MEKELLE UNIVERSITY

COLLEGE OF HEALTH SCIENCES,

SCHOOL OF MEDICINE

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

MATERNAL & NEONATAL OUTCOMES AND ASSOCIATED FACTORS OF BREECH PRESENTATION: A PROSPECTIVE CROSS SECTIONAL STUDY IN AYDER COMPREHENSIVE SPECIALIZED HOSPITAL, NORTHERN ETHIOPIA

FROM JUNE 2024 TO DECEMBER 2024

BY: KIBRET HAGOS, MD, YEAR - 4 RESIDENT

A THESIS PROPOSAL SUBMITTED TO THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, COLLEGE OF HEALTH SCIENCES, MEKELLE UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE CERTIFICATE OF SPECIALITY IN OBSTETRICS AND GYNECOLOGY

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ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical Conduct of the research project and for provision of required progress reports as Per terms and conditions of the Research Publications Office in effect at the time of Grant is forwarded as the result of this application.

Name of the student: _____

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Approval of the primary Advisor

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Approval of Graduate Program Coordinator

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Mekelle University College of Health Sciences

Department of obstetrics and Gynecology

Advisor's Approval Sheet

This is to certify that the thesis proposal entitled "MATERNAL & NEONATAL OUTCOMES AND ASSOCIATED FACTORS OF BREECH PRESENTATION AT ACSH" is submitted in partial fulfillment of the requirements for the certificate for specialty in Obstetrics and Gynecology, College of Health Sciences of Mekelle University and has been carried out by

Kibret Hagos ID No:chs/gynr/05/13 under my supervision. Therefore, I recommend that the resident has fulfilled the requirements and hence hereby can submit the thesis proposal to the Department.

Name of Primary Advisor	**Signature**	**Date**
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Girmatsion F.	_____	_____

Declaration

I hereby declare that this proposal thesis is my original work and has not been presented for a degree in any other university and all sources of material used for this thesis have been duly acknowledged.

Name: Kibret Hagos

Signature:_____

Date: _____

This thesis proposal had been submitted for examination with my approval as thesis advisor.

Name: _____

Signature: _____ Date: _____

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Abbreviations and acronyms

ACSH	Ayder Comprehensive Specialized Hospital
AOR	Adjusted Odds Ratio
MMR	Maternal Mortality Ratios
NMR	Neonatal Mortality Rates
ACOG	American College of Obstetricians and Gynecologists
ANC	Antenatal Care
APGAR	Appearance, Pulse rate, Grimace, Activity, Respiratory effort
C/D	Cesarean Delivery
CTG	Cardiotocography
ECV	External Cephalic Version
EFM	Electronic Fetal Monitoring
ENT	Ear, Nose and throat
FHR	Fetal Heart Rate
GA	Gestational Age
IUFD	Intrauterine Fetal Death
LNMP	Last Normal Menstrual Period
NICU	Neonatal Intensive Care Unit
PMR	Perinatal Mortality Rate
PNA	Perinatal Asphyxia
PPH	Postpartum Hemorrhage
PROM	Premature Rupture of Membrane
SEFW	Sonographically Estimated Fetal Weight
SPSS	Statistical Package for Social Science
SSSI	Superficial Surgical Site infection
TBT	Term Breech Trial
VBD	Vaginal Breech Delivery
WHO	World Health Organization

Abstract

Background: Breech presentation, a longitudinal fetal lie where the buttocks or legs enter the pelvis before the head, is the most common malpresentation, occurring in 3-5% of singleton deliveries at term (37 weeks gestation or later) (1–3). While breech positioning is more frequent earlier in pregnancy due to the similar bulk of fetal poles, its persistence at term is less common and varies globally. Risk factors and prevalence underscore its clinical significance, yet the optimal mode of delivery—vaginal versus cesarean—remains contentious. Evidence suggests cesarean delivery reduces perinatal risks, but a WHO study highlights maternal mortality and severe morbidity rates 3.4 and 2.3 times higher, respectively, compared to vaginal delivery, fueling ongoing debate (4) (1,2,5–7).

Objective: To assess maternal and neonatal outcomes of singleton term breech deliveries at Ayder Comprehensive Specialized Hospital from June, December 31, 2024

Methods: Hospital based ~~prospective~~ cross sectional study conducted in Mekelle University at Ayder Comprehensive Specialized Hospital over 6 monthes period from June, December 31, 2024.IBM-SPSS version 27 was used. Descriptive analysis such as frequency, percentage, and mean, median was applied for different factors and outcomes. Logistic regression analysis was applied for statically significant variables with p value<0.05.

Results: The prevalence of term breech presentation in this study was 3.2% (136). Majority, 102(75%) of them delivered via cesarean delivery (C/D), and 34 (25%) had vaginal breech delivery. Perinatal mortality rate was 123 per 1000 deliveries and 15 (11.0%) neonates admitted to the NICU. Of these, 5(33.3%) were diagnosed with perinatal asphyxia (PNA), and 5 (33.3%) had respiratory distress (RD) secondary to meconium aspiration syndrome (MAS), 5 (33.3%) had Early neonatal sepsis, 2(1.4%) had soft tissue trauma and hypothermia. Low APGAR scores (<7) were observed in 28 (20.5%) of neonates at 1 minute and 12 (8.8%) at 5 minutes. Maternal complications included postpartum hemorrhage (PPH) in 3 (2.2%) of cases, third-degree perineal tears 1 (0.7%), and wound infections 2 (1.5%).One mother experienced severe adhesions leading to organ injury (iatrogenic bladder injury) and required a hysterectomy.

Conclusion:

There was significant number of maternal and neonatal complication. Parity, early gestational age at delivery, birth of new born less than 2500gm and unintended pregnancy were associated with maternal and neonatal outcomes of singleton term breech deliveries. There was higher rate of CD (75%) for singleton term breech deliveries when compared to other similar tertiary level hospital. Easier access to effective contraception methods can certainly help to address un intended pregnancy. A protocol for the management of breech delivery and a regular training facility for junior residents to conduct assisted vaginal breech delivery is recommended. Achieving universal coverage of the recommended new WHO ANC contacts model is

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considered feasible through collaborative efforts among healthcare providers, facilities, and policymakers.

Key words: Term Breech delivery, Vaginal delivery, Mode of delivery, complication

1 Introduction

1.1 Background

Breech presentation is a longitudinal lie of the fetus with the caudal pole (buttock or lower extremity) occupying the lower part of the uterus and cephalic pole in the uterine fundus(1)(2). This presentation occurs in 3% to 4% of labors overall, although it is found in 7% of pregnancies at 32 weeks and in 25% of pregnancies of less than 28 weeks' duration(1). The diagnosis of breech presentation may be made by abdominal palpation or vaginal examination and confirmed by ultrasound. There are three types of Breech presentation. The infant in the frank breech position is flexed at the hips with extended knees (pike position). The complete breech is flexed at both joints (tuck position), and the footling or incomplete breech has one or both hips partially or fully extended.(1,8),(5)

Globally, there is variation in the incidence of term breech presentation; for example, the prevalence of term breech presentation in coutries with low and middle icome countries, was reported to be 3.7% in USA and 3.4% in Norway(9). Likewise, incidences of 3.8%, 2.1%, 2.6%, and 4% were reported in Malaysia, India, 5.03% in Nepal Cameroon, Nigeria, and Ethiopia, respectively (10)(11).

The predisposing factors for breech deliveries include maternal factors (foeto pelvic disproportion, soft tissue dystocia, müllerian anomalies, pelvic tumors (myoma, ovarian neoplasm, etc.), and grand multipara); placenta factors (placenta previa, cornual placenta (it contributes 73 %)); liquid factors (polyhydramnios, oligohydramnios); and cord factors (very long cord and very short cord). Multiple pregnancies and congenital abnormalities (fetal malformations have been reported in 4-8 % of term breech deliveries and 18 % of preterm breech deliveries), Certain fetal genetic disorders, including as trisomy's 13, 18, and 21, Potter syndrome, and myotonic dystrophy, have been linked to higher incidence of breech presentation. Additional stated risk factors include IUGR, older maternal age, female gender, primiparity, and prior breech presentation(1).

The breech fetus is at increased risk of harm during delivery because cord compression between the cervix and body must occur as the breech crowns and because the aftercoming shoulders, head, and arms are at greater risk of harm from dystocia. The two most crucial factors that determine the safety of a vaginal breech delivery are noninterference until the fetus is delivered to the level of the umbilicus and continuous electronic FHR monitoring(1)

Breech presentation and delivery have been classified as high risk because of the increased incidence of perinatal and maternal complications. Comprehensive obstetric care and intensive neonatal care play a crucial role to decrease complications related to breech delivery(10). Maternal mortality and serious morbidity in C/D are 3.4 and 2.3 times greater than vaginal delivery, respectively, according to WHO research (12)

The C/D rate for singleton term breech in the USA grew from 10% in 1956 to 95% in 1991–1999 years. Prior to the TBT, the C/D rates that was reported in other western nations was: 72–90% in Germany; 74% in Sweden; 77% in England and Ireland; 79% in Greece; and 90% in Australia(5).

Perinatal mortality and morbidity in the planned vaginal breech delivery were significantly higher than with planned caesarean delivery. Even taking into account the relatively low absolute risks of vaginal breech delivery, the current study substantiates the practice of individualised decision-making on the route of delivery in a term breech presentation. Compared to the planned C/D group, the planned vaginal group had a 2- to 5-fold increased relative risk of perinatal mortality and morbidity. In the intended vaginal delivery group, the absolute risks of perinatal mortality,

fetal neurologic morbidity, birth trauma, 5-minute APGAR score <7, and PNA were 0.3, 0.7, 0.7, 2.4, and 3.3%, respectively(5)(13).

Nonetheless, a number of authors have demonstrated that, in certain cases involving breech presentation, vaginal breech delivery remains a safe and viable alternative. For numerous reasonable and acceptable reasons, no singleton term breech baby should be delivered via C/D. First, it is not unusual for breech presentations to experience spontaneous commencement and rapidly progressing labor before the elective C/D scheduling date. 9.6% of the TBT women who were scheduled for elective C/D delivered their babies naturally. Second, unless vaginal breech birth is practiced, skill transfer to aspiring physicians and midwives—who will unavoidably encounter breech vaginal delivery—will not transpire efficiently. Thirdly, breech presentation women often present in labor even if they are not candidates for C/D. It is also widely understood that there are risks associated with both planned vaginal birth for breech presentation and elective C/D, so it is not shocking that labor itself involves some risk. It is advised to conduct a comparison analysis between vaginal breech and vaginal cephalic birth, as well as to make individual decisions regarding the mode of delivery(7)(5)

1.2 Statement of the problem:

Breech presentation occurs in about 3-4% of all term singleton pregnancies. Perinatal mortality is increased 2- to 4-fold with breech presentation, regardless of the mode of delivery. Compared with a fetus with cephalic presentation, a breech fetus faces an increased risk of asphyxia from cord compression and of traumatic injury during labor and delivery of the shoulders and head.

It has long been area of controversy for not only it is associated with poor perinatal birth outcome but also there are no consistent and strong recommendations upon which attending physicians can rely on the management and mode of delivery.

In the United States, elective C/D has significantly increased from 12% in 1970 to 87% in 2001 because of the Term Breech Trial recommendation favoring C/D for better perinatal outcome with a modest increment in short term maternal morbidities.

Planned C/D is not cost-effective practice of care in resource limited setting and appropriate selection can be made for breech assisted vaginal delivery. Breech presentation is a high-risk pregnancy as it is associated with poor perinatal and maternal outcome. Thus, obstetric and neonatal care should be comprehensive and intensive to reduce birth associated risks for both the neonates and mothers.(14,15)

Breech presentation is associated with increased rates of maternal and perinatal morbidity regardless of modes of delivery. A 10-fold higher risk of intrapartum fetal death is found to be associated with vaginal breech delivery in comparison to caesarean delivery(9). The Sub-Saharan Africa region has the world's largest neonatal death rate and accounts for 43% of global newborn deaths. Ethiopia has one of the highest neonatal mortality rates in the world, next to Sierra Leone, the Central African Republic, and Somalia, with 99000 neonatal deaths reported in 2020, making it the fourth-highest neonatal death rate globally. Ethiopia has agreed to meet the Sustainable Development Goals (SDGs) and has put in place major neonatal mortality strategies(16)

Despite the widely recognized and documented risks to mothers and newborns, there are no recent documents that show the magnitude of beech presentation in our institution, ACSH.

In my observation some residents and senior obstetricians usually prefer C/D to Vaginal delivery for most primigravidae and some multiparous mothers with breech presentation. These all created not only practice disparity and disharmony but also confusion and medico legal liability among the training residents and patient dissatisfaction. Thus, this study is meant to determine the maternal and neonatal outcomes of term, singleton breech delivery at ACSH, Mekelle, Tigray Ethiopia.

1.3 Significant of the study:

Because of the extremely high newborn mortality and morbidity rates, breech deliveries have always been a hot topic in obstetrics. These result from a mixture of preterm delivery, congenital malformation, birth trauma, and birth asphyxia. Furthermore, regardless of the method of birth, 19.4% of newborns who experience term breech deliveries experience long-term morbidity until they reach school age.

The lack of prior research specific to the local context regarding breech presentation outcomes indicates a critical gap in knowledge. This absence of data limits the ability to formulate effective management protocols tailored to the unique challenges faced in this region.

To address these gaps, the proposed study will provide valuable data specific to this region and hospital setting, thereby facilitating a deeper understanding of the challenges faced, maternal and neonatal outcomes with breech presentation, explore potential contributing factors such as socioeconomic status, access to ANC, and identify risk factors that may play a role for breech presentation.

Additionally, Since there is no study conducted on Maternal & neonatal outcomes and associated factors of breech presentation in the study area, the result of this study will help ACSH in updating the management protocol of breech deliveries. It will give additional input to stakeholders and policy makers to formulate guidelines for the management of singleton term breech delivers. It will also serve as a baseline for further studies in the future.

2 Literature Review

2.1 Epidemiology and classification of breech Presentation

Breech presentation is a longitudinal lie of the fetus with the caudal pole (buttock or lower extremity) occupying the lower part of the uterus and cephalic pole in the uterine fundus. This presentation occurs in 3% to 4% of labors overall, although it is found in 7% of pregnancies at 32 weeks and in 25% of pregnancies of less than 28 weeks' duration(1). Is the most common form of malpresentation, and the etiology and management has been the topic of professional discussions for centuries. Until a decade ago, the delivery of a breech baby was an integral part of obstetric training, although many obstetricians preferred CS over vaginal delivery(2)(1)(5)(17)

Generally, breech presentation is the most common malpresentation ranging from3 to 5% at term and 20% at 28 weeks of gestation despite the variations from country to country. The incidence of breech at term was reported to be 3.8 % in Malaysia.2.1% in India,2.98% in Cameroon,2.6% in Nigeria and 4% in Ethiopia. There are 3 types Breech; Frank breech where both hips are flexed and knees are extended and accounts 48% to73%, Complete breech where both hips and knees are flexed and footling breech (at least one hip is extended) account 4.6% to 11.5% and 12.4% to 40.5% respectively(18) (19)(10)(11)

2.2 Risk Factors

The two most common risk factors for breech presentation are prematurity and previous history of breech presentation. Others include multiple gestation, amniotic fluid abnormality, anencephaly, hydrocephalus, uterine structural abnormalities and tumor previa. The recurrence rate after one and two previous breech deliveries is 10% and 28% respectively(1)

2.3 Mode of Breech Delivery

Studies support that vaginal delivery is a suitable option for singleton term breech presentation though many factors affect the route of delivery such as fetal characteristics, maternal pelvic dimension, coexisting pregnancy complications, provider experience, patient preference and hospital capabilities. Hyperextension of the fetal head during vaginal breech delivery has been consistently associated with a high (21%) risk of spinal cord injury. Footling breech carries a extremely high (16% to 19%) risk of cord prolapse during labor (2)(1).

Only 3 years after the publication of the TBT, the leadauthors of the TBT reported that 92% of over 80 collaborative centers in 23 countries had completely abandoned planned VBD in favor of CS (20). In The Netherlands, the CS rate for breech presentation has increased from 57% in 2000 to 81% in 2001 after the publication of the TBT (5)

Published in 2006, the PREMODA study was intended to be a prospective observational study with intention-to-treat analysis (5). Recruited from 174 centers in France and Belgium, the study comprised almost 8000 women with breech presentation at term (~four times as many as included in the TBT). When breech babies were delivered via caesarean section as opposed to vaginal delivery, the investigators found no differences in perinatal morbidity or mortality(3)

A systematic review in 2015 by Berhan et al. reports a substantial increase in elective CDs for breech presentation in high-income countries since 2000; at the same time, a two- to fivefold risk increase in perinatal mortality and morbidity has been reported with planned vaginal delivey(VD)(5)

Out of 4741 deliveries, 122 singleton breech births were reported in a Nigerian study. During the study period, 2.6% of singleton term breech births occurred. Of the breech deliveries, 88 (72.1%) delivered vaginally, whereas 12 (9.8%) and 22 (18.0%) underwent elective and emergency cesarean sections, respectively. 32 prenatal deaths (36.2%) were reported overall. Among these were 8 (6.6%) intrauterine fatalities before admission, 15 (12.3%) fresh stillbirths, and 7 (5.7%) early neonatal deaths. Of the prenatal deaths, 19 (61.9%) included moms who were not booked. There were 250 perinatal deaths for every 1000 births (15).

According to a study conducted in Jimma University Medical Center in 2019, about 88% of the mothers were in labor at presentation to the labor ward and only 38.9% of them were in Latent phase first stage of labor and the commonest type was frank breech accounting 38% of the cases (3). About 75% of the women had obstetric scanning at admission to the labor ward. Majority of them, 57(52.8%), undergone Emergency C/D while 38.9% and 8.3% had assisted vaginal delivery and elective C/D respectively. The most common (31%) indication for emergency C/D was footling breech (9,21)

In a study conducted at Tercha hospital in southen Ethiopia, the prevalence of singleton breech deliveries was 3.1% (106 out of 3565 deliveries). Out of the total breech deliveries 90(84.9%) born alive and 16(15.1%) were dead indicating that the perinatal mortality rate to be 151 per 1000 breech deliveries. Among alive ones 62(68.9%) were born healthy, 24(26.7%) asphyxiated and 4(4.4%) born with birth injury. The documented possible causes of death in this study were entrapment of after coming head 4 (25%), birth asphyxia 6 (37.5%), cord prolapse 2(12.5%) and intrauterine death of unknown cause 4 (25%). Vaginal delivery has significant statistical association with poor(dead) fetal outcome of breech delivery (p=0.038). ANC has significant statistical association with fetal outcome(22).

Entrapment of aftercoming head is a specific intrapartum emergency associated with breech vaginal delivery and it reflects either incompletely dilated cervix or cephalopelvic disproportion (21). This complication is more common in preterm breech deliveries and can occur in both vaginal and cesarean deliveries. Kayem et al. reported head entrapment in 13.1% among vaginal and 5.9% among cesarean deliveries of preterm breech(21)(6).

In One study done in nepal (9) (17)Perinatal Mortality Rate (PMR) was 133.7 per 1000 breech births for the nepal, which was lower than that the studies in Ethiopia, Nigeria and India. (192-250 per 1000 breech births). This might be due to lower rate of vaginal breech deliveries (10,23). In this study, the perinatal mortality was present only among the neonates delivered by vaginal breech delivery 5.7%).(9) Vaginal delivery was higher in other countries like 55.8% in Pakistan, 54.61% in Cameroon, 42.6% in India , 72.1% in eastern Nigeria (17)(24)(25)

2.4 Complications

2.4.1 Perinatal and Maternal complications

Some perinatal outcomes, like hip dysplasia, may be inherent to the breech position rather than delivery. A Study from a teaching Hospital Medical Center (Jimma) indicates most fetuses (94, 87.1%) were born alive though there were IUFDs in 4.6% of admitted to the labor ward while on follow up. First minute Apgar score was between 5 and 7 in 72.3 %- and fifth-minute Apgar score was >7 in 77.7% of neonates. 25% of neonates born alive required admission to NICU: 40.7% of them were diagnosed to have PNA and the PMR was 157.4 per 1000 breech deliveries. Almost half of the women (49.1%) were diagnosed in labor. Statistical analysis supported that perinatal outcome is not affected when diagnosis of breech presentation is made in labor or during ANC follow up (10).

About 34.3% of 108 mothers developed wound infection, and 24% had post-partum hemorrhage. One maternal death was recorded in the emergency C/D group caused by post-partum hemorrhage(10)

In comparison to the overall number of deliveries, perinatal death was higher in one study conducted at Yekatit 12 Hospital in Addis Ababa, Ethiopia; fetuses with low birth weights had a higher mortality rate. Additionally, among patients without prenatal treatment, there is a twofold increase in perinatal deaths (26)

The overall perinatal mortality as per the study done at Wolliso, southwestern Ethiopia, was 7.5%(27)

2.5 Conceptual framework

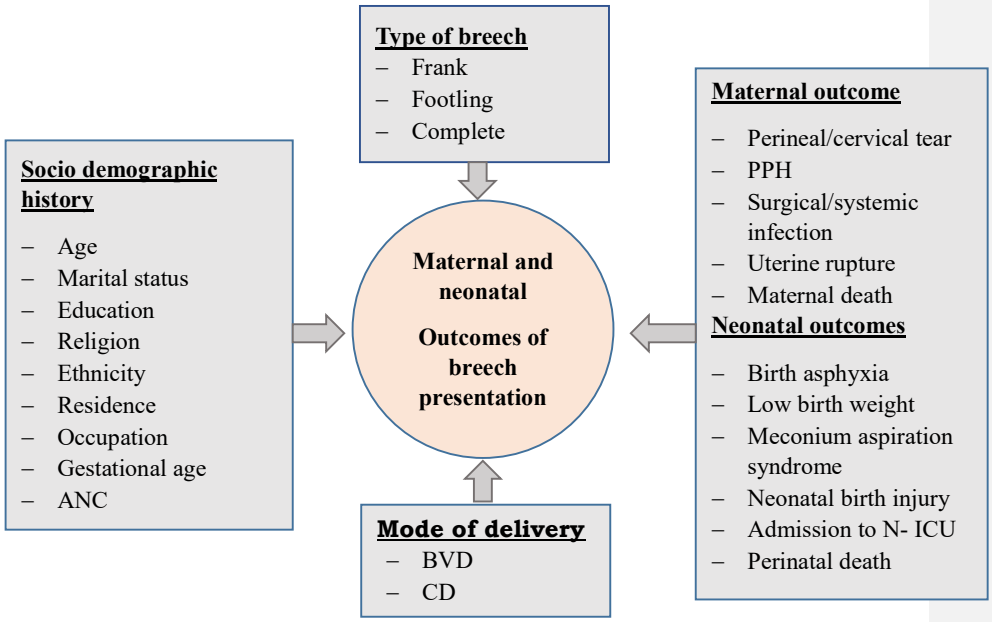

Figure 1conceptual framework based on previous literature reviews

3 Objectives of the Study

3.1 Objectives of the Study

3.1.1 General Objective:

- To determine the maternal and neonatal outcomes of term singleton breech presentation at ACSH from June, 2024 to December 2024

3.1.2 Specific Objectives:

- To assess maternal outcome of breech presentation who delivered at ACSH from May, 2024 to December 2024
- To identify factors associated with maternal and fetal outcomes of breech deliveries at ACSH from June, 2024 to December 2024
- To determine the prevalence of term reech presetation at ACSH from June, 2024 to December 2024

4 Methods of the Study

4.1 Study Area and period

Tigray is one of the northern most of the 13 regional state of the Federal Democratic Republic of Ethiopia. Mekelle is the capital city of Tigray and is located 780 km away from the capital city of Ethiopia, Addis Ababa. Mekelle has four governmental hospitals, ACSH, Mekelle General Hospital, Quiha General Hospital and Lekatit 11 Primary Hospital.

This study was conducted at Mekelle University, Ayder comprehensive Specialized hospital. Ayder comprehensive Specialized Hospital is found in Mekelle, and one of the largest public hospitals in Ethiopia. It started as a referral and specialized medical center in 2008 G.C. It serves for more than 9 million populations in its catchment areas of Tigray, Northern Afar, and North-eastern part of Amhara regional states. It is the second largest hospital in the nation and has more than 500 inpatient beds in the four major departments (pediatric and child health, Internal medicine, Surgery and Obstetrics/ Gynecology) and other specialty units. The hospital also served as teaching hospital and research center for the College of Health Sciences, Mekelle University. There are 78 inpatient beds, 3 delivery couches, and its own separate operation theater, with recovery room of six beds. Regarding to staffing, there are 13 senior Obstetrician and Gynecologists (11 permanent staff and 2 honorary staff), 35 residents, and midwives providing the care. It has 7000 deliveries per year.

The hospital also served as teaching hospital and research center for the College of Health Sciences, Mekelle University.

The choice of this setting is strategic due to its high volume of obstetric cases, both from the local population and referrals from surrounding areas, making it an ideal location for studying diverse obstetric outcomes. This study was conducted from June to December 2024

4.2 Study design

Facility based cross-sectional study

4.3 Population

4.3.1 Source population

The source population for this study was pregnant mother who deliver at ACSH

4.3.2 Study population

The study population was those pregnant mothers with breech presentation during delivery at term ACSH.

4.3.3 Eligible criteria

Inclusion and Exclusion Criteria

- Singleton Term Breech Pregnancy

Exclusion Criteria:

- Higer order pregnancy/Multiple pregnancy
- Pre term deliveries

- Fetus with congenital anomaly
- IUFD from the outset
- Unknown GA
- Pregnancies with chronic medical illness or obstetric complications

4.4 Study variables

Independent Variables

- Age
- Residence
- Religion
- Marital status
- Education
- Occupation
- Gestational age
- ANC
- Referral Status

Dependent variables

- Maternal and Neonatal outcome

4.5 Sample Size

Sample size will be calcuated suing signle population propostion formula

Sample size will be calcuated suing signle population propostion formula

($n = Z^2\alpha\ P(1-P)/w^2$) with the assumption of z at 95% confidence interval (1.96), prevalnce of PNA from previous study in Jimma was 40.7% (10), margin of error 5%. The final sample size will be 371. Howevre, the average rate of breech delivery is at maximum of 25 per months, so within six months we expect a total of 150 breech deliverires. To correct the sample size and avarge load of cases in the hospital, We used correction formual. (nf=ni/(1+ni/N). Thus, the final sample size will be 122 breech delivery, by adding 10% for non-resposne rate. The final sample size will be 136 breech deliveries.

Where

nf = corrected sample size,

ni = uncorrected sample size,

N = total number of all the source population.

z= standard normal deviate, set at 1.96 which corresponds to 95% confidence limit

p= Expected population proportion

1-p = proportion

w =Margin of error (5%).

4.6 Data collection techniques

This study was conducted at ACSH that was chosen for its case load and service delivery feasibility. Both medical records and interview with mothers was done**.** Data was collected using pretested structured questionnaire, developed from literature review, after getting a signed consent of participation. Data was collected by a trained midwife from the labor ward and maternity, data of NICU admission was collected by trained NICU nurse. Findings were recorded till 7th day of postpartum. The principal investigator supervises the data collection until the sample size is attained.

4.7 Data management and Analysis

Data was coded, entered, cleaned, and analyzed using IBM-Statistical Package for Social Science (SPSS) version 27. Statistical analysis was conducted using appropriate methods based on the nature of the data and research questions. Descriptive statistics such as frequencies, proportions, means, and standard deviations was used to summarize demographic and clinical characteristics of the study population. Logistic regression analysis was employed at binary level to model the combined effects of maternal socio-demographic variables and obstetric, neonatal outcomes of singleton term breech delivery at ACSH. Logistic regression analysis multivariate level was done to assess the association between breech presentation and maternal and neonatal complications while controlling for potential confounders. (P value <_ 0.05 was used)

4.8 Operational Definitions

1. Early Ultrasound refers to Ultrasound done not beyond 24 weeks of gestation
2. Term pregnancy stands for GA of 37 to 41W6D
3. Big for breech vaginal delivery refers to a breech fetus weighing more than 3.5kg
4. Advanced maternal age is to mean for ≥35 years of age woman
5. After -coming head refers to mean situation in which there is difficulty in extracting the fetal head during vaginal breech delivery
6. Hyperextended head is when the fetal head angles is greater than 90° from the thoracic spine to the mandible.
7. Birth injuries/trauma includes: fracture of clavicle, humerus or femur, intracranial bleeding, cephalic hematoma, facial nerve paresis, brachial plexus injury and other trauma
8. Breech with x factor includes, Beech + (oligohydramnios, BOH, previous uterine scar, post term, advanced maternal age>35...)
9. Elective CD; when the CD is done on elective base or the mother is not in labor and membrane is intact. Fetal and maternal condition is in normal state
10. Unmarried-mothers wo deliver as single mother, or living with family or divorced or widow mothers

4.9 Ethical Considerations

Ethical approval for this study was sought from college of health institutional review board (IRB of Mekelle University, College of Health Science, Department of Obstetrics and Gynecology at ACSH. Ethical issue is to be considered in all steps of the research. Detailed explanation about the objective, Purpose and benefit of the study is going to be given to the study population.

Notification of approval MU-IRB2424/2024

Study participants full cooperation, informed verbal consent was obtained from the participants. We will not use name in the collection of data.

5 Results

During the study period (June 1-December 31, 2024), a total of 2809 women who gave birth in the study area, 136 mothers were in breech presentation at term, making the prevalence of breech 4.8%. Out of this 102 (75%) delivered via CD and 34 (25%) via assisted vaginal breech delivery.

5.1.1 Socio-demography characteristics

The majority of mothers 109 (80.1%) were aged between 20-34 years, with a mean age of 27.57 (±5.646) years. More than two third of mothers 99 (70.6%) had attended primary or secondary school and hundred forty (83.8%) mothers were urban residents. Nearly all mothers 129(94.9%) were married. Over half of the participants 77 (56.6%) were referred to our hospital from govermental and non governmental health facilities; out of those referral 62 (80.2%) delivered by CD. (Table 1).

Table 1 Socio-Demographic Characteristics of Mothers with Term Breech Presentation (n=136) at ACSH, Tigray region of Ethiopia, 2024 (n=136)

variable		Frequency	Percent
Age of mothers	<20yrs	8	5.9
	20-34yrs	109	80.1
	>=35yrs	19	14.0
Residency	Urban	114	83.8
	Rural	22	16.2
Educational status	Illiterate	10	7.4
	Primary and 2ry school	99	72.7
	College or university graduate	27	19.9
Occupation	Unemployed	93	68.4
	Employed	43	31.6
Marital status	Married	129	94.9
	Unmarried	7	5.1
Ethnicity	Tigray	134	98.5
	Afar	2	1.5
Religion	Orthodox	121	89.0
	Muslim	12	8.8
	protestant	3	2.2
Referral Status	Yes	77	56.6
	No	59	43.4

Referral Status	Yes	77	56.6
	No	59	43.4
Mode of delivery (n-77)	C/D	62	80.5
	AVBD	15	19.5

5.1.2 Past and current obstetric characteristics of the participant mothers

All mothers had antenatal care (ANC) coverage, about two third 93 (68.4%) had 5 to 8 contacts, a quarter 33 (24.3%) of them had 1 to 4 contacts and 10 mothers (7.4%) had more than 8 contacts. The majority of women were found to be multiparous consisting 82 (60.3%) of the corespondents, the remaining 54 (39.7%) were primiparous. Mothers with a history of stillbirth were found 14(10.3%). At presentation, majority 97 (71.3%) of mothers were in labor, while 39 (28.7%) were not. All mothers gave birth at term; the percentages were 44 (32.4%), 68 (50%), 14 (10.3%), 10 (7.2%), early term, full term, late term, and post term, respectively. (table 2)

Three fourth 102 (75%) of mothers delivered via CD, most of them 68 (66.7%) CD were done on emergency base and the remaining 34 (33.3%) CD were elective. A quarter of mothers 34(25%) delivered with assisted vaginal breech delivery. The most common type of breech presentation was frank breech 70 (51.5%), followed by complete breech 62 (45.6%) and footling breech 4 (2.9%). Based on indication for C/D 38 (27.9%) cases were done for the indication of big for breech vaginal delivery, for breech plus X factor 27 (26.4%), In 25 (24.5%) (15 primiparous & 10 multiparous) cases Breech plus opted (breech presentation with no medical or pregnancy complications) was an indication for CD, NRFHRP 6(4.5%), the rest CD was done for Poor progress of labor 4. (Table 2) & (figure 5.1)

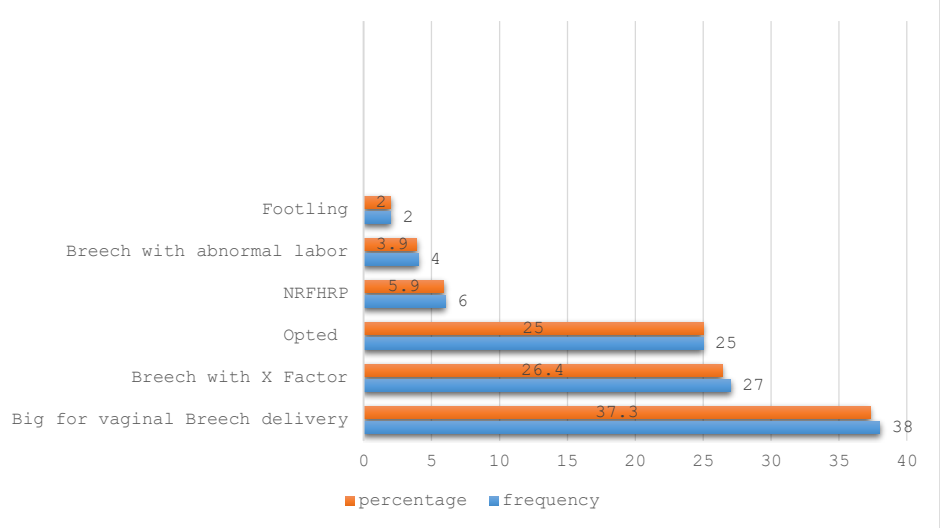

Figure1 percentage and distribution of CD indication among mothers with breech presentation at term at ACSH Tigray Ethiopia, 2024 (n=102)

Table 2 Past and current obstetric performance of the mothers with term breech presentation at ACSH, Tigray region of Ethiopia, 2024, (n=136)

Variable		Frequency	Percent
Gravidity	Primigravida	45	33.1
	Multigravida	91	66.9
Parity	Primipara	54	39.7
	Multipara	64	47.1
	Grand multipara	18	13.2
END History	yes	8	5.9%
	No	128	94.1
History of stillbirth	Yes	14	10.3
	No	122	89.3
ANC contact	Yes	100	0
	No	0	0

No of contacts	1-4		33	24.3
	5 to 8		93	68.4
	>8		10	7.4
pregnancy planned	Yes		127	93.4
	No		9	6.6
Labor status	In labor		97	28.7
	Before labor		39	71.3
Gestational age at delivery	37wks-38wks 6D		44	32.4
	39wks-40wks6D		68	50.0
	41wks -41wks6D		14	10.3
	>=42 wks		10	7.4
Type of breech	Frank		70	51.5
	Complete		62	45.6
	Footling		4	2.9
Mode of delivery	assisted vaginal Breech		34	25
	CD	Elective C/D	34	33.3
		Emergency C/D	68	66.6

5.1.3 Perinatal and maternal outcomes of mothers with term breech presentation

This finding illustrated that more than half 86 (63.2%) of the neonatal birth weight in this study was 2500gm to 3500gm. The minimum and maximum birth weights were 2100gm and 4200gm and the median weight was 3200gm (SD=486.076). About half 72 (52.9%) of neonates were male sex. Low APGAR scores (<7) recorded in 28 (20.5%) of neonates at 1st minute and 12 (8.8%) at 5th minutes. Fifteen neonates admitted to the NICU, of these, 5 (33.3%) were diagnosed with perinatal asphyxia (PNA), and 5 (33.3%) had respiratory distress (RD) secondary to meconium aspiration syndrome (MAS), the other 5 (33.3%) were admitted with EONS and 3 neonates had soft tissue trauma & hypothermia. From the total admission 10 (66.7%) discharged improved and, 5 (33.3) of them were early neonatal death within 7day. The perinatal mortality rate was 123 per 1,000 deliveries (15 death /136 breech delivery), (Table 4) & (Figure 5.2)

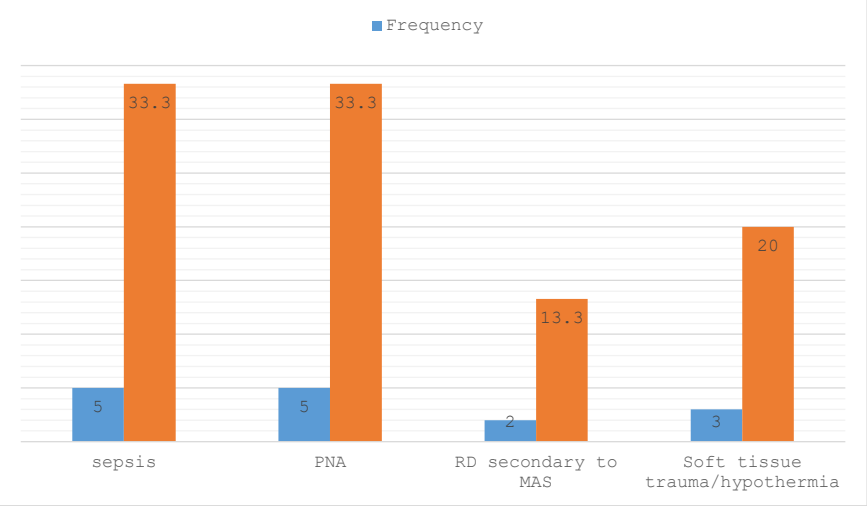

Figure 2percentage and distribution NICU admission diagnosis

With regard to maternal morbidities, 3 mothers developed PPH (2.2%), one mother complicated with 3rd degree perineal tear; there was severe adhesions leading to organ injury (iatrogenic bladder injury) and required a hysterectomy and blood transfusion in one of the mothers. Two mother developed wound infection and postpartum depression. (table :3)

Table 3 Perinatal and maternal outcomes of mothers with term breech presentation at ACSH, Tigray region of Ethiopia, 2024, (n=136).

Variable		Frequency	Percent
Sex	Female	64	47.1
	male	72	52.9
Status	Alive	127	92.6
	END/stillbirth	10	7.3
Weight in kg	<2500gm	17	12.5
	2500 gm -3499gm	86	63.2
	>=3500 gm	33	24.3
APGAR_1st_minGroup	<7	26	6.6
	>7	110	80.9
APGAR_5th_min	<7	12	8.8
	>7	124	91.2
Referred to NICU		15	11.0
Soft tissue trauma		1	0.7
PNA		5	3.7
Stage of PNA	Stage		
	1	2	1.5

	2	2	1.5
	3	1	0.7
Sepsis (EONs)		5	3.7
RDS secondary to MAS		5	5.1
Condition upon discharge			
END		5	33.3
Alive and improved		10	66.7
Maternal complication			
Perineal Tear degree (3rd Degree)		1	0.7
SSI/systemic infection		2	1.5
Organ injury (bladder injury & Hysterectomy)		1	0.7
PPH		3	2.2
Postpartum depression		2	1.5

ICU intensive care unit, RDS respiratory distress syndrome, meconium aspiration syndrome, PNA perinatal asphyxia, postpartum hemorrhage.

5.1.4 Factors associated with complication with breech presentations:

Variables at bivariate level with p-value <0.25 were included into multivariable logistic regression and based on this age, residency, status of planned pregnancy, sex of newborn, parity, mode of birth, gestational age and weight of newborn were included. At multivariate level, status of planned pregnancy, gestational age, gravidity/parity and birth weight were statistically significant predictors of adverse maternal and perinatal outcomes with P-value <0.05. Mothers with unplanned pregnancies had a higher likelihood of experiencing complications (AOR = **5.957** (95% CI: 1.063 - 33.382, p = 0.042) as compared to mother whom planned ahead their pregnancy. Moreover, primigravida mothers were more likely to experience complications (AOR = 4.017, 95% CI: 1.153-14, p = 0.029) as compared to multigravida mothers. On the condition, those mothers who deliveries at early-term gestation had a higher risk of complications compared to full-term and post term deliveries with (AOR = 4.609, 95% CI: 1.718-12.362, p = 0.002). lastly birth weight also showed significant predicator of complication. Neonates with a birth weight <2.5 kg had a significantly higher risk of complications with (AOR = 9.168, 95% CI: 2.167-38.791, p = 0.003) as compared to neonates weighing more than 2500gm. **(Table 4)**.

Table 4 Multivariate analysis for selected variable and fetal and maternal outcome of singleton term breech presentation at ACSH, Tigray region of Ethiopia, 2024

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	AgrGroup3(1)	-.249	.598	.173	1	**.677**	**.780**	**.241**	**2.517**
	Residence(1)	-.662	.661	1.000	1	**.317**	**.516**	**.141**	**1.887**
	Gravidity of women(1)	1.391	.637	4.765	1	**.029**	**4.017**	**1.153**	**14.000**
	Pregnancy_planned(1)	1.785	.879	4.118	1	**.042**	**5.957**	**1.063**	**33.382**
	GA_REG(1)	1.528	.503	9.212	1	**.002**	**4.609**	**1.718**	**12.362**
	Mode_of_delivery(1)	-.124	.596	.043	1	**.835**	**.884**	**.275**	**2.840**
	Sex_newborn(1)	.524	.452	1.344	1	**.246**	**1.689**	**.696**	**4.098**
	Weight_REG(1)	2.216	.736	9.065	1	**.003**	**9.168**	**2.167**	**38.791**
	Constant	-2.368	.728	10.594	1	.001	.094		

a. Variable(s) entered on step 1: AgrGroup3, Residence, Gravidity of women, Pregnancy_planned, GA_REG, Mode_of_delivery, Sex_newborn, Weight_REG.

6. Discussion

Between June and December 2024, a total of 2809 mothers were admitted for labor and delivery at our hospital. Out of this, 136 cases were singleton term breech deliveries, yielding a breech presentation prevalence of 4.8% at term. This rate is slightly lower than the prevalence reported in Jimma University medical collage hospital (5.3%) and higher than Mizan Aman Hospital (4.2%) (19) and (10) , with the global prevalence range of 3-4%(1). This high percentage record is due to study was conducted in a teaching hospital that provides care to the most complicated and high-risk cases in the region.

The study participants ranged from 18 to 43 years old, with an average age of 27.57 years (SD ± 5.646). The majority of mothers, 109 (80.1%), were between the ages of 20 and 34, aligning with findings from Mizan Aman Hospital, where participants ranged from 17 to 40 years, with a mean age of 25.68 years (19). Additionally, 99 (70.6%) mothers had completed either primary or secondary education. Most of the participants, 114 (83.8%), resided in urban areas, and over half, 77 (56.6%), were referred to our hospital.

In this study neonates with <2500 gm born from singleton breech presentation were significantly associated with adverse birth outcomes, This finding is similar to the study findings of Mizan Aman hospital and Jimma hospials of Ethiopia which are similarly tertiary level hospitals. This association could be due to the circumference of the head of the neonate with weight of <2500 g. In contrast, in the study conducted in Basra, birth weight of 2500–3500 gm was significantly associated with adverse birth outcome as compared with weight of 3500–4000 g and in study conducted in Nigeria birth weight of >3500 g was significantly associated with adverse birth outcome as compared with weight of 2500 g– 3500 g. the explanation was Presumably IUGR fetuses were randomised or fetal-growth retardation was not recognised during pregnancy. In addition to this, there is a report of head entrapment (cervical retraction) for weight less than 2500gm tem breech trial (13) (18) (28).

Unplanned pregnancies are associated with a higher likelihood of complications. Mothers with unplanned pregnancies have significant risk of adverse maternal and neonatal outcome than the planned pregnancy. This aligns with studies showing that unplanned pregnancies often correlate with inadequate prenatal care and higher risks of preterm birth and low birth weight . even in the developed contries like USA, in a study conducted 2011 48% of pregnancies were unintended. This condition is associated with higher percentage of late entry to care, higher rates of preterm birth and alcohol use during pregnancy. Birth preparedness and complication readiness (BPCR) are strategies designed to promote the timely use of skilled maternal and neonatal care, particularly during childbirth (31).

Experiencing neonatal and maternal complication was high likely when the pregnant mothers are Primigravida than parous mothers. This finding supported by most of studies done on breech including term breech trial (13,29,30). Clinical assessment for any unfavorable shape or pelvic contraction and radiograph pelvimetry is optional and should be considered in nulliparous women (journal of women health) (10,17). Also, in term breech trial, Adverse

maternal and neonatal outcomes were significant in the primigravid than thire counter multiparous mothers.

Even though all mothers delivered at term, Gestational age is a critical factor, with early-term deliveries (37-38W6D) posing a higher risk of complications compared to full-term deliveries. The occurrence of maternal and neonatal complication was high likely with. This is consistent with research indicating that early term births are linked to increased risks of respiratory distress and neonatal intensive care unit (NICU) admissions (Neggers, 2018). Gestational age estimation should be accurate. The one reason mentioned is, at early term they are not clear of the prematurity complication,(17,30)

Majority of mothers 102 (75%) delivered via cesarean section, with 68 (66.7%) being emergency CD and 34 (33.3%) elective CD. This high rate of CD can be explained; direct CD was done for primigravids, we were not intervening for labor abnormality and lastly CD was done for multiparous mothers with option. The most common indication for CD was "big for vaginal breech delivery" 38 (37.2%), although 15 (39.4%) of these cases did not meet the weight cutoff for CD. Over all in about 5% of new born the estimated fetal weight can be above 20% of the actual birth weight. This percentage of error is even greater when the presentation is breech. The marginal error percentage of ultrasound in breech presentation was found to be higher than the other studies. In other studies, such as those from Jimma & Nepal, footling breech was the primary indication for CD 31%, & 18.9% respectively)(10,17). Thirty-four (25%) mothers delivered via assisted Vaginal breech delivery, which is lower than rates reported in Jimma (42%), Cameroon (54.61%), and Nigeria (72.1%)(10,11,24). The lower rate in this study may be due to ; first reason might be 77(56.6%) of our participants were referred and might show higher risk. second reason is in the Pakistan study they have induced those women with dysfunctional labor, whereas there was no such practice in our case which can have an effect on the lower success rate. In 15 primi and 10 multi mother (25%) CD was done for the indication of Breech presentation plus opted (breech presentation with no medical or pregnancy complications).

The perinatal mortality rate was 123 per 1,000 deliveries, with 15 neonatal deaths (6 intrapartum and 9 early neonatal deaths). This rate is higher than in Mizan Aman (120 per 1,000) and ACOG committee; perinatal mortality rate for breech delivery was 66 per 1000 deliveries from developed countries; but its lower than in Yekatit 12 Hospital (330 per 1,000) and Black Lion Hospital (194.3 per 1,000), in a teaching hospital of Eastern Nigeria was 250 per 1000 deliveries(10,19) (24) . The inclusion of preterm deliveries in previous studies may explain these differences, as preterm neonates are at higher risk of mortality. The leading cause of neonatal death was birth asphyxia, differing from studies in Nigeria and Cameroon, where entrapment of the aftercoming head and birth injury were more common (10) (31)(17). Low APGAR scores (<7) were observed in 28 (19.1%) of neonates at 1 minute and 12 (8.8%) at 5 minutes, which is lower than rates reported in studies from Jimma, Mizan Aman, Cameroon, and Nepal. This suggests that the neonates in this study had better immediate outcomes, possibly due to the exclusion of preterm deliveries (11) (10) (31)(17). Based on NICU admissions; A total of 15 neonates (11%) were admitted to the NICU. The commonest causes of NICU admission were, early onset neonatal sepsis. perinatal asphyxia, RD secondary

to meconium aspiration and the rest were birth injury (soft tissue) and hypothermia. Those NICU admission rates are almost similar to other tertiary level hospitals. On the other hand, the rate of birth injury was low from the reports of Yekatit 12 hospital. The lower rate in this study may be due to the exclusion of preterm deliveries(10).

Of all deliveries, 9 (6.6%) of had maternal complications but there was no maternal death. Postpartum hemorrhage complicated 3 (2.2%) mothers, one mother experienced severe adhesions leading to organ injury (iatrogenic bladder injury) and required a hysterectomy and blood transfusion. Notable risks associated with repeat delivery after CS include abnormally invasive placenta, significant blood loss, adhesions, and organ injury. Those complication rates are lower than the Jimma university study reported; 1 maternal death and PPH occurred in 24% of mothers. Reasons for the high number were put as, nature of high-risk mothers, more than half had no ANC or came late and there might be under reporting of complications. Two mother (1.5%) developed wound infection which is similar to the Nepal study done at tertiary hospital level (32) and 2 mothers with postpartum depression. There was OASIS- 3rd degree perineal tear in one of the mothers. These complication rates are comparable to those reported in tertiary hospital studies from Nepal, suggesting that maternal outcomes in this study are consistent with those in similar settings (10,17).

ANC booking was universal at least for one contact; which is higher than the studies in Tercha hospital, Mizan Aman hospital (89.1%) Cameroon (93.4%), India 88.57% (19,22)(33) (11). Ninety-three mothers (68.4%) had 5 to 8 ANC contacts. Emplmenting the new WHO ANC model is one of the methods for risk reduction. Based on this 8+ model only (7.4%) mothers achieved it. Multiparity was common 82 (63.3%), consistent with findings from Mizan Aman (57.6%), suggesting that multiparity is a risk factor for breech presentation. The most frequent type of breech presentation was frank breech (51.5%), slightly lower than the 59.46% reported in Jimma University studies (10,19).

Other factors, such as maternal age, residency, sex of the newborn, and mode of delivery, did not show statistically significant associations with complications.

7 Conclusion and Recommendation

The study highlights a significant prevalence of breech presentation, which is associated with significant number of maternal and neonatal complication.

The maternal and neonatal outcomes of term breech singleton deliveries were better when the mothers are multiparous, birth weight is between 2500gm and 3500gm, the gestational age is full term and the pregnancy is as a result of planned.

Maternal complication occurred in 6.6% of the total deliveries, this rate is slightly lower than similar level university hospitals of Ethiopia but it aligns with other low- and middle-income countries. There might be under reporting of complications due to different reasons inter observer variations but this wild allegation needs researchers.

Birth weight is an important predictive parameter for neonatal morbidity and mortality. Particularly in fetuses with breech presentation, accurate estimation of fetal weight is extremely important for pridiction of complication such and assessing the possibility of successful assisted vaginal breech delivery or to proceecd with CD. Indications for CD should always be carefully evaluated, especially important in resource-poor settings such as sub-Saharan Africa

There was higher rate of CD for breech delivery compared to other similar tertiary level teaching hospitals both locally (Ethipoian), African and Asian country university hospital studies.

Upon deciding mode of delivery based on the sonographic findings, we sholud take the most accurate values andwe should use appropratly calibered ultrasound machines and to be measured by the most resident or senior. Since as a low income country we should decrease the burden of unnecessary primary CD and its aftermath complication.

studies.

Additional longitudinal studies in diverse settings and with large number of sample size is needed to better understand the factors influencing breech delivery outcomes impact on maternal and neonatal health.

Limitation of the study

The study was conducted in a tertiary care hospital, which may not reflect outcomes in the general population.

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ANNEXES

Annex I: Consent Form

Hello. My name is Dr. Kibret Hagos G/Yesus. I am a Doctor of Medicine currently specializing in Obstetrics and Gynecology. I am now in my 4th year of study. I am conducting a research on birth outcome of breech presentation delivered at ACSH, Tigray, Northern Ethiopia.

The information we collect will help the health care providers, researchers, policy makers and the hospital at large have a baseline input on the birth outcome of breech presentation delivered and revise management protocol based on the outcome and further researches. These questions will not take more than 15 minutes.

All of the answers you give was confidential and will not be shared with anyone other than members of this research team. You don't have to be paid in this study, but I hope you will agree to answer the questions since your views are important.

Please contact the principal investigator if you have any questions with the following address.

Name of Principal Investigator: Dr. Kibret Hagos

Tel: 0916924442

Email: megakibret@gmail.com Sign……Date……

Signature of interviewer: _____

Date: _____

Respondent agrees to be interviewed:

Sign_____

Annex II: Data Extraction format

Currently, I am undertaking Research Thesis on birth outcome of breech presentation and associated factors delivered at ACSH, Tigray, and Northern Ethiopia. Please read the questions carefully and circle the number/letter provided below. According to the questions the respondents can select one option, select more than one option, or give a word/words or numbers.

Assurance of Principal Investigators

I, the undersigned, agree to accept all responsibilities for the scientific and ethical conduct of the research project and for the provision of required progress reports as per the terms and conditions of the requirements of the department. I will provide timely progress report and seek the necessary advice and approval from my advisor in the course of the research.

Name of the specialty trainee: Kibret Hagos G/Yesus, M.D.,

Signature: _____

Approval of the Major Advisor

Name of the advisor: Mullugeta Gebru, M.D Fanos Gebru, M.D.+, Assistant Professor of Obstetrics and Gynecology

Signature: _____

Date: _____

Data extraction form

This questionnaire is developed to collect data for the study on Maternal &neonatal outcomes and associated factors of Breech presentation. This was filled by data collector who is trained to collect data in this study.

Name of data collector _____

Place of admission:

A) ACSH

Part 1 Socio demography characteristics	
1. Identification	A. Date of admission_____ B. Date of discharge_____ C. MRN---------- D. Age E. Phone number_____

	F. Religion:	I. Orthodox II. Catholic III. Protestant IV. Muslim V. Other specify_____
	G. Ethnicity	I. Tigray II. Amara III. Afar IV. Other specify_____
	H. Residence	I. Urban II. Rural
	I. Marital status	I. Married II. Single III. Divorced IV. Widowed
	J. Educational status	I. Illiterate II. Grade 1-4 III. Grade 5-8 IV. Grade 9-12 V. College or University graduate
	K. Occupation	I. House Wife II. Governmental Employee III. Private Employee IV. Student V. Daily Laborer VI. Others_____
Part 2 Reproductive, obstetric, medical history		

2. Reproductive history	A. Gravidity:___ B. Parity:____ C. Alive kids:___ D. Stillbirth:____ E. END:___	F. Infantile death:____ G. No. of Abortion:____ H. No. of Ectopic Pregnancy:____ I. No. of GTD:_____
3. Gestational age at delivery (in weeks): _____		A. Reliable LNMP B. Early Ultrasound C. Unknown
4. ANC	a) Had contact	If she had contact , number of contacts_____ Place of ANC 1. Health center 2. Public general hospital 3. Private clinic/hospital 4. Referral hospital
	b) No ANC contact	
5. Referral Status	I. Yes II. No	If yes Place of referral_____
6. Is pregnancy planned	I. Yes II. No	
7. Is pregnancy wanted	I. Yes II. No	
8. Is pregnancy supported	I. Yes II. No	
9. Obstetric complication before delivery	I. Yes II. No III. If yes A. PROM B. Intra amniotic infection	

	C. Placenta previa D. Preeclampsia/Eclampsia E. Preterm labor F. Polyhydramnios or Oligohydramnios G. MSAF H. If others specify_____
10. Risk factors	I. Uterine anomaly II. Uterine myoma if yes site of the myoma III. Polyhydramnios or Oligohydramnios IV. Placenta previa
11. Mode of delivery	I. Assisted breech vaginal delivery II. C/D III. If C/D indication A. Big for breech vaginal delivery B. Cord prolaps C. Footling breech D. Breech + opted for C/D E. Post term F. Prolonged ROM G. Hyperextended head H. Dysfunctional Labor(arrest,prolonged..) I. Advanced maternal age J. NRFHRP
12.	*Delivery Attendant* A. Obstetrician B. Residents(level of resident) C. Medical interns D. Midwifes

Part 3 Outcome and Postpartum Maternal and Neonatal Status	
MRN of Neonate_____	
13. Outcome	Weight:_____ Sex:____ Status, alive or dead_____
14. APGAR score	1st min:____ 5th min_____ 10th min_____15th min____20th min_____
15.Any difficulty during delivery , head enterapment, or other difficulty	1) Yes 2) No If Yes specify …….
1. Birth injury	3) Yes 4) No If Yes specify type of birth injury_____
2. Neonate referred to NICU?	I. Yes II No II. If yes, admission diagnosis A. Sepsis B. PNA C. RDS D. MAS E. TTN F. Neonatal Jaundice G. Hypothermia H. Birth Trauma (Specify)---------- I. Icu care more than 4 day A)yes B) No J. Others (Specify)
3. Congenital anomaly	I. Yes II. No III. If yes, specify the type of congenital anomaly ----------
4. Maternal complication before discharge after delivery	I. PPH II. Maternal systemic infection

	III. Aftercoming of head IV. Wound infection V. Perineal Tear , degree_____ VI. Postpartum depression VII. Length of hospital stay in days-------- VIII. Preterm labor IX. Obstructed labor X. If other specify _____
5. Discharge condition	1. Alive and improved 2. END

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Characteristics	Maternal and perinatal Outcomes of breech		COR (95% CI)	P-value	AOR (95%, CI)	p-value
	Yes, n (%)	no, n(%)				
Age						
<=24years	12(26.7)	33(73.3)	Ref		Ref	
>24 years	16(17.6)	75(82.4)	0.436 (0.204, 0.935)	0.033	0.780 (0.241-2.517)	0.677
Residence						
Urban	21(18.4)	93(81.6)	Ref		Ref	
Rural	7(31.8)	15(68.2)	1.098(0.411-2.934)	0.299	0.516(0.141-1.887)	0.317
Planned pregnancy						
Yes	24(18.9)	103(81.1)	Ref		Ref	
No	4(44.4)	5(55.6)	1.945(0.495-7.653)	0.341	5.957 (1.063-33.382)	0.042
Sex of newborn						
Female	16(25)	48(75)	1.683(0.804-3.522)	0.167	1.689(0.696-4.098)	0.246
Male	12(16.7)	60(83.3)	Ref		Ref	
Gravidity/parity						
Primiparous	14(31.1)	31(68.9)	3.106(1.442-6.692)	0.004	4.017 (1.153-14)	0.029
Multiparous	14(15.4)	77(84.6)	Ref		Ref	
Mode of birth						
C/D	16(15.7)	86 (84.2)	Ref		Ref	
AVD	12 (35.3)	22(64.7)	1.373(0.602-3.132)	0.451	0.884(0.275-2.840)	0.835
Gestational age						
Early term	14(31.8)	30(68.2)	3.842(1.766-8.358)	0.001	4.609(1.718-12.362)	0.002
Full term/post term	14(15.2)	78(84.8)	Ref		Ref	
Weight of newborn						
<2.5kg	13(76.5)	4(23.5)	10.562 (3.188 - 35.000)	0.000	9.168(2.167-38.791)	0.003
>=2.5kg	15(28)	108(79.4)	Ref		Ref	