COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

POSTGRADUATE PROGRAM

Clinical, sociodemographic profiles, and outcomes of mothers referred to three teaching hospitals for tertiary care: Addis Ababa, Ethiopia: Prospective cross-sectional study

Thesis to be submitted to the department of obstetrics and Gynecology, Addis Ababa University in partial Fulfillment for the requirements of specialization certificate in obstetrics and Gynecology

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Addis Ababa University,

College of Health Sciences, Department of Obstetrics and Gynecology

Research report attesting page

STUDENT DECLARATION

I, Dr Fozia Arebo hereby declare that this thesis entitled **"**clinical, sociodemographic profiles, and outcomes of mothers referred to three teaching hospitals for tertiary care **"** was fully undertaken by me under the guidance of my advisor and that I have, to the best of my knowledge and effort, I have cited all various sources of information used in this thesis, and I am also declaring that this thesis has not been submitted to any other institution for the award of any degree, certificate, masters or diploma.

Fozia Arebo (MD) Signature _____ Date _____

SUPERVISOR DECLARATION

I hereby certify that I have read and evaluated this research thesis relating to **"**clinical, sociodemographic profiles, and outcomes of mothers referred to three teaching hospitals for tertiary care**"** under my guidance from its inception up to in its current format and that it can be submitted for final approval in partial fulfillment to the Degree of Specialty in Obstetrics and Gynecology. I also certify that the above declaration made by the investigator is correct to the best of my knowledge as an advisor.

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LIST OF ACRONYMS

AA	Addis Ababa
AAU	Addis Ababa University
ANC	Antenatal care
APH	Antepartum hemorrhage
C/S	Cesarean section
CHS	College of health science
CPD	Cephalo pelvic disproportion
DM	Diabetes mellitus
DRPC	Department Research and Publication Committee
EDHS	Ethiopian Demographic and Health Survey
EMOC	Emergency obstetric care
EMONC	Emergency obstetric and neonatal care
FMOH	Federal ministry of health
FRU	First referral unit
GMH	Gandhi Memorial Hospital
HC	Health center
HMD	Hyaline membrane disease
ICD/PM	International classification of disease for perinatal mortality

ICU	Intensive Care unit
IESO	Integrated emergency surgical officers
IUFD	Intrauterine fetal death
IV	Intravenous
LBW	Low birth weight
MCH/FP	Maternal and child health/Family planning
MMR	Maternal Mortality Ratio
MoH	Minister of health
OBGYN	Obstetrics and Gynecology
PMR	Perinatal mortality rate
PPH	Postpartum hemorrhage
PPROM	Preterm premature rupture of membrane
REI	Reproductive Endocrinologist and Infertility
RH	Reproductive health
SPSS	Statistical package for the social science
SVD	Spontaneous vertex delivery
TASH	Tikur Anbesa Specialized Hospital
UN	United nation
WHO	World health organization
ZMH	Zewditu Memorial Hospital

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ABSTRACT

Background: The referral system is crucial for ensuring that patients have access to emergency obstetric care during pregnancy and labor since the promptness and appropriateness of the referrals affect the patients' final prognosis. One of the best interventions to improve the devastating feto maternal outcomes of laboring women is early detection of problems and immediate referral to a better health care service provider.

Objective: To determine the feto-maternal outcomes and associated factors among pregnant women referred for labor and delivery service to the three teaching hospitals.

Method: Institution based cross sectional study was conducted to determine the feto-maternal outcome and associated factors among 411 mothers who came referred to the three teaching hopitals in Addis Ababa from February 1 to May 30, 2024. Systematic sampling technique was used to select mothers referred for labor and delivery. Data were entered and analyzed by statistical package for social sciences window version 26.The data was analyzed by logistic regression using 95% confidence level and P-value of less than 0.05 and multivariable logistic regression model was used to identify the associated factors.

RESULT: A total of 411 women referred for labor and delivery services were included in this study. The most common reasons for referral to the tertiary hospital were dystocia or (labor abnormality), which accounted for 21.7% of the referrals, followed by fetal distress (11.4%) and pregnancy-induced hypertension, which accounted for 9.7% of the referral cases. Adverse maternal and fetal outcomes happened in 8% and 33% of referred mothers, respectively. Determinant factors for poor maternal outcome were not having ANC (AOR=3.3, 95%CI=1.87, 12.83), arrival before 30 minutes of referral (AOR=3.1, 95%CI=1.27, 7.69), mode of delivery by instrumental and ABD (AOR=8.9, 95%CI=2.03, 39.67 & AOR=7.3, 95%CI=5.54, 49.38, respectively), and having poor perinatal outcome (AOR=2.9, 95%CI=1.17, 7.57). The determinant factors for poor perinatal outcome were being illiterate (AOR=1.8, 95%CI=1.15, 4.96), not having ANC (AOR=4.7, 95%CI=2.15, 12.42), initiation of ANC in the third trimester (AOR=7.5, 95%CI=1.16, 48.20), referral at night (AOR=1.6, 95%CI=1.04, 2.59), and taking more than 30 minutes to arrive after referral (AOR=2.5, 95%CI=1.41, 4.35).

CONCLUSION: The study revealed that lack of ANC and delayed initiation of ANC are among the main factors that contributed to adverse maternal and fetal outcomes among referrals. Giving more attention to those parts of the population who didn't attend formal education and implementing early referral practice will improve adverse maternal and fetal outcomes.

Key word: Referral system, maternal outcomes, perinatal outcomes, laboring mother

1. INTRODUCTION

1.1 BACKGROUND

Ethiopia's public health care system is designed around the concept of a "health network model," which uses three tiers of health care delivery: primary, secondary, and tertiary, with specific populations to be served at each level. A practical and well-coordinated referral system must be used to ensure the harmonization of this health network. In an urban setting, a health center at the bottom serves 40,000 people, a general hospital at the middle serves 1–1.5 million beneficiaries, and a specialized hospital at the top serves 3–5 million.(1)

Referral is a process in which a health worker hands over the responsibility of care, either temporarily or permanently, to another health professional, social worker, or community resource due to their own inability or limitations in providing the required care. It is a reciprocal process that guarantees a consistent level of care for patients or clients. Furthermore, it also involves offering support services such as communication and transportation alongside direct patient care. It occurs from the community to primary healthcare services, to hospitals, within hospitals, and vice versa.(2)

Referral can occur in a vertical manner, following the hierarchical structure of health services that range from the lower levels of the health tier system to the higher levels. It can also be horizontal among similar facility levels to benefit patients in terms of cost, location, and other factors. Referrals can also take a diagonal approach when a basic health facility sends patients directly to a specialized center without following the usual hierarchical process. Referrals may involve practitioners from public, private, community-based, as well as other conventional and alternative medicine fields, and occasionally include social services as well.(1)

Obstetric referral refers to the process by which a healthcare worker transfers the responsibility of obstetric care to another health worker in response to the inability to provide the necessary care. Several sequential elements of obstetric referral, which are designed to ensure a continuum of care, exist. These components involve the timely identification of complications, offering counseling services to clients, conducting pre-referral communications, filling out referral forms, and providing pertinent medical documents. Coordinating an ambulance for transport,

designating a caregiver to accompany the patient, and conducting referral audits are essential elements of the referral network.

The referral system is crucial for ensuring that patients have access to emergency obstetric care during pregnancy and labor since the promptness and appropriateness of the referrals affect the patients' final prognosis.

1.2 STATEMENT OF THE PROBLEM

Due to the unpredictable nature of pregnancy complications and their potential to become severe and life-threatening, timing is essential to avert maternal death and disability. This is why referral in an obstetric emergency is significant. For this reason, emergency obstetric care (EmOC) has been called the ‘keystone in the arch of safe motherhood". (4)Therefore, maternal and newborn deaths may be avoided if effective referral mechanisms are in place to enable pregnant women to access suitable health services when difficulties develop. A recent systematic review of maternal health initiatives indicated that the most successful programs included the establishment of referral systems as a component.(5)

Majority of maternal deaths occur during and after childbirth and they are avoidable when women have access to health care before, during, and after childbirth. Obstetrics patients are usually healthy and free from co-morbidities. The majority of them can be handled at the primary health care facility. Timely identification of high-risk cases prone to land up in such complications as well as identification of patients with such complications and their immediate referral to a center that is well equipped to tackle such cases may improve the feto-maternal outcome.(5)

The tertiary hospital should provide decentralized, round-the-clock, all-inclusive emergency obstetric care (EmOC) for the majority of typical maternity care circumstances. (6) However, the concentration of almost all births in ‘‘referral-level’’ hospitals does not guarantee a low maternal mortality ratio (MMR).Inadequate technical skills and overcrowding lead to poor quality of care in hospitals with very high volumes of patient delivery. (6) Therefore, to reduce the number of unnecessary referrals and reduce the burden on tertiary care hospitals, health care workers should

be trained in essential and emergency obstetric care, which will help reduce morbidity and mortality.(6)

Maternal and perinatal outcomes in referred cases depend on the time and proper referral of such cases with the provision of emergency obstetric care during transport. Thus, timely referral, not mere referral, plays a significant role.(4)

1.3 SIGNIFICANCE OF THE STUDY

Ethiopia is one of the developing countries with a high maternal mortality ratio and perinatal mortality rate. The current referral system in the country is very important for the early identification and management of obstetric complications. Therefore, there is still a need to research the factors that influence adverse pregnancy and childbirth outcomes.

The study's findings will help improve maternal referral practices and determine the variables that influence them. It will assist us in identifying gaps that contribute to poor maternal and perinatal outcomes. It also assists us in improving our care, starting at the lowest level. It will also guide health professionals to prioritize and individualize cases so that timely intervention can take place. Therefore, this study aims to evaluate the maternal and perinatal outcomes of those cases referred for labor and delivery services.

2. LITERATURE REVIEW

In 2020, around 287,000 women worldwide lost their lives due to maternal issues, which translates to nearly 800 maternal deaths each day, or about one every two minutes. Sub-Saharan Africa was the sole region exhibiting a significantly high maternal mortality rate, estimated at 545 maternal deaths for every 100,000 live births... Ethiopia is among the countries that had more than 10,000 maternal deaths in 2020, which accounts for 3.6% of global maternal deaths.(7)

Recent estimates in the Countdown 2014 report indicate that most maternal deaths happen during labor and shortly after childbirth, primarily due to hemorrhage (25%), pre-eclampsia/eclampsia (16%), and infection (10%).Unsafe abortion accounted for 10% of avoidable maternal deaths. Hence, addressing the top four leading causes can avert about nine in ten maternal deaths.(8) A

woman who has recently given birth and is starting to bleed heavily might die within two hours if she does not receive treatment for this maternity-related complication. This time period should be adequate for her to access the emergency obstetric and neonatal care (EmONC) that she requires. However, if she resides in an area with limited resources, where 99 percent of maternal deaths happen, reaching a healthcare facility could be quite a challenge. If she reaches the facility, how many other patients will be ahead of her? Is the facility prepared to handle serious complications similar to hers? Will there actually be a clinician available at the facility (9)

Based on a systematic review that was done on eighteen health facility-based maternal mortality studies conducted between 1980 and 2012 in Ethiopia, The summary of the findings have shown that from 1980 to 1999, the leading four contributors to maternal mortality were complications from abortion (31%), obstructed labor or uterine rupture (29%), infections or sepsis (21%), and hemorrhage (12%). Over the past ten years, the leading reasons for maternal mortality have been obstructed labor or uterine rupture (36%), hemorrhage (22%), hypertensive disorders during pregnancy (19%), and sepsis or infection (13%). Obstructed labor remains the primary cause of maternal fatalities, while deaths associated with hypertensive disorders and hemorrhage have been rising. The results of this review were somewhat similar to the WHO analysis for Africa during the same timeframe, with the exception of obstructed labor(10)

According to United Nations (UN) estimates, Ethiopia has reduced maternal mortality by 72 percent since 1990, with a 5 percent annual rate of reduction. The maternal mortality ratio (MMR) has declined to 353 per 100,000 live births in 2015 from 1,250 in 1990.(2)

Despite the decrease in perinatal mortality rates in Ethiopia, stillbirth rates are still alarmingly high. In EDHS 2000, 2005, and 2011, the rates stood at 52, 37, and 46 per 1000 total births, respectively. These figures indicate the urgent need to address the issue at hand. The stillbirth rate of 18 per 1000 pregnancies lasting 7 months or more is unacceptable, and it's linked to high maternal deaths, alongside perinatal and neonatal mortality rates. To provide better care during late pregnancy, labor and delivery, and the early postnatal period, there is an urgent need to improve the availability and quality of obstetric services. It is, therefore, essential that we take action to improve the situation.(11)

Several maternal morbidities, also known as “near miss” may be a good indicator of the quality and effectiveness of obstetric care, because it may identify priorities in maternal care more rapidly than mortality alone and from a facility-based cross-sectional study that was conducted in five selected hospitals in Addis Ababa shows that the majorities (88.2%) of near-miss cases were referred from other health facilities, and a significant number of maternal near-misses (68.5%) occurred before arrival at the participating hospitals, which underscores the importance of eliminating pre-hospital barriers.(12)

Obstetric referral is the process of directing or redirecting an obstetric client to an appropriate specialist for definitive treatment. This definitive treatment could be delivered as basic emergency obstetric care (BEMOC) or comprehensive emergency obstetric care (CEMOC) at various levels of health centers within the referral system. Equipment, personnel, infrastructure, medications, and supplies are key indicators of a health facility's readiness to handle obstetric emergencies. If a healthcare facility cannot carry out some or all of the essential services provided by BEMOC and CEMOC for managing obstetric emergencies, it is essential to refer the patient to a more equipped health center. A referral is essential since some required care might not be accessible at the lower tiers of the healthcare system.(13)

The rationale for referrals is the promotion of continuity of services. An efficient referral system provides close communication between all levels of the health system and assists in ensuring that patients receive the finest care possible quickly and conveniently near home. It also helps utilize hospitals and primary healthcare services in a cost-efficient manner. Additionally, it alleviates congestion of patients at secondary and tertiary healthcare facilities.(1)(14) For a good obstetric referral process, the healthcare system is expected to adhere to established protocols. An appropriate obstetric referral should be made timely, adhere to established standards, and have sufficient documentation, staff accompaniment, and prompt care from skilled medical professionals at the receiving facility.(2)

The national referral network is composed of referral networks that are organized based on geographically defined catchment areas. A catchment level of referral network links primary hospitals to health centers. The next level of the referral network connects primary hospitals with

general hospitals that are found in a specifically defined geographic area. The highest level of the network connects general hospitals to specialized hospitals. (1)(15)

Maternal referral is performed based on the available standard operational procedures. Providers need standards to help them decide when to refer a woman to a higher level of treatment depending on the severity of the issue or the level of risk. Such referral criteria must take into account organizational capabilities, community preferences, and local epidemiological conditions. The partograph is frequently suggested as one of these decision-making tools for labor progress and the well-being of the mother and fetus. The link between "use," decision-making, and effective referral action, although successfully incorporated into normal practice in a number of situations, can still call for attention. In fact, the standard operating procedures for maternal referral are provided for all health facilities, including the lead hospitals.(16)

In the city administration of Addis Ababa, obstetric referrals are carried out by various stakeholders, each with distinct roles and responsibilities. Addis Ababa city administration health bureau is the main actor responsible for the overall coordination and endorsement of the referral standard operating procedures and protocols. Lead hospitals have the role of providing appropriate obstetric care for the referred in mothers. A liaison office is a unit that facilitates the referral process by making effective communications with HCs and hospitals in addition to auditing the available beds. Another key actor in the obstetric referral network is the HCs, which are responsible to early identify a mother who requires a referral and referring those mothers who need a referral to the lead hospitals.(3)

One of the key significant strategies encouraged to reduce maternal and neonatal mortality in low and middle-income countries is timely access to CEmONC with the provision of BEmONC at the primary health-care level of country’s health system.(17)

Access to and utilization of facility-based maternal health services is more common in Addis Ababa than in other parts of Ethiopia. According to the 2019 EDHS, 94.8% of women in Addis Ababa reported giving birth in a facility While the indicators for infrastructure, facility readiness, and provider capacity in Addis are superior to those in more distant areas, the metrics for Emergency Obstetric and Newborn Care (EmONC) reveal that conditions in Addis are poorer compared to other major cities like Harar and Dire Dawa, and in some instances, even fall below

national averages. A woman may experiences obstetric complications during pregnancy and childbirth, which might end in maternal death Therefore; decreasing maternal death has become an international health agenda item that could be achieved through the provision of timely, high-quality obstetric services. Provision of evidence-based quality emergency obstetric care helped countries around the world to reduce maternal mortality.(3)

An inefficient referral system is among the key factors contributing to the deaths of mothers. Therefore, "referral" of patients from basic to more advanced levels of care is seen as a crucial component of allopathic healthcare systems. The idea of a formalized maternity referral system has its roots in the previously advocated risk screening strategy during the antenatal period, where frontline health workers would try to identify those women at high risk of obstetric complications and refer them for specialized antenatal and delivery care at a higher (typically hospital) level.(15)(16)

In Ethiopia, the public primary HCs provide basic obstetric and neonatal care (EmONC) and are expected to manage about 85% of the total deliveries. Hospitals are tertiary care centers for referrals and provide comprehensive EmONC for about 15% of complications that cannot be managed at the primary HCs. These two healthcare settings are linked by a system of referral. Referrals could facilitate prompt access to emergency care for mothers with obstetric complications and potentially reduce adverse maternal and neonatal outcomes. Contrary to what is expected, 65% of the total deliveries in Addis Ababa occur in hospitals, with the majority being referred during the intrapartum period.(19) These undue referrals seem to be overburdening the hospitals and contributing to the compromised quality of obstetric and neonatal care in the city. Poor competence among skilled providers, a lack of clinical management protocols at the primary HCs, and poor adherence to clinical recommendations among providers could contribute to the high burden of referrals and poor maternal and neonatal health outcomes.(18)

In this regard, Ethiopia is not exceptional. Several studies from other sub-Saharan countries have shown similar patterns of over-diagnosing obstetric complications in the primary care settings where the magnitude of referrals reached as high as 43 % in Zimbabwe (30 % antenatal and 13 % intrapartum).(20) Studies also show that by strengthening the primary care settings many

of the undue referrals could have been averted without compromising maternal and neonatal wellbeing.(21)

In 2006, the Ethiopian Federal Ministry of Health (FMOH) developed the National Reproductive Health Strategy (2006–2015) that focuses specifically on improving facility infrastructure, training healthcare providers, and promoting referrals to health facilities for birth. Despite ongoing efforts to implement these strategies, the maternal mortality ratio (MMR) has remained high.(18) The 2016 Ethiopian Demographic and Health Survey (EDHS) estimated an MMR of 412 maternal deaths per 100,000 live births which is still high.(22) Currently, UNFPA estimates that 22,000 Ethiopian women and girls die annually as a result of pregnancy and childbirth complications and an additional 500,000 suffer from pregnancy-related morbidities. While the reasons for high maternal mortality ratios in Ethiopia are multifactorial; low rates of facility-based deliveries, lack of trained personnel and emergency obstetric services at facilities, and inefficient referral systems for obstetric emergencies are key health system weaknesses.(17)

A mixed methods approach was employed to evaluate obstacles to providing quality emergency obstetric care. Qualitative analyses included 29 semi-structured key informant interviews with providers from an urban referral network consisting of a hospital and seven health centers. Quantitative survey data were collected from 111 providers, 80% (111/138) of those providing maternal health services in the same referral network, and respondents identified a lack of transportation and communication infrastructure, overcrowding at the referral hospital, insufficient pre-service and in-service training, and the absence of supportive supervision as key barriers to the provision of quality emergency obstetric care. The study concluded that to enhance the effective utilization of current human resources and infrastructure, it is essential to have dedicated transportation and communication systems, as well as improvements in both pre-service and in-service training, along with supportive supervision. These measures would help improve access to and the delivery of timely, high-quality emergency obstetric care in Addis Ababa, Ethiopia..(23)

A good referral system increases the efficiency of the health system by maximizing the appropriate use of healthcare facilities. It strengthens the peripheral health facilities and improves the decision-making capacity of professionals at the lower level of the referral network. It also creates opportunities for a balanced distribution of funds, services, and professionals

while at the same time improving the effectiveness of the health system. In addition, a good referral system helps to promote cooperation among primary, secondary, and tertiary levels of care.(15)

To create an efficient referral system, it is necessary to raise community awareness of the danger signs of pregnancy, labor, and Puerperium, improve access to emergency care units, upgrade outlying facilities to deliver better care closer to the community and enhance the emergency management capacity for obstetric complications in the existing referral facilities.

Due to a shortage of trained personnel and facilities, the primary level of care is not equipped to handle the unanticipated complications of pregnancy and labor, necessitating the referral of patients to higher levels of treatment. A referral strategy informed by an evaluation of the population's needs and the health system's capabilities, referral centers with adequate resources, good cooperation between referral levels, formalized communication, and transportation arrangements between peripheral and referral centers is essential components of successful maternity referral systems in developing countries.(24)

For any type of medical issue, the optimal site of care selection requires a good match between patient risks and facility capabilities and resources. Predicting patients in obstetrics who will require additional resources beyond standard obstetric and newborn care is challenging. Babies born to women without prenatal risk factors may encounter unforeseen difficulties during delivery or afterward.

The need for early detection of obstetric problems and the local provision of appropriate medical and surgical care to address them is now highlighted in current safe motherhood policies. Therefore, critical competencies required of frontline maternity care workers include identifying obstetric problems and initiating appropriate emergency referral processes.(16)

The field of maternal health has long used the framework of the “3 delays” to understand barriers to care and to identify points of intervention The First delay refers to the hesitation of the individual, family, or both in deciding to pursue medical assistance. The second delay may happen when she attempts to access suitable healthcare. Both of these delays are connected to access to healthcare, encompassing elements like family and community beliefs, knowledge about services, cost of care, transportation options, and the distance to healthcare facilities..

Improved awareness in the community and the use of new communications technologies, including mobile phones, can address the first delay. Improved transport services and reduced transport costs can also address the second delay. The third delay is a delay in receiving care at health facilities. This involves factors within the health facility, including organization, quality of care, and availability of staff and equipment. Addressing these issues is an essential component of ensuring quality emergency obstetric care. Almost three-quarters of the current maternal deaths might be averted.(25)

A prospective observational study conducted in Pakistan aimed to outline the perinatal and maternal outcomes in patients referred to a tertiary care hospital and to assess how delays affect these feto-maternal outcomes from July to December 2010 showed that Patients referred in the antenatal period were 21%, 69% in the intrapartum period, and only 10% in the postpartum period. 53.5% of them were delivered via CS, 16% via instrumental delivery, and 14 % via SVD. The most common reasons for referral were meconium-stained amniotic fluid, prolonged labor, fetal distress, and repeat Cesarean sections, respectively. Maternal death was 2.5%, which is 97% of referrals, and fetal death was 13%, which is 87% of all referrals. This research concludes that the rates of referrals to tertiary care centers are steadily increasing. Repeat Caesarean sections and meconium-stained liquor are the top reasons. Delay in referral is a big contributory factor to adverse maternal and perinatal outcomes. There is an urgent need for the provision of a 24-hour emergency Obstetric care system with alert transportation readily available to women in need.(26)

Another facility-based, cross-sectional study done to assess where the delays occur in the referral chain of most maternal health outcomes in Addis Ababa, Ethiopia, based on the three-delay model, shows that 90.8% of pregnant women experienced at least one of the three delays and 17.6% experienced all three delays. 7.2% of referred women had severe maternal outcomes. Three-fourths (74.7%) of the referred pregnant women experienced the third delay (delay in receiving appropriate care) and 52.4% experienced the first delay (delay in deciding to seek care). The study highlights the persistence of delays at all levels, especially the third delay and its contribution to severe maternal outcomes.(27)

A Systematic review done to assess the effectiveness of emergency obstetric referral interventions in developing country settings found that complex, community-targeted interventions reduce neonatal mortality, but not how the referral components contributed.(26)

In a descriptive cross-sectional study on sociodemographic characteristics and pregnancy outcomes of referred and booked parturients in Nigerian teaching hospitals, statistically significant differences were found in gravidity, marital status, social class, and average monthly income of patients' modes of delivery and pregnancy outcomes. 43.8% of referred cases were able to achieve SVD, with 43.1% requiring CS, but booked parturients achieved 70.5% of SVD. 44% had CS, there were 11.8% neonatal deaths, and 22.9% of babies were admitted into the NICU in the referred parturients, but there were 0.7% neonatal deaths and 7.8% NICU admissions in those booked parturients. This study has shown that regular antenatal care has a significant impact on improving pregnancy outcomes.(28)

In another descriptive retrospective study done in northern Tanzania among referred pregnant women in labor shows that the majority of them are primigravid and the main reason for referral was prolonged labor. Among those women, almost half gave birth by CS (45%). The maternal deaths that occurred during the study period almost exclusively occurred in women referred from health facilities while in labor, and they concluded that the majority of referred women during labor from lower health facilities are linked to maternal complications, such as prolonged labor. This highlights the importance of further evaluating the capabilities of lower-level health facilities to promptly identify complications and deliver efficient emergency obstetric care, as well as ensuring timely referrals to more advanced facilities.(29)

In a cross-sectional study that was done in the Philippines to determine the maternal and fetal outcomes of referred cases from the period of January 1, 2019, to December 31, 2019, it was shown that 40% of referred cases were primigravid and had preexisting medical problems (7.4%). The most common reason for referral was labor dystocia (protracted labor +prolonged second stage of labor), hypertension, PPH, and malpresentation, followed by fetal distress. The primary CS rate was 16.6%. 18 cases necessitate other forms of major and minor surgical intervention. The maternal near-miss cases that satisfied the criteria set by the WHO were 46.7 per 1000 live births. The maternal mortality rate was 10.6 per 1,000 live births. 45% of newborns

required NICU admission, and there were 13 stillbirths .The study found that 40% of referred cases, including first-time pregnancies and pregnant women with existing medical conditions, should not have been handled at the primary care level. Instead, they should have been directed to a secondary or tertiary care facility for proper management.. Needless to say, education of the populace and more training and monitoring of the performance of the base health facility workers should be done to prevent maternal and fetal catastrophes. (30)

A prospective clinical study undertaken to study the maternal and fetal outcomes of obstetric referrals during the study period of January 2019 to September 2019 in eastern India showed that 62% of them were primigravid, 72.09 % of them were in the age group between 21 and 25 years, and 66.1% were of socioeconomic status class III. 62.3% of them were delivered via CS. 37.7% were delivered vaginally, and there was one instrumental delivery. The common reasons for referral were pregnancy-induced hypertension, previous CS, PROM, preterm labor, and fetal distress, followed by obstructed labor. The perinatal mortality rate was 95.23 per 1000 live births. One-third of newborns were admitted to the NICU, with the most common cause of admission being asphyxia. Maternal morbidity was in the form of wound sepsis (8%) and 8 cases of PPH. Unlike other studies, there was no maternal mortality. They have concluded that educating the population about the existing health care delivery system and sensitizing the public towards improving maternal and child health would go a long way towards optimally utilizing the existing infrastructure and improving maternal and neonatal outcomes.(31)

A prospective observational study was conducted from September 2017 to September 2019 in Odisha (India) to assess the maternal and perinatal outcomes of referred Patients in labor from peripheral hospitals. From the study, the incidence of referral of obstetric cases in labor was 211 per 1000 referred cases. Primigravida constituted 65.8% of the total recorded cases. Most referred cases were from rural areas (80.7%), with the primary cause of referral being fetal distress (28.7%), followed by obstructed labor (21%). In this study, vaginal delivery (55.4%) was the primary mode of delivery compared to Cesarean section (44%). Postpartum hemorrhage (22.8%) was found to be the most common maternal complication, and birth asphyxia (28.9%) was the most common perinatal complication in this study. They concluded that mass health education, a team of well-trained healthcare providers at peripheral hospitals, and timely referral are crucial in achieving satisfactory maternal and fetal outcome.(32)

3. OBJECTIVE

3.1 GENERAL OBJECTIVE

- ✔ To assess the clinical, sociodemographic profiles and feto-maternal outcome of pregnant women referred for labor and delivery.

3.2 SPECIFIC OBJECTIVE

- ✔ Identify the clinical and sociodemographic profiles of pregnant women referred for labor and delivery.
- ✔ To describe the maternal outcome of pregnant women referred for labor and delivery.
- ✔ To describe the fetal outcome of pregnant women referred for labor and delivery.

4. METHODS

4.1 STUDY DESIGN AND PERIOD

Facility-based prospective cross-sectional study was undertaken from February to May, 2024

4.2 STUDY AREA

The study was conducted in Black Lion Specialized Hospital, Zewditu Memorial Hospital, and Gandhi Memorial Hospital, which are found in Addis Ababa and cover the higher maternity service in Addis Ababa

4.3 SOURCE POPULATION

All mothers referred to the Department of Obstetrics and Gynecology at the three teaching hospitals.

4.4 STUDY POPULATION

All pregnant women referred for labor and delivery service to the three teaching hospitals during the study period.

4.5 ELIGIBILITY CRITERIA

Inclusion criteria

- ✔ All pregnant women referred for labor and delivery service to the three teaching hospitals during the study period**.**

Exclusion Criteria

- ✔ Patient booked in our hospital.
- ✔ Patients who refused to give consent.
- ✔ Self-referrals

4.6 SAMPLING SIZE AND SAMPLING TECHNIQUE

4.6.1 SAMPLE SIZE DETERMINATION

The sample size was calculated with 95% confidence interval, 5% margin of error and P (proportion of adverse maternal and perinatal outcome) was taken as 50% because there was no study done in our set up.

The required sample size was calculated using a single population proportion formula:

$$n = \frac{(Z\alpha/2)^2 P (1-P)}{d^2}$$

$$n = \frac{(1.96)^2 x (0.5(1-0.5)}{(0.05)^2} = 384$$

Where:

n= the minimum sample size

Zα/2= value of standard normal distribution (SND) corresponding to a significance level of alpha at 95 %(1.96)

P= proportion of adverse maternal or perinatal outcome which was taken as 50%

d=margin of error 5%

Potential 10% of non-respondent rate was added so our final sample size was 422.

4.6.2 SAMPLING PROCEDURE

The calculated sample size was proportionally allocated to the three hospitals based on the number of cases referred for labor and delivery service for the last three months, 2023. Information regarding referrals was collected from the selected health facilities HMIS for this study. On the basis of this, a proportional allocation of samples was made for each facility. 65, 78, and 279 referrals from TASH, ZMH, and GMH, respectively, were included. Recruitment of study subjects for the study was made using consecutive sampling, in which the participants were identified or recruited before discharge, and the recruitment continued until the allocated sample size for each hospital was fulfilled using the systematic sampling method from each health facility.

4.7 STUDY VARIABLES

4.7.1 DEPENDENT VARIABLE:

Feto-maternal outcome

4.7.2 INDEPENDENT VARIABLES:

Sociodemographic characteristics

- ✔ Age
- ✔ Marital status
- ✔ Residence
- ✔ Educational status
- ✔ Monthly income

Obstetric factors

- ✔ Reproductive history
- ✔ Gestational age
- ✔ Current obstetric complications
- ✔ Other medical comorbidities

Referral factors

- ✔ Reasons of referral
- ✔ Mode of transport
- ✔ Time of referral
- ✔ Time of arrival
- ✔ Diagnosis at arrival
- ✔ Maternal condition at arrival
- ✔ Fetal condition at arrival
- ✔ Waiting time before interventions

Health seeking behavior

- ✔ **ANC**

4.8 OPERATIONAL DEFINITIONS

Adverse perinatal outcome: The occurrence of at least one of the following: low Apgar score in the first fifth minute, Still birth, perinatal asphyxia, LBW, early onset neonatal sepsis, early neonatal death.

Adverse maternal outcome: A mother who was diagnosed to have one or more of the following: postpartum haemorrhage, shock, eclampsia, uterine rupture, pulmonary edema, laboratory evidence of organ damage, requirement of blood transfusion and/or maternal death during the process of delivery and those who underwent laparotomy.

Labor: Diagnosed by treating health professional after a women achieves more than two contractions and /or with the presence of cervical change**.**

Referral: pregnant women who were brought for obstetric care with a referral slip and an accompanying health professional in order to receive better care but had not received antenatal care at any of the three hospitals

4.9 DATA COLLECTION TOOLS AND PROCEDURE

Data collectors were trained on the objective of the study, the data collection procedures, and the data collection tool. A pre-test was done on 5% of the total sample size before the study to establish the suitability, practicability, and reliability of the study questions. Modifications and adjustments were made as appropriate. Data was collected using structured questionnaires and checklists adapted from other studies and expert opinions. The questionnaire was prepared in the English language.

Data was collected by the trained data collectors. On enrolling eligible patients, the trained data collectors introduced themselves to the patient and got consent to answer the questionnaire. The data obtained from the questionnaires were supplemented by data extracted directly from the patient's files, including the referral form. For complicated mothers and newborns, data collectors were looking at the patient's progress. The newborns progress was followed for 7 days.

During the data collection period, the principal investigator was there to watch over the procedure. Moreover, collected data was reviewed and checked for completeness and consistency by the principal investigator daily.

4.10 DATA PROCESSING AND ANALYSIS

After the data have been collected, the data was first checked for completeness, edited, and coded. The extracted data was cleaned and checked for accuracy and consistency, and then it was entered into SPSS version 26 and analyzed. Descriptive statistics were used and presented with narration, tabulation, and graphical presentation. Binary logistic regression was used to do bi-variable and multi-variable analysis to determine the associated factors. Variables with p-value <0.05 in bi-variable analysis were entered into multivariable analysis to filter out confounding factors.

5. RESULT

5.1 Sociodemographic characteristics of the study participants

In this study, 411 participants were involved, giving a response rate of 97.4%. The majority (40.1%) of the study participants were in the age group of 25–29 years, with a mean and SD of 26.73±4.79 years. Ninety-two percent of the study participants were married, and 40.6% had secondary education. Almost half of the study participants were housewives, 61.8% were orthodox Christians in religion, and 61.3% were housewives with a monthly income of 5000–10,000 ETB

Table 1 The sociodemographic characteristics of study participants who referred for labor and delivery service to the three teaching hospitals during the study period.

Variable	frequency	Percent
Age in years		
19-24	140	34.1
25-29	165	40.1
30-34	73	17.8
≥35	33	8.0
Marital status		
Married	377	91.7
Single	28	6.8
Divorced	6	1.5
Education level		
No formal education	34	8.3
Primary	128	31.1
Secondary	167	40.6
Collage and above	82	20.0
Occupation		
Housewife	200	48.7
Government employee	62	15.1
Merchant	91	22.1
Daily laborer	43	10.5
Student	15	3.6
Religion		
Orthodox	254	61.8
Muslim	102	24.8
Protestant	52	12.7
Catholic	3	.7

Monthly income		
<5000	102	24.8
5000-10000	252	61.3
>10000	57	13.9

5.2 Obstetric related characteristics of the study participants

Half of the study participants were Primigravida, and 25.2% had a history of abortion. Of those, 84.6% had only had one abortion. 78% of the study participants were referred at GA of 37–40^{+6} weeks, while 12.7% of the referred cases were referred at GA between 28–36+6 weeks, and 3.6% of the referred mothers have an unknown GA.

71.3% of mothers delivered at the health centers, and 81.6% had a previous outcome of an alive birth. Ninety percent of the mothers delivered vaginally. Almost ninety-four percent of the study participants had antenatal care follow-up, and of those, 89.6% had ANC follow-up at the health centers. Fifty-three percent of the study participants initiated antenatal care in the first trimester of pregnancy, and 16.8% of the study participants had more than eight and above ANC follow-up visits.

Table 2. Obstetric characteristics of the study participants

Variable	Category	Frequency	Percent
Gravidity	Primigravida	204	49.6
	Multigravida	196	47.7
	Grand multigravida	11	2.7
Parity (n=207)	Nulliparous	23	10.7
	Primiparous	117	56.8
	Multiparous	65	31.6
	Grand multiparous	2	1.0
History of abortion (n=207)	Yes	53	25.6
	No	154	74.4
Number of abortion (n=53)	One	45	84.9
	Two	2	3.8
	Three	6	11.3
Gestational age in weeks	<37	52	12.7
	37-40^{+6}	305	74.2
	41-41^{+6}	37	9.0
	≥42	2	.5
	unknown	15	3.6
Place of previous delivery (N=184)	Local HC	131	71.2
	Hospital	33	17.9

	Home	20	10.9
Outcome of the previous pregnancies(n=207)	Abortion	53	25.6
	Live birth	182	87.9
	Neonatal death	1	0.5
	Stillbirth	5	2.4
How did the client give a birth for her previous babies (n=184)	Caesarean delivery	10	5.3
	CS and SVD	4	2.2
	SVD	166	90.3
	SVD and breech	2	1.1
	Vaginal breech delivery	2	1.1
Antenatal care follow up	Yes	386	93.9
	No	25	6.1
Place of ANC (n=386)	HC	346	89.6
	Private clinic	20	5.2
	Private hospital	11	2.8
	Government hospital	9	2.4
Time of ANC initiation (n=386)	First trimester	206	53.4
	Second trimester	174	45.1
	Third trimester	6	1.5
Number of ANC (n=386)	<8	321	83.2
	≥8	65	16.8

5.3 Duration of waiting from any obstetric symptom up to arrival health facility

85.2% of mothers visited a health facility after 30 minutes of the initial symptom, and of those mothers, 55.4% waited for more than 30 minutes because they thought it was normal.

Table 1 Duration of waiting from any obstetric symptom up to arrival health facility

Variable	frequency	Percent
Duration of time from any obstetric sign and symptom		
≤30minute	61	14.8
>30minute	350	85.2
Reason for waiting more than 30 minutes (=350)		
Didn't know the danger sign	61	17.4
Think of fine and normal	194	55.4
Don't have money	13	3.7
I couldn't have transport	93	26.6
Waiting for decision of family	24	6.9

5.4 REFERRAL RELATED CHARACTERISTICS OF THE STUDY PARTICIPANTS

Most (93.7%) of the study participants were referred from the health centers, and 47.2% of the participants went to the health center with a complaint of pushing down pain. Almost 43 percent (42.8%) of the study participants were referred at night, and 41.6% arrived at night in the study setting. Sixty-nine percent of the study participants took more than 30 minutes to arrive in the referred setting from the time of referral, and 77.1% were referred by the midwife and 93.2% were transported by ambulance.

Table 2Referral related characteristics of the study participants

Variable	frequency	Percent
Source of referral		
HC	385	93.7
private clinic	7	1.7
private hospital	2	.5
Government hospital	17	4.1
Chief compliant at the health centers		
Pushing down pain	194	47.2
pushing down pain with leakage liquor	160	38.9
Pushing down pain and Vaginal bleeding	13	3.2
Pushing down pain and headache/blurring of vision/epigastric pain	15	3.6
Leakage of liquor	15	3.6
Headache/blurring of vision/epigastric pain	7	1.7
Vaginal bleeding	5	1.2
Decrease fetal movement	2	.5
Time of referral		
Day	235	57.2
Night	176	42.8
Time of arrival		
Day	240	58.4
Night	171	41.6
Time taken from referral to arrival in minute		
≤30	125	30.4
>30	286	69.6
Who referred the patient		
Midwife	317	77.1
HO	48	11.7
GP	44	10.7
OBGY specialist	2	.5
Mode of transport in referral		
Ambulance	383	93.2
Taxi	22	5.4
private vehicle	6	1.5

5.5 THE REFERRAL DIAGNOSIS OF THE STUDY PARTICIPANTS

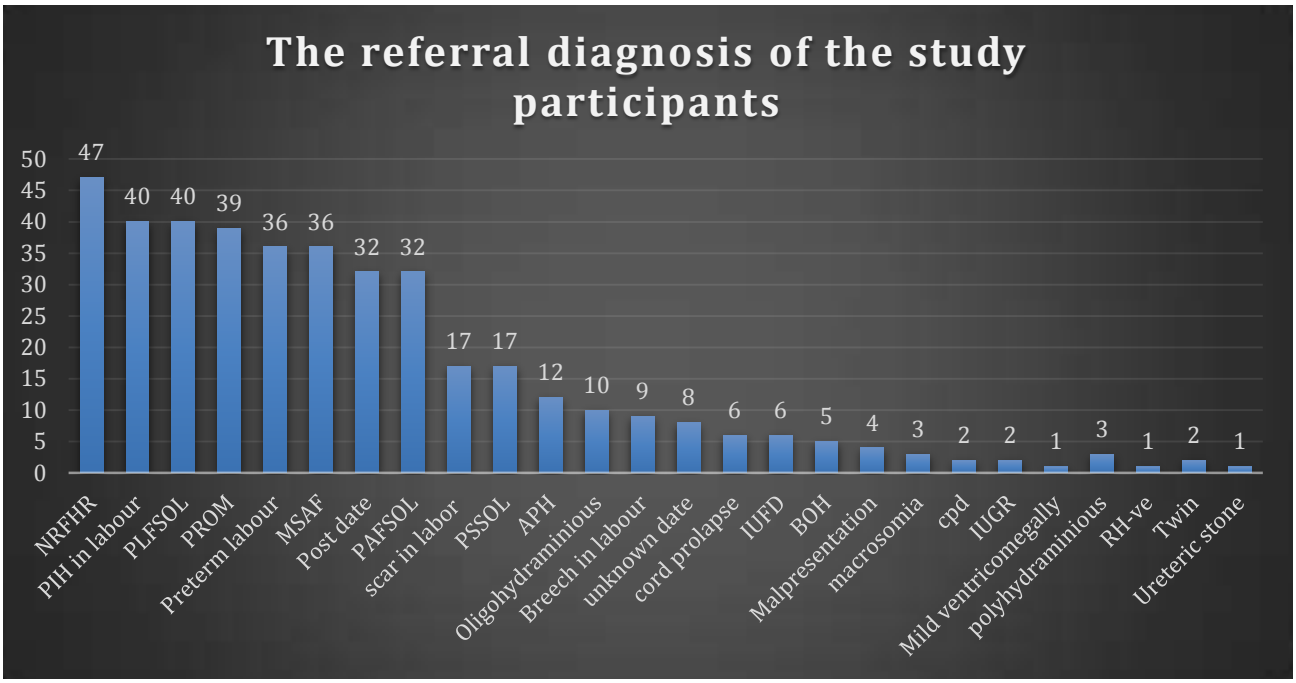

Figure 1.The referral diagnosis of the study participants

5.5 DIAGNOSIS OF THE PATIENT ON ARRIVAL AT THE EMERGENCY OPD

Upon arrival at the three hospitals, 54.1% of the laboring mothers who had been referred were diagnosed with normal progressive labour, whereas 45.9% of the referrals were diagnosed with complicated labour.

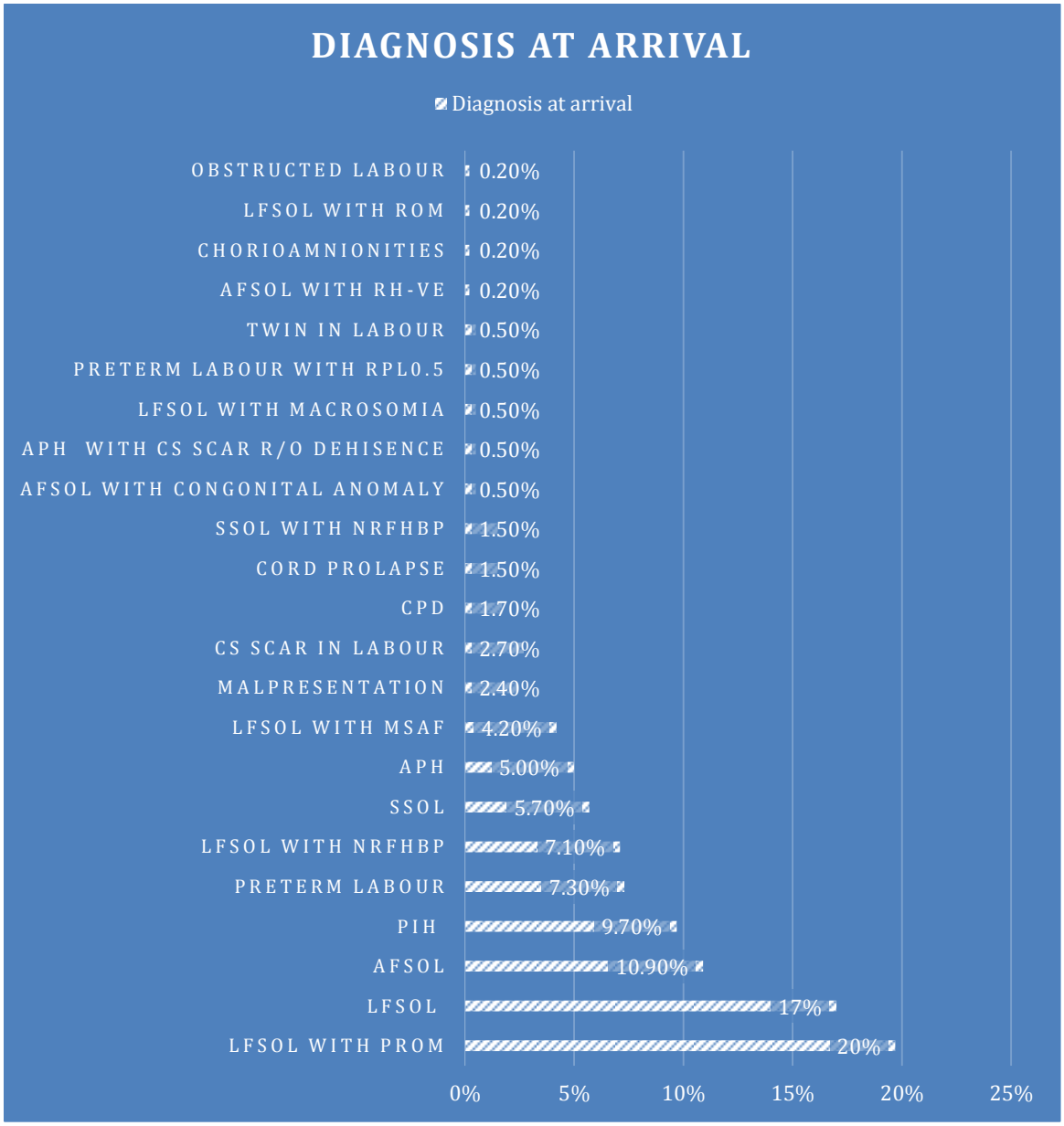

Figure 1 Diagnosis at arrival

5.6 LABOUR AND DELIVERY CHARACTERISTICS OF THE STUDY PARTICIPANTS

Eighty percent of the study participants had a normal fetal heartbeat on arrival, and 89.8% were delivered within 12 hours of arrival. Half of the study participants were delivered vaginally, and 46.2% were delivered by caesarean section. From those delivered by CS, 43.2% were done directly from the EGOPD within thirty minutes of arrival, and 41% of them were done for an indication of NRFHRP.

Table 3Labour and delivery characteristics of the study participants

variable	frequency	Percent
FHB at arrival(n=413)		
Normal	331	80.1
Tachycardia	49	11.9
Bradycardia	22	5.3
Negative	11	2.7
Total Still birth	17	
FHB negative before arrival	11	64.7
FHB negative after arrival	6	35.3
Duration of labor after arrival		
<12hrs	369	89.8
≥12hrs	42	10.2
Mode of delivery		
SVD	205	49.9
CS	190	46.2
ABD	3	.7
Instrumental	13	3.2
If SVD labour condition (n=205)		
Spontaneous	198	96.6
after augmentation	7	3.4
CS time of decision (n=190)		
Direct (from EOPD < 30 minutes stay	82	43.2
After following at Emergency OPD or labor Ward	108	56.8
Types of instrumental delivery (n=13)		
Vacuum	4	30.8
Forceps	9	69.2
Place of delivery (221)		
Labour ward	209	94.5
EGOPD	12	5.5

5.7 INDICATION OF CESAREAN DELIVERY

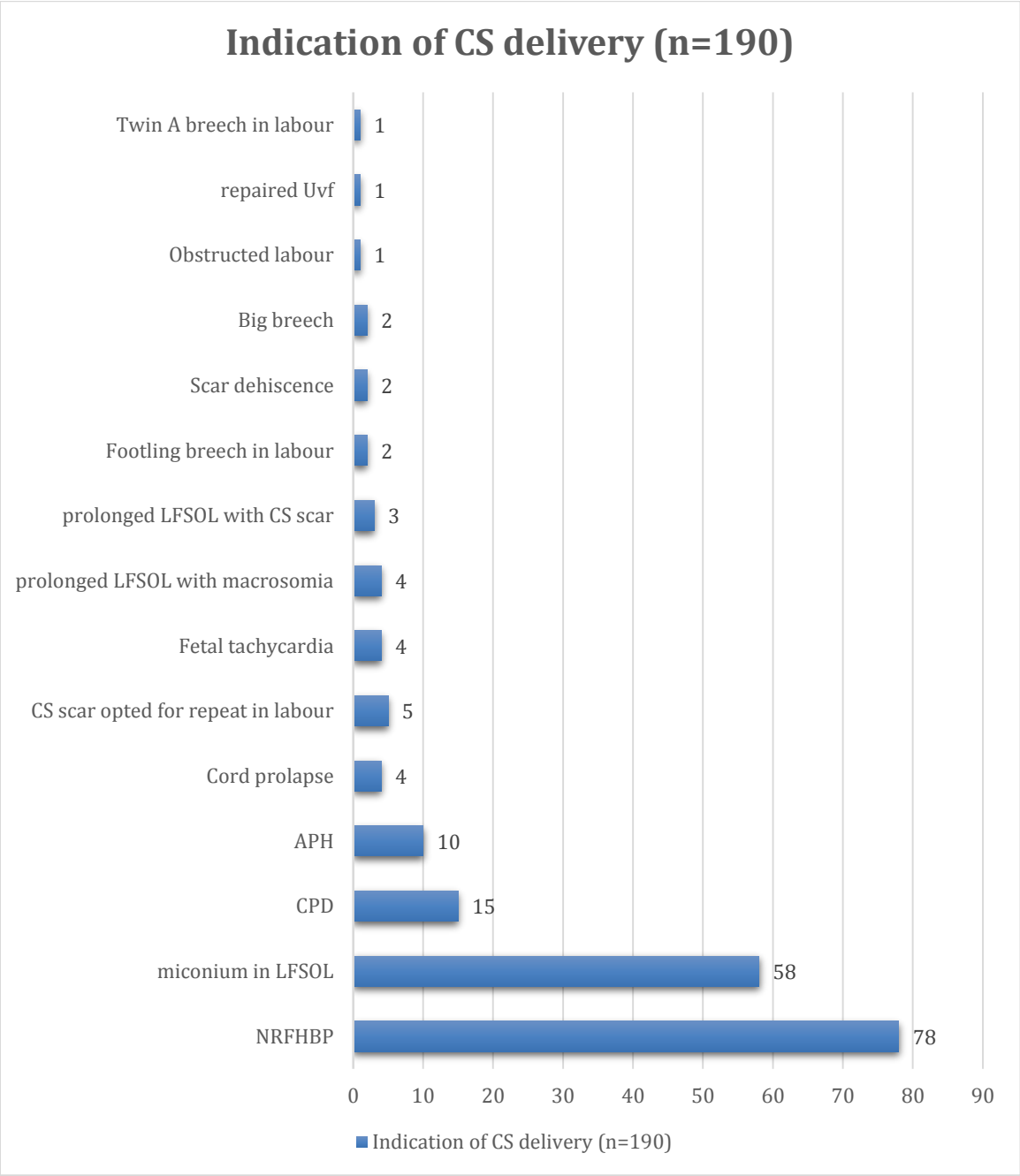

Figure 2Indication of cesarean delivery

5.8 MATERNAL OUTCOME RELATED CHARACTERISTICS

Seven percent of the patients in this study had poor maternal outcomes. Of them, 46.4% needed blood transfusions, 25% needed to be admitted to the ICU, and 21.4% had PPH diagnoses followed by eclampsia and coagulation abnormalities.

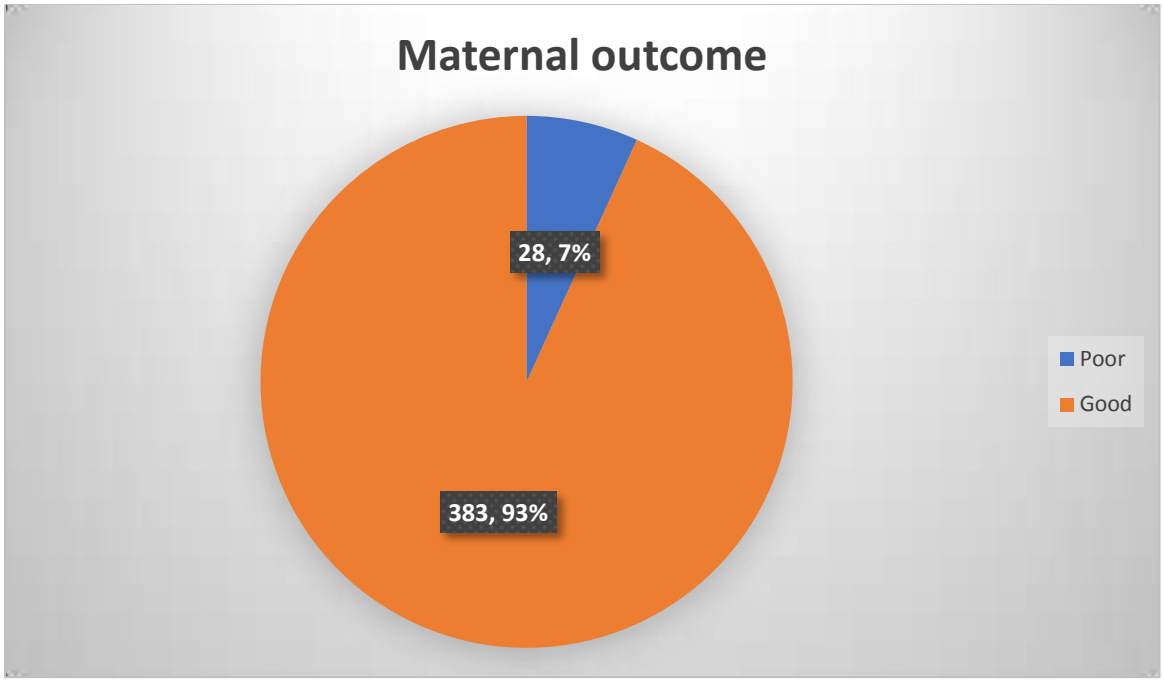

Figure 3 maternal outcome

5.9 TYPES OF MATERNAL COMPLICATION

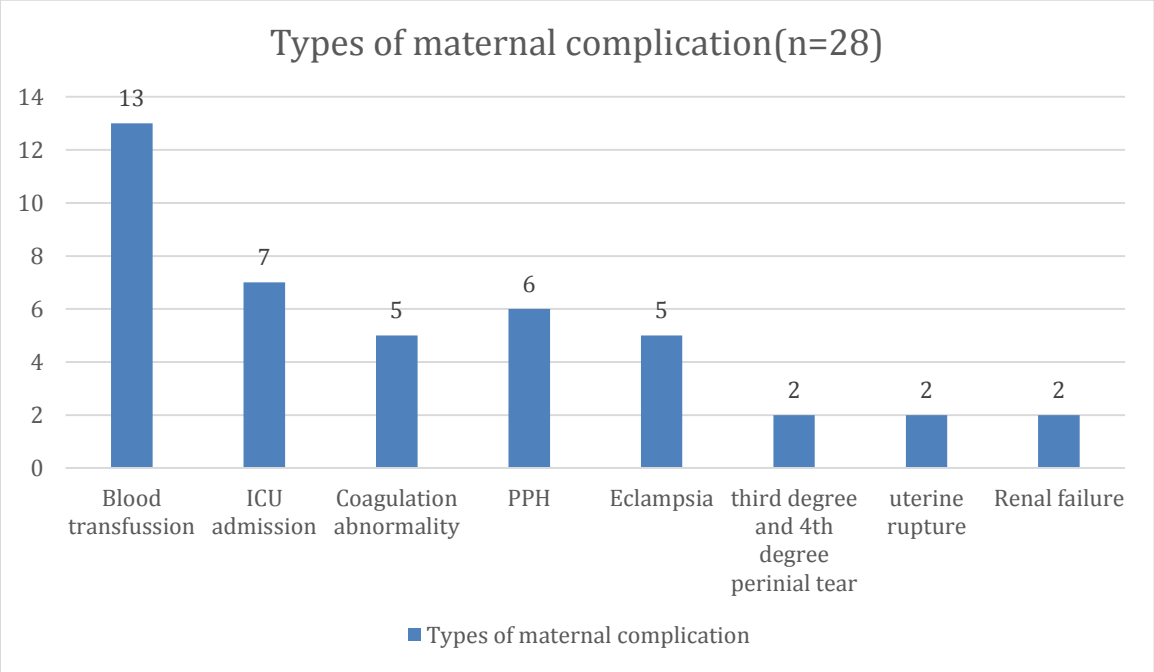

Figure 4 Type of maternal complication

5.10 THE DETERMINANT FACTOR OF MATERNAL POOR OUTCOME

The findings of the study revealed that ANC, time of arrival, mode of delivery, and perinatal outcome were associated with maternal outcome by bivariate logistic regression. The multivariate logistic regression revealed that study participants who haven't had ANC were 3.3 folds more likely to have poor maternal outcome outcomes compared to those who did (AOR = 3.3, 95% CI = 1.87, 12.83), and study participants who arrived after 30 minutes of referral were 3.1 folds more likely to have poor maternal outcomes compared to those in the opposite compartment (AOR = 3.1, 95% CI = 1.27, 7.69).

Study participants whose modes of delivery by instrumental and ABD were 8.9 and 7.3 folds increased their poor maternal outcomes compared to those delivered by SVD (AOR = 8.9, 95% CI = 2.03, 39.67, and AOR = 7.3, 95% CI = 5.54, 49.38, respectively), and study participants

who had poor perinatal outcomes had 2.9 folds increased their poor maternal outcomes compared to their opposite compartments (AOR = 2.9, 95% CI = 1.17, 7.57)

Table 4The bivariate and multivariate logistic regression of association between maternal outcome and independent variable among women referred for labour and delivery in the three teaching hospitals of Addis Ababa university, 2024.

Variable	Maternal outcome		P-value	COR with 95%CI	p-value	AOR with 95%CI
	yes	No				
Have ANC						
Yes	22	364	1		1	
No	6	19	0.001	5.2(1.89, 14.39)	0.049	**3.3(1.87, 12.83)**
Duration from referral to arrival in minute						
≤30	16	109	0.002	3.4(1.54, 7.32)	0.013	**3.1(1.27, 7.69)**
>30	12	274	1		1	
Time arrival						
Day	14	226	1		1	
Night	14	157	0.53	1.4(0.67, 3.10)	0.162	1.9(0.77, 4.63)
Mode of delivery						
SVD	10	195	1		1	
CS	11	179	0.687	1.2(0.49, 2.88)	0.639	1.3(0.48, 3.32)
ABD	2	1	0.004	13.9(3.26, 46.72)	0.001	**7.3(5.54, 49.38)**
Instrumental	5	8	0.000	12.2(3.37, 44.07)	0.004	**8.9(2.03, 39.67)**
Outcome of the neonate						
Good	12	263	1		1	
Poor	16	120	0.007	2.9(1.34, 6.37)	0.022	**2.9(1.17, 7.57)**

5.11 PERINATAL OUTCOME RELATED CHARACTERISTICS OF THE STUDY PARTICIPANTS

The finding of the study also indicates that 33% of the neonate had poor perinatal outcome, while 67% had good perinatal outcome as shown in the figure below.

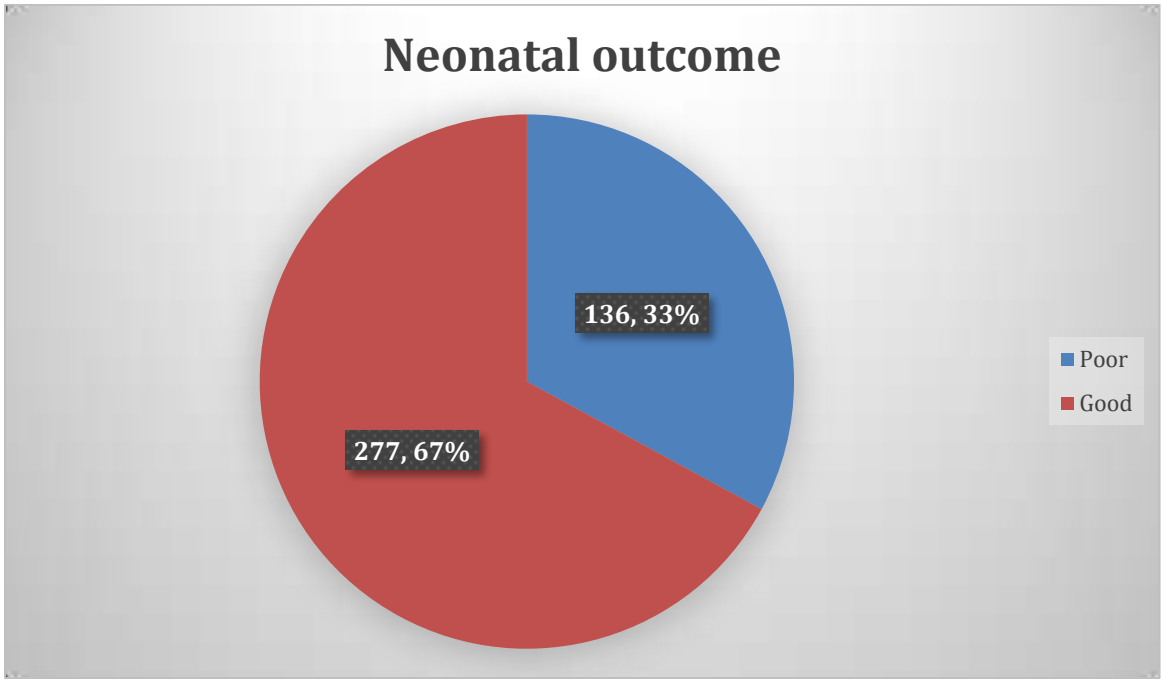

Figure 5 Neonatal outcome

In this study, 95.9% of the participants had an alive fetal outcome, and 84.7% of them had a normal birth weight. Four percent of newborns were stillborn. Thirty-percent of the neonates were admitted to the NICU, of whom 38.7% were admitted with a diagnosis of neonatal sepsis. From those admitted to the NICU, 75.6% improved, 7.6% died, and 16.8% were still in the NICU after 1 week of admission.

Table 5 Perinatal and neonatal outcome related characteristics of the study participants

Variable	frequency	Percent
Fetal outcome (n=413)		
Alive	396	95.9
Still birth	17	4.1
weight of the newborn (n=413)		
<2500	56	13.6
2500-3999	350	84.7
≥4000	7	1.7
First minute APGAR(n=413)		
0	17	4.1
1-6	36	8.7

≥7	360	87.2
Fifth minute APGAR (n=396)		
1-6	10	2.5
≥7	386	97.5
Admission to NICU (n=396)		
Yes	119	30
No	277	70
Admission diagnosis(n=119)		
Birth trauma	2	1.7
MAS	12	10.1
Neonatal Jaundice	1	0.8
Neonatal sepsis	46	38.6
Neonatal sepsis and Jaundice	2	1.7
Neonatal sepsis and LBW	8	6.7
Neonatal sepsis and MAS	2	1.7
Neonatal sepsis and RDS	10	8.4
Perinatal asphyxia	20	16.8
PNA and MAS	2	1.7
RDS	14	11.8
Outcome of NICU (n=119)		
Dead	9	7.6
Improved	90	75.6
Till in NICU	20	16.8

5.12 THE DETERMINANT FACTOR OF NEONATAL OUTCOME

The odds of maternal education level, ANC follow-up, and the duration of time from referral to arrival were associated with neonatal outcome by bivariate logistic regression. The multivariate logistic regression revealed that study participants whose education level is illiterate had a 1.8-fold increase in their poor neonatal outcome compared to those whose education level is college and above (AOR = 1.8, 95% CI = 1.15–4.96), and study participants who haven't had ANC follow-up had a 4.7-fold increase in their poor neonatal outcome compared to those in their opposite compartment (AOR = 4.7, 95% CI = 2.15–12.42). The study participant who initiated ANC in the third trimester had a 7.5-fold increase in its poor neonatal outcome compared to those initiated in the first trimester of pregnancy (AOR = 7.5, 95% CI = 1.16–48.20).

The study participant who was referred at night had a 1.6-fold increase in poor neonatal outcome (AOR=1.6, 95%CI=1.04, 2.59), and the study participant who took more than 30 minutes to

arrive after referral had a 2.5-fold increase in poor neonatal outcome compared to its opposite compartment (AOR=2.5, 95%CI=1.41, 4.35).

Table 6The bivariate and multivariate logistic regression of association between neonatal outcome and independent variable among women referred for labour and delivery in the three teaching hospitals of Addis Ababa university, 2024.

Variable	Neonatal outcome		p-value	COR with 95%CI	P-Value	AOR with 95%CI
	Poor	Good				
Age in years						
19-24	47	93	0.091	2.3(0.88, 5.89)	0.099	2.5(0.84, 7.42)
25-29	58	107	0.063	2.4(0.95, 6.25)	0.068	2.7(0.93, 7.85)
30-34	25	48	0.098	2.3(0.86, 6.42)	0.063	2.8(0.85, 8.54)
≥35	6	27	1		1	
Maternal education level						
No formal education	17	17	0.049	2.3(1.00, 5.18)	0.014	**1.8(1.15, 4.96)**
primary	46	82	0.416	1.3(0.71, 2.31)	0.874	1.1(0.53, 2.11)
secondary	48	119	0.776	0.92(0.52, 1.64)	0.840	0.94(0.49, 1.77)
collage and above	25	59	1		1	
House hold monthly income in birr						
<5000	46	56	0.149	1.6(0.84, 3.23)	0.955	0.98(0.44, 2.15)
5000-10000	71	182	0.440	0.78(0.42, 1.45)	0.428	0.76(0.39, 1.48)
>10000	19	38	1		1	
ANC follow up						
Yes	118	268	1		1	
no	18	9	0.000	5.8(2.38, 14.36)	0.001	**4.7(2.15, 12.42)**
Time of ANC initiation						
First trimester	54	153	1		1	
Second trimester	60	115	0.080	1.5(0.95, 2.30)	0.149	1.4(0.88, 2.25)
Third trimester	4	2	0.050	5.6(1.00, 31.61)	0.035	**7.5(1.16, 48.20)**
Time of referral						
Day	69	166	1		1	
Night	67	111	0.064	1.5(0.98, 2.24)	0.033	**1.6(1.04, 2.59)**
Duration of referral to arrival in minute						
≤30	32	94	1		1	
>30	104	183	0.034	1.7(1.04, 2.65)	0.002	**2.5(1.41, 4.35)**

6. DISCUSSION

A total of 411 women referred for labor and delivery services were included in this study. The majority of referral cases are in the age group between 25 and 29 (40.1%); there was no referral of the teenage pregnancy group in this study, and 8.3% of the women haven't had formal education. In fact, the literate percentage is highest in Addis Ababa (84%). (22)

Almost half (49.5%) of the study participants were Primigravida, and 78% of the women were referred at GA of 37–40+6 weeks. The study also shows that 3.6% of the referred women have no early milestone, nor do they remember their last normal menstrual period. Almost 94 percent of the study participants had antenatal care follow-up; of those, only 16.8% had more than eight and above ANC follow-up visits, as currently recommended.

The most common reasons for referral to the tertiary hospital were dystocia or (labor abnormality), which accounted for 21.7% of the referrals, followed by fetal distress (11.4%) and pregnancy-induced hypertension, which accounted for 9.7% of the referral cases. These study findings are consistent with other published studies. (29, 30, 31)

In this study, half (49.9) of the study participants delivered vaginaly, and 46.2% of them delivered via cesarean section. The percentage of CS was consistent with the study done in Nigeria and Tanzania (28, 29), but lower than the study done in eastern India (31).

The findings of this study also assess the maternal and perinatal outcomes of mothers referred to tertiary hospitals for tertiary care accordingly. The result of the study found that 8% of the study participants had poor maternal outcomes. From those poor maternal outcomes, blood transfusion requirement accounts for 46.4%, followed by ICU admission, PPH, eclampsia, and coagulation abnormalities. This finding is in line with the study done in Addis Ababa and India (31). This complication may be because patients are referred when their condition exceeds the management capabilities of the referring health facility, and given that they arrive in critical condition, it exacerbates their situation. Another possibility is that the high number of patients at referral centers can overwhelm these facilities, potentially resulting in compromised quality of care due

to overcrowding and overworked staff. The fact that our tertiary health facilities are also not equipped as expected makes the condition more worse.

The study participants who haven't had ANC had 3.3-fold increase in poor perinatal outcomes compared to those who have had ANC. Regular antenatal care has a significant impact on improving pregnancy outcomes, and this was also shown in a study done in Nigeria in which the booked patients had better maternal and fetal outcomes than the referred patients. It's during ANC that detailed histories of past and present pregnancies are obtained and preexisting health conditions, if any, are identified. Patients that may be predisposed to developing certain conditions during the course of pregnancy or worsening of preexisting conditions are identified, and this forms the foundation of subsequent antenatal visits.

Those study participants who arrived within 30 minutes of referral had 3.1-fold poorer maternal outcomes than those who arrived after 30 minutes of arrival even if the patients reached early they were already complicated so early identification of complications and those mothers having risk factors will alleviate this problem.

Study participants whose modes of delivery are instrumental and assisted breech delivery were 8.9 and 7.3 folds, which increased their poor maternal outcomes compared to those delivered by SVD this could be explained by possible complications associated with instrumental delivery including perinatal trauma and PPH.

Study participants having poor perinatal outcomes had a 2.9-fold increase in their poor maternal outcome compared to their opposite compartment this may be because those having poor maternal outcomes has also adverse perinatal outcomes considering the interventions like instrumental delivery done for indication of fetal distress which resulted in adverse perinatal outcome due to already compromised state during arrival and the possible complications associated with instrumental delivery resulted in maternal complication including perineal trauma and subsequent complications like PPH and blood transfusion requirement.

The findings of the study also revealed that 33% of the neonates had poor perinatal outcomes, and of those four percent, they were stillborn. This finding was lower than the study done in Nigeria (28). Thirty percent of the neonates were admitted to the NICU, and 38.7% of them were admitted with a diagnosis of neonatal sepsis. This finding was higher than the study done in Nigeria and India (28, 32). This may be because the majority of the referred cases are with prolonged labor, as well as the contribution could be there with those patients with prelabor rupture of membrane and preterm labor, which inherently carry higher risks for poor perinatal outcomes.

From those admitted to the NICU, 75.6% improved, 7.6% died, and 16.8% were still in the NICU after 1 week of admission. This finding was higher than the study done in Nigeria (28). The study participants whose education level was illiterate had a 1.8-fold increase in poor neonatal outcomes compared to those whose education level was college and above. This may be because educated mothers are more likely to seek timely and regular prenatal care. Those with lower education levels might delay or avoid prenatal visits due to a lack of understanding of their importance. So, essential screenings and interventions that can prevent or manage complications are often missed when prenatal care is inadequate.

Study participants who hadn't had ANC follow-up had a 4.7-fold increase in their poor neonatal outcome compared to those who had ANC follow-up, and those women who initiated ANC in the third trimester had a poorer outcome (by 7.5 fold) than those who initiated ANC at the first trimester. This may be because ANC visits are an opportunity for healthcare providers to educate pregnant women about healthy behaviors, the danger signs of pregnancy, and the importance of proper hygiene and vaccination. Lack of this education can result in preventable health issues like low birth weight and preterm labor.

The study participant referred at night had a 1.6-fold increase in poor neonatal outcomes. This may be because nighttime referrals often face delays in response and transportation due to the limited availability of healthcare personnel and emergency services. These delays can be critical, especially in emergencies such as obstetric hemorrhage or fetal distress.

7. CONCLUSION

- In this study, 8% of the study participants had poor maternal outcomes, and 33% of the neonates had poor perinatal outcomes. The determinant factors for poor maternal outcome were not having ANC, mode of delivery by instrumental and ABD, and having poor perinatal outcome. The determinant factors for poor perinatal outcome were being illiterate, not having ANC, as well as initiation of ANC in the third trimester, referral at night, and taking more than 30 minutes to arrive after referral. Implementing early referral practice and early risk identification in lower health facilities will decrease adverse maternal and perinatal outcome.

8. LIMITATION OF THE STUDY

The study was done only in three institutions with limited study period, so it is difficult to generalize the study findings nation wide

9. RECOMMENDATIONS

- Awareness creation should be made on the optimum use of antenatal care
- Utilizing mass media to promote health education
- Equipping lower-level health facilities with trained personnel and necessary equipment will unquestionably reduce patient overcrowding in tertiary facilities.

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Annex-III Information Sheet

Questionnaire Identification Number _____

My name is _____. I am working as a data collector in the research Conducted by Dr. Fozia, who is conducting this research for the partial fulfillment of her specialty in Obstetrics and Gynecology in AAU.

Purpose: To assess the maternal and perinatal outcome of those mothers referred for labor and delivery service at Gandhi Memorial Hospital, Zewditu Memorial Hospital and Black Lion Specialized Hospital, Addis Ababa, Ethiopia.

Procedure: I am hopeful that this research will benefit those mothers being referred for labor and delivery service. I will provide research results to the concerned body for intervention. If you are willing to participate in this project, you need to understand and say ‘’yes‟ on the agreement form.

Risk/ Discomfort: By participating in this research project, you may feel that it has some discomfort especially on spending time about 40-50 minutes. We hope you will participate in the study for the sake of the benefit of the research result. I am sure there is no risk in participating in this research project.

Benefits: There may not be a direct benefit to you but your participation is likely to help us in the assessment of maternal and perinatal outcome of those mothers referred at Gandhi Memorial Hospital, Zewditu Memorial Hospital and Black Lion Specialized Hospital, Addis Ababa.

Confidentiality: The information collected from this research project will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it. In addition, it will not be revealed to anyone except the principal investigator and will be kept locked with a key.

Right to refuse or withdraw: You have full right to refuse from participating in or include your chart information in this research. You can choose not to respond to some or all questions if you do not want to give your response. If you have additional questions about the study, please contact

Dr. Fozia’s principal investigator

Tel: +251 -920751621

Are you willing to participate in this study?

1. Yes ……. Continue to the next part

2. No…….Skip to next participant

Annex IV: Consent Form

I understand all conditions stated above. I have understood that participation in this study is entirely voluntary. I have been told that my answers to the questions will not be given to anyone else and no reports of this study ever identify me in any way. Therefore, I am ready and willing to participate in this study.

If the respondent does not agree to be interviewed thank her and go to the next respondent.

If the respondent says 'YES' continue.

Checked by: _____

Supervisor: Name _____ signature_____

Date_____/_____/____E.C

Interviewer Name_____Sign_____

Part I:Socio-demographic characteristics of respondents			
S. No	Questions	Responses	
101	Age of the mother	_____years	
102	Marital status	1.Single 2.Married 3.Divorced 4.Widowed 5.Other _____	
103	Educational level	1. No formal education 2. Primary school (up to grade 8) 3. Secondary (up to 10th grade) 4. Preparatory (grade 11 & 12th) 5. Diploma 6. Degree 7. Master and above	
104	Occupation	1.House wife 2.Merchant 3.Government employee 4.Daily laborers 5.No job 6.Other(specify)_____	
105	Religion	1.Orthodox Christian 2.Islam 3.Protestant 4.Others(specify)_____	
106	Monthly house hold income	_____	
Part II : Maternal obstetric history			
201	Reproductive history	1. Gravidity _____ 2. Parity ____ 3 Abortion___ 4. Ectopic ____	
202	Gestational age (from chart physician diagnosis)	_____	
203	Place of delivery for her previous pregnancies	1.Home 2.Local health center 3.Hospital	
204	Outcome of the previous pregnancies (more than one answer is possible)	1. Abortion 2. Ectopic pregnancy 3. Stillbirth 4. Live birth 5. Neonatal death	
205	How did the client give a birth for her previous babies?	1. SVD 2. Caesarean delivery 3. Vaginal breech delivery 4. Instrumental assisted vaginal delivery	
206	Did you have Antenatal care (ANC) follow up	1.Yes 2.No	

207	If 'yes' to Qn# 206, where was your follow up?	1. Government Hospital 2. Private Hospital 3. Local health center 4. Private clinic	
208	If yes to Qn # 206 at which month of pregnancy was your first visit?	_____	
209	How many ANC visits did you have?		

Part III : Referral

301	Source of referral?	1.Health center 2.private hospital 3.Private clinic 4.Goverment Hospitals 4.1 From Addis Ababa 4.2 Outside Addis Ababa	
302	What is the date & time of referral and hospital arrival?	1. Date of referral _____ 2. Time of referral _____ (**Night/day)** 3. Date of arrival _____ 4. Time of arrival _____ (**Night/day)**	
303	Who referred the patient?	1.Midwife 2.Health officer 3.IESO 4.General practitioner 5.Obstetrician/Gynecologist 6.Other(specify) _____	
304	What was the reason for referral?		
305	What was the mode of transport?	1.Ambulance 2.Private vehicle 3.Taxi 4.Other(specify) _____	
306	What is her chief complaint? (more than one answer is possible	1.Pushing down pain 2. Leakage of liquor 3 Vaginal bleeding 4.decrease/absent fetal movement 5. headache/blurring of vision/epigastric pain 6. Others (specify)_____	
307	After how many days or hours she went to health facility?	1. _____minutes 2. _____ Hrs 3. _____days	
308	If she stayed more than 30 minutes, reason of delay (more than one answer is possible)	1. I don't know the danger sign 2. I think it will be fine/normal 3. I didn't have money 4. I couldn't get transport 5. I don't know where I should go 6. I'm waiting decision of my husband/families 7.others(mention)_____	
309	After how many hours/days stay at EGOPD she admitted?	1. _____minutes 2. _____ Hrs 3. _____days	
310	What diagnosis was made upon arrival to this hospital?	1. APH 2. PIH 3. Preterm labour	

	(more than one diagnosis is possible)	4. Post term pregnancy 5. Previous C-section 6. Malpresentation / malposition 7. Labor diagnosis 7.1 Latent phase 7.2. Active phase 7.3. Second stage 8. Rupture of membrane (premature/prolonged) 9. Cephalopelvic disproportion (CPD) 10. Obstructed labour 11.non-reasuring fetal heart rate (Bradycardia/Tachycardia) 11. Others (mention)_____	
Part IV: Feto maternal outcome			
401	General condition of the mother on arrival?	1. Comfortable 2. In labor pain 3. In cardiorespiratory distress 4. comatose	
402	FHB of the fetus on arrival	1. Normal 2. Fetal tachycardia 3. Fetal bradycardia 4. Negative fetal heart beat 5. Other abnormal CTG finding(specify)	
403	Duration of labour before referral in hrs	_____	
404	Duration of labor after referral	_____	
405	Mode of delivery	1.Vaginal delivery 1.1 spontaneous 1.2 After Induction/priming 2. Assisted breech delivery 3. Instrumental delivery 3.1. Vacuum 3.2. Forceps 4. C-section 4.1 Direct (from EOPD < 30 minutes stay) 4.2 After following at Emergency OPD or labor Ward 5. Laparotomy (for ruptured uterus)	
406	If C-section done indication (more than one answer is possible)	1.Non reassuring fetal heart rate pattern 2. Cephalopelvic disproportion 3. Obstructed labour 4.APH 5. Meconium in latent stage 6. Cord prolapse 7. Malpresentation/malposition 8. Failed vacuum/forceps 9. Others (specify)_____	
407	Place of delivery (vaginal delivery)	1. Emergency OPD 2. Labour ward	

408	Fetal outcome	1. Alive 2. Still birth 2.1. Fetal heart beat positive on arrival 2.2. Fetal heart beat negative on arrival	
409	Birth weight in grams	_____	
410	APGAR score at 1st &5th minutes	_____ _____	
411	Admission to NICU	1.Yes 2.No	
412	If 'yes' to Qn 411, What was the admission diagnosis?	1.Perinatal asphyxia 2.Neonatal sepsis 3.respiratory distress syndrome 4.Neonatal Jaundice 5.Birth trauma (Specify) 6.Hypoglycemia 7.Other (specify)	
413	Status of the newborn at discharge	1.Improved 2.Improved with sequelae 3.Dead 4. Still in NICU Specify the cause	
414	Presence of maternal complication	1. Yes 2. No	
415	If, maternal complication present which one (more than one answer possible)	1. PPH 2. Eclampsia 3. Uterine rupture 4. 3rd or 4th degree perineal tear 5. Blood transfusion 6. ICU admission 7. Maternal death 8. Hepatic failure 9. Shock 10. Renal failure 11. Hematology/coagulation abnormality 12. Others (mention)_____	