

**Barriers to Access to Comprehensive Emergency  
Obstetric and Newborn Health (CEmONC) among  
Emergency Referral Cases from Selected 16 Primary  
Health Care Units in Ethiopia: Obstetric Complication and  
Referral Audit and Learnings from Women’s Experiences**



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## Acronyms

ANC	Antenatal Care
APH	Antepartum Haemorrhage
BEmONC	Basic Emergency Obstetric and Newborn Care
C/S	Caesarian Section
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
EmONC	Emergency Obstetric and Newborn Care
FMoH	Federal Ministry of Health
HDA	Health Development Army
HEW	Health Extension Worker
ICU	Intensive Care Unit
JSI	JSI Research and Training Institute Inc.
L10K	The Last Ten Kilometers Project
MDG	Millennium Development Program
MMR	Maternal Mortality Ratio
PHCU	Primary Health Care Unit
PNC	Postnatal Care
PPH	Postpartum Haemorrhage
SD	Standard Deviation
SMM	Severe Maternal Morbidities
SNNP	Southern Nations, Nationalities and People's region
SVD	Spontaneous Vaginal Deliveries
WHO	World Health Organization

## Abstract

Most maternal complications that account for nearly three-quarters of maternal deaths can be averted by the early recognition of obstetric complications, use of appropriate emergency referral procedures, and by providing timely and adequate care. However, many women still face challenges in timely accessing life-saving emergency obstetric interventions. Documenting the experience of mothers with complications of receiving emergency care helps to explore the barriers to access care. Thus, this obstetric complication and referral audit study was conducted to explore barriers to the access to CEmONC at 16 referral hospitals that serve as the referral sites for the referral PHCUs where L10K has been implementing its referral innovations. Data were collected through hospital records review and follow-up interview of complication survivors in their respective communities.

A total of 56 complicated cases were identified from referral hospitals that were referred from intervention PHCUs during April-June 2015. About two-thirds (n=38) of them were severe maternal morbidities (i.e., 37 near-miss cases and one maternal death) and one-third (n=18) of them were high-risk complications. Obstructed/prolonged labor was the leading cause of complication followed by hemorrhage. It was also found out that obstetric hemorrhage was the major underlying cause of complication and anemia and prolonged/obstructed labor were the major contributory factors for the complications.

A significant proportion of mothers was located far from an hour walking distance to ambulance access point. Delayed recognition of complications and transport problem including the long ambulance waiting were still the major challenge to seek and reach timely care. The second delay, delay in reaching care, found to be the most important factor contributing to delay in accessing EmONC care in this study. We also found that the median time of stay at the health center was two hours; this meant that majority of the women did not receive definitive care at the health centers, indicating that mothers were delayed at health centers. Delay in receiving care was also found to be high in this study, particularly at health centers.

Frequency and content of ANC consultations need focus to identify and treat pre-existing conditions like anemia which are the major contributing factor for complications. Ambulance prioritization mechanism for emergency cases needs to be instituted at health centers to address the first and second delays. Care at the health center needs to be improved to avoid unnecessary delays. Moreover, detailed investigation of the appropriateness of care provided at health centers would help identify areas for improvement in the referral system. Initiating referral audit for complicated cases would also help to improve the practice of early referral to health centers.

## **Acknowledgement**

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We would like to acknowledge our colleagues for their contributions to all the steps of organizing and implementing the survey. We acknowledge the interviewers and the supervisors for their hard work, dedication, and for accomplishing the field work on schedule.

Finally, we take this opportunity to extend our gratitude to all study participants who took their time to respond to the survey questionnaires and provide us with valuable information.

## Background

The maternal mortality ratio (MMR) of Ethiopia is among the highest in the world; which is 497 per 100,000 live births; well above the Millennium Development Goal (MDG) 5 target of 267 maternal deaths per 100,000 live births to be achieved by 2015[1]. The neonatal mortality rate currently stands at 29 deaths per 1,000 live births and accounts for 43% of all under-five mortality[2].

Most maternal and neonatal critical conditions that lead to deaths take place during delivery and within 48 hours from childbirth. The major complications that account for nearly three-quarters of all maternal deaths are the following: severe bleeding, pregnancy induced hypertension, severe pre-eclampsia, eclampsia, infection, obstructed labor and abortion complications [3]. The majority of these causes of maternal death can be averted by the early recognition of obstetric complications, use of appropriate emergency referral procedures, and by providing timely and adequate care [4]. However, many women still face challenges in timely accessing life-saving emergency obstetric interventions (EmONC)<sup>1</sup>. The “three delays”- delay in deciding to seek care, delay in reaching care, and delay in receiving adequate care during life-threatening conditions is one of the contributing factors of high maternal mortality [5, 6].

Access to and utilization of proven interventions to reduce maternal and newborn death is low in Ethiopia; mainly due to socio-cultural factors, a limited number of skilled staff, a limited number of well-equipped and well-functioning facilities, low quality of care, and weak referral system [7]. To speed up the progress towards reducing both maternal and neonatal mortality, the Federal Ministry of Health (FMoH) has been taking efforts to expand access to basic EmONC (BEmONC) care and establish referral systems for medical emergencies in rural Ethiopia. Major national efforts to improve maternal mortality currently include mobilizing communities to encourage pregnant mothers to give birth in health facilities; creating effective supportive and referral linkages within the primary health care units; staffing health centers with midwives to ensure continuous availability of BEmONC services, and the provision of ambulances to woredas to mitigate transportation barriers [8].

FMoH has introduced a three-tier health care delivery system to systematically address the health care needs of the population. The first tier, which is the Primary Health Care Unit (PHCU), comprised of a primary hospital (with population coverage of 60,000-100,000 people), health centers (15,000-25,000 people) and five satellite health posts (3,000-5,000 population). All of these facilities are connected through referral. Health centers and primary hospitals are expected to provide BEmONC and Comprehensive EmONC (CEmONC) care, respectively. Complicated cases including uterine rupture, severe pre-eclampsia/eclampsia, ectopic pregnancies, and so on

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<sup>1</sup> Basic EmONC (BEmONC) services are set of life-saving functions such as the administration of antibiotics, oxytocic drugs, and anticonvulsants, as well as manual removal of retained placentas, removal of retained products of conception, assisted vaginal delivery, and neonatal resuscitation while comprehensive EmONC (CEmONC) services additionally include blood transfusion and obstetric surgery.

that need blood transfusion and surgical care would be referred to primary hospitals. In cases of primary hospitals are not present, CEmONC referral sites for the PHCUs are zonal or regional hospitals.

To demonstrate innovative approaches to strengthening referral systems and refining those approaches for adoption and scaling across the country, The Last Ten Kilometers Project (L10K), JSI Research & Training Institute, Inc., has been implementing *effective care seeking and referral solutions* to improve care-seeking behavior and response for critical maternal and newborn conditions in 32 rural PHCUs of Ethiopia. During phase 1, i.e., October 2012 – September 2013, L10K's referral solutions initiative has been focused on eight PHCUs in eight woredas. During phase 2, i.e., October 2013 – September 2014, L10K's referral activities has spread to another eight PHCUs in eight woredas. In the third phase, (October 2014-September 2015), it has spread to another 16 PHCUs in 16 phase 1 and 2 woredas. The core interventions that L10K uses are a three-step change process-1) assesses local context and available referral resources, 2) use that information in the participatory design of innovations to strengthen the referral system, and 3) implement the active management of the referral system.

Women experience a wide range of clinical conditions during pregnancy, childbirth and postpartum ranging from a healthy pregnancy to extreme of maternal death. The maternal deaths are the tip of the iceberg, and many more women are estimated to suffer pregnancy-related illnesses, near-miss events<sup>2</sup>, and other potentially devastating consequences after birth [9]. Documenting the experience of mothers with severe morbidities of receiving emergency care helps explore the barriers to access and quality of care. Moreover, identifying the dynamics associated with states of maternal morbidity and the delays that occur in the sequence of the obstetric care provided at each level of the health system will help to design evidence and context based interventions to avert these life-threatening complications. Thus, we conducted audits of obstetric complications in 16 referral hospitals that serve as the referral sites for the referral PHCUs where L10K has been implementing its referral innovations to explore barriers to the access to CEmONC.

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<sup>2</sup> A range of life-threatening clinical conditions including diseases that can threaten a women's life during pregnancy, childbirth or within 42 days of termination of pregnancy

## Objectives

1. Investigate women's experiences of obstetric complications of pregnancy
2. Identify the causes of the three delays
3. Explore the quality of care provided at health center and hospital level
4. Assess the referral process of women with obstetric complications

## Methods

**Study Area and Population:** L10K has been implementing referral initiatives in 32 PHCUs and its referral hospitals, eight in each of Amhara, Oromia, Southern Nations, Nationalities and People's region (SNNP) and Tigray regions in 16 districts. This study was conducted in the 16 referral hospitals that serve as referral sites for the 16 referral PHCUs where L10K has been implementing referral innovations since October 2012 (Table 1).

The study domains were women who were referred from the catchment areas of the PHCUs to hospitals with obstetric complications during pregnancy, delivery or within 42 days after termination of pregnancy and managed at these referral hospitals during April to June 2015.

**Table 1: List of health centers and its referral hospitals included in this study, July 2015**

Region	Zone	Woreda	Health center	Referral hospitals
Amhara	East Gojjam	Baso Liben	Yejube	Debre Markos referral hospital
Amhara	North Gondar	Gondar Zuria	Maksegnit	Gondar university hospital
Amhara	North Shoa	Baso Worena	Keyt	Debre Birhan referral hospital
Amhara	West Gojjam	Burie Zuria	Alefa	Finote Selam district hospital
Oromia	East Wollega	Limu	Gelila	Gida Ayana district hospital
Oromia	Illuababora	Chora	Kumbabe	Bedele district Hospital
Oromia	Jimma	Shabe Sombo	Shebe	Jimma university hospital
Oromia	West Wollega	Mana Sibru	Mendi	Nedjo district hospital
SNNP	Bench Maji	Sheko	Sheko	Mizan Aman general hospital
SNNP	Gedio	Wonago	Wonago	Dilla university hospital
SNNP	Kafa	Gimbo	Uffa	Gebretsadik Shewo general hospital
SNNP	Silite	Dalocha	Dalocha	Worabe comprehensive specialized hospital
Tigray	Central	Tahtay Maychew	Wukromaray	Axum referral hospital
Tigray	North West	Laelay Adiabo	Adidaero	Sehul (Shire) district hospital
Tigray	South East	Samre Sehart	Gijet	Ayder specialized hospital
Tigray	Southern	Ofla	Hashenge	Lemlem Karl district hospital

**Study Design:** A cross-sectional obstetric complication and referral audit study was conducted in selected 16 referral solutions intervention PHCUs and its referral hospitals. It was conducted in light of 'three delays' and quality of care to explore barriers in the access to CEmONC at selected referral hospitals that serve as the referral sites for the 16 PHCUs.

**Data collection:** A total of 133 maternal cases that reside in the catchment areas of the intervention PHCUs were identified through record review at referral hospitals during April-June 2015. Of which 55 of them were life-threatening complications, one was maternal death, and the remaining were normal deliveries.

First, obstetric emergencies referred from the catchment areas of the 16 PHCUs were identified from hospital records. This was done through identification of cases referred from the referral PHCUs using patient addresses and reviewing their history to identify the types of obstetric complications, their treatment, and outcomes. Then, a retrospective follow-up study was employed to interview survivors from obstetric complication in their respective communities. This was conducted at the homes of women who had obstetric complications, referred to hospitals, and survived a complication with the aim to assess the woman's experience of at the referral hospital, the effectiveness of referral system, pre-referral treatment, and treatments at the referring units. The addresses of the survivors were obtained from the medical records and a local guide was used to help the interviewers guide to the homes of the woman.

Data collectors who had prior experience of data collection in maternal and child health surveys, and have good knowledge of the health system were employed. The data collectors were trained for three days with one day dedicated to field training to test the actual data collection. Data were collected by using an android mobile application SurveyCTO<sup>3</sup> collect. This platform allowed data quality assurance through ensuring appropriate skip patterns during the interview and allowing only entering logical values. Data were entered into the cloud using android phones. The data collection was conducted in July 2015. The data were daily revised by survey coordinators and uploaded to the server.

Data were collected through interview of obstetric complication survivors and through review of hospital records. Socio-demographic characteristics (age, parity, educational status, and marital status), obstetric history, Antenatal Care (ANC) attendance, pregnancy outcomes, and the levels of delay in care-seeking, reaching facilities and receiving care were collected through interviewing mothers. On the other hand, type of obstetric complications and life-threatening conditions, admission to Intensive Care Unit (ICU), and underlying and contributory conditions of complications were collected by reviewing medical records.

**Measurements:** The obstetric complications included in this study were: hemorrhage (antepartum and postpartum), prolonged and obstructed labor, postpartum sepsis, complications of abortion, severe pre-eclampsia, eclampsia, and ruptured uterus. Potentially life-threatening conditions (near-miss cases) were identified using a set of World Health Organization (WHO) clinical, laboratory, and management-based criteria (See box 1). Near-miss women are defined as those women who nearly died but survived life-threatening conditions that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy [10]. Severe Post-partum Haemorrhage

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<sup>3</sup> <http://www.surveyccto.com/index.html>

**Box 1: Inclusion criteria for near-miss Severe maternal complications**

- Severe postpartum haemorrhage
- Severe pre-eclampsia
- Eclampsia
- Sepsis or severe systemic infection
- Ruptured uterus

**Critical interventions or ICU use**

- Admission to ICU
- Interventional radiology
- Laparotomy
- Use of blood products

**Life-threatening conditions**

- Cardiovascular dysfunction
- Respiratory dysfunction
- Renal dysfunction
- Coagulation/hematologic dysfunction
- Hepatic dysfunction
- Neurologic dysfunction
- Uterine dysfunction / Hysterectomy

**Maternal vital status**

- Maternal death

(PPH), severe pre-eclampsia, eclampsia, sepsis, and ruptured uterus cases and those who took critical interventions or admitted to ICU or cases with organ dysfunctions were taken as *maternal near miss*. Maternal near misses and maternal deaths were defined as *severe maternal morbidities*. On the other hand, abortion complications, prolonged/obstructed labor and Antepartum Haemorrhage (APH) cases that did not have organ dysfunction and not admitted to ICU or did not receive critical interventions were taken as *high-risk complications* [11]. This study used instruments developed by WHO to standardize the definition of cases of severe maternal morbidity and near miss[10].

This study also explored the status of the three delays. The first delay was defined as the interval between recognition of the complication to starting travel to the facility to seek care. Likewise, the second delay (i.e., time in arrival at the facility) was defined as the interval between starting travel to the facility and reaching it (i.e., time needed for acquiring transport included) and the third delay (i.e., time in receiving treatment) was the interval between reaching the facility and the time the treatment was received [11]. The mother's response to seeking care or receiving care immediately was taken as five minutes.

**Data Analysis:** Data were edited; open-ended responses were recoded into categorical variables where necessary and analyzed using Stata software. Descriptive statistics was used to analyze the type of complications, underlying and associated conditions, care-seeking, referral practice, and maternal and perinatal care.

**Ethical clearance:** Ethical clearance was obtained from ethical review committees of the respective regional health bureaus. All the study participants were informed about the purpose of the study and their right to opt out or to respond to questions. Informed verbal consent was obtained prior to interviewing any study subject. The values, rights, and norms of the study subjects, the community, enumerators and supervisors were respected.

## Results

### Socio-demographic characteristics

As presented in Table 2, most of the mothers were a rural residence (82%) and the median distance to the ambulance access point was 30 minutes walking distance. About one-fifth of the mothers was resided beyond an hour walking distance from the ambulance access points. More than one-third of mothers had no education. The majority of mothers were with the age range of 20-34 years and the mean age was 26 years.

**Table 2: Socio-demographic characteristics of mothers with obstetric complications, July 2015**

Characteristics	Number	Percent
<b>Region (n=56)</b>		
Amhara	19	33.9
Oromia	10	17.9
SNNP	13	23.2
Tigray	14	25.0
<b>Residence (n=55)</b>		
Rural	45	81.8
Urban	10	18.2
<b>Age (n=56)</b>		
< 20 years	3	5.4
20-34 years	47	83.9
35+ years	6	10.7
Mean $\pm$ SD	26.2 $\pm$ 5.7	
Range	18-40	
<b>Marital status (n=55)</b>		
Married	51	92.7
Not in union	4	7.3
<b>Educational status (n=55)</b>	n=55	
No education	20	36.4
Primary education	24	43.6
Secondary+ education	11	20.0
<b>Religion (n=55)</b>		
Orthodox	33	60.0
Protestant	12	21.8
Muslim	10	18.2
<b>Occupation (n=55)</b>		
Farmer	20	36.3
Housewife	26	47.3
Office worker	4	7.3

Merchant	5	9.1
<b>Distance to ambulance access point (waking distance in minutes)</b>		
Within 60 minutes	44	80.0
Beyond 60 minutes	11	20.0
Median	30	
Range	0-240	

### Reproductive and obstetric history

The mean gravidity of mothers at admission to hospital was 3.3 and most mothers (79%) were term at admission. About 89% and 57% of mothers received, at least, one ANC and four ANC care during pregnancy, respectively. About 40% delivered by caesarean section (C/S), 46% of them delivered with spontaneous vaginal deliveries (SVD), and one mother died still pregnant. Seventy-nine percent of pregnancies ended with live birth, 11% stillbirths and 9% abortion. Nearly one-third (29%) of them received Postnatal Care (PNC) after discharge (Table 3).

**Table 3: Reproductive and obstetric history of mothers with obstetric complications, July 2015**

Characteristics	Number	Percent
<b>Gravidity at admission (n=56)</b>		
1	23	41.1
2	9	16.1
3	3	5.4
4	3	5.4
5	6	10.7
6+	12	21.4
Mean gravidity	3.3	
Range	1-10	
<b>Gestational age at admission (n=56)</b>		
< 32 weeks	8	14.3
32- 37 weeks	16	28.6
37+ weeks	32	57.1
<b>Antenatal care at least once (n=56)</b>		
Yes	49	89.1
No	6	10.9
Mean number of ANC visits	3.9	
<b>ANC4+ visits (n=49)</b>		
Yes	28	57.1
No	19	38.8
Unknown	2	4.1
<b>Final mode of delivery (n=56)</b>		
Spontaneous vaginal delivery	26	46.4
Assisted vaginal delivery	4	7.1
Caesarian section	19	33.9

Medical methods for uterine evacuation	5	8.9
Laparotomy	1	1.8
Women died still pregnant	1	1.8
<b>Main attendant at birth (n=56)</b>		
Gynecologist/obstetrician	20	35.7
Integrated emergency obstetrics surgeon (IEOS)	6	10.7
Midwife	19	33.9
General practitioner	5	8.9
TBA/relative	4	7.1
Self with on assistant	1	1.8
Died still pregnant	1	1.8
<b>Outcome of pregnancy (n=56)</b>		
Not delivered	1	1.8
Live birth	44	78.6
Stillbirth	6	10.7
Abortion	5	8.9
<b>PNC care (n=55)</b>		
Yes	16	29.1
No	39	70.9

### Obstetric complications, admission to ICU, and underlying factors for complication/death

According to the WHO criteria, a total of 37 near miss cases, one maternal death, and 18 high-risk complication cases were identified from hospital registers. This meant that the mortality index was 2.6%--i.e., for every 37 near-miss cases there was one maternal death. About two-thirds (n=38) of the cases were severe maternal morbidities (SMM) (i.e., 37 near miss cases and one maternal death).

Obstructed or prolonged labor was the leading cause of complication (45%) followed by postpartum hemorrhage (16%). Obstetric hemorrhage was the major underlying cause of complication/death. Overall, one-fifth of the cases was admitted to ICU. One-third of SMM was admitted to ICU, 11% used blood products, and 5% had a laparotomy. Cardiac and hepatic dysfunction were observed in 4 (7%) of the mothers. Anemia and prolonged/obstructed labor were the major contributory factors for SMM.

**Table 4: Obstetric complications, admission to ICU and underlying factors for complication/ death, July 2015**

Characteristics	SMM (n=38)	High-risk complication (n=18)	Total (n=56)
	n (%)	n (%)	n (%)
<b>Obstetric complications</b>			
Abortion complication	1(2.6)	4(22.2)	5(8.9)

APH	2(5.3)	4(22.2)	5(8.9)
Prolonged or obstructed labor	14(36.8)	10(55.6)	25(44.6)
PPH	9(23.7)		9(16.1)
Severe pre-eclampsia	5(13.2)		5(8.9)
Eclampsia	1(2.6)		1(1.8)
Sepsis or severe systemic infection	5(13.2)		5(8.9)
Ruptured uterus	1(2.6)		1(1.8)
<b>Critical interventions or admissions to ICU</b>			
Admitted to ICU	11(28.9)		11(19.6)
Use of blood products	4(10.5)		4(7.1)
Laparotomy (includes hysterectomy)	2(5.3)		2(3.6)
Not admitted to ICU	21(55.3)		21(37.5)
<b>Organ dysfunction / life-threatening conditions</b>			
No organ dysfunction	25(65.8)	18 (100.0)	41(65.8)
Cardiac dysfunction	3(7.9)		3(7.9)
Hepatic dysfunction	1(2.6)		1(2.6)
No data	9(23.7)		11(23.7)
<b>Underlying cause of complication present</b>			
Pregnancy with abortive outcome	1(2.6)	4(22.2)	5(8.9)
Obstetric haemorrhage	13(34.2)	5(27.8)	18(32.1)
Hypertensive disorders	4(10.5)	0(0.0)	4(7.1)
Pregnancy-related infection	4(10.5)	0(0.0)	4(7.1)
Other obstetric disease or complication	5(10.5)	3(16.7)	8(14.3)
Medical/surgical/mental disease or complication	2(5.3)	0(0.0)	2(3.6)
Unanticipated complications of management	0(0.0)	0(0.0)	0(0.0)
Coincidental conditions	0(0.0)	0(0.0)	1(1.8)
Unknown	0(0.0)	1(5.6)	1(1.8)
<b>Contributory/associated conditions present</b>			
Anemia	9(23.7)	1(5.6)	10(17.9)
Prolonged/obstructed labour	17(44.7)	9(50.0)	26(46.4)
Malaria	1(2.6)	0(0.0)	1(1.8)

### Referral process

A hospital record review showed that 77% of obstetric complications (82% among SMM versus 67% among high-risk complications) had evidence of referral from health centers. According to the referral evidence found at the hospital, about half of the cases were escorted during transfer to

hospital, 84% used an ambulance, for 21% of cases advance call made to inform hospitals, and more than 90% of them were sent with referral slip. Use of ambulance and call ahead to inform hospitals were significantly higher among SMM cases than high-risk complication cases (*Fisher's exact=0.013 and 0.035, respectively*). However, there was no significant difference in escorting and use of referral slip among SMM and high-risk cases.

The main reasons for referral from the health center to the hospital were the absence of definitive treatment (61%) and the protocols say refer (44%). More than half of the cases received some sort of medical treatment at the health center prior to referral to hospital. The pre-referral treatment given to the mother included IV fluids (51%) and antibiotics (16%). However, about a quarter of mothers did not receive pre-referral treatment and none of the five pre-eclampsia/eclampsia cases referred was received MgSO<sub>4</sub> as a pre-referral treatment. More than one-third of mothers did not receive transfer care; but, about half of mothers received IV fluids on the way to the hospital (Table 5).

**Table 5: Adherence to aspects of referral protocols, pre-referral management, and transfer care of mothers with obstetric complication, July 2015**

Characteristics	SMM (n=38)	High risk complication	Total (n=56)
	n (%)	n (%)	n (%)
<b>Referral status (to hospital)</b>	<b>n=38</b>	<b>n=18</b>	<b>n=56</b>
No sign of referral/Self-referred	7(18.4)	6(33.3)	13(23.2)
Referred from HC	31(81.6)	12(66.7)	43(76.8)
<b>Referral processes (n=43)</b>	<b>n=31</b>	<b>n=12</b>	<b>n=43</b>
Escorted	16(51.6)	5(41.7)	21(48.8)
Sent with referral slip	30(96.8)	10(83.3)	40(93.0)
Arrived with ambulance/sector vehicle	29(93.6)*	7(58.3)	36(83.7)
Someone called ahead to inform the hospital	9(29.0)*	1(8.3)	9(20.9)
<b>Types of written notice sent with the patient (n=40)</b>	<b>n=30</b>	<b>n=10</b>	<b>n=40</b>
What had been given and what procedures had been done	21(70)	6 (60.0)	27(67.5)
Reason for referral	30(100)	10 (100.0)	40(100)
Patient's history	22(73.3)	9 (90.0)	5(12.5)
<b>Reason for referral</b>	<b>n=31</b>	<b>n=12</b>	<b>n=43</b>
Definitive treatment not available	19(61.3)	7(58.3)	26(60.5)
Guidelines/protocols say refer	17(44.7)	2(16.7)	19(44.2)
Drugs not available	0(0)	0(0)	0(0)
Equipment not available	1(3.2)	1 (8.3)	2(4.7)
Provider absent	0(0)	0(0)	0(0)
Staff not trained to treat	1(3.2)	0(0)	1(2.3)
Other	1(3.2)	1 (8.3)	2(4.7)
No data	2(6.5)	1 (8.3)	3(7)

<b>Receive some sort of medical treatment before referral at health center</b>		<b>n=12</b>	
	<b>n=27</b>		<b>n=39</b>
Yes	17(63)	6 (50)	23(59)
No	10(37)	6 (50)	16(41)
<b>Pre-referral treatments/procedures given for the mother at referring facility</b>		<b>n=12</b>	
	<b>n=31</b>		<b>n=43</b>
No pre-referral treatment given	9(29)	1(8.3)	10(23.3)
IV fluids for resuscitation	17(54.8)	5(41.7)	22(51.2)
Antibiotics	6(19.4)	1(8.3)	7(16.3)
Uterotonics	2(6.5)	0(0)	2(4.7)
Anticonvulsants (MgSO <sub>4</sub> )	0(0)	0(0)	0(0)
Antihypertensives	1(3.2)	0(0)	1(2.3)
Removal of retained products	1(3.2)	0(0)	1(2.3)
No data	4(12.9)	5(41.7)	9(20.9)
<b>Transfer care to hospital</b>	<b>n=27</b>	<b>n=12</b>	<b>n=39</b>
No care received	10(37.0)	4(33.3)	14(35.9)
IV line opened	13(48.1)	7(58.3)	20(51.3)
Drugs given	4(14.8)	2(16.7)	6(15.4)
Monitor condition	7(25.9)	1(8.3)	8(20.5)
Thermal protection	0(0)	0(0)	0(0.0)
Emotional support provided	4(14.8)	1(8.3)	5(12.8)
Positioning	0(0)	0(0)	0(0)
Other (left with no referral)	1(3.7)	0(0)	1(2.6)

\*P-value<0.05

## Care-seeking, reaching facility and receiving care

### Seeking care

More than two-thirds (70%) of mothers seek care at the health center or health post first and one-fifth of them went directly to the hospital. More proportion of SMM cases visited lower level facilities mainly health centers first before visiting hospitals than high-risk cases. The main reasons mentioned to seek care at health center first were proximity (85%), while; the main reasons to go directly to hospital were confidence on providers' care and knowledge (44%), good supply of medicines (38%), referred by other facility (38%), affordable cost (38%), and respectful care (25%).

Two-thirds of mothers seek care immediately after recognition of complications. The median time taken from recognition of complication and start travel to seek care was 5 minutes ranging from 5 minutes to 8 hours. Not recognizing danger signs timely and lack of transport were the major reasons cited for delayed care seeking. Less than half of them (65% of SMM and 17% of high-risk complications) used an ambulance to seek care. The median time to get ambulance was 20 minutes ranging from 2 minutes to 4 hours. Nearly 19% of mothers wait more than an hour to get an ambulance and a quarter of them claim the ambulance waiting times was too long. Complication

survivors also reported that husband/family and health works/health extension workers (HEWs) were mainly influenced the decision to seek care (Table 6).

More proportion of SMM cases used an ambulance to seek care than high-risk cases, however; there was no significant difference in waiting time to get an ambulance. Likewise, there was no significant difference in timely recognition of complication and starting travel to seek care with the severity of complication.

**Table 6: Health seeking behavior of mothers with obstetric complications, July 2015**

Characteristics	SMM (n=38)	High risk complication (n=18)	Total (n=56)
	n (%)	n (%)	n (%)
<b>First seek care (n=55)</b>	<b>n=37</b>	<b>n=18</b>	<b>n=55</b>
Health center/health post	32(86.5)	12(66.7)	39(70.9)
Hospital	5(13.5)	6(33.3)	11(20)
<b>Reasons to seek care at health center first</b>	<b>n=27</b>	<b>n=12</b>	<b>n=39</b>
Proximity	23(74.2)	10(83.3)	33(84.6)
Affordable cost	6(19.4)	0(0)	7(17.9)
Short waiting time to see provider	2(6.5)	1(8.3)	5(12.8)
Confidence on providers' care and knowledge	2(6.5)	2(16.7)	5(12.8)
Respectful care/providers are nice	2(6.5)	0(0)	3(7.7)
Good supply of medicines	2(6.5)	1(8.3)	3(7.7)
Referred by other facility	6(19.4)	2(16.7)	8(20.5)
Transport problem to go to another facility	4(12.9)		4(10.3)
<b>Reasons to seek care at hospital directly without visiting health centers</b>	<b>n=10</b>	<b>n=6</b>	<b>n=16</b>
Proximity	1(10)	1(16.7)	2(12.5)
Affordable cost	5(50)	1(16.7)	6(37.5)
Short waiting time to see provider	3(30)	0(0)	3(18.8)
Confidence on providers' care and knowledge	5(50)	2(33.3)	7(43.8)
Respectful care/providers are nice	3(30)	1(16.7)	4(25)
Good supply of medicines	4(40)	1(16.7)	5(31.3)
Referred by other facility	6(60)	0(0)	6(37.5)
Transport problem to go to other facility	0(0)	0(0)	0(0)
Unknown	1(0)	1(16.7)	2(12.5)
<b>Time period decided to seek care</b>	<b>n=37</b>	<b>n=18</b>	<b>n=55</b>
Before recognition of complication	24(64.9)	14(77.8)	38(69.1)
After recognition of complication	13(35.1)	4(22.2)	17(30.9)
<b>Time taken from recognition of complication and starting travel to health facility to seek care (in minutes)</b>	<b>n=34</b>	<b>n=14</b>	<b>n=48</b>
Immediately (within 5 min)	23(67.7)	9(64.3)	32(66.7)

5- 60 minutes	7(20.6)	4(28.6)	11(22.9)
More than 60 minutes	4(11.8)	1(7.1)	5(10.4)
Median	5	5	5
Range	5-480	0-30	5-480
<b>Reasons for delayed seeking</b>	<b>n=10</b>	<b>n=4</b>	<b>n=12</b>
Not recognizing the danger signs timely	5(50.0)	1(25.0)	6(50.0)
Distance of the facility	3(30.0)	0(0.0)	3(25.0)
Opportunity cost	1(10.0)	0(0.0)	1(8.3)
Cost of transport	2(20.0)	0(0.0)	2(16.7)
Lack of transport from home to health facility	2(20.0)	1(50.0)	3(25.0)
Lack of partner/family support	1(10.0)	0(0.0)	1(8.3)
Poor quality care	1(10.0)	0(0.0)	1(8.3)
Not necessary to go health facility for birth	1(10.0)	0(0.0)	1(8.3)
Not customary to go to facility for birth	0(0.0)	0(0.0)	0(0.0)
<b>Persons involved in decision making to seek care</b>	<b>n=37</b>	<b>n=18</b>	<b>n=55</b>
Husband/family	18(48.7)	10(55.6)	28(50.9)
In-laws	1(2.7)	0(0)	1(1.8)
Health development army (HDAs) members	2(5.4)	1(5.6)	3(5.4)
Relative/neighbors	3(8.1)	0(0)	3(5.4)
HWs/HEWs	9(24.3)	3(16.7)	12(21.8)
Self	4(10.8)	4(22.2)	8(14.6)
<b>Means of transport to seek care</b>	<b>n=37</b>	<b>n=18</b>	<b>n=55</b>
Walked	5(13.5)	4(22.2)	9(16.3)
Ambulance	24(64.9)*	3(16.7)	27(49.1)
Public transport	4(10.8)	9(50)	13(23.6)
Carried by relatives	4(10.8)	2(11.1)	6(10.9)
<b>Waiting time to get ambulance (in minutes)</b>	<b>n=23</b>	<b>n=4</b>	<b>n=27</b>
Within 60 minutes	19(82.6)	3(75.0)	22(81.5)
Beyond 60 minutes	4(17.4)	1(25.0)	5(18.5)
Median	20	12.5	20
Range	2-180	5-240	2-240
Acceptable	17(73.9)	3(75)	20(74.1)
Too long	6(26.1)	1(25)	7(25.9)

\*Fisher's exact (P-value<0.05)

### Reaching health facilities

Nearly 47% of mothers who visited health center first stayed more than two hours there with a median time of 120 minutes. Likewise, about 39% of mothers complained that the referral initiated at the health center was late. Overall, median time taken to reach health facility was 75 minutes ranging from 20 to 270 minutes. The median time taken from the health center to reach hospital was 32.5 minutes. Nearly two-third of mothers took more than an hour to reach health facilities. A quarter of women reported that there were challenges during travel to a health facility. The major

challenges were ambulance delay (9%), ambulance absent/non-functional (14%), and poor/inaccessible road (9%).

There was no significant difference in the second delay between SMM and high-risk cases.

**Table 7: Delays in reaching health facilities among complication survivors, July 2015**

Characteristics	SMM	High risk complication	Total
<b>Time of stay at the health center</b>			
Within two hours	14 (60.9)	3 (33.3)	17(53.1)
More than 2 hours	9 (39.1)	6 (66.7)	15(46.9)
Median	120 min	180	120 min
Range	5-8640 min	5-960	5-8640 min
<b>Referral initiated timely (at health center)</b>	<b>n=27</b>	<b>n=12</b>	<b>n=39</b>
Timely	16(59.3)	8 (66.7)	24(61.5)
Late	11(40.7)	4(33.3)	15(38.5)
<b>Reasons for delayed referral from health center</b>	<b>n=11</b>	<b>n=4</b>	<b>n=15</b>
Ambulance delay	3(27.3)	0(0.0)	3(20)
Refusal of referral	0(0.0)	1(25.0)	1(6.7)
Consider the case as simple /just gave medication and followed	2(18.2)	0(0.0)	2(13.3)
Don't know	6(54.5)	3(75.0)	9(60.0)
<b>Median time taken to reach hospital</b>	50.0	44.4	32.5
Range	2-210	25-150	2-210
<b>Time taken from starting travel to health facility to reaching it including time needed for acquiring transport (in minutes)</b>	<b>n=37</b>	<b>n=18</b>	<b>n=55</b>
Within 60 minutes	14 (36.8)	6(33.3)	20(35.7)
More than 60 minutes	24 (63.2)	12(66.7)	36(64.3)
Median	75	71.3	75
Range	20-270	30-240	20-270
<b>Challenges faced in relation to transport</b>	<b>n=37</b>	<b>n=18</b>	<b>n=55</b>
No challenges	29 (78.4)	13(72.2)	42(75)
Ambulance delay	3(8.1)	2(11.1)	5(8.9)
Lack of health professional	1(2.7)	0(0.0)	1(1.8)
Ambulance absent/not functional	7(18.9)	1 (5.6)	8(14.3)
Road to access to ambulance	3(8.1)	2(11.1)	5(8.9)
No telephone to call ambulance	1(2.7)	0(0.0)	1(1.8)
Driver misconduct	1(2.7)	0(0.0)	1(1.8)
I do not know	1(2.7)	0(0.0)	1(1.8)

### Receiving treatment

The median time to see a provider for the first time was 5 minutes both at the health center and hospital; however, median waiting time before receiving medical treatment (once saw a provider) was 15 minutes at the health center and 5 minutes at hospitals. Thirteen percent and 7% of mothers complained the waiting time to get treatment were too long at the health center and hospital, respectively. Likewise, 34% and 21% of mothers received treatment after 30 minutes of arrival to the health center and hospital, respectively. The main reasons for delayed treatment at health center were the absence of providers and negligence of providers. On the other hand, refusal of referral to hospital, late referral from the health center, staff negligence and inadequate number of staff were the main reasons for delayed treatment at hospitals.

However, there was no significant difference in delay of receiving treatment among SMM and high-risk complication cases.

**Table 8: Delay in receiving treatment at health center and its referral hospitals among complication survivors, July 2015**

Characteristics	Health center			Hospital		
	SMM	High risk complication	Total	SMM	High risk complication	Total
<b>Waiting time to see a provider for the first time</b>	<b>n=27</b>	<b>n=11</b>	<b>n=38</b>	<b>n=28</b>	<b>n=12</b>	<b>n=40</b>
Within 30 minutes	22(81.5)	9(81.8)	31(81.6)	26(92.9)	11(91.7)	37(92.5)
More than 30 minutes	5(18.5)	2(18.2)	7(18.4)	2(7.1)	1(8.3)	3(7.5)
Median	5	10	5 min	5	5 min	5 min
Range	5-180	5-420 min	5-420 min	5-60	5-120 min	5-120 min
Acceptable	25(92.6)	10(90.1)	36 (92.3)	26(92.9)	11(91.7)	52(94.6)
Too long	2(7.4)	1(9.9)	3 (7.7)	2(7.1)	1(8.3)	3(5.4)
<b>Waiting time of receiving medical treatment (once saw a provider)</b>	<b>n=18</b>	<b>n=4</b>	<b>n=22</b>	<b>n=28</b>	<b>n=9</b>	<b>n=37</b>
Within 30 minutes	13(72.2)	4(100.0)	17(77.3)	25(89.3)	8(88.9)	33(89.2)
More than 30 minutes	5(27.8)	0(0.0)	5(22.7)	3(10.7)	1(11.1)	4(10.8)
Median	25	7.5	15 min	5	10	5 min
Range	5-120	5-20	5-120 minutes	5-2880	5-720	5-2880
Acceptable	23(85.2)	11(91.7)	34 (87.2)	34(91.9)	17(94.4)	51(92.7)
Too long	4(14.8)	1(8.3)	5 (12.8)	3(8.1)	1(5.6)	4 (7.3)
<b>Time taken to receive treatment after arrival to facility (to see provider and receiving treatment)</b>	<b>n=27</b>	<b>n=11</b>	<b>n=38</b>	<b>n=30</b>	<b>n=12</b>	<b>n=42</b>
Within 30 minutes	16(59.3)	9(81.8)	25 (65.8)	24(80.0)	9(75.0)	33(78.6)
More than 30 minutes	11(40.7)	2(18.2)	13 (34.2)	6(20.0)	3(25.0)	9(21.4)
Median	15	15	15 min	11.5	17.5	13 min
Range	5-210	10-421	5-421 min	5-2910	5-723	5-2910

<b>Reason for long waiting time for seeing a provider and/or receiving care</b>	<b>n=6</b>	<b>n=1</b>	<b>n=7</b>	<b>n=10</b>	<b>n=3</b>	<b>n=13</b>
Refusal of treatment or admission	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1(33.3)	1 (7.7)
Refusal of referral to higher facility	1(16.7)	0 (0.0)	1 (14.3)	4(40.0)	1(33.3)	5 (38.5)
No money to pay for care	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Lack of supplies or equipment	2(33.3)	0 (0.0)	1 (14.3)	1(10.0)	0 (0.0)	1 (7.7)
Negligence of staff on duty/ misconduct	3(50.0)	0 (0.0)	3 (42.9)	1(10.0)	1(33.3)	2 (15.4)
Inadequate number of staff	0 (0.0)	0 (0.0)	0 (0.0)	3(30.0)	0 (0.0)	3 (23.1)
Absence of provider	2(33.3)	1(100.0)	3 (42.9)	1(10.0)	0 (0.0)	1 (7.7)
Staff lack of skill/expertise	2(33.3)	0 (0.0)	2 (28.6)	0 (0.0)	0 (0.0)	0 (0.0)
Late referral practice of referring unit				1(10.0)	1(33.3)	2 (15.4)

## Women's views and suggestions on maternal and perinatal care at referring health centers and receiving hospitals

More than 80% of mothers responded that their privacy was respected during treatment at the health facilities. Regarding the right to information, nearly two-thirds of mothers reported that the provider explains what was doing during the examination. About two-thirds (66%) of mothers received information regarding referral to hospital. The types of information provided by the referring health center were name and location of the hospital (44 %), the importance of referral (39 %), time to go (28 %), the urgency of referral (26 %), and pre-referral treatment given (13%). About 80% and 93% of mothers were satisfied with the care they received from the health center and hospitals, respectively. About two-thirds and 52 % of women claimed the reception on arrival was respectful at the health center and hospital, respectively. Similarly, most reported that facility staff treated them respectfully (Table 9).

**Table 9: Women's views and suggestions on care provision at health facilities, July 2015**

Characteristics	Health center (n=39)	Hospital (n=55)
<b>Privacy respected</b>		
Yes	33 (84.6)	45 (81.8)
No	6 (15.4)	10 (18.2)
<b>Nature of reception on arrival</b>		
Friendly	26(66.7)	29(52.7)
Somewhat good	9(23.1)	18(32.7)
Disrespectful	4(10.3)	7(12.7)
<b>Staff handling</b>		
Respectful	32(82.0)	47(85.4)
Not respectful	7(18.0)	8(14.6)
<b>The provider explains what was doing during examination</b>		
Yes	25 (64.1)	38 (69.1)
No	14 (35.9)	17 (30.9)
<b>Received enough information about the condition and about what the provider was doing</b>		
Yes	25 (64.1)	32 (58.2)
No	14 (35.9)	23 (41.8)
<b>Information received from health center staff regarding referral to the hospital</b>		
No information received	13 (33.3)	
Name and location of hospital	17 (43.6)	
Who to contact at hospital	1 (2.6)	
When to go	11 (28.2)	
Importance of referral	15 (38.5)	
About the urgency of the referral	10 (25.6)	
General counseling	7 (17.9)	

About the pre-referral treatment given	5 (12.8)	
Other	1 (2.6)	
Don't know	3 (7.7)	
<b>Satisfaction with care</b>		
Yes	31 (79.5)	51 (92.7)
No	8 (20.5)	4 (7.3)
<b>Like best about this facility</b>		
Short waiting time to see provider	22 (56.4)	34 (61.8)
Short distance to facility	9 (23.1)	3 (5.5)
Facility is clean	9 (23.1)	31 (56.4)
Being treated with respect	18 (46.2)	27 (49.1)
Provider is competent/knowledgeable	7 (17.9)	34 (61.8)
Confidentiality/privacy	10 (25.6)	17 (30.9)
Good supply of medicines	9 (23.1)	29 (49.1)
Affordable cost of care	10 (25.6)	14 (25.5)
Access to ambulance	12 (30.8)	3 (5.5)
Being able to choose health care provider	0 (0.0)	0(0.0)
Other	2 (5.1)	5 (9.1)
Don't know	2 (5.1)	3 (5.5)
<b>Suggestions for improvement</b>		
Shorten waiting time to see provider	4 (10.3)	5 (9.1)
Improve distance of health facility	7 (17.9)	10 (18.2)
Clean the facility	6 (15.4)	6 (10.9)
Improve respect of providers toward patients	14 (35.9)	8 (14.5)
Improve skills of providers/assign doctors	12 (30.8)	6 (10.9)
Improve confidentiality/privacy	8 (20.5)	7 (12.7)
Improve supply of medicines	9 (23.1)	7 (12.7)
Reimburse costs incurred	2 (5.1)	2 (3.6)
Improve women's ability to choose a provider	4 (10.3)	3 (5.5)
Improve time required to get ambulance	11 (28.2)	11 (20.0)
Practice early referral	10 (25.6)	3 (5.5)
Avoid referral /treat all cases in this facility	6 (15.4)	3 (5.5)
Ambulance back home service	12 (30.8)	13 (23.6)
Other	7 (17.9)	10 (18.2)
Don't know	5 (12.8)	13 (23.6)

Mothers liked most about the health center include short waiting time, being treated with respect, and access to the ambulance. Likewise, more than half of mothers liked short waiting time to see a provider, providers' skills, and supply of drugs, and cleanliness of the hospital most.

Improve respectful care, skills of providers, the time required to get an ambulance, early referral, and ambulance back home service were the main points suggested for improvement at the heather. Likewise, ambulance back home service and improve the distance of the facility were the main points suggested for hospital care improvement.

## Discussion

Obstetric complication and referral audit was done through hospital record review and follow-up interview of complication survivors to investigate the barriers to access timely EmONC care. This study also attempted to assess the factors relating to the three delays and the referral system between health centers and its referral hospitals.

No education is usually associated with low ability to assimilate health choices and negotiate access to appropriate providers [12]. In this study, we observed that most mothers with obstetric complications had no formal education or their educational level was low. A quarter of mothers was beyond an hour walking distance to ambulance access point. Many studies also identified distance influences families decision to seek care in an emergency and reaching health facilities [13]. This is compounded by the unavailability of transportation during labor for the majority of women living in rural areas.

Studies found out that ANC consultations lead to prompt decision-making in an obstetric emergency [14]. However, our study found out that utilization of ANC care was low given these complicated mothers need specialty care and frequent follow-up during pregnancy. Likewise, early PNC care is essential to identify complications early on; however, most mothers with complications didn't get PNC care after discharge in this study.

The leading cause of complications identified in this study (i.e., hemorrhage, sepsis, and pre-eclampsia/eclampsia) and the contributing factors (i.e., anemia and prolonged/obstructed labor) were common in Ethiopia [2]. Thus, facilities should get prepared to tackle these problems.

Effective referral is believed to avert the three delays [4]; however, in this study the communication and transport arrangement which is the major component of the referral system was low. The main reasons for referral were the absence of definitive treatment at the health center. Furthermore, pre-referral and transfer care was found to be low which needs to be improved.

Delay in decisions to seek timely care is one of the demand-side barriers to using appropriate care during life-threatening obstetric complications. Many studies identified distance, cost, quality of care, illness factors including recognition of illness and sociocultural factors are the most common barriers to seeking care [15-18]. This survey showed that considerable number mothers seek care after recognition of complications mainly due to poor knowledge of signs of complications and transport problem. Similar findings were reported from different developing countries- unaware of danger signs of pregnancy and lack of birth preparedness, and delay to seek care promptly despite recognition of danger signs was identified as a major barrier to using EmONC care [17, 19-22].

Even after the decision to seek care, time to get ambulance was long and contributes to the delay in reaching care in this study. The second delay, delay in reaching care, found to be the most important factor contributing to delay in accessing EmONC, particularly in rural areas. We also found that the median time of stay at the health center was two hours; this meant that majority of the women did not receive definitive care at the health centers, indicating that mothers were delayed at health centers. Other studies showed that travel delay is a function of the number of health facilities visited and difficulty in obtaining transportation [23, 24]. The common reasons mentioned for delayed referral were ambulance delay, refusal of referral, and considering the case simple and manageable. Other studies also reported that delayed referral can occur both as a result

of health workers failing to manage referrals promptly and from the inability or hesitation of patients to follow through with a referral [25]. In the present study, the time to reach facility was two hours which is higher than the studies in Bangladesh [11, 19].

Deficiencies in the quality of care provided at health facilities resulted from insufficient and unqualified staff, shortage of essential equipment, supplies, drugs and blood as well as inadequate management are frequently mentioned in the literature as barriers to the access to lifesaving procedures [15]. Delay in receiving care was also found to be high in this study, particularly at health centers. Most mothers delayed in seeing a provider the first time or receiving treatment at the health center than a hospital because of the absence of the providers or negligence of the providers.

Poor quality and disrespectful care during delivery including poor provider attitude, lack of attention to complaints and follow-up in labor, and unresponsive to community beliefs and practices have recently been recognized as an important barrier to women's decisions to seek care [26-28]. In this study, most mothers reported that their privacy was respected during treatment at both health center and hospital, hospital staff treated them respectfully and satisfied with the care they received from both facilities. However, the goodness of reception on arrival at the health center and hospital and the information provided during examination and information provided regarding referral to hospital needs to be improved. Mothers mentioned that respectful care, skills of providers, the time required getting an ambulance, early referral, and ambulance back home services as the main points suggested for improvement at the health center. And ambulance back home service and improve the distance of the facility were the main points suggested for hospital care improvement.

## **Conclusion and Recommendation**

Frequency and content of ANC consultations need focus to identify and treat pre-existing conditions like anemia which are the major contributing factor for complications. Through the continuum of care, early and continuous PNC care is critical for these complicated cases to follow the consequences of the complication, early identify any life-threatening conditions, and to provide reproductive care and counseling.

A significant proportion of mothers was located far from an hour walking distance to ambulance access point. Delayed recognition of complications and transport problem including the long ambulance waiting were still the major challenge to seek and reach timely care. So, ambulance prioritization mechanism for emergency cases needs to be strengthened at health centers. Timely referral of women with due consideration to transportation problems also needs to be given attention. Moreover, communication and transport arrangement is equally critical in a time of critical conditions.

Care at the health center needs to be improved to avoid unnecessary delays. Moreover, detailed investigation of the appropriateness of care provided at health centers would help identify areas for improvement in the referral system. Initiating referral audit for complicated cases would also help to improve the practice of early referral to health centers.

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## Appendix: Obstetric Complications Audit Tool

### Part I: Review for Obstetric Complications

*This part should be filled by reviewing hospital records*

#### Instructions for screening for obstetric complications

1. Identify women with obstetric complications/ potentially life-threatening conditions managed in the last 3 months from the hospital registers (i.e., delivery, abortion, gyn/obs IPD, OT and neonatal/ pediatrics IPD registers).
2. Identify cases that came from L10K intervention PHCUs by using patient identifiers (medical record number and address).
3. Then review those cases that came from intervention PHCUs and complete the questionnaire accordingly

#### Section 1: Identification

SN	Prompt	Response	Remark
101	Area Identification	A) Region _____ B) Zone _____ C) Woreda _____ D) Health center _____ E) Hospital name _____	
102	Date of review (EC)	[ ]/[ ]/[ ] DD  MM  YY	
103	Age of the mother <b>AGE IN COMPLETED YEARS</b>		
104	Address of the mother	Kebele _____	
105	Medical record number (MRN)	[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]	

#### Section 2: Obstetric complication cases treated at hospital

SN	Prompt	Response	Remark
201	Please specify the obstetric complications that the mother had	<b>Abortion complications</b> ( <i>abortion with bleeding that requires treatment or septic</i> ).....1 <b>APH</b> .....2 <b>PPH</b> ( <i>includes retained placentae, postpartum hemorrhage, any bleeding that requires treatment and severe bleeding from lacerations</i> ).....3 <b>Prolonged or obstructed labor</b> ( <i>prolonged first or second stage of labor, malpresentation (brow, face, or transverse) and CPD</i> ).....4	

		<b>Severe pre-eclampsia</b> .....5 <b>Eclampsia</b> .....6 <b>Sepsis or severe systemic infection</b> .....7 <b>Ectopic pregnancy</b> .....8 <b>Ruptured uterus</b> .....9	
202	Did the mother admit to intensive care unit (ICU) and/or receive any of the critical interventions?  <b>CIRCLE ALL THAT APPLY</b>	Admission to ICU.....1 Use of blood products (includes any blood transfusion).....2 Laparotomy (includes hysterectomy, excludes caesarean section).....3 Interventional radiology (uterine artery embolization).....4 caesarean section (C/S).....5	
203	Did the mother develop any of the following organ dysfunction/life-threatening conditions?  <b>CIRCLE ALL THAT APPLY</b>	<b>Cardiovascular dysfunction</b> ( <i>Shock, use of continuous vasoactive drugs, cardiac arrest, CPR, severe hypoperfusion or severe acidosis</i> ) .....1 <b>Respiratory dysfunction</b> ( <i>acute cyanosis, gasping, Severe tachypnea, severe bradypnea, severe hypoxemia or intubation and ventilation not related to anesthesia</i> ) .....2 <b>Renal dysfunction</b> ( <i>oliguria non-responsive to fluids or diuretics, dialysis for acute renal failure, or severe acute azotemia</i> ) .....3 <b>Coagulation/hematologic dysfunction</b> ( <i>failure to form clots, massive transfusion of blood, or severe acute thrombocytopenia</i> ) .....4 <b>Hepatic dysfunction</b> ( <i>jaundice in the presence of pre-eclampsia, or severe acute hyperbilirubinemia</i> ) .....5 <b>Neurologic dysfunction</b> ( <i>prolonged unconsciousness /coma, stroke, or status epilepticus</i> ) .....6 <b>Uterine dysfunction / Hysterectomy</b> .....7	
204	Maternal condition at discharge	Died.....1 Alive.....2 Referred to another facility.....3	
<b>Section 3: Maternal and perinatal information</b>			
301	At the time of admission, how many times had she been pregnant and how many times had she given birth?	Gravidity ..... [   ] Parity..... [   ] Gestational age of index pregnancy (in weeks) ..... [   ]	

	How many weeks was the gestation of this pregnancy?		
302	Time period of complication or death	Ante-partum.....1 Intrapartum.....2 Post-partum.....3 Unspecified.....99	
303	The final mode of delivery / end of pregnancy. Please specify:	Vaginal delivery.....1 Assisted delivery (vacuum or forceps).....2 Caesarean section.....3 Complete abortion.....4 Curettage / vacuum aspiration.....5 Medical methods for uterine evacuation.....6 Laparotomy for ectopic pregnancy.....7 Laparotomy for ruptured uterus.....8 Women discharged or died still pregnant.....9 Other, specify.....88 Unknown.....99	
304	Main attendant at birth	Gynecologist/obstetrician.....1 IEOS.....2 Midwife.....3 General practitioner.....4 Nurse.....5 Health officer.....6 HEW.....7 TBA/relative.....8 Self with no assistant.....9 Other/ specify.....88	
305	Outcome of pregnancy	Not delivered.....1 Live birth.....2 Born alive but died before discharge.....3 Stillbirth.....4 Abortion.....5 Ectopic pregnancy.....6 Molar pregnancy.....7	<b>For 1,2 and 4-7, skip to 308</b>
306	Age of the newborn at death <i>If less than one day record in hours</i>	_ _     _ _  Days and Hours	
307	Cause of newborn death	Birth asphyxia.....1 Sepsis.....2 Aspiration.....3 Congenital anomalies.....4 Preterm.....5	

		Respiratory distress.....6 Other, specify _____88	
308	What was the underlying cause of death/ complication? Please specify: (1=Yes 2=No) <b>CIRCLE ALL THAT APPLY</b>	<p style="text-align: right;"><b>Yes No</b></p> Pregnancy with abortive outcome (abortion/ectopic pregnancy).....1 2 Obstetric hemorrhage..... 1 2 Hypertensive disorders.....1 2 Pregnancy-related infection.....1 2 Other obstetric disease or complication.....1 2 Medical/surgical/mental disease or complication.....1 2 Unanticipated complications of management.....1 2 Coincidental conditions.....1 2 Unknown.....99	
309	Which of the contributory/ associated conditions were present? Please specify: (1=Yes 2=No) <b>CIRCLE ALL THAT APPLY</b>	<p style="text-align: right;"><b>Yes No</b></p> Anemia.....1 2 HIV infection.....1 2 Previous caesarean section.....1 2 Prolonged/obstructed labour.....1 2 Malaria.....1 2 Cardiovascular disease.....1 2 Diabetics.....1 2	
310	About referral process, please specify whether the mother was referred to another facility or if she referred herself?	No sign of referral/Self-referred.....1 Referred from HC.....2 Referred from HEW/HDA.....3 Referred from other hospital/ private clinic.... 4 Unknown.....99	<b>→End of review</b>
311	When was the referral initiated from referring agent/facility?	____ __/____ __/____ ____ (dd / mm / yyyy) ____ __: Time	
312	Did the mother arrive with slip, escorted, and arrived using ambulance? Did someone call ahead to inform the hospital? <b>Specify; (1=Yes 2=No 99=Do not know)</b>	<p style="text-align: right;"><b>Yes No DK</b></p> Escorted.....1 2 99 Sent with referral slip.....1 2 99 Arrived with ambulance/ sector vehicle.....1 2 99 Someone call ahead to inform the hospital....1 2 99	<b>If no referral slips, skip to 314</b>
313	If sent with referral slip, written notice of the following sent with the patient?	What had been given and what procedures had been done.....1 Reason for referral.....2	

		Patient's history.....3 No data.....99	
314	What were the reasons for referral to this facility? <b>CIRCLE ALL THAT APPLY?</b>	Definitive treatment not available.....1 Guidelines/protocols say refer.....2 Drugs not available.....3 Equipment not available.....4 Provider absent.....5 Staff not trained to treat.....6 Staff had little confidence to treat.....7 Other _____88	
315	What pre-referral treatments/procedures were given by the referring facility? <b>CIRCLE ALL THAT APPLY</b>	<b>Pre-referral treatments/procedures given for the mother at referring facility</b> No pre-referral treatment given.....1 IV fluids for resuscitation.....2 Antibiotics.....3 Uterotonics (Oxytocin, Misoprostol or Ergometrine).....4 Anticonvulsants (MgSO4).....5 Antihypertensives.....6 Manual removal of placenta.....7 Assisted delivery (vacuum or forceps).....8 Removal of retained products.....9 Balloon or condom tamponade.....10 Abdominal packing.....11 Analgesics (diclofenac, paracetamol).....12 Antimalarials.....13 Nevirapine / ART.....14 Other treatment for the mother.....88  <b>Pre-referral treatments/procedures for newborn</b> No pre-referral treatment given.....1 Resuscitation with bag and mask.....2 Oxygen.....3 Antibiotics.....4 Skin-to-skin contact (KMC).....5 Nevirapine / ART.....6 Other treatment for the newborn.....88	

**Part II: Obstetric Complication Survivors Interview**

*This form has to be filled in for mothers who developed obstetric complications during the last birth/ pregnancy and managed at hospital*

**Introduction and Consent**

Hello. My name is \_\_\_\_\_ and I am here as a part of a survey being conducted by John Snow, Inc. Research and Training Institute Inc. / Last Ten Kilometers Project (JSI/ L10K). JSI/L10K works in the area of Reproductive, Maternal Newborn and Child Health in collaboration with the regional health bureaus.

The purpose of the interview is to collect information on your experiences of facility delivery. The information obtained from you will be used to redesign BEmONC interventions in your locality as well as nationally. The interview will take approximately 30 minutes. All the information obtained from you will be kept confidential.

Your participation in the study is completely voluntary. You may withdraw your consent and discontinue participation at any time or you have the right not to answer any question that you do not want to. However, I hope you will participate in the survey since your views are important.

Do you want to ask me anything about the survey?

May I begin the interview now?      1.  Yes.                              2.  No

Signature of interviewer \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/2014

<b>Section 1: Background characteristics</b>			
<b>SN</b>	<b>Prompt</b>	<b>Response</b>	<b>Skip</b>
401	Residence	Rural.....1 Urban.....2	
402	What is your marital status?	Never married.....1 Currently married.....2 Separated.....3 Divorced.....4 Widowed.....5 Living together.....6	<b>If 1 and 3-5, skip to 404</b>
403	What is your educational status?	Unable to read or write.....1 Read and write.....2 <b><u>Formal education</u></b> Grade [ ][ ] Technical/vocational certificate . . . . . 3 University/college diploma . . . 4 University/college degree or Higher . . . . . 5	
404	Husband's educational status	Unable to read or write.....1 Read and write.....2 <b><u>Formal education</u></b> Grade [ ][ ] Technical/vocational certificate . . . . . 3 University/college diploma . . . 4 University/college degree or Higher . . . . . 5	

404	What is your religion?	Orthodox .....1 Catholic ..... 2 Protestant ..... 3 Muslim ..... 4 Other(Specify)_____	
405	What is your occupation, that is, what kind of work do you mainly do?	Farmer .....1 Housewife.....2 Office worker.....3 Merchant.....4 Daily laborer.....5 Jobless.....6 Student.....7	
407	How long does it take you to walk to the nearest health post, health center, and hospital? <b>RECORD IN MINUTES</b>	Health post: ..... [ ][ ] Health Center: ..... [ ][ ] Hospital:..... [ ][ ]	
408	How far is your home from the ambulance access point?	Kilometers [ ][ ] Walking distance in minutes [ ][ ]	
409	How many times have you been pregnant?	Number [   ]	
410	How many times have you given birth?	Number [ ][ ]	
411	Did you go to a health facility to attend ANC care for the index pregnancy?	Yes.....1 No.....2	→413
412	How many times did you receive antenatal care in the health facility during the index pregnancy?	Number [ ][ ][ ] Don't Know.....99	
413	Outcome of the last pregnancy	Abortion.....1 Live birth.....2 Stillbirth.....3 Ectopic pregnancy.....4 Molar pregnancy.....5	→421  →421
414	Where did you deliver your last birth?	Home.....1 Government Hospital.....2 Government Health center .....3 Health post.....4 Private clinic.....5 Private hospital.....6 NGO health facility.....7 On the way to health facility.....8 Other.....88	
415	Who assisted with the delivery of the last birth?	<b>Health professional</b> Doctor.....1	

		Nurse/midwife.....2 HEW.....3 Other health personnel (Specify).....4 <b>Other person</b> tTBA.....5 Untrained TBA.....6 HDA.....7 Relative/friend.....8 Other.....9 No one.....10	
416	If delivered at home, why didn't you deliver in a health facility?  <b>MULTIPLE RESPONSES  POSSIBLE  CIRCLE ALL THAT APPLY</b>	Cost too much (direct cost and opportunity cost).....1 .....1 Facility not open.....2 Facility too far.....3 No transportation.....4 Don't trust facility capability (lack of medicines, equipment and competent provider).....5 .....5 Poor quality of care at facility (attitude of providers etc).....6 No female provider at facility.....7 Husband/family don't allow.....8 No family to support children at home.....9 Not necessary.....10 Not customary.....11 Labor happened so quickly.....12 Failed to recognize signs of labor/ complications.....13 .....13 Other.....88 Specify_____ -	
417	What type of delivery did you have in your last pregnancy? Please tell me your mode of delivery for your index pregnancy	Vaginal delivery.....1 Caesarean section, that is cut your belly open to take the baby out.....2 Laparotomy .....3 Hysterectomy (surgical removal of the uterus).....4 Curettage/vacuum aspiration.....5 Other.....88 Don't know.....99	

418	After you gave birth, did anyone check on your/your baby's health while you were still in the facility?	Yes ..... 1 No ..... 2	
419	Did anyone check on your health after you left the facility?	Yes ..... 1 No ..... 2	→421
420	How long after delivery did the first checkup take place? <b>IF LESS THAN ONE DAY, RECORD IN HOURS.</b> <b>IF LESS THAN ONE WEEK, RECORD IN DAYS.</b>	Hours..... [   ] Days..... [   ] Weeks ..... [   ] Don't know.....99	
421	We know you went to the government hospital during your last pregnancy, but before actually going to the hospital did you seek care somewhere else or from someone else?	Yes .....1 No.....2	→501
422	Where did you first seek care?	Health post.....1 Health center.....2 Government Hospital.....3 Private clinic.....4 Private hospital.....5 NGO health facility.....6 Other .....88 Specify_____	<b>For 1 and 3-6, skip to 601</b>
<b>Section 2: Care seeking, referral and maternal and perinatal care at referring unit/health center</b>			
<b>Now I am going to ask you about the care you received from the referring health center</b>			
501	What was the reason or medical problem that caused you to seek care at that first facility?		
502	Why did you choose that facility to seek care?  <b><u>PROBE:</u> What else?</b> <b>RECORD ALL THAT APPLY</b>	Proximity.....1 Affordable cost .....2 Short waiting time to see provider.....3 Confidence on providers' care and knowledge..... ...4 Respectful care/providers are nice.....5 Good supply of medicines.....6 Referred by another facility.....7 Transport problem to go to another facility.....8 Other (specify)_____88 Don't know.....99	

503	When was the time period you decided to seek care?	<p style="text-align: right;">Before labor started....1</p> <p style="text-align: right;">After labor started but before recognition of complication.....2</p> <p style="text-align: right;">After recognition of complication.....3</p> <p style="text-align: right;">Don't know.....99</p>	<p>→ 506</p> <p>→506</p>
504	How long did it take you from recognition of complication and starting travel to that facility to seek care? <b>RECORD IN MINUTES</b>	<p style="text-align: right;">Minutes [ _   _ ]</p> <p style="text-align: right;">Immediately .....2</p> <p style="text-align: right;">Don't know.....99</p>	→506
505	Why did you not seek care immediately after the recognition of the complication? <b>RECORD ALL THAT APPLY</b>	<p style="text-align: right;">Not recognizing the danger signs timely.....1</p> <p style="text-align: right;">Distance of the facility.....2</p> <p style="text-align: right;">Opportunity Cost .....3</p> <p style="text-align: right;">Cost of transport.....4</p> <p style="text-align: right;">Lack of transport from home to health facility.....5</p> <p style="text-align: right;">Lack of partner/family support.....6</p> <p style="text-align: right;">Poor quality care.....7</p> <p style="text-align: right;">Not necessary to go health facility for birth.....8</p> <p style="text-align: right;">Not customary to go to facility for birth.....9</p> <p style="text-align: right;">Other, specify.....88</p>	
506	Who influenced your decision to seek care?	<p style="text-align: right;">Husband/family.....1</p> <p style="text-align: right;">In-law.....2</p> <p style="text-align: right;">HDAs.....3</p> <p style="text-align: right;">Relatives/neighbors .....3</p> <p style="text-align: right;">Health workers/HEWs.....4</p> <p style="text-align: right;">Other.....5</p> <p style="text-align: right;">Specify.....</p>	
507	How did you get to that facility?	<p style="text-align: right;">Walked.....1</p> <p style="text-align: right;">Ambulance.....2</p> <p style="text-align: right;">Public transport.....3</p> <p style="text-align: right;">Carried by relatives.....4</p>	<p>→511</p> <p>→511</p> <p>→511</p>
508	How did you get an ambulance?	<p style="text-align: right;">Direct call by husband or family.....1</p> <p style="text-align: right;">HEW call.....2</p> <p style="text-align: right;">HDA call.....3</p> <p style="text-align: right;">Other.....88</p>	
509	How long did you wait to get an ambulance? <b>RECORD IN MINUTES</b>	Minutes [ _   _ ]	
510	Do you think this wait was acceptable or too long?	<p style="text-align: right;">Acceptable.....1</p> <p style="text-align: right;">Too long.....2</p>	
511	Who accompanied you during travel to a health facility?	<p style="text-align: right;">Arrived alone.....1</p> <p style="text-align: right;">Family member.....2</p> <p style="text-align: right;">HEW.....3</p>	

	<b>CIRCLE ALL THAT APPLY?</b>	HW (Midwife/ nurse/HO).....4 Auxiliary staff .....5	
512	How long did it take you from starting travel to a health facility to reaching it (including time needed for acquiring transport)? <b>RECORD IN MINUTES</b>	Minutes [ _   _   _ ]	
513	What challenges did you face in relation to transport?	Open ended	
514	How long did you wait before seeing a provider for the first time (at the health facility prior to referral to the hospital)?	Minutes [ _   _   _ ]	
515	Do you think this wait was acceptable or too long?	Acceptable.....1 Too long.....2	
516	Did you receive some sort of medical treatment before being sent to the hospital?	Yes.....1 No.....2	<b>→518</b>
517	After you saw a provider for the first time, how long did you wait before someone gave you medical treatment for the problem? <b>RECORD IN MINUTES</b>	Minutes [ _   _   _ ]	
518	Do you think this wait was acceptable or too long?	Acceptable.....1 Too long.....2	
<b>IF 515 OR 518 = 2 (TOO LONG), CONTINUE WITH 519. OTHERWISE, SKIP TO 520</b>			
519	What do you think was the reason for such a long waiting time for seeing a provider and/or for receiving care?  <b>PROBE: What else? RECORD ALL THAT APPLY</b>	<b>Personal/family/community factors</b> Refusal of treatment or admission.....1 Refusal of referral to higher facility.....2 No money to pay for care.....3 <b>Health system factors</b> Lack of blood products, supplies, and equipment.....4 Negligence of staff on duty/ staff professional misconduct.....5 Inadequate number of staff.....6 Absence of provider.....7 Staff lack of skill/ expertise.....8 Others, specify _____88	
520	Did you receive any of the following interventions around the time of your delivery <b>at the health center</b> ?	Antibiotics or any other drugs by drip.....1 Injection or pill to stop bleeding/to contract uterus after baby was born.....2	

		Manual removal of placenta or removal of retained products.....3 Vacuum extraction (suction to pull baby out).....4 Don't know.....99	
521	How were you welcomed to the facility when you arrived? <b><i>Probe for greeting, called by name, talked in a friendly manner etc</i></b>	Open ended	
522	Do you feel your privacy was respected by the staff?	Yes.....1 No .....2	
523	How did the facility staff treat you? <b><i>Probe for respect, confidentiality, listening attentively,</i></b>	Open ended	
524	When you were being examined, did the provider explain to you what he/she was doing?	Yes.....1 No .....2	
525	Do you feel you received enough information about your condition and about what the provider was doing?	Yes.....1 No .....2	
526	What information did you receive from health facility staff regarding referral to the hospital? <b>RECORD ALL THAT APPLY</b>	No information received.....1 Name and location of hospital.....2 Who to contact at hospital.....3 When to go.....4 Importance of referral.....5 About the urgency of the referral.....6 General counseling.....7 About the pre-referral treatment given.....8 Other, specify _____88 Don't know.....99	
527	How long did you stay at the referring unit? <b>RECORD IN MINUTES</b>	Minutes [ ][ ] Don't remember.....99	
528	When did the facility decide to refer you to the hospital? <b>Date?</b> <b>Time?</b>	___ ___/___ ___/___ ___ ___ (dd / mm / yyyy) ___ ___: Time Don't remember.....99	

529	When did you actually leave the health facility? <b>Date?</b> <b>Time?</b>	<p style="text-align: center;">___ ___/___ ___/___ ___ ___ (dd / mm / yyyy)</p> <p style="text-align: right;">___ ___: Time</p> <p>Don't remember.....99</p>	
530	Do you think the referral initiated at health center was timely?	<p style="text-align: right;">Yes.....1</p> <p style="text-align: right;">No.....2</p>	→532
531	Why did the staff not send you timely?	Open ended	
532	How long did it take you to reach the hospital? <b>RECORD IN MINUTES</b>	<p style="text-align: right;">Minutes [__ __]</p> <p>Don't remember.....99</p>	
533	Who accompanied you during your travel to the hospital?	<p style="text-align: right;">Arrived alone.....1</p> <p style="text-align: right;">Family member.....2</p> <p style="text-align: right;">HEW.....3</p> <p style="text-align: right;">Midwife/ nurse/HO.....4</p> <p style="text-align: right;">Auxiliary staff.....5</p>	
534	What care did you receive during the transfer to the hospital? <b>RECORD ALL THAT APPLY</b>	<p style="text-align: right;">No care received.....1</p> <p style="text-align: right;">IV line opened.....2</p> <p style="text-align: right;">Drugs given.....3</p> <p style="text-align: right;">Monitor condition.....4</p> <p style="text-align: right;">Thermal protection.....5</p> <p style="text-align: right;">Emotional support provided.....6</p> <p style="text-align: right;">Positioning.....7</p> <p style="text-align: right;">Other, specify.....88</p>	
535	Are you satisfied with the overall care that you received at the health center?	<p style="text-align: right;">Very satisfied.....1</p> <p style="text-align: right;">Satisfied.....2</p> <p style="text-align: right;">Somewhat satisfied.....3</p> <p style="text-align: right;">Somewhat dissatisfied.....4</p> <p style="text-align: right;">Very dissatisfied.....</p>	
536	What did you like best about that facility? <b>RECORD ALL THAT APPLY</b>	<p style="text-align: right;">Short waiting time to see provider.....1</p> <p style="text-align: right;">Short distance to facility.....2</p> <p style="text-align: right;">Facility is clean.....3</p> <p style="text-align: right;">Being treated with respect.....4</p> <p style="text-align: right;">Provider is competent/knowledgeable.....5</p> <p style="text-align: right;">Confidentiality/privacy.....6</p> <p style="text-align: right;">Good supply of medicines.....7</p> <p style="text-align: right;">Affordable cost of care.....8</p> <p style="text-align: right;">Access to ambulance.....9</p> <p style="text-align: right;">Being able to choose health care provider....10</p> <p style="text-align: right;">Other (specify).....88</p> <p style="text-align: right;">Don't know.....99</p>	
537	What suggestions do you have for improvement?	Shorten waiting time to see provider.....1	↓ <b>Go to 611</b>

	<b>RECORD ALL THAT APPLY</b>	Improve distance of health facility/open hospital around here.....2 Clean the facility.....3 Improve respect of providers toward patients..... ..4 Improve skills of providers/assign doctors..... ....5 Improve confidentiality/privacy.....6 Improve supply of medicines.....7 Reimburse costs incurred.....8 Improve women’s ability to choose a health care provider.....9 Improve time required to get ambulance.....10 Practice early referral.....11 Avoid referral to hospital/treat all cases in this facility.....12 Ambulance back home service.....13 Other (specify).....88 Don’t know.....99	
<b>Section 3: Care at referral hospital</b>			
<b>Now I am going to ask you about the care you received from hospital</b>			
601	What was the medical problem that brought you to the hospital?		
602	Why did you choose this facility to seek care? <b>RECORD ALL THAT APPLY</b>	Proximity.....1 Affordable cost of care.....2 Short waiting time to see provider.....3 Confidence on providers’ care and knowledge..... .4 Respectful care.....5 Good supply of medicines.....6 Referred by another facility.....7 Transport problem to go to another facility.....8 Other (specify).....88 Don’t know.....99	
603	When was the time period you decided to seek care - before labor started after labor began or	Before labor started.....1 After labor starts but before recognition of complication.....2	

	after recognition of a complication?	After recognition of complication.....3 Don't know.....99	
604	How long did it take you from recognition of complication and starting travel to the hospital? <b>RECORD IN MINUTES</b>	Minutes [ _ _ _ ] Immediately .....1 Don't know.....99	
605	Why did you not seek care immediately after the recognition of the complication? <b>RECORD ALL THAT APPLY</b>	Not recognizing the danger signs timely.....1 Distance of the facility.....2 Opportunity Cost .....3 Cost of transport.....4 Lack of transport from home to health facility.....5 Lack of partner/family support.....6 Poor quality care.....7 Not necessary to go health facility for birth.....8 Not customary to go to facility for birth.....9 Other, specify_____88	
606	Who influenced your decision to seek care?	Husband/family.....1 In-law.....2 HDAs.....3 Relatives/neighbors .....3 Health workers/HEWs.....4 Other.....5 Specify_____	
607	How did you get to the hospital?	Walked.....1 Ambulance.....2 Public transport.....3 Carried by relatives.....4	→611 →611 →611
608	How did you get the ambulance?	Direct call by husband or family.....1 HEW called.....3 Arranged by HC.....4	
609	How long did you wait for the ambulance to arrive? <b>RECORD IN MINUTES</b>	Minutes [ _ _ _ ]	
610	Do you think this wait was acceptable or too long?	Acceptable.....1 Too long.....2	
611	Who accompanied you during your travel to the hospital?	Arrived alone.....1 Family member.....2 HEW.....3 Midwife/ nurse/HO.....4 Auxiliary staff.....5	
612	How long did it take you to go from the health center to the	Minutes [ _ _ _ ] Don't remember.....99	

	hospital (including time needed for transport to arrive)? <b>RECORD IN MINUTES</b>		
613	What challenges did you face in relation to transport?	Open ended	
614	When did you arrive at the hospital?	<p>___ ___/___ ___/___ ___</p> <p>(dd / mm / yyyy)</p> <p>___ :___</p> <p>Time</p> <p>Don't remember.....99</p>	
615	When were you admitted to the hospital?	<p>___ ___/___ ___/___ ___</p> <p>(dd / mm / yyyy)</p> <p>___ :___</p> <p>Time</p> <p>Don't remember.....99</p>	
616	On arrival, how long did you wait before seeing a provider at the hospital? <b>RECORD IN MINUTES</b>	<p>Minutes [__ _]</p> <p>Don't remember.....99</p>	
617	Do you think this wait was acceptable or too long?	<p>Acceptable.....1</p> <p>Too long.....2</p>	
618	Once you saw a doctor/provider, how long did you wait before you received medical treatment? <b>RECORD IN MINUTES</b>	<p>Minutes [__ _]</p> <p>Don't remember.....99</p>	
619	Do you think this wait was acceptable or too long?	<p>Acceptable.....1</p> <p>Too long.....2</p>	
	<b>IF 617 OR 619 = 2 (TOO LONG), CONTINUE WITH 620; OTHERWISE, SKIP TO 621.</b>		
620	What do you think was the reason for long waiting time for seeing a provider and/or receiving care? <b>PROBE: What else?</b> <b>RECORD ALL THAT APPLY</b>	<p><b>Personal/family/community factors</b></p> <p>Refusal of treatment or admission.....1</p> <p>Refusal of referral to higher facility.....2</p> <p>No money to pay for care.....3</p> <p><b>Health system factors</b></p> <p>Lack of blood products, supplies, and equipment.....4</p> <p>Negligence of staff on duty/ professional staff misconduct.....5</p> <p>Inadequate number of staff.....6</p> <p>Absence of critical provider(s).....7</p> <p>Critical staff on call.....8</p> <p>Staff lack of skill/ expertise.....9</p> <p>Late referral practice of referring unit.....10</p> <p>Others, specify.....88</p>	

621	<p>Did you receive any of the following around the time of your delivery at the hospital?  <b>RECORD ALL THAT APPLY</b></p>	<p>IV antibiotics.....1  IV uterotonics or pill to stop bleeding/contract uterus after baby was born.....2  Manual removal of placenta or removal of retained products.....3  Vacuum extraction or forceps delivery.....4  Blood transfusion.....5  Cesarean section.....6  Hysterectomy.....7  Laparotomy.....8  Uterine evacuation.....9  Provision of IV fluid.....10  Laceration repair.....11  Don't know.....99</p>	
622	<p>How were you welcomed to the facility when you arrived?  <i><b>Probe for greeting, called by name, talked in a friendly manner etc.</b></i></p>	<p>Open ended</p>	
623	<p>Do you feel your privacy was respected by the staff?</p>	<p>Yes.....1  No.....2</p>	
624	<p>When you were being examined, did the provider explain to you what he/she was doing?</p>	<p>Yes.....1  No.....2</p>	
625	<p>Do you feel you received enough information about your condition and about what the provider was doing?</p>	<p>Yes.....1  No.....2</p>	
626	<p>How did the facility staff treat you?  <i><b>Probe for respect, confidentiality, listening attentively etc.</b></i></p>	<p>Open ended</p>	
627	<p>Are you satisfied with the care you received?</p>	<p>Very satisfied.....1  Satisfied.....2  Somewhat satisfied.....3  Somewhat dissatisfied.....4  Very dissatisfied.....5</p>	
628	<p>What do you like best about this facility?  <b>RECORD ALL THAT APPLY</b></p>	<p>Short waiting time to see provider.....1  Short distance to facility.....2  Facility is clean.....3  Being treated with respect.....4  Provider is competent/knowledgeable.....5  Confidentiality/privacy.....6  Good supply of medicines.....7</p>	

		Affordable cost of care.....8 Being able to choose health care provider.....9 Other (specify)_____88 Don't know.....99	
629	What suggestions do you have for improvement? <b>RECORD ALL THAT          APPLY</b>	Shorten waiting time to see doctor.....1 Improve distance of health facility.....2 Clean the facility.....3 Improve respect of doctors/nurses toward patients.....4 Improve skills of doctors/nurses.....5 Improve confidentiality/privacy.....6 Improve supply of medicines.....7 Reduce cost of treatment.....8 Improve women's ability to choose a health care provider.....9 Ambulance back home service.....10 Other (specify)_____88 Don't know.....99	

*This is the end of interview!!*

*Thank you!*