they did not always accompany the cases. They gave the high workload and limited number of staff as reasons for not accompanying the case most of the time. According to a respondent,

If I do not expect the mother to deliver on the way, I may not go. But if we have cases like hypertension, bleeding, we accompany the case. The case burden at this health centre also determines the decision to accompany the referred case. I may also send another professional.

Some of the *woredas* also recruited an emergency technician – trained for 12 months - who travels with the ambulance. The health centre staff acknowledged this professional's role. However, a participating emergency technician felt that the hospital staff did not accept her. According to the respondent,

The other challenge is from the receiving facility. Usually, health workers at hospitals prefer health centre staff to accompany and explain the case well. I think they are right. As I do not attend the cases, I may not explain the reasons for referral.

Lack of equipment was another challenge. The ambulance is not prepared for transporting emergency cases. Some of the equipment is with the health workers going with the ambulance. The ambulance, for example, does not have installed oxygen. According to the respondent,

Another challenge I face is lack of equipment. For example, I do not have oxygen in the ambulance. But I have some basic equipment such as gloves, forceps and scissors, and an Ambubag as part of my kit.

Well-equipped ambulances with trained paramedics are the crux of an emergency transportation system which aims at saving lives during the first critical period (Acharya, Badhu, Shah & Shrestha 2017:182) Experience from Qatar showed that incorporating an Ambulance Service Critical Care Paramedic (CCP) into the system provided a seamless care continuum (Campbell 2017:53). On contrary to the standards of emergency management, this study found critical shortage of equipment in the ambulance. A study conducted in Nepal found that oxygen cylinder and adult oxygen masks are available in most (90%) ambulances (Acharya et al 2017:185).

5.4.4.4 Category 4: Communication between users and ambulance drivers

The users and the ambulance drivers communicate by telephone. When the health centre initiates the referral, the referral focal person or the head of the facility or the health workers providing the care call the ambulance driver by telephone. The response to the call depends on who calls for the driver and the driver's behaviour and commitment. According to respondents,

A call to ambulances can be done by health workers from health centres or family members from the households. The source of a call may determine the response of the driver. We have all the phone numbers of all the three drivers, and we call to one of them and they inform us who is on duty.

Communicating with ambulance drivers is mentioned as one of the challenges in the referral system. Partly it is due to limitations related to communication gadgets and the rest is due to human factor. In Ghana, only sixty-four per cent of assessed facilities had a working telephone or shortwave radio for communication (Kyei-Nimakoh, Carolan-Olah & McCann 2017:4). Another study conducted in Mozambique reported challenges in relation to ambulance drivers and emergency focal persons that people responsible in managing ambulances are not responding to calls. In addition, in some instances, the health workers are expected to convince ambulance drivers to treat the case as emergency (Adolphson, Axemo & Högberg 2016:99).

5.4.4.5 Category 5: Tracking the ambulance

Tracking the whereabouts of the ambulance is very important to facilitate communication between health workers, referral focal person and drivers. The drivers should keep a register in the vehicle, but this was not well monitored. It is important to check for completion of the registers and reporting to the next level.

I have a register. This register includes the data, odometer, *keble*, name of the case, age, sex and residence and their reason for referral and where to go. I can present it when I'm requested to do so by the *woreda* health office.

Various technology-based ambulance tracking system were introduced by various countries. To mention some, an emergency system in Iran uses GPS and display map in ambulances that reduced the response time of ambulance drivers (Delshad et al 2016:2). Bangladesh also introduced a cost-effective ambulance service using mobile phones and geographical positioning system (GPS) tracking (North-West University 2016:16). In addition, North-West University in South Africa designed and implemented a system integrated with a mobile application and a location-based service (LBS) to bridge the communication gap between healthcare providers and patients residing in the rural areas (North-West University 2016:14).

5.4.5 Theme 4: Services availability at receiving facility determines the functionality of the referral system

5.4.5.1 Category 1: Service availability at hospital level

The respondents underlined that many factors affected service availability, including the capacity of the hospitals to implement health services standards; acquiring the required health workforce; availability of enough infrastructure to host the necessary units, such as operating theatres, NICU and blood bank, and enough beds. The availability of these capacities indicates the readiness of the hospitals for complication management, and collaboration with other facilities, either public or private, to address the gaps. According to a respondent,

Sometimes we do not have any admissions. When there is no power, we prefer to refer cases. As we do not have oxygen cylinders, neonates requiring oxygen are referred. In addition, thermal care was also not available when there was power interruption. There was an incident when the standby generator was not working for a month. In that time, we referred all of them. Many of the services that we provide are related to electric power availability and we do not admit when the generator is not functional. We do not want to take the risk.

Ideally, health service users should have the opportunity to utilize health care whenever the need arises (Kyei-Nimakoh et al 2017:6). The initiation of referral process is a medical decision and it depends on many things which among others include the availability of a health institution with specialist facilities, and the quality of care at the referral institution (Singh, Doyle, Campbell, Mathew & Murthy 2016:2). A study conducted in Bangladesh also found that hospitals at district and subdistrict levels were challenged by lack of healthcare personnel and logistic support, including equipment, essential drugs, and laboratory needs (Islam et al 2015:8). Some of the logistics related challenges; such as, irregular supply of water and electricity, were also ascertained by a study conducted in India. Sometimes shortage of budget to cover administrative running costs, like fuel for generator, also led to discontinuation of services (Bhattacharyya et al 2015:426).

5.4.5.2 Category 2: Increased service utilisation at hospital level

The community's knowledge of the type of services available at various levels of the health system, proximity, and inappropriate referrals increased unnecessary use of services at hospital level. According to respondents,

The difference [plan versus performance] was because some of them were going directly to hospitals and other health centres. We do not expect home delivery. They are going to other health centres and hospitals because of the proximity.

If you stay here the whole day, you can witness that all the referred cases are spontaneous vaginal delivery.

Unnecessary referrals overload referral hospitals beyond their capabilities with minor cases which could have been seen at primary level care facilities (Koce et al 2019:2). In

India, Singh et al (2016:19) found that many unnecessary referrals to hospitals were due to the inability of primary health centres to provide basic delivery care and BEmOC services, a tendency for unjustified referrals to higher institutions, and bypassing the CHCs as first referral choice. Regarding obstetrics referrals at Saint Paul's Hospital Millennium Medical College (SPHMMC) in Addis Ababa, Abdella et al (2019:11) found that 80% of referrals were for delivery services; of those who gave birth, 77.3% were delivered by SVD, and 71% of those were conducted at emergency obstetric units.

5.4.5.3 Category 3: Proper reception at the hospital level

Proper reception of referred cases is the hallmark of quality of care provision at hospital level. Referred cases should be considered high risk and treated accordingly. However, the previous experiences of hospital and health centre staff and the completeness and appropriateness of the communication between the two levels determine the attention provided to the case. In many cases, hospital staff do not trust cases sent by health centres. According to a respondent,

The ambulance brings them here. They also have referral slip and health workers from the health centre. When they enter the facility, they just come directly. As this is an emergency, they are not required to pay for a card [visit to the health worker] first. While we provide the necessary care, anyone from their family can process the administrative requirements.

The admission should pass through the physical and pelvic examinations, medical record reviews to see if the case had previous contact with the hospital, and laboratory investigations to establish a diagnosis, if deemed necessary. The respondents indicated that the quality of reception depended on the availability of the required laboratory investigations, the availability of the senior health worker, the caseload, use of ambulance, the presence of a health worker accompanying the case, and the reputation of the referring health facility and health worker. In general, compared to walk-in patients, referred cases have priority at reception where they are guided directly to the delivery room or NICU. According to respondents,

I sometimes think this is just pushing the case to the hospital. It might be good if we provide the care to mothers, but we are not equipped well. We do not have a human resource shortage, but we have lots of limitations.

When we have referrals, we pay more attention to them. We check diagnosis and review the case to confirm. If the case requires more attention, we follow them regularly. We regularly follow the vital signs. If she is in active phase, we start the use of partograph.

Mothers always seeks for responsiveness, promptness, and inter-personal behavior when they visit health facilities (Bhattacharyya et al 2015:422). These are linked to providers' attitudes and behaviors and it sometimes providers behave differently as a response to burnout (Mahato 2017:41; Filby, McConville & Portela 2016:9). The dissatisfaction of mothers at the reception may be due to long waiting time to retrieve folders and receive treatment, unfriendly attitudes of providers and other support staff and late arrival to work by providers (The WHARC WHO FMOH MNCH Implementation Research Study Team et al 2017:4). The other cause as ascertained by another study in India is linked to spaces. Lack of waiting area available for users before admission and for the accompanying persons and overcrowding of wards were ascertained (Bhattacharyya et al 2015:426).

5.4.5.4 Category 4: Labour monitoring

For delivery cases, following the mothers using the labour monitoring chart is an important component of the care steps. The provider's skills; availability of the chart; number of health workers assigned for the session (day or night duty); staff attitude towards the chart; number of cases to be followed; the quality of teamwork and staff relationships; the strength of supervisor follow-up; the focus of the supervision team; the timing of checking for completeness; the practice of experienced/senior midwives/health workers, and clarity on the components of the chart, determine the consistency and completeness of the labour monitoring chart. According to respondents,

The components can be filled. To be honest, when the mother is at the second stage, all the components of the chart are filled. All four components are filled. If you are lucky and the foetal heartbeat is good, without properly following the case, as the chart completeness is checked, you complete the chart after delivery. Usually, when I review the charts, descent is forgotten especially when the mother's cervix is full. There are also some sections which only require checking that the box not properly filled. And, especially when the labour prolongs, the actions are not filled. For example, when ARM was done, it is not written in the chart.

They (midwives) are great. Even compared to the referral hospital where we were trained, they do it here properly. But we are not sure whether they fill in while providing the service or not. As you know, there is a saying, 'treating a chart'. We only capture them when there are stillbirths, which signify poor utilisation of the chart.

The quality of partograph use determines the outcome of labour. In Bangladesh, Khan et al (2018:29) found that the stillbirth rate among mothers with abnormal partographs was higher than among those with normal partographs (4.2% of 71 abnormal and 3.3% of 577 normal partographs). In a study of healthcare providers' perspectives on challenges and opportunities in labour monitoring in Nigeria and Uganda, Yang, Bohren, Kyaddondo, Titiloye, Olutayo, Oladapo, Souza, Gülmezoglu, Mugerwa & Fawole (2017:21) found delays in responding to abnormal labour observations, suboptimal clinical team cooperation, and insufficient provider-client communication were the biggest problems. The WHO (2018a: 59) found that poor availability, lack of confidence, difficulty of use, lack of clear policy on use, and workload contributed to low utilisation of partographs and underscored that these factors led to retrospective completion and inconsistent partograph recording.

5.4.5.5 Category 5: Work environment at hospital level

The respondents described the work environment as the interaction among staff, hospital management and the patients themselves. The success of the completed referral system is determined by how the hospital management conducts regular follow-ups on practices, staff relationships and implementation of the health workers' motivation packages as stipulated in national and regional policy and innovative staff

motivation schemes. In addition, the proximity of the seniors' residence area to the hospital is a factor to ensure timely support to the midwives working at the hospital level. Interactions between staff and health workers in the delivery room also contributed to a convenient work environment. According to respondents,

The attendants are the ones who sometimes insult you. This is because of a loose environment; the security is not strong. If we have securities close to us, we may not fight with the attendants. You need to pass through the attendants to call for the security forces. In this process, there are also some people who want to fight with you. This factor in one way or another forces you to not to like the profession, even though you are happy with what you do.

There is a loose follow-up. Management follow-up is important. When the health workers can exercise freely, they do not pay attention to every detail. If the patient card is, for example, audited every day, we may be forced to complete the partograph properly. Accountability is important.

The team spirit is the driving force for the achievements. Imagine had there not been this, the challenges and the environment are not convenient. The MCH department has very good teamwork and each one of us is good to others. Some of us also have experience of birth and know the pain.

Poor working conditions further compromise quality of care (Filby et al 2016:10). Some reports underlined that health workers globally work in difficult, unsafe, isolated and poorly equipped settings (Homer et al 2018:7). On top of improving the working condition, emergency management requires a well-functioning teamwork (Adolphson et al 2016:97). Establishing multi-disciplinary teamwork is imperative to nurture a collaborative attitude, problem solving skills and functional relationship among health work force to ensure continuity of care (Homer et al 2018:9).

5.5.5 Theme 5: Functional cross-facility support platforms for better collaboration and coordination between facilities

5.5.5.1 Category 1: Feedback on referral

Feedback to the referring facility is a means of establishing communication between health centres and hospitals. When and how it is given has an impact on its application. Most of the health workers at the hospitals reported that they provided written or on-the-spot feedback to the referring health worker. However, the health centres complained about lack of feedback in the system. Some of the respondents believed that most of the cases came for similar inappropriate reasons. The respondents gave the following reasons for the lack of referral feedback: overload too high to provide written feedback; incomplete contact address of the referring health worker; limited follow up from the health centre side; lack of health centres' commitment to work on the feedback; most referrals coming without health workers; use of inappropriate referral forms, and not trusting the competencies of health workers at hospital level. According to a respondent,

We provide feedback. They may not accept the feedback and that is why they commit similar mistakes time and time again. They may feel we are the same as they are in terms of qualification. However, we have more experience and have worked with many other professionals and with seniors. In due course, we have better experience.

The health centre staff, however, believe it is because of the lack of commitment of the hospital staff that the health centres do not receive feedback. Even when they provide feedback, the tone of communication is not appropriate. According to a respondent,

They always communicate the negative. The feedback tone is always negative. This may be because they think they work at hospital level. For example, we can take a case of prolonged labour. We meticulously follow her and decide on the case. Then, en route due to the nature of the road, the position may change, or the labour may be hastened. When they reach hospital, they may deliver normally. In this case, the feedback says 'you are sending us the wrong cases'. Sometimes, it is good to ask the patient herself and understand our efforts rather than concluding we are tired of providing the care.

The referral focal person or health centre head collects the referral feedback and the feedback is jointly reviewed by the delivery case team members. In some of the health centres, the feedback is used as an opportunity for coaching and filling in the missing materials which was the cause for the referral. Another opportunity presented by the respondents was a meeting between health centres, hospital and *woreda* health office officials where every stakeholder takes an assignment to improve the common problems happening regarding referrals. According to respondents,

Our relationship with the health centres should be properly guided. We need to at least have a quarter-based meeting with them. Recently we had that meeting with the MCH lead, Referral focal person and midwives from the hospital and *woreda* health offices. We took samples from their referral feedback and discussed on them.

Eskandari, Abbaszadeh and Borhani (2013:4) underline the importance of referral feedback as the lack of it may distort the process of referral and patient follow up. Lack of proper referral documentation affects the completeness of referral feedback loop. In India, for instance, 73% of referrals were provided referral slips but they did not provide any information about clinical manifestations or treatment which limits the completeness of referral feedbacks (Singh et al 2016:17). In addition, the fact that referred clients being transported unaccompanied by healthcare staff is also another missed opportunity to collect feedback from the referral sites (Kyei-Nimakoh et al 2017:7).

5.5.5.2 Category 2: Consultation and mentorship support

The relationship between health centres and hospitals can be strengthened further by initiating functional technical support structures in the form of telephone consultation and through either individual or group mentorship support to the health centres. The respondents stated that telephone consultation is necessary to minimise unnecessary referrals. According to a respondent,

When we have no one to consult with here at the health centre level, we call the person working at the hospital. The call helps us manage the case and avoid referrals. It also sends a message to prepare themselves to provide the services.

The respondents indicated that mentorship support improved health workers' competence and reorganised service delivery platforms at health centre level. As mentorship support requires advance preparation before the actual visit, it contributes to ensuring that health centres' problems are dealt with comprehensively and sends a message that for any of the actions about referral, the health centre is accountable. This further presents an opportunity for continued consultations between the health workers at health centre and hospital level as well as the opportunity to present any administrative-related problems to the *woreda* health office representatives. One of the respondents described the process they followed to provide group mentorship:

One pharmacist, IESO, Lab, GP, and quality officer went to the health centre. I [IESO] conducted mass U/S screening. All the staff from the hospital supported the health centres. This was a great experience. The main thing was that they are visited. It is also good to receive feedback. Another limitation in the health system is their accountability. They have formal relations with the *woreda*, but not the hospital. Such visits are helpful. There is a clear skill difference. If there is *woreda* level training, there will be strong communication moving forward.

In rural Iran, the lack of feedback had a negative impact on the process of referral and patient follow-up (Eskandari, Abbaszadeh & Borhani 2013: 232). In India, lack of accountability and of back referral of minor cases that came directly to higher level were among the factors affecting the referral feedback system (Bhattacharya 2017:3).

5.5.5.3 Category 3: Functional service management committees

Various management-related committees have been established at both health centre and hospital level. The respondents identified the referral, MPDSR, and quality team committees among those that have a stake in the referral system. However, the functionality of those groups is either limited to one level or known by very few in the system. According to a respondent,

There is an MPDSR committee led by the quality unit. Four midwives are also part of the team. The committee analyses the case. The cause of the problem is analysed, and every team member is evaluated. They do not go to the health centre and home though. The result is used to educate the health workers at all levels.

As the study in India demonstrated that accountability with regards to referral practices should be ensured and best performances need to be rewarded (Jayanthi et al 2015:16). The availability of accountability mechanisms further promote active collaboration among levels as well as enhance the implementation of harmonized referral system (Singh et al 2016:19). These however are lacking as demonstrated by a study conducted in India which showed an overall lack of monitoring of the referral system and accountability to patients (Singh et al 2016:18).

5.6 OVERVIEW OF MAIN QUALITATIVE FINDINGS

The referral chain model has three important elements: Sender, Transport and Receiver. This study identified the health centre as the sender; public transport and ambulances as transport, and the primary hospital as receiver. The main limitations identified in each element are summarised next.

In all the health centres in the study, delivery and essential newborn care services were provided to a wider catchment population than expected. In addition, prior interactions with the mother during ANC and pregnant mothers' conference at community level established a relationship between the health centre and mothers, which contributed to improved utilisation of services at the health centre level. Two health workers were assigned to the delivery case team in each health centre. Two factors led to high caseloads. In one instance, for example, a single midwife provided delivery care to six clients per night. Most of the health workers had limited experience and only a few had attended in-service training to improve their skills. Besides these limitations, the health workforce was challenged by a lack of properly implemented motivation packages, and of supplies and reagents. Moreover, due to high caseloads, limited competence among service providers, inappropriate practices during intrapartum care and logistical problems, unnecessary maternal and newborn related referrals were sent to the primary hospitals.

The study found that knowledge of referral pathways determined the referral practices at the lower level of the system. There were self-referred cases and referrals by health workers because of family and community members' advice, private facility practices and lack of regular update of referral directory. Communication between facilities is another important factor. A strong referral focal person and referral committee

contribute to facility standards. Practice differed from facility to facility. Prior communication before referral should happen, but the hospitals complained about a lack thereof. This could be due to health centre management's concentration on establishing the focal person and committee and regularly following performance. Patient pre-referral preparation was not done well. All the referred cases did have referral slips, but information was incomplete and/or inaccurate. At some of the sites, the referral decision was made solely by the medical doctors rather than a committee.

Transporting the referred cases was a challenge. All the *woredas* visited had at least one ambulance for patient transportation. However, its availability was determined by the number of calls, who had called the driver, and other assignments given by the *woreda* health office. In several cases, public transport was an option if the client agreed. However, having ambulances available to some patients and sending others by public transport was a matter for discussion between the community members and the health centre management. In some cases, health workers requested vehicles from the government offices and neighbouring *woredas*. The available ambulances were not well equipped for emergency management or well-staffed. In some *woredas*, emergency management technicians were assigned to each ambulance to provide the service while transporting the referred cases. However, health professionals at health centre level accompanied cases based on the caseload and type of referred cases. In general, due to the reporting line to the *woreda* rather than hospital and no strong tracking system, ambulance management was poorly managed to provide the service.

The readiness of the hospital to receive the referred clients and provide quality care was an important component of the referral system. Service availability was challenged by the capacity of the hospital to have the necessary rooms and infrastructure, highly trained workforce, and supplies and laboratory reagents available. The number of cases visiting the hospitals also comprised quality of care. The referred cases at the reception received preferential treatment based on previous knowledge of the sending facility and health workers, and communication between the sending and receiving facility which was not well established due to logistics, documentation factors, and patients coming alone. Admitted cases were not properly monitored because of the high caseload, limited supervision support, and the focus of follow up. In many cases, healthcare professionals tended to "treat charts" rather than promote evidence-based practices while providing care. The quality of practice was challenged by insecurity in the work

environment but strengthened by good teamwork and availability of consultation support. Beyond providing services at hospital level, the primary hospitals failed to improve the capacity of health centres through mentorship support, communicating positive feedback on referrals and linking hospital level and health centre management structures.

5.7 CONCLUSION

This chapter discussed the findings from the key informant interview during the phase 2 of the study. A total of twenty-six health workers included in the key informant interviews. The findings from the interview focused on exploring the experiences of health workers which managing maternal and new-born care related referral system. The finding generated five major themes: Capability of identifying appropriate cases for referral, proper initiation of the referral process determines the outcome, emergency medical transportation, services availability at receiving facility determines the functionality of the referral system and functional cross-facility support platforms for better collaboration and coordination between facilities. Each theme in this chapter were described by the direct quotes and relevant literatures.

Chapter 6 discusses the strategies developed to improve the referral system in relation to maternal and newborn health.

CHAPTER 6

STRATEGIES TO IMPROVE MATERNAL AND NEWBORN REFERRAL SYSTEM

6.1 INTRODUCTION

The purpose of the study was to formulate strategies to improve maternal and newborn health care referrals in the health system in Ethiopia. Accordingly, the researcher analysed the effects of current referral practices in the health system and identified and developed strategies to improve referrals in the health system.

The quantitative and qualitative findings of the study indicated a significant proportion of inappropriate referrals within the health care system. The inappropriate referrals were mainly due to patients' self-referrals and the capacity of the lower health system. Poor referral practices impact negatively on the health care system and quality of care.

The researcher conducted a thorough literature review, examined the costs and practices of patient referrals, and collected data from health workers in the field in order to develop strategies to improve the referral system in maternal and newborn related emergency care in Ethiopia.

The findings were categorised according to the three components of the referral chain model, namely sending, transporting and receiving, as well as the overall governance and accountability system in relation to referrals.

6.2 STRATEGY DEVELOPMENT

According to Clayton (2019), there are five stages of the strategic management process, namely framing the objective; identifying issues; identifying possible strategies to tackle the issues or problems; developing the strategies and implementing and evaluating the strategies. The researcher collected quantitative data on the referral practices, costs and problems about the referral system. In the qualitative phase, the researcher explored health workers' experiences and perceptions of the system and

problems as well as their suggestions and recommendations to tackle the problems and improve the system. The researcher drew up a list of interventions/strategies aimed at four areas: sending, transport and communication, receiving, and monitoring and governance/accountability.

The researcher sent the strategies to selected programme managers and health workers involved in MNH care provision and management for validation and revised the strategies according to the feedback received for implementation of the strategy. Implementation, evaluation and control require follow up after completion of this study.

6.3 SCOPE OF THE PROPOSED STRATEGIES

Improvement in the referral system requires considerations at strategic and operational levels. The suggested strategies require the engagement of policy makers, programme managers and service providers.

6.4 AIM OF THE STRATEGY

The overall aim of the strategy is to improve the availability of a functional maternal and newborn care referral system. The strategy consists of strategies to

- Improve the capacity of health centres to provide the expected type of care and improve quality of care.
- Improve the availability and utilisation of quality emergency transportation services.
- Enhance the readiness of hospitals to provide emergency maternal and newborn health care.
- Establish referral system governance and an accountability framework within the health system.

6.5 STRATEGIES TO IMPROVE THE REFERRAL SYSTEM

The capacity of different tiers of public sector health facilities to provide essential maternal and newborn care varies. Some facilities have the capacity to provide Comprehensive emergency obstetric and newborn care (CEmONC), while others can

only provide Basic emergency obstetrics and newborn care (BEmONC) (Chaturvedi et al 2014:2). Many cases can be managed by the lower level health facilities. For cases requiring advanced care, establishing an effective referral system is crucial. Continued study and reflections on the referral system are required to assist people working at both levels of the system to enable them to decide when, where and how to refer cases.

Successful implementation of the referral system needs a progressive referral strategy based on population needs and health system capacity; specific referral protocols well understood by all actors; active communication and collaboration between referral levels and other sectors; functional communication and transport arrangements; an adequately equipped referral institution providing affordable services, supervision and accountability for quality of care, and monitoring of effectiveness of the referral system and policy support (Singh et al 2016:19). Based on the findings, Figure 6.1 depicts the major elements in the strategy.

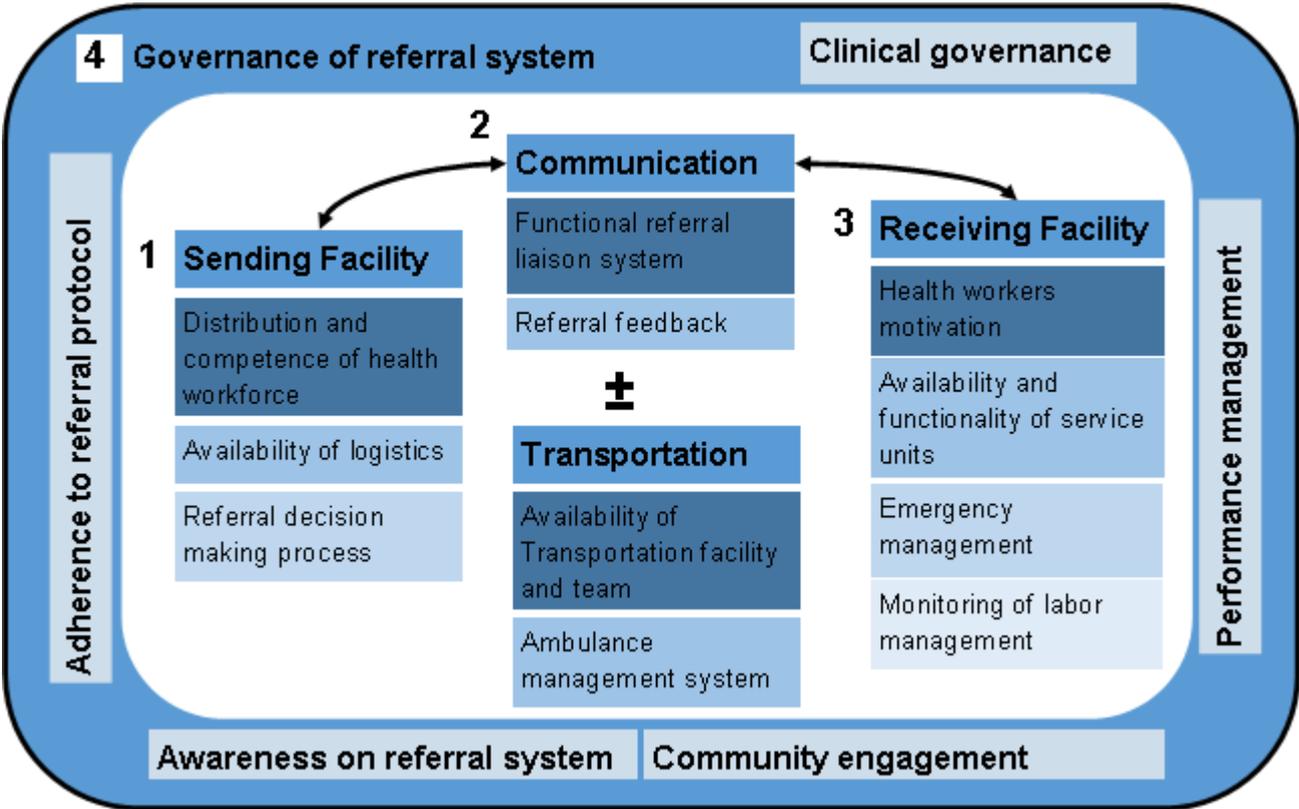


Figure 6.1 Elements of the strategy to improve the referral system

The study respondents’ suggestions to overcome the identified bottlenecks and problems are discussed along with reference to the literature review.

6.5.1 Strategies for sending facilities

Delivery care at a nearby facility is a key element of the health system to ensure a timely intervention for reducing the risk of maternal and perinatal death (Nyamtema, Mwakatundu, N, Dominico, S, Mohamed, H, Pemba, S, Rumanyika, R, Kairuki, C, Kassiga, I, Shayo, A, Issa, O, Nzabuhakwa, C, Lyimo, C, Van Roosmalen 2016:12). An integrated and comprehensive approach can effectively address the distribution and retention of health workforce in the system. This requires investment in training, deployment, and retention of health workers; improvement in the quality of their competencies; adopting a range of financial and non-financial incentives to improve management systems and the work environment in which they operate (Koblinsky et al 2016:2311).

Delivering quality care also requires monitoring the effects of relatively less-experienced health workers, staff rotation and the coverage of in-service BEmONC training (Austin et al 2015:6). In addition to the availability and adequacy of the health workforce, a clear national statement should be formulated of what should constitute primary care for uncomplicated deliveries, and what mechanisms, including referral, need to be put in place for complicated deliveries.

A study in Burundi identified robust protocols for the effective identification of obstetric complications, together with health centre staff trained in the proficient use of these protocols (Tayler-Smith et al 2013:998). The availability of the health workforce and capacity of the lower level health system should thus be regularly measured against those expectations (Koblinsky et al 2016:2312).

Meticulous follow up of adherence to high-quality clinical practice guidelines, and utilisation of peer-to-peer or simulation-based training should be implemented to improve providers' knowledge, clinical skills, attitudes, and women-centred approaches (Koblinsky et al 2016:2308). Regular practice of skills acquired is an important determinant to retain skills and to improve the quality of maternal care index score in health care facilities with low volumes of deliveries (<500 births) (Kruk, Leslie, Verguet, Mbaruku, Adanu & Langer 2016: e849).

| Major area | Interventions |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.1.1 Distribution of health workforce | <ul style="list-style-type: none"> • The minimum standards set for health centres should consider any of the community level activities happening under each health centre. • The minimum standards of health workforce distribution should be based on the number and type of service uptakes rather than total population. The type of service uptake is an important factor to be considered. • The placement of the health workers should factor in availing enough health workers during night shift. |
| 6.5.1.2 Competence of health workforce | <ul style="list-style-type: none"> • Continued team-based discussion on referral feedback at the health centre level and development of an improvement plan as a management tool. • Hospitals should be equipped as a technical knowledge hub to identify gaps and work on skills development programmes for mid-level health workers. • Peer-to-peer regular coaching practices at health centre level. • Enhance the role of seniors and experienced professionals to demonstrate good behaviours and attitudes to newcomers. • Case presentation among health workers should be encouraged to promote team-based learning schemes. • Establishment of mandatory refresher credited e-learning materials to be used when the health workers have spare time. |

In the referral system, an adequately resourced facility offering good quality care is important (Tayler-Smith et al 2013:998). Upgrading extremely remote rural health centres to provide CEmONC services is an appropriate and effective intervention and has proven feasible and acceptable. The establishment of modest surgical theatres and training associate clinicians in life-saving skills enabled lower-level facilities to cope with serious obstetric emergencies (Nyamtema et al 2016:14).

| Major area | Interventions |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.1.3 Improve availability of infrastructures and logistics | <ul style="list-style-type: none"> • Mobilise resources from community to improve logistics-related problems occurring at health centre level. • Increase relationships between facilities to fill gaps in shortages of supplies, drugs and laboratory reagents. • Availability of back-up laboratory machines for use during power interruptions. • Introduce and implement a logistics information system targeting laboratory reagents and supplies. • Identify common brands for laboratory services and have a disposal and maintenance plan for each laboratory and other investigation equipment. • Introduce and scale-up test kits to be used for non-laboratory technicians as a back-up for shortage of professionals. |

The referral system should run by a dedicated team. This will help to ensure that appropriate cases for referral are identified; necessary requirements for patient preparation are identified, and the referral procedures are made consistently.

| Major area | Interventions |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.1.4 Referral decision-making | <ul style="list-style-type: none"> • A job aid should be prepared and made readily available to assist health workers to quickly choose cases for referral. • A referral decision should be made by a team working at the health centre level on any shift of the day. • Documentation of referral decisions should be encouraged to be filed at the health centre level and review of documents made by facility management. • Introduce labels for severity and urgency of case management. This may be done through providing stickers to be used on the referral paper. |

6.5.2 Strategies for communication and transportation

Establishing high degrees of communication between healthcare professionals belonging to different organisations is important. Communication is a key factor for successful collaboration and emphasises the need to find the best way for information to flow between each level of a complex interorganisational system. For maximum benefit, communication must be regular, active, reciprocal and open, as both parties need to be comfortable communicating with each other (Karam et al 2018:75). In Burundi, Tayler-Smith et al (2013:998) identified multiple factors for an effective referral system, including a functional and efficient communication system using a two-way solar-powered radio system or cell phones; medically equipped ambulances including a trained midwife or nurse as part of the ambulance team to enhance stabilisation and preparation of women for emergency interventions, and twenty-four hour availability of functional and dedicated ambulances, with independent ambulance teams, providing transport free of charge. Other strategies to improve communication between facilities include health workers receiving training on when to make a referral; regular meetings between providers; provider training on how to write referral letters, and the introduction of electronic medical records (EMRs) on care coordination in general or on referral process in particular. In Kiambu County, Kenya, computer-based communication assisted the health workers to receive written or e-mail referral letters twice as often as by telephone or other verbal communication (Kamau, Osuga & Njuguna 2017:48).

| Major area | Interventions |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.2.1 Functionality of the referral liaison system | <ul style="list-style-type: none"> • Assign a focal person/coordinator with the right characteristics – skills of coordination, approachable, responsible, active and organised to facilitate the referral process. • Facilities – workstation, registers, phone and filing system. • Orientation of staff assigned to night shift about the procedures and the documentation requirements and ensure any referred cases are presented to the referral focal person as well as the head of the health centre. • Assign three people, in eight-hourly shifts, in the liaison office with the required tools/apparatus at the hospital level to ensure 24/7 availability. • Introduce a performance standard and establish a feedback collection system on the functionality of the liaison system – responsiveness to the requests coming from health centres, follow up of referred cases until discharge by health centre focal person, consistent use of communication materials, completeness of documentation, feedback rate, survival rate of referred cases, and appropriateness of referral. • Introduce an electronic version referral and feedback communication platform. |

Transportation is another important dimension. A free ambulance service is highly cost effective and a facilitator for the use of health facilities for delivery care (Tayler-Smith et al 2013:999; Mahato et al 2017:51). Limited availability of transportation and lack of communication and coordination between health centres and hospitals before and after referrals hindered the efficiency of the referral system in Ethiopia (Austin et al 2015:3).

| Major area | Interventions |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.2.2 Availability of transportation facility and team | <ul style="list-style-type: none"> • Advocate for the assignment of at least two ambulances for each district – one solely dedicated for referrals between health centres and hospitals. • Train emergency management technicians to be assigned with the ambulances, including development of clear career pathway and scope of practice. • Use of ambulance or other public transportation options for health workers who accompany the referred cases. • Provide spaces at hospital level for accommodation of health workers who accompany patients after midnight. |
| 6.5.2.3 Proper management of the ambulance services | <ul style="list-style-type: none"> • Introduce a zonal or regional level pooled ambulance management system especially for referrals between facilities. • Ensure the placement of one of the ambulances at hospital level and all related running expenses including drivers' salary and benefits to be covered by the hospital. • Install a GPS system in the ambulance for proper tracking of its location and monitoring can be done both at the pooled management station and hospital level. • Initiate a coordinated call station together with pooled management of ambulance services. |

6.5.3 Strategies for receiving facility

In Tamil Nadu, referral-in cases in hospitals reflected their capacity to treat emergency obstetric cases in terms of manpower and materials, as perceived by lower level health facilities (Rajasulochana & Dash 2018:368). Rajasulochana and Dash (2018:368) found an urgent need to readdress the human resource policy for health care personnel; devise mechanisms for periodic inspection and preventive maintenance of hospital equipment and develop management capabilities and leadership skills. Primary hospitals in Ethiopia are expected to serve as CEmONC facilities, which requires the availability of blood transfusion and surgical (caesarean section) services in addition to what is commonly available at the health centre level. Globally, CEmONC signal functions are being expanded to include infection prevention and management for both mothers and infants; monitoring and management of labour using the partograph; active management of the third stage of labour, and infant thermal protection, feeding, and HIV prevention (Otolorin et al 2015:S46). High-quality basic and emergency care services include the importance of health facility strengthening, competency-based provider education, and strong government ownership and coordination as essential precursors to high impact evidence-based maternal and newborn interventions in low-resource settings (Otolorin et al 2015:S46). It is imperative to make sure that these services are always available irrespective of the day. To assist hospitals in providing the services, countries have different support mechanisms. For example, India introduced the patient welfare society (PWS) fund and annual maintenance grant (AMG) to enable smooth hospital management (Rajasulochana & Dash 2018:373). Equipment procurement is also linked to a mandatory annual maintenance contract by the suppliers and mechanisms have been introduced for periodic inspection and preventive maintenance of equipment (Rajasulochana & Dash 2018:375).

| Major area | Interventions |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.3.1 Emergency management | <ul style="list-style-type: none"> • Discourage preferential treatment of cases based on previous experiences with the sending facility and health worker. • Treat every referred case as an emergency regardless of the initial diagnosis. • When resources are limited, give priority to the referred cases and ensure that all the required monitoring and documentation tools are consistently used. |
| 6.5.3.2 Resource mobilisation and efficient use of resources | <ul style="list-style-type: none"> • Promote the benefit of avoidance of inappropriate referral for the health system in addition to its benefit to the client. • Simplify the process of budget allocation and approval system in the health system. • Capacitate managers working at health centres and primary hospitals in cost analysis and efficient cost management. • Adopt mechanisms to simplify organisation of a community, mobilisation of resources and utilisation of resources to improve the health care system. |

El Helou, Samiee-Zafarghandy, Fusch, Wahab, Aliberti, Bakry, Barnard and Doucette (2017:61) found that the reconstruction of mega-units of intensive care into smaller care units within a single operational service according to specific patient populations, clinical team providers and determined process and purpose enhance the provision of safe and effective care at NICUs. Improvements in service quality, especially in the NICU, may also require clinical management guidelines. In Uganda, three types of guidelines were developed, namely emergency care, priority care and ongoing care. The priority care guidelines allowed staff to make a quick assessment of key problems and led them to correct, immediate and lifesaving management. The ongoing care guidelines provided simple but more detailed information on each diagnosis including risk factors, clinical presentation, investigations, emergency management and ongoing management. The guideline was also oriented to all staff on-site for one 2-hour module each week to minimise interference with limited staffing (Burgoine, Ikiror, Akol, Kakai, Talyewoya, Sande, Otim, Okello, Hewitt-Smith & Olupot-Olupot 2018:4).

| Major area | Interventions |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.3.3 Functionality of the infrastructure | <ul style="list-style-type: none"> • The primary function of the hospital management should be ensuring the availability and functionality of the standard infrastructure at the hospital level. • Strengthen the linkage with universities and use the opportunity to mobilise resources to fill infrastructure related gaps. • Maximise the use of multisectoral transformation plans to be implemented in all districts. • Ensure that savings from reduced inappropriate referrals are used to further improve hospital infrastructure. • Conduct operations research and present the results on the challenges of the lack of infrastructure on quality of care and the loss in the system and burden on the community to policy makers, programme managers and facility managers. |
| 6.5.3.4. Functionality of service units (NICU and OR) | <ul style="list-style-type: none"> • Set a minimum list of equipment for each micro-unit at the NICU and ensure the availability of functional equipment. • Partition the NICU into micro units with glass partitions to ensure clear view. • Provide a separate room for medication preparation in the NICU. • Establish strong internal supply and other logistics management systems for the OR and NICU. |

With regard to providing caesarean sections at primary hospitals, maximise the use of emergency surgeons and carefully revise the benefit packages and motivational schemes to increase the capacity to decentralise CEmONC services to the lower levels of the health care administration (Nyamtema et al 2016:10).

| Major area | Interventions |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.3.5 Health workers' motivation | <ul style="list-style-type: none"> • Establish new cadres when there is a need and after the development of clear scope of practice. • Do a quick analysis of the existing professions in the system and establish clear career pathways. • Ensure private practices at primary level care are either allowed or prohibited to all. As lack of clarity leads to inconsistent application which may demotivate health workers. • Establish and regularly update health workforce account/database at zonal and regional level. • Establish a scope of practice that allows teamwork at every level of the health system. • Introduce benefit packages for practices rather than professions. For example, any health workers working at delivery rooms should get risk allowances. • In addition to making health facilities client friendly, the Ministry of Health should also make them provider friendly. The work environment |

| Major area | Interventions |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>should not expose people to security problems.</p> <ul style="list-style-type: none"> Assign health service managers who have worked in various levels of the health system and attended leadership development programmes. This would promote team building, problem solving, staff management, conflict management and change management. |

The consistent and correct use of labour monitoring in the health system requires attention and improvement. Apart from maintaining key functionalities of a partograph, an improved labour monitoring tool should be user-friendly, feasible to deploy in the local context, reliable as a tool for detecting danger signs in a timely manner, and, ideally, be more automated/dynamic and less complex for mid-level health workers to use (Yang et al 2017:24).

| Major area | Interventions |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.3.3 Monitoring of labour management | <ul style="list-style-type: none"> Provide a copy of partograph completion. Test and scale-up an electronic version of a simplified partograph. Introduce two types of checks – timely update and chart completion. The first can be made by a first line supervisor and the second by a quality team established at the hospital level. Focus on monitoring the proper use of the tool by senior and experienced midwives as they can be considered as an example or model for others. |

6.5.4 Strategies aiming at referral governance, monitoring and accountability

Referral systems frequently look good on paper, but are not well implemented (Eskandari et al 2013: 231). Implementation of a system requires a clear governance/accountability framework and monitoring system (Singh et al 2016:18). The governance system may take two forms – representation and clinical governance. In Indonesia, representatives of public and private health facilities collaborated with district health officials and civil society representatives to map the most efficient referral pathways between facilities and define their individual roles and responsibilities (Hyre, Caiola, Amelia, Gandawidjaja, Markus & Baharuddin 2019:10). Clinical governance encompassed shared accountability for sustaining and improving service quality and using data for decision-making. A team within the facility promoted accountability, communication, and ongoing learning within health facilities by introducing and establishing purposefully selected principles of good care and practices to strengthen clinical governance (Hyre et al 2019:10).

| Major area | Interventions |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.4.1 Strengthen the existing quality improvement team to ensure clinical governance | <ul style="list-style-type: none"> • Ensure the functionality of referral committees at health centre levels. • Strengthen the use of senior staff in quality audits at hospitals and their catchment health centres. • Ensure the functionality of the quality improvement teams at health centres and proper use of improvement models for quality improvement projects at local level. |

In rural Southern Tanzania, the health system administration and district health care facilities frequently lacked the capacity to sustain the initiative and improve interventions (Jaribu, Penfold, Manzi, Schellenberg & Pfeiffer 2016:8). In Indonesia, interventions to send cases and receive guidance from hospital staff on pre-referral stabilisation, SMS messages and phone calls were routed among facilities according to the referral pathways outlined in the referral network (Hyre et al 2019:10). In addition, regular emergency drills were introduced to improve clinical performance, teamwork and communication, and to identify and resolve sources of delays in responsiveness (Hyre et al 2019:10). In India, referral audits were introduced for obstetric emergencies to improve referral systems for obstetric care and prevent delays (Singh et al 2016:18). In the Upper East Region of Ghana, adherence to standardised referral guidelines was maintained after the introduction of referral audit (Kyei-Onanjiri, Carolan-Olah, Awoonor-Williams & McCann 2018:6). In Addis Ababa, Austin et al (2015:5) found that back referrals of simple cases strengthened accountability and alleviated hospital overcrowding.

| Major area | Interventions |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.4.2 Awareness of referral system | <ul style="list-style-type: none"> • Actively collaborate with health centres to educate the community on health systems literacy to assist them know what kinds of services are available at health centres and hospitals. • Introduce a discouraging strategy on self-referred cases, such as priority to referred cases, co-payments, no ambulance services for return. |
| 6.5.4.3 Community engagement to improve referral practices | <ul style="list-style-type: none"> • Strengthen and encourage recently delivered mothers' participation in the pregnant women's conference to share experiences on delivery care and provide feedback to the midwives from the health centres. • Strengthen the performance management team at health centre level to continuously and regularly conduct exit interviews and consistent use of community score cards to monitor mothers and their families' experience of care and ambulance management. • Establish a platform for open discussion between the client or her family member and service provider. • Allow family members to accompany mothers so that they monitor the quality of care provided to the mother. |

| Major area | Interventions |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.4.4 Consistent provision of feedback on referred cases | <ul style="list-style-type: none"> • Give consistent feedback on every referred case in a way convenient to the staff working at hospital level. • Organise regular sessions among health centres, hospital and <i>woreda</i> health offices to review referrals and share responsibility to improve the situation. |

Improvement regarding the referral system requires setting performance standards. These standards should be based on the MOH referral guidelines, including elements of a functional referral system, and be used regularly by district health office teams to assess performance of the referral system, identify gaps, and drive action plans to address gaps (Hyre et al 2019:10). This also requires framing indicators at various levels: complicated maternal admissions as a percentage of total maternal admissions, complicated neonatal admissions as a percentage of total neonatal admissions, and referral-in and referral-out maternal and neonatal cases (Rajasulochana & Dash 2018:368; Acker, Sovanna & Strehlow 2017:20). The data can be collected from the registers, audit reports or GIS modelling combined with population data (Chaturvedi et al 2014:9). The results should be presented to staff in the form of laminated charts, and the data reviewed during regular internal meetings, and governance meetings (Hyre et al 2019:9).

| Major area | Interventions |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.5.4.5 Performance measurement and management | <ul style="list-style-type: none"> • Introduce a by-pass rate as a proxy indicator for community engagement and client preference as part of quality of care measurement at the health centre level. • The hospital should regularly conduct referral audits and compile findings and explore reasons for identified unnecessary referrals. • Introduce surprise audits at NICU and delivery wards, including operation rooms. • Include appropriateness of referral and referral feedback rates in the key performance indicators for health centres and hospitals, respectively. |

6.6 CONCLUSION

This chapter described the strategies developed to improve the maternal and newborn care referral system at primary level care. The strategies are based on the findings, the literature review and experts' feedback. The major strategies were categorized in four: Strategies for sending facilities, communication and transportation, receiving facility and overall referral governance. Each category of strategy included major focus areas and possible interventions for consideration.

Chapter 7 briefly describes the conclusions of the study and makes recommendations for practice and further research.

CHAPTER 7

FINDINGS, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

Maternal and newborn health is one of the main indicators of a good health system. Maternal death affects the family, especially the children, immeasurably, and the community and economy.

Globally, half of all maternal deaths, one-third of stillbirths and one quarter of neonatal deaths are due to delivery-related complications (Pasha et al 2015:8). Emergency medical, surgical and obstetric management and service are less developed in low- and middle-income, resource-limited countries. Ethiopia has high maternal and neonatal mortality rates (CSA [Ethiopia] & ICF 2017:124, 252). The reduction of maternal mortality is beneficial for both mother and newborn and depends on the availability of high-quality delivery care and a functioning referral system (Dewana et al 2017:31). An effective referral system is a critical component of the health system for the reduction of maternal mortality and morbidity due to obstetric complications (Chaturvedi et al 2014:1). The actions of lower-level health facilities with limited capacity affect the time required to complete the referral process for emergency case management. The health sector in Ethiopia is a three-tier health care delivery system. The first tier or level is a *woreda* or district health system comprising a primary hospital (with a population coverage of 60,000-100,000 people), health centres (PHC facilities serving a population of 15,000-25,000) and their satellite health posts (serving 3,000-5,000) that are connected to each other by a referral system (FMoH 2010:4). This study focused on first level health care delivery, especially maternal and newborn services.

A lack of coordination between facilities, however, has negatively affected communities' trust and the efficiency of health service delivery. Regarding obstetrics emergency management, in Ethiopia, all health centres are expected to implement Basic Emergency Obstetrics and Neonatal Care (BEmONC) by fulfilling all the seven signal functions and primary hospitals implement comprehensive emergency obstetrics and neonatal care (CEmONC). Health centres should be able to identify cases requiring

advanced care and refer them to the hospitals promptly. The urgency of care required for women in labour means that they should be treated as emergency cases.

An effective referral system is a critical component of the health system for the reduction of maternal mortality and morbidity due to obstetric complications (Chaturvedi et al 2014:1). The actions of lower-level health facilities with limited capacity affected the time required to complete the referral process for emergency case management. The major components of the referral system – sending, transporting and receiving - about maternal and neonatal health were analysed by means of medical record review, health service costing and in-depth interviews with health workers.

This chapter briefly summarises the findings, presents the limitations of the study and makes recommendations for practice and further research.

7.2 FINDINGS

The study found that the selected hospitals and health centres had a referral system, but several factors impeded the effective implementation of the system. An effective referral system should have formal communication and transport systems, capable receiving facilities, protocols for sending and receiving facilities, and take accountability for providers' performance (Tiruneh et al 2018:4). The findings are discussed according to sending facility, transportation, receiving facility, and referral control and accountability.

7.2.1 Sending facility

The study found that knowledge of referral pathways determined the referral practices at the lower level of the system. There were self-referred cases and referrals by health workers because of family and community members' advice, private facility practices and lack of regular updates of the referral directory. Communication between facilities is another important factor. A strong referral focal person and referral committee contribute to facility standards. Practice differed from facility to facility. Prior communication before referral should happen, but the hospitals complained about a lack thereof. This could be due to health centre management's concentration on establishing the focal person and committee and regularly following performance.

Patient pre-referral preparation was not done well. All the referred cases had referral slips from the sending facilities, but information was incomplete and/or inaccurate. At some of the sites, referral decisions were made solely by the medical doctors rather than a committee. The number of inappropriate referrals to primary hospitals indicated a need to mobilise and educate the community on the services available and protocols of care.

The competence and motivation of the health workers at health centres were affected by untimely payments including salary and other benefits, shortage of supplies and drugs, limited management skills, and budget shortages. Unavailability of key health workers, such as midwives and laboratory technicians, also affected the availability of services and completeness of care. In addition, the introduction of benefit packages based on profession rather than practice negatively affected motivation and teamwork at health centre level.

Decisions on referral cases should be a team effort. Not all the facilities had a referral team and referral focal person. Decision-making was also affected by the number of health workers available, caseload, assignment of medical doctors, and follow up by management. The functionality of the referral committee and focal person, and knowledge of the referral pathways determine the timely initiation, communication, documentation and follow up of referrals.

7.2.2 Transportation

Emergency medical transportation is a critical component of the referral system; delays in transportation determine the outcome of care at hospital level. Transporting the referred cases was a challenge. All the *woredas* visited had at least one ambulance for patient transportation. However, its availability was determined by the number of calls, who had called the driver, and other assignments given by the *woreda* health office. Ambulance management was generally poor, lacked a tracking system, and was negatively affected by confusion and lack of coordination between facilities. In addition, there were frequent breakdowns due to limited budget for maintenance and running costs. In several cases, public transport was an option if the client agreed. However, having ambulances available to some patients and sending others by public transport was a matter for discussion between the community members and the health centre

management. In some cases, health workers requested vehicles from the government offices and neighbouring *woredas*. The available ambulances were not well equipped for emergency management or well-staffed. In some *woredas*, emergency management technicians were assigned to each ambulance to provide the service while transporting the referred cases. However, health professionals at health centre level accompanied cases based on the caseload and type of referred cases. In general, due to the reporting line to the *woreda* rather than the hospital and no strong tracking system, ambulance management was poorly done to provide the service.

7.2.3 Receiving facility

The readiness of the hospital to receive the referred clients and provide quality care was an important component of the referral system. Service availability was challenged by the capacity of the hospital to have the necessary rooms and infrastructure, highly trained workforce, and supplies and laboratory reagents available. The number of cases visiting the hospitals also comprised quality of care. The reception of referred cases receiving preferential treatment based on previous knowledge of the sending facility and health workers, and communication between the sending and receiving facility was not well established due to logistics, documentation factors and patients coming alone. The study found that logistical problems such as power interruptions, non-functionality of equipment and tests and unavailability of blood banks or refrigerators affected the availability of services in the selected facilities.

Quality of maternal care depends on the quality of the labour monitoring and thus evidence-based care. However, partograph utilisation was not consistently practised. Admitted cases were not properly monitored because of the high caseload, limited supervision support, and the focus of follow up. In many cases, healthcare professionals tended to “treat charts” rather than promote evidence-based practices while providing care. The quality of practice was challenged by insecurity in the work environment but strengthened by good teamwork and available consultation support. Beyond providing services at hospital level, the primary hospitals failed to improve the capacity of health centres through mentorship support, communicating positive feedback on referrals and linking hospital level and health centre management structures.

7.2.4 Referral control and accountability

The respondents indicated that there was a referral system, but its implementation depended on the people involved, the use of performance indicators, follow up by management, and an accountability framework. Some of the selected facilities had started forming a multidisciplinary team to develop and improve the referral system, including ambulance and drug availability, patient-centred and friendly care, and regular assessment using the community scorecard programme. Health facility governing boards need to ensure required capacity, in terms of competence, service availability, budget and motivation of health workers at health centre level to minimise unnecessary referrals.

7.3 LIMITATIONS OF THE STUDY

The study was restricted to two primary hospitals and six health facilities in one region of Ethiopia therefore the findings cannot be generalised to other regions or the whole country. The researcher reviewed medical records to evaluate the completeness and outcome of care at the hospital level. The results may not be conclusive as some care may have been done, but not recorded. In addition, some cost items were programme related expenses and the costs may not be accurate.

7.4 RECOMMENDATIONS

Based on the findings, the researcher makes the following recommendations for practice and further research.

7.4.1 Practice

The recommendations for practice are presented under sending facility, transportation, receiving facility, and control and accountability.

7.4.1.1 *Sending facility*

Health centres are the first point of contact in Ethiopia's health system and should be capable of providing acceptable quality care. Quality care is affected by structure and process.

- *Structure*

The human resource distribution and availability require attention. The placement of health workers from *woredas* should be based on caseload and community level activities. Each health centre should have a minimum of three midwives. When health workers need to attend meetings/training and community level activities, temporary replacement workers should be available. This requires additional staff and meetings on site for management of emergencies.

Facility managers should motivate health workers and ensure payment of staff benefit packages. All managers must receive mandatory management training before assignment and attend regular mentorship programme sessions. Health workers' benefit packages, such as risk allowance, should be based on practice.

Each facility must appoint a referral focal person and referral committee to facilitate communication and promote teamwork among the multidisciplinary teams. The referral focal person must have the necessary equipment to facilitate communication, document experiences and organise a joint review of feedback on referrals. Each facility must have a copy of written guidelines on the role of the referral focal person in order to promote consistency in the absence of the focal person. Facility management must appoint a referral committee to improve the quality of referral decisions, promote teamwork and team accountability, and peer support.

Health facilities must ensure the availability of drugs, supplies and laboratory reagents and the implementation of the integrated pharmaceutical logistics system. Health centre governing boards must allocate resources for purchases from private companies, especially in emergencies.

- *Process*

A referral directory is an essential tool to ensure health workers know about the referral pathways. Each facility should have a referral directory placed in an area accessible to all health workers. The referral directory must be updated regularly. In the long term, developing a mobile application may be required.

Referral guidelines should be developed and maintained at health centres to facilitate decisions on referrals. All health workers should be trained in the use of these guidelines.

Simple job aids/algorithm to facilitate easy decision on referral cases should be developed and maintained at health centre levels. The knowledge and skills of the health workers on the appropriate use of them should be enhanced.

Pre-referral management is an important step in the care process. This step requires the availability of the necessary drugs and supplies to provide this service. Management should oversee complete pre-referral management.

Referral communication should be complete and based on agreed referral formats. It is also important to attach partographs for the cases which are in active labour phase. It is imperative to sensitise the health workers that decisions are based on the items captured in the partograph format.

7.4.1.2 *Transportation*

Emergency medical transportation is a critical component of the referral system. Accordingly, the researcher recommends the following:

- To improve availability, the study recommends at least two ambulances for each *woreda*: one to be directly managed by the hospital and the other by the *woreda* health office. The hospital ambulance should primarily transport cases between health centre and hospital and beyond. The *woreda* ambulance should primarily transport people from home to health centres.

- The recruitment of drivers should consider applicants' character as well as qualifications. Ambulance drivers need to be friendly, qualified, and able to provide patient-centred emergency transportation.
- Emergency teams or health workers should be available to accompany patients with the ambulance. This needs to be mandatory with a framework stating scope of work and accountability.
- Ambulances should be equipped with fully functioning essential lifesaving equipment.
- In the long-term, establishing a central call centre, perhaps at zone level, and installing GPS instruments in vehicles might enhance a pooled use of vehicles.

7.4.1.3 Receiving facility

In order to improve maternal and newborn care at the receiving facility, the study recommends the following:

- *Structure*

Hospital and health centre management should be responsible for and ensure the proper use of allocated budgets. Management should ensure efficient use of resources at hospital level. In addition, one-time logistics related problems should be addressed through community level resource mobilisation strategy.

Inappropriate referrals should be followed up and minimised in order to limit wastage and improve the capacity of health centres to provide the required basic services to the target population.

NICU services should be reorganised to ensure the rooms are separated with glass partitions and fitted with the required equipment that is functional all the time. Health workers and support staff should be trained in assembling and preventive maintenance.

The primary hospitals provide services to selected villages/*kebeles*, which may compromise or overload the referral system in some instances. Thus, the hospital should dedicate separate rooms (e.g., EmONC) for basic services to people coming from the direct catchment population.

Each hospital should have a liaison office staffed with three people working in three shifts. The liaison office staff should always be available, document referral-ins and referral-outs, and ensure feedback is provided to the health centres.

- *Process*

Emergency cases should receive priority when they reach hospitals. Preferential treatment should be avoided as that could affect the completeness of care. Different types of referral papers could be used to indicate the urgency of care since some cases may have been referred because of logistics related problems.

A referral audit is one of the tools to ensure appropriate clinical cases are attended by hospitals and communication between health centres and hospitals is guided objectively. A tool for audit can be adapted from the Robinson case classification for delivery management and NICU case classification.

Labour monitoring is a continuous process and should be considered an element of care that extends from health centres. Therefore, partographs should accompany referrals and health workers should be trained in the use and completion thereof as a priority. In addition, quality checks while using the tool may improve its appropriate use for evidence-based decisions in labour management. Focusing on senior midwives in the team should improve the culture of use when new staff join the team.

- *Outcome*

Documentation of the outcome of care is frequently omitted, especially in NICUs. To improve documentation, including for adverse outcomes, “blaming and shaming” should be avoided. Process-based performance indicators should be introduced and used.

7.4.1.4 Control and accountability framework

Health facility management should review referral appropriateness, planning and availability of quality care at the appropriate level.

The community scorecard programme should include issues related to referrals and the results of the score used to improve the health system. Facility level management should monitor performance standards about referral management and monitoring.

All health workers should know the referral communication protocols and formats, and appropriate timing and place for referrals.

The Ministry of Health should develop and issue key performance indicators. All health facilities should have these guidelines available and use them.

7.4.2 Further research

The researcher recommends that further research be conducted on the following topics:

- An examination of household and family costs due to inappropriate referrals and the economic benefits of managing inappropriate referrals
- The relationship between the overall performance of the health system and the appropriateness of referral
- The role of quality improvement networks in facilitating referral practices at lower levels of the Ethiopian health system.

7.5 CONCLUSION

This chapter outlined the findings and limitations of the study and made recommendations for practice and further research. The purpose of the study was to formulate strategies to improve maternal and newborn health care referrals in the health system in Ethiopia. The researcher developed strategies to improve maternal and newborn referrals based on the findings. The researcher will disseminate the findings in recognised scientific journals and presentations at regional and national forums.

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ANNEXURES

ANNEXURE 1: ETHICAL CLEARANCE CERTIFICATE FROM UNISA

Module/Degree Code (e.g. DPCHS04):
For which degree are you registered?

| | | | | | | |
|-------------------------------------------------------------|---|---|---|---|---|---|
| D | P | C | H | S | 0 | 4 |
| Doctor of Literature and Philosophy in Health Studies | | | | | | |

Group number:

Date tabled (dd-mm-yy)*:

Submission

*To be completed by the DHDC coordinator

DEPARTMENT OF HEALTH STUDIES

DEPARTMENTAL HIGHER DEGREES COMMITTEE: REPORT BY PROPOSAL REVIEWERS

Rev: 2

SECTION A PERSONAL INFORMATION

FULL NAME (CHRISTIAN NAME) AND SURNAME OF CANDIDATE

BINYAM FEKADU DESTA

THESIS/DISSERTATION TITLE

Strategies to improve maternal and new-born care referral systems in Ethiopia

NAME OF REFEREE(S)

1. Dr ES Janse van Rensburg
2.

SIGNATURE AND DATE

1.
2.

Rensburg

24/3/16

NB:

- Indicate by means of an "X" whether each of the following aspects relating to the research proposal tabled for ethical clearance is acceptably.

| | Reviewer 1 | Reviewer 2 |
|-------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| The study is relevant | Yes | |
| The inclusion and exclusion criteria is relevant to the context | Yes | |
| The objectives of the study will contribute to sound conclusions with the smallest possible exposure to risk for participants | Yes | |
| The study will contribute to the body of knowledge | Yes | |
| The researcher will be suitable pertaining to support, academic qualifications and facilities | Yes | |
| Sufficient measures is in place to protect the rights of the participants | Yes | |
| The number of participants to be recruited is adequate for the proposed study is adequate to support the study | Yes | |
| The study protects the participants right to privacy | Yes | |
| Participants medical aids will not be charged | Yes | |
| There will be no cost implication for participants | Yes | |
| Recruitment of participants will be in an ethical manner | Yes | |
| All rights of the participants will be adhered to | Yes | |
| All written information to the participant is submitted in the final version | Yes | |
| The written information is adequate and complete | Yes | |
| The application allow the participant time to give consent or not | Yes | |
| Will there be restrictions on the publication of results | No | |
| The statistical methods to be used is adequate | Yes | |

22 DECLARATION

Is the declaration ticked off as requested?

| | | | |
|-----|-------------------------------------|----|--------------------------|
| Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
|-----|-------------------------------------|----|--------------------------|

Is the declaration signed?

| | | | |
|-----|-------------------------------------|----|--------------------------|
| Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
|-----|-------------------------------------|----|--------------------------|

Any additional comments:

*

ANNEXURE 2: SUPPORT LETTER FOR THE STUDY



የደቡብ ብሄሮች ብሔረሰቦችና ሕዝቦች ክልላዊ
 መንግሥት ጤና ቢሮ
 South Nations Nationalities and People's Regional
 State Health Bureau

ቁጥር: *Pen48-240/10610*
 Ref. No
 ቀን: *26/03/2010*
 Date

- To**
- Sidama Zone Health Department, Hawassa
 - Bench Maji Zone Health Department, Mizan
 - Gamo Goffa Zone Health Department, Arba Minch
 - Gedio Zone Health Department, Dilla
 - Silte Zone Health Department, Worabe
 - Kaffa Zone Health Department, Bonga
 - Wolayita Zone Health Department, Sodo
 - Kembata Tembaro Zone Health Department, Durame
 - Hadiya Zone Health Department, Hossana
 - South Omo Zone Health Department, Jinka
 - Gurage Zone Health Department, Wolkite
 - Dawro Zone Health Department, Tereba
 - Sheka Zone Health Department, Masha
 - Segen area Zone Health Department, Segen
 - Yem Special Woreda Health Office, Foffa
 - Basketo Special Woreda Health Office, Laska
 - Halaba Special Woreda Health Office, Kulito

Sub: Research Support Request

Mr Binyam Fekadu Desta, a PHD student in University of South Africa (UNISA), has submitted a thesis proposal entitled “Strategies to improve maternal and newborn care referral system in Ethiopia” for SNNP Regional Health Research and Technology Transfer Process. His proposal was reviewed and approved by the ethical review board. This is thus to request your good office to support Mr. Binyam Fekadu to access medical records, administrative documents, health workers and other relevant bodies for the cause.

Thank you in advance for your cooperation with **Mr. Binyam Fekadu Desta** to conduct his research on the above title.

[Signature]
Emebet Mekonnen Fara
 የደቡብ ብሔረሰቦችና ሕዝቦች ክልላዊ
 ጤና ቢሮ ሂደት ሂሳብ ባለቤት
 Health research and technology
 transfer support process owner

- CC
- ❖ Health Research and Technology Transfer Process, Hawassa
 - ❖ Mr Binyam Fekadu Desta, Addis Ababa



| | | | | | | |
|--------|--------------|-------|----------|--------|-------------------------|---------------|
| ☒ 149 | ☎ {20-92-09} | Fax ☎ | 20-57-92 | E-mail | snnpd@telecom.net.et | Code 251-0462 |
| Awassa | {20-59-50} | | 20-59-55 | | snnpdpd@telecom.net.et | M.s |
| | {20-92-08} | | 20-54-09 | | snnpdhiv@telecom.net.et | |
| | {20-54-06} | | 12-44-85 | | | |
| | {20-02-32} | | | | | |

ANNEXURE 4: MEDICAL RECORD EXTRACTING SHEET

Questionnaire Number: _____

Name of Facility: _____

Background information

| | | | | | | | | |
|-------|-----------------------------------------------|-------------------------------|-------|--------------|--|-------|-----------------------------|-----------------------------|
| Q 1.1 | Zone | | Q.1.2 | Woreda | | Q 1.3 | Kebele | |
| Q 1.4 | Village/Gote | | Q.1.5 | House number | | Q 1.6 | Phone number | |
| Q 1.7 | Age (Years for adult and days for newborn) | ____ Years ____ days | Q.1.8 | Patient code | | Q.1.9 | Service providing case team | 1) Delivery room 2) NICU |

Summary of referral information

| | | | | | | | | |
|---------|--------------------------------------------------------------------------------------------------|-----------------|--------|---------------------------------------------------------------------|-----------------|---------------------------------------------------------------------|------------------------------------------------------------|-----------------|
| Q 2.1. | Was the case referred from another facility? | 1) Yes 2) NO | Q.2.2 | If the case is referred, what is the name of referring institution? | | Q.2.3 | Was the referring facility the first contact for the case? | 1) Yes 2) No |
| Q.2.4 | The approximate distance from the referring facility (hours of driving by public transport) | | | Data collectors estimate (-----) | Q.2.5 | Is there a referral slip attached to the file/recorded in the card? | 1) Yes 2) No | |
| Q.2.6 | Does the referral slip include what was done before referral? | | | 1) Yes 2) No | | | | |
| Q.2.7. | If it is written in the referral slip, list the type of investigation made before referral | | | | | | | |
| Q 2.8 | If it is written in the referral slip, list the type of treatments given/started before referral | | | | | | | |
| Q.2.9 | Did the referral use the ambulance from the sending facility? | 1) Yes 2) No | Q.2.10 | Was the referral accompanied by health professional? | 1) Yes 2) No | | | |
| Q. 2.11 | What was the reason for referral (as it is written on the referral slip or patient record/card) | | | | | | | |

Chief complaint of the case as documented by the hospital

| | | | | | |
|--------|-----------------|--|---------|---------------|--|
| Q. 3.1 | Chief complaint | | Q. 3.2. | Date of visit | |
|--------|-----------------|--|---------|---------------|--|

Description of the maternal case as presented to delivery ward

| | | | | | | | | |
|---------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------|------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----|
| Q 4.1 | Gravida | | Q.4.2 | Parity | | Q.4.3 | Number of ANC follow ups | |
| Q.4.4 | Where was she following ANC? | 1) In this hospital 2) In the referring facility 3) In the referring catchment health post 4) Other institution | | | | Q.4.5 | How long the client has taken iron in this current pregnancy? How long has the client taken iron ... pregnancy? | |
| Q.4.6 | Does the client have or has she had or had the following obstetrics problems? | Last Pregnancy (√) | Current pregnancy (√) | Q.4.7. | Does the client have or has she had the following medical condition? | Last Pregnancy (√) | Current Pregnancy (√) | |
| Q.4.6.a | Abortion | | | Q.4.7.a | Diabetic | | | |
| Q.4.6.b | Stillbirth | | | Q.4.7.b | Renal disease | | | |
| Q.4.6.c | Pre term | | | Q.4.7.c | Cardiac disease | | | |
| Q.4.6.d | Low birth weight | | | Q.4.7.d | Chronic HPN | | | |
| Q.4.6.e | Big baby | | | Q.4.7.e | Substance abuse | | | |
| Q.4.6.f | Preeclampsia/eclampsia | | | Q.4.7.f | Other medical conditions | | | |
| Q.4.6.g | Surgery on reproductive organ | | | Q.4.7.g | Other, Specify _____ | | | |
| Q.4.6.h | Vaginal bleeding | | | | | | | |
| Q.4.6.i | Multiple pregnancy | | | | | | | |
| Q.4.6.j | Other, Specify _____ | | | | | | | |
| Q.4.8 | Current investigation done and its result (put tick mark for the right answer) | Inside facility | Outside of this facility | 4.9 | Is there any problem identified from the test (put tick mark for the right answer) | Yes | No | |
| Q.4.8.a | HIV Test | | | Q.4.9.a | HIV test | | | |
| Q.4.8.b | Hepatitis | | | Q.4.9.b | Hepatitis | | | |
| Q.4.8.c | VDRL | | | Q.4.9.c | VDRL | | | |
| Q.4.8.d | RH Factor | | | Q.4.9.d | RH factor | | | |
| Q.4.8.e | Ultrasound | | | Q.4.9.e | Ultrasound | | | |
| Q.4.8.f | Urine analysis | | | Q.4.9.f | Urine analysis | | | |
| Q.4.8.g | HgB | | | Q.4.9.g | HgB | | | |
| Q.4.8.h | Other, Specify _____ | | | Q.4.9.h | Others, Specify _____ | | | |
| Q 4.10 | Vital signs at admission | T | | RR | | PR | | BP |
| Q.4.11 | Measurements taken at admission | Gestational age | | MUAC | | Ht | | Wt |
| Q.4.12 | Physical examination results | Pallor | 1) Yes 2) No 3) Not recorded | | Jaundice | 1) Yes 2) No 3) Not recorded | | |
| Q.4.13 | Abdominal examination at admission | Presentation | | | | Lie | | |

| | | | | | | | |
|--------|--------------------------|---------------------|--|---------|--|-------------------|--|
| Q.4.14 | Pelvic exam at admission | Cervical dilatation | | Station | | Moulding | |
| | | Vaginal discharge | | | | Ruptured membrane | |

Labour monitoring - Partograph records/labour monitoring and management

| | | | | | | | | |
|-------|---------------------------------------------------------------------------------|--------------------------|------|--------------------------------------------------------------------|------|-------------------------------------------------------------------|-------------------|-----------------|
| 5.1 | Is the partograph attached to the record/patient card? | 1) Yes 2) No 3) NA | 5.2 | Date of admission | | 5.3 | Time of admission | |
| 5.4 | Hours of ruptured membrane | | 5.5 | Foetal heart beats (<i>All records separated by comma</i>) | | | | |
| 5.6. | "Moulding" (Put number of "X" records) | | 5.7 | Liquor (all records) | | | | |
| 5.8 | Descent (all records) | | 5.9 | Cervical dilatation (<i>All records separated by comma</i>) | | | | |
| 5.10 | Number of contractions per 10 minutes (<i>All records separated by comma</i>) | | 5.11 | Duration of contractions (<i>All records separated by comma</i>) | | | | |
| 5.12 | Urine tests done (all records) | Acetone | | Protein | | Urine volume | | |
| 5.13 | Maternal vital signs (<i>All records separated by comma</i>) | BP | | T | | PR | | RR |
| 5.14. | Any problem identified during labour | | | | 5.15 | Any medicines for induction (dose and frequency) | | |
| 5.16 | Any medicine given to treat the mother while in labour (dose and frequency) | | | | 5.17 | In your opinion, does ?was the Partograph filled properly? | | 1) Yes 2) No |

Outcome of labour

| | | | | | | | | |
|-----|-----------------------|------------------------------------------------------------------------------------------------------|------|--------------------------|--|------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 6.1 | Date of delivery | | 6.2 | Time of delivery | | 6.3 | Mode of delivery | a) SVD b) C/S c) Forceps d) Vaccum e) Episiotomy f) Other procedure |
| 6.4 | Maternal status | 1) Stable 2) Unstable/deteriorated and referred to the next facility 3) Died | 6.5 | Obstetrics complications | | 6.5 | Obstetrics complications | 1) Pre-eclampsia 2) Eclampsia 3) APH 4) PPH 5) Other 6) Referred |
| 6.6 | Newborn birth outcome | 1) Alive 2) Stillbirth 3) Live birth, died before arrival 4) Live birth, died after arrival | 6.7 | APGAR score (1'/5' min) | | 6.8 | Sex of the newborn | 1) Male 2) Female |
| 6.9 | Height | | 6.10 | Weight | | 6.11 | Problem identified in the newborn | 1) Prematurity 2) Sepsis 3) Respiratory distrust/asphyxia 4) Low birth weight 5) Congenital malformation 6) Other specify |

| | | | | | | | |
|------|-----------------|-------------------------------------------------------------------|------|-------------------------|-----------------------------------------------------------|--|--|
| 6.12 | Treatment given | 1) Oxygen resuscitated 2) Resuscitated and survived 3) Died | 6.13 | Cause of death, if died | 1) Prematurity 2) Infection 3) Asphyxia 4) Other | | |
|------|-----------------|-------------------------------------------------------------------|------|-------------------------|-----------------------------------------------------------|--|--|

Newborn Intensive Care Unit service

| | | | | | | | | | |
|------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|--------------------------------------------------------------------------------------------------------------|-----|
| 7.1 | Date of birth and time | | 7.2 | Date of admission | | 7.3 | Mode of Delivery | a) SVD b) C/S c) Forceps d) Vaccum e) Episotomy f) Other procedure | |
| 7.4 | Sex | | 7.5 | Vital Signs at admission | Wt | | T | RR | AHR |
| 7.6 | Place of delivery | 1) Home delivery 2) Same facility 3) Referred from other facility | 7.7 | APGAR score (1'/5') | | 7.8 | Birth weight | | |
| 7.9 | Gestational age (wks) | | 7.10 | Maternal health condition | 1) HIV positive 2) Syphilis +ve 3) Hepatitis B+ve 4) Hepatitis C+ve 5) Dead 6) Other, Specify _____ | | | | |
| 7.11 | Major problems | 1) Prematurity 2) Low birth weight 3) Sepsis 4) Respiratory distress/asphyxia 5) Perinatal asphyxia 6) Congenital malformation 7) Other specify _____ | 7.12 | Management | 1) CPAP 2) Antibiotics 3) Anticonvelants 4) Phototherapy 5) Glucose 6) Oxygen 7) Blood transfusion 8) Incubator/thermal care 9) Other, Specify _____ | | | | |
| 7.13 | Discharge date and time | | 7.14 | Discharge weight | | 7.15 | Discharge status | 1) Recovered 2) Dead 3) Transferred 4) Other, Specify _____ | |
| 7.16 | Survived after resuscitation | 1) Yes 2) No | 7.17 | If died, (age in days) | | 7.18 | Cause of death | 1) Prematurity 2) Sepsis 3) Prenatal asphyxia 4) Congenital malformation 5) Other, specify _____ | |

Back referral

| | | | | | | | | |
|-----|-------------------------|-----------------|-----|------------------------------------|--|-----|----------------------------|---------------------------------------------------------------------------------|
| 8.1 | Any back referrals made | 1) Yes 2) No | 8.2 | If yes, name of receiving facility | | 8.3 | Type of receiving facility | a) HP b) HC c) Hospital d) Private facility e) Other, Specify _____ |
|-----|-------------------------|-----------------|-----|------------------------------------|--|-----|----------------------------|---------------------------------------------------------------------------------|

Conclusion/remark

| | | |
|-----|-------------------------------------------------------------------|-----------------|
| 9.1 | In your opinion, can this case be treated at health centre level? | 1) Yes 2) No |
|-----|-------------------------------------------------------------------|-----------------|

ANNEXURE 5: HEALTH SERVICE COSTING TOOL – NUMBER OF VISITS

Name of Facility: _____

Period of reporting: _____

| Activity | Total |
|----------------------------------------------------------------------------------------------------------------------------|-------|
| Access to Health Service | |
| Maternal, Neonatal, and Child Health | |
| Maternal Health | |
| Contraceptive acceptance rate | |
| Total new and repeat acceptors, disaggregated by age | |
| New acceptors by age | |
| Repeat acceptors by age | |
| Antenatal Care coverage –First visit | |
| Number of pregnant women that received antenatal care at least once | |
| Antenatal care coverage – four visits | |
| Number of pregnant women that received antenatal care: at least four visits | |
| Proportion of births attended by skilled health personnel | |
| Number of births attended by skilled health personnel | |
| Early Postnatal Care Coverage | |
| Number of women having given birth by caesarean section | |
| Number of women receiving comprehensive abortion care services | |
| Number of safe abortions performed | |
| Number of post abortion/emergency care | |
| Institutional maternal deaths | |
| Number of maternal deaths in health facility | |
| Still birth rate | |
| Number of still births | |
| Number of Live births | |
| PMTCT | |
| Percentage of pregnant and lactating women who were tested for HIV and who know their results | |
| Number of pregnant women tested and know their result during pregnancy | |
| Number of pregnant women tested and know their result during labour & delivery | |
| Number of women tested and know their result during the postpartum period | |
| Number of women tested positive for HIV | |
| Number of HIV Positive pregnant and lactating women who received ART at ANC+L&D+PNC for the first time based on option B+. | |
| Number of HIV positive pregnant and lactating women who received ARV prophylaxis | |
| Number of HIV-positive women who get pregnant while on ART and linked to ANC | |
| Number of HIV-positive women who get pregnant while on ART and linked to ANC | |

| Activity | Total |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Percentage of infants born to HIV infected women receiving a virologic test for HIV within 12 months of birth | |
| Percentage of Infants born to HIV-infected women started on co-trimoxazole prophylaxis within two months of birth | |
| Number of infants born to HIV positive women started on co-trimoxazole prophylaxis within two months of birth | |
| Percentage of infants born to HIV-infected women receiving antiretroviral (ARV) prophylaxis for prevention of mother-to-child transmission (PMTCT) | |
| Number of HIV exposed infants who received antiretroviral (ARV) prophylaxis at L&D and PNC | |
| Percentage of HIV exposed infants receiving HIV confirmatory (antibody test) test by 18 months | |
| Number of HIV exposed infants receiving HIV confirmatory (antibody test) by 18 months-whose test result is HIV positive | |
| Number of HIV exposed infants receiving HIV confirmatory (antibody test) by 18 months-whose test result is HIV negative | |
| Child Health | |
| Number of children under one year of age who have received BCG vaccine | |
| Number of children under one year of age who have received first dose of pentavalent vaccine | |
| Number of children under one year of age who have received third dose of pentavalent vaccine | |
| Number of children under one year of age who have received first dose of pneumococcal vaccine | |
| Number of children under one year of age who have received third dose of pneumococcal vaccine | |
| Number of children under one year of age who have received first dose of Rotavirus vaccine | |
| Number of children under one year of age who have received 2nd dose of Rotavirus vaccine | |
| Number of children under one year of age who have received measles vaccine | |
| Number of children received all vaccine doses before 1st birthday | |
| Number of Infants whose mothers had protective doses of TT against NNT (PAB) | |
| Number of children under one year of age who have received first dose of polio vaccine | |
| Number of children under one year of age who have received third dose of Polio vaccine | |
| Early institutional neonatal death | |
| Number of neonatal deaths in the first 24 hrs of life/institutional/ | |
| Number of neonatal deaths between 1 and 7 days of life/institutional/ | |
| Nutrition | |
| Percentage of Low birth weight newborns | |

| Activity | Total |
|---------------------------------------------------------------------------------------|--------------|
| Number of live-born babies with birth weight less than 2,500 g | |
| Total number of live births weighed | |
| Percentage of underweight Children aged <5 years (Growth Monitoring) | |
| Number of weights measured for children under 5yrs, by age | |
| Proportion of children 6 - 59 months with severe acute malnutrition | |
| Total Number of children screened for malnutrition | |
| Number of children screened and have sever acute malnutrition | |
| Treatment outcome for management of severe acute malnutrition in children 6-59 months | |
| Number of children recovered | |
| Number of children defaulted | |
| Number of children transferred | |
| Number of children died | |
| Total number of children who exit from severe acute malnutrition treatment | |
| Number of children aged 6-59 months supplemented with vitamin-A | |
| Prevention and Control of Diseases | |
| Communicable diseases | |
| HIV/AIDS | |
| Clients receiving HIV test results (at VCT) | |
| Clients testing positive for HIV (at VCT) | |
| Clients receiving HIV test results (at PICT) | |
| Clients testing positive for HIV (at PICT) | |
| Newly enrolled in pre-ART care | |
| Number of adults and children with HIV infection newly enrolled in Pre ART care | |
| HIV positive persons receiving co-trimoxazole prophylaxis | |
| Number of HIV positive persons receiving CTX prophylaxis | |
| Number of PLHIV ever started on ART | |
| Number of adults and children with advanced HIV infection ever started on ART | |
| Number of adults and children who are currently on ART | |
| Adults >= 15years: First Line Regimen | |
| Adults >= 15years: Adult Second Line Regimen | |
| < 1 year: First Line Regimen | |
| < 1 year: Second Line Regimen | |
| Children aged 1-4 years: First Line Regimen | |
| Children aged 1-4 years: Second Line Regimen | |
| Children aged 1-4 years: Third Line Regimen | |
| Children aged 5-14 years: First Line Regimen | |

| Activity | Total |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Children aged 5-14 years: Second Line Regimen | |
| Number of adults and children with HIV infection newly started on ART | |
| ART cohort alive and on ART (from ART facility cohort report) at 12 months (Survival on ART) | |
| Number of persons on original 1st line regimen, including those on alternate 1st line regimen and those on 2nd line regimen | |
| Number of persons on ART in the original cohort including those transferred in, minus those transferred out (net current cohort). | |
| Percentage of ART patients with an undetectable viral load at 12 month after initiation of ART | |
| Number of adult and pediatric patients with an undetectable viral load <1,000 copies/ml at 12 months | |
| Number of adults and children who initiated ART in the 12 months prior to the beginning of the reporting period with a viral load count at 12-month visit | |
| Proportion of clinically undernourished People Living with HIV (PLHIV) who received the therapeutic or supplementary food | |
| Number of clinically undernourished PLHIV that received therapeutic or supplementary food | |
| Clinically undernourished PLHIV who are on ART and received therapeutic or supplementary food | |
| Clinically undernourished PLHIV who are NOT on ART that received therapeutic or supplementary food | |
| Number of PLHIV that were nutritionally assessed and found to be clinically undernourished | |
| Number of HIV-positive adults and children Currently receiving clinical care | |
| Number of HIV positive adults and children who Currently receive clinical Service (clinical WHO staging or CD4 count or viral load) during the reporting period, by age and sex | |
| Number of newly enrolled HIV positive adults and children who received clinical Service (clinical WHO staging or CD4 count or viral load) during the reporting period, by age and sex | |
| Number of persons provided with post exposure prophylaxis (PEP) for risk of HIV infection | |
| Number of HIV infected women aged 15-49 reporting the use of any method of modern family planning | |
| Malaria | |
| Number of slides or RDT positive for malaria | |
| Total number of slides or RDT performed for malaria diagnosis | |
| Non-Communicable diseases | |
| Cervical cancer screening in women age 30 – 49 using VIA/PAP smear | |

| Activity | Total |
|----------------------------------------------------------------------------|--------------|
| Number of women age 30 – 49 screened once with VIA/PAP for cervical cancer | |
| Quality of health Services | |
| Number of outpatient visits | |
| Number of inpatient admissions | |
| Total Number of NICU | |
| Total number of Major OR | |

ANNEXURE 6: HEALTH SERVICE COSTING TOOL – COMMON ADMINISTRATIVE EXPENSES

Name of Facility: _____

Period of reporting: _____

| Account description | Code | Expenditure |
|------------------------------------------|-------------|-------------|
| Uniforms, clothing, bedding | 6211 | |
| Office supplies | 6212 | |
| Printing | 6213 | |
| Food | 6216 | |
| Fuel and lubricants | 6217 | |
| Other materials and supplies | 6218 | |
| Miscellaneous equipment | 6219 | |
| Per diem | 6231 | |
| Transport fees | 6232 | |
| Official entertainment | 6233 | |
| M/R of vehicles and other transport | 6241 | |
| M/R of aircraft and boats | 6242 | |
| M/R plant, machinery & equipment | 6243 | |
| M/R buildings, furnishing & fixtures | 6244 | |
| M/R of infrastructure | 6245 | |
| Contracted professional services | 6251 | |
| Rent | 6252 | |
| Advertising | 6253 | |
| Insurance | 6254 | |
| Freight | 6255 | |
| Fees and charges | 6256 | |
| Electricity charges | 6257 | |
| Telecommunication charges | 6258 | |
| Water and other utilities | 6259 | |
| Local training | 6271 | |
| External training | 6272 | |
| Stocks of food | 6281 | |
| Stocks of fuel | 6282 | |
| Other stocks | 6283 | |
| Purchase of vehicles/other transport | 6311 | |
| Purchase of aircraft, boats, etc. | 6312 | |
| Purchase of plant, machinery & equipment | 6313 | |

| Account description | Code | Expenditure |
|---------------------------------------------------|-------------|--------------------|
| Purchase of buildings, furnishing & fixtures | 6314 | |
| Purchase of livestock and transport animals | 6315 | |
| Subsidies, investments and grant payments | 6410 | |
| Grants, contributions & subsidies to institutions | 6412 | |
| Contributions to international organizations | 6414 | |
| Compensation to individuals and institutions | 6416 | |
| Grants and gratitude to individuals | 6417 | |
| Miscellaneous payments | 6419 | |
| TOTAL | | |

ANNEXURE 9: HEALTH SERVICE COSTING TOOL – DRUGS, SUPPLIES AND LABORATORY TESTS

Name of Facility: _____

Period of reporting: _____

Name of unit: _____

Section 1: Drugs

| Drug, Protocol, Dosage, Unit | % of cases requiring | Strength (unit per dose) | Frequency per day | Number of days | Total units - Low estimate | Total units - High Estimate | Weighted Average cost per treatment - Low Cost | Weighted Average cost per treatment - High Cost |
|------------------------------|----------------------|--------------------------|-------------------|----------------|----------------------------|-----------------------------|------------------------------------------------|-------------------------------------------------|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Section 2 Medical supply

| Supplies | % of cases requiring | Strength (unit per dose) | Frequency per day | Number of days | Total units - Low estimate | Total units - High Estimate | Weighted Average cost per treatment - Low Cost | Weighted Average cost per treatment - High Cost |
|----------|----------------------|--------------------------|-------------------|----------------|----------------------------|-----------------------------|------------------------------------------------|-------------------------------------------------|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Section 3: Laboratory tests

| Laboratory Test | % of cases requiring | Frequency per day | Number of days | Total units - Low estimate | Total units - High Estimate | Weighted Average cost per treatment - Low Cost | Weighted Average cost per treatment - High Cost |
|-----------------|----------------------|-------------------|----------------|----------------------------|-----------------------------|------------------------------------------------|-------------------------------------------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

ANNEXURE 10: QUALITATIVE – KEY INFORMANT INTERVIEW GUIDE

Introduction and Consent

My name is Binyam Fekadu and I am here to conduct an interview with you to understand the Ethiopian health system more. Your responses will be used by the Regional Health Bureau and FMOH and other relevant stakeholders to improve the referral system between health centres and primary hospitals.

As part this study we are collecting information through interviews from you and other participants, and you were selected to participate. We would very much appreciate your participation in this research. The interview usually takes about one (1) hour to complete. Whatever information you provide will be kept strictly confidential and will not be shown to other persons. Participation in this interview is also entirely on a voluntary basis and you can choose not to answer any individual questions or all the questions. We hope that you will participate fully in this assessment since your views are very important.

Do you have any questions? May I begin the interview now?

Verbal consent given by the interviewee, check box

Background information

(This section needs to be filled in by the interviewer before starting the questions.)

| | |
|-----------------------------------------------|----------------------------------------------------------------------------------|
| 1. Name of facility: | |
| 2. Type of health facility | Health Centre <input type="checkbox"/> Primary Hospital <input type="checkbox"/> |
| 3. Qualification | |
| 4. Position | |
| 5. How long has s/he worked in this position? | |
| 6. How long has s/he been in the facility? | |

Guiding questions

| Elements of the model | Key questions | Probes |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General | 1. What are the major responsibilities your facility is playing to ensure the community is getting the MNH related health services? | <ul style="list-style-type: none"> Type of services provided What are the common health problems/cases you are seeing? Comment on trends of cases; which cases are increasing in your catchment area? What are the major steps you follow while providing the care? Do you think you are providing the intended services you are expected to provide? If not, what are the major reasons |
| Structure | 2. Do you think your facility is well | <ul style="list-style-type: none"> Comments on physical structure |

| Elements of the model | Key questions | Probes |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | equipped to provide the service | <ul style="list-style-type: none"> • Catchment population • Human resources – number, mix and motivation • Budget and equipment • Availability of supplies and commodities |
| Structure | 3. How is your facility linked to other health facilities - at similar or other levels of care? | <ul style="list-style-type: none"> • Your relationship with the lower, same and higher-level public facilities • Your relationship with the private facilities • What are your responsibilities in these relationships? • What are the common areas of support you require from other facilities? Why? |
| Structure | 4. What kinds of role the facility management, district administration and community play to improve the referral system? | <ul style="list-style-type: none"> • What is expected from the management? • What has the management done so far? • Your relationship with Woreda/District Health Office • How are you collaborating with community and community structures? |
| Process | 5. What are the issues related to referrals in the health system? | <ul style="list-style-type: none"> • How do the referral pathways look? <ul style="list-style-type: none"> a. Is this pathway maintained? Why? • What are the common reasons for referral? • Who decides about the referral? • What are the common requirements you fulfil before referrals? • Communication with the referred case and receiving facility • How is the documentation done? Who is responsible? • How is feedback/back referral done? <ul style="list-style-type: none"> a. Who is providing feedback? Who follows it up? b. What common feedback have you received? c. What have you done to improve on the feedbacks? • Do you think the referred cases are appropriate? |
| Process | 6. What are the major problems referred cases are facing? | <ul style="list-style-type: none"> • Completeness of care at sending facility - What would you have preferred to do? Why? <ul style="list-style-type: none"> a. History taking b. Routine follow up c. Investigation • Completeness of care at receiving facility - What would you have preferred to do? <ul style="list-style-type: none"> a. History taking b. Routine follow up c. Investigation • Health worker related issues • Socio-economic factors - at household and community levels • Transportation facility • Travel time |
| Outcome | 7. Do you think the referred cases are satisfied with the care you are providing? | <ul style="list-style-type: none"> • What would you do differently for referred cases? • What satisfies them? • What have you done to improve the services and increase your patients' satisfaction? • How do you monitor their satisfaction? • Do you have any satisfaction assessment done for the mothers coming for themselves or their newborn care? Can you share the report with us? • Are you satisfied with the outcome of services? Why? |

| Elements of the model | Key questions | Probes |
|------------------------------|-----------------------------------------------|---------------|
| General | 8. Do you have anything that you wish to add? | |

Thank you very much for your time

ANNEXURE 11: LETTER FROM THE LANGUAGE EDITOR

Cell/Mobile: 073-782-3923

53 Glover Avenue
Doringkloof
0157 Centurion

13 December 2019

TO WHOM IT MAY CONCERN

I hereby certify that I have edited Binyam Fekadu Desta's doctoral dissertation, **Strategies to improve maternal and newborn care referral systems**, for language and content.

IM Cooper

Iauma M Cooper
192-290-4