The page features decorative elements consisting of several overlapping blue circles of varying shades and sizes, and thin blue lines that intersect to form a large, light-blue triangular shape framing the central text.

**DETERMINANTS OF BREECH PRESENTATION AT BIRTH IN SINGLETONS
AT JIMMA UNIVERSITY MEDICAL CENTER, SOUTH WEST ETHIOPIA: A
CASE-CONTROL STUDY**

ADDISU TADESSE WODAJO (MD)

**A THESIS SUBMITTED TO THE DEPARTMENT OF OBSTETRICS AND
GYNECOLOGY JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH AND
MEDICAL SCIENCES THE SCHOOL OF GRADUATE STUDIES IN THE
PARTIAL FULFILLMENT OF THE REQUIRMENTS FOR THE SPECIALITY
CERTIFICATE ON OBSTETRICS AND GYNECOLOGY**

**JULY, 2017
JIMMA, ETHIOPIA**

DETERMINANTS OF BREECH PRESENTATION AT BIRTH IN
SINGLETONS AT JIMMA UNIVERSITY MEDICAL CENTER, SOUTH
WEST ETHIOPIA: A CASE-CONTROL STUDY

BY: ADDISU TADESSE WODAJO (MD)

ADVISORS:

DR. FITSUM ARAYA (MD, Associate Professor of Obstetrics and
Gynecology)

Mr. LAMESSA DUBE (MPH IN RH)

JULY, 2017

JIMMA, ETHIOPIA

Abstract

Background: Breech delivery is generally associated with higher perinatal morbidity and mortality and the optimal mode of delivery continues to be a source of debate. However, there is paucity of information about the factors associated with breech presentation at birth in singletons at the Jimma University medical center.

Objective: To assess the determinants of breech presentation at birth in singletons in Jimma university medical center, south west Ethiopia from July, 2016 to July, 2017.

Method: Hospital based case-control study was conducted in Jimma University medical center, labor ward from July, 2016 to July, 2017. Pre-tested structured questionnaires were used for data collection. Data was collected by Obstetrics and Gynecology residents in the labor ward; and entered into SPSS version 21 and descriptive statistic and binary logistic regression were used for analysis and result were expressed in narration from, tables and subsequent recommendations were forwarded based on the result.

Result: Low birth weight, extremes of amniotic fluid volume (oligohyramnios, polyhydramnios), personal history of breech delivery and female fetus; were significantly associated with increased risk of breech presentations at birth in singletons .The associations of maternal age, parity, and previous history of Cesarean Section with breech presentations were not substantiated by this results. Uterine abnormalities; placental location, fetal congenital anomaly and maternal medical therapies; the overall incidence of these variables were significantly small to assess their impact on fetal presentations at birth in singletons.

Conclusion and Recommendation:

This study found low birth weight, extremes of amniotic fluid volume (oligohyramnios, polyhydramnios), History of breech delivery and Female gender were independent predictors of breech presentation at birth in singletons and recommended considering these significantly associated factors to anticipate breech presentation for further evaluation and management; in the study facility. Further prospective study is recommended on larger sample size over a longer study periods; to assess the associations of variables with few incidences; the variables which has no associations, to make the relative risks solid and the confidence intervals close into the risk factors and potential mechanisms of breech presentation.

AKNOWLEDGEMENT

I would like to thank my supervisors, Dr Fitsum Araya (MD), and Mr. Lamessa Dube for their patient guidance, encouragement and advice they have provided throughout my time as their student. I have been extremely lucky to have a supervisor who cared so much about my work, and who responded to my questions and queries so promptly.

Completing this work would have been all the more difficult had it been not for the support and friendship provided by my friends who collected the data and gave me constructive comments during writing this manuscript, and their unlimited support in searching for references. I am indebted to them for their help.

I must express my very profound gratitude to my parents for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them.

Nevertheless, I am also grateful to all mothers (study participants) for accepting nothing less than excellence from me.

Finally, I would like to acknowledge Mrs. Yetinayet Ashine who helped me in printing and compiling this research.

TABLE OF CONTENTS

CONTENT	PAGE
Abstract -----	I
Acknowledgment -----	II
Table of Content-----	III
List of Tables -----	IV
List of Figures -----	V
List of Acronyms -----	VI
Chapter One:-Introduction.....	1
1.1 Back Ground-----	1
1.2 Statement of the Problem -----	2
Chapter Two:-2.1 Literature Review -----	5
2.2 Significance of the Study-----	10
2.3 Conceptual Frame work -----	12
Chapter Three	
Objectives-----	13
Chapter four:-4. Methods and materials-----	14
4.1 Study Area and Period-----	14
4.2 Study Design -----	14
4.3 Population -----	14
4.3.1 Source Population -----	14
4.3.2 Study Population -----	15
4.3.3 Inclusion Criteria -----	15
4.3.4 Exclusion Criteria -----	15
4.4 Sample size and sampling Technique/sampling Procedures -----	15
4.5 Sampling Collection and measurement -----	15
4.5.1 Study Variables-----	15
4.5.2 Dependent Variables-----	15
4.5.3 Data Collection Instruments -----	17
4.5.4 Data Collection Procedures -----	17
4.6 Data Processing and analysis-----	18
4.7 Data Quality Control-----	18
4.8 Limitation of Study-----	18
4.9 Ethical Consideration -----	18
4.10 Dissemination Plan -----	19
Chapter five Result-----	20
Chapter Six Discussion-----	29
Chapter Seven conclusion and Recommendation-----	33
References -----	34
Annex I - Questionnaires -----	40

LIST OF TABLE AND FIGURE

TABLE's	pages
Table 1: Socio-demographic characteristics of mothers of singleton breech cases and controls: presented to labor ward, JUMC, from 28 completed weeks of gestation, from July, 2016 to July, 2017(153 cases, 459 controls).....	21
Table 2: Obstetric characteristics of mothers of singleton breech cases and controls: presented to labor ward, JUMC, from 28 completed weeks of gestation, from July, 2016 to July,2017(153 cases and 459 controls).....	23
Table 3: Labor and delivery characteristics of mothers of singleton breech cases and controls: presented to labor ward, JUMC, from 28 completed weeks of gestation, from July, 2016 to July, 2017(153 cases and 459 controls).....	25
Table 4: Perinatal Outcome characteristics of selected singleton breech cases and controls: presented to labor ward, JUMC, from 28 completed weeks of gestation, from July, 2016 to July, 2017(153 cases and 459 controls)	26
Table 5: Multivariate analysis results for independent predictors of breech presentation at birth in singletons: presented to labor ward, JUMC, from 28 completed weeks of gestation, from July, 2016 to July, 2017(153 cases and 459 controls).....	28

LIST OF FIGURES

PAGES

Figure 1 conceptual framework to assess determinants of breech presentation at parturition among women presenting to the labor ward from 28 completed weeks of gestation at Jimma University Medical Center from July, 2016 to July, 2017.....12

ACRONYMS

ANC	: Antenatal care
C/S	: Cesarean Section
CPAP	: Continuous Positive Airway Pressure
EFW	: Estimated Fetal Weight
EONS	: Early Onset Neonatal Sepsis
ENND	: Early Neonatal Death
GA	: Gestational Age
HMD	: Hyaline Membrane Disease
ICU	: Intensive Care Unit
IUGR	: Intrauterine Growth Restriction
JU	: Jimma University
JUSH	: Jimma University Medical Center
LBW	: Low Birth Weight
LNMP	: Last Normal Menstrual Period
LUSTC/S	: Lower uterine segment transverse cesarean section
MAS	: Meconium Aspiration Syndrome
NRFRP	: Non Reassuring Fetal heart Rate Pattern
OBGYN	: Obstetrics and Gynecology
PNMR	: Perinatal Mortality Rate
PNA	: Perinatal Asphyxia
PPH	: Postpartum Hemorrhage
WHO	: World Health Organization

CHAPTER ONE: INTRODUCTION

1.1. BACKGROUND

The infant presenting as a breech occupies a longitudinal axis with the cephalic pole in the uterine fundus. This presentation occurs in 3 to 4 percent of labors overall, although it is found in 7 percent of pregnancies at 32 weeks and in 25 percent of pregnancies of less than 28 weeks' duration[1].When breech presentation is identified, the major concerns are; whether the fetus has adopted this position because of an underlying abnormality and avoiding maternal and fetal harm during delivery[2].

There are three types of breech presentations: (I) Frank breech position, both hips are flexed and both knees are extended so that the feet are adjacent to the fetal head. At term, 50 to 70 percent of breech fetuses are in this position. (ii) Complete breech position, both hips and both knees are flexed. At term, 5 to 10 percent of breech fetuses are in this position. And (iii) incomplete breech position, one or both hips are not completely flexed. At term, 10 to 40 percent of breech fetuses are incomplete. One or both feet are the presenting part in a footling breech. Rarely, one or both knees are the presenting part; this is called a kneeling breech [3].

It is hypothesized that a normally proportioned active fetus in a normal volume of amniotic fluid adopts the cephalic presentation near term because this position is the best fit in the intrauterine space. If any of these variables are disrupted by underlying maternal, fetal, or placental conditions, then breech presentation becomes more likely. In most pregnancies, however, breech presentation appears to be a chance occurrence (3). Abnormalities of the uterus and/or fetus account for less than 15 percent of breech presentations. And, there are a range of possible reasons which are listed below:

Prematurity – This is one of the most common causes of breech. Many babies are in breech position until 30 weeks or so (because they have more room to move around) and if labor happens to start, then the birth is a breech birth [4].

Altered intrauterine contour or volume:

- Uterine anomalies (e.g., bicornuate or septet uterus)[5 ,6]
- Space occupying lesions (e.g., uterine leiomyomata)
- Placental abnormalities (e.g., placenta previa, cornual placenta) [7]
- Multiparity resulting in a lax abdominal wall and more rounded intrauterine space
- Extremes of amniotic fluid volume (polyhydramnios, oligohydramnios)
- Contracted maternal pelvis [8]

Altered fetal shape: Fetal anomaly (e.g., anencephaly, hydrocephaly, sacrococcygeal teratoma, neck mass); Extended fetal legs [3]

Impaired fetal mobility: Crowding from multiple gestations; Neurologic impairment; Short umbilical cord [9]; fetal asphyxia [10]

Other purported risk factors include primiparity [3]. Female sex [11], maternal anticonvulsant therapy [12], older maternal age, fetal growth restriction, and previous breech presentation [13]. Analysis of data from a population based registry showed that the risk of breech presentation in a second pregnancy was 9 percent if the first infant was breech and 2 percent if the first infant was non breech [13]. After two consecutive breech deliveries, the risk of another breech presentation rises to 21 to 28 percent [13, 14]. And after three consecutive breech deliveries the risk is 38 percent [13].

In addition, men or women who were delivered at term from breech presentation were twice as likely to have firstborn offspring in breech presentation as parents who were delivered in cephalic presentation [15]. This suggests there may be a heritable component to fetal presentation that can be transmitted from either parent.

1.2. Statement of the problem

Breech presentation has always been a matter of concern for the midwife & the obstetrician because of its association with high perinatal morbidity and mortality. Perinatal mortality is increased 2- to 4-fold with breech presentation, regardless of the mode of delivery. These are due to combination of trauma, birth asphyxia, prematurity

and congenital malformation. In addition, 19.4% of neonates undergoing term breech deliveries have long-term morbidity up to the school age irrespective of mode of delivery. The safest route of delivery for breech presentations has long been a topic of debate [16].

To reduce the high perinatal mortality or serious neonatal morbidity associated with breech vaginal delivery, some centers in developed nations favor planned cesarean section group than for the planned vaginal birth group. The publication of these results had a major effect on obstetrical practice, and resulted in the American College of Obstetricians and Gynecologists (ACOG) recommending the implementation of a policy of elective cesarean section for all breech presentations at term. This recommendation led to a radical change in practice, with a cesarean delivery rate of 86.9% in the United States in 2002 for breech presentations at term [17].

In one Study in Nigeria, the neonatal outcome between vaginal and cesarean births for fetuses presenting breech at term was not significantly different in terms of the neonatal mortality rate or neonatal intensive care unit admission rate [18].

In Ethiopia, although information on breech deliveries is limited, study done at Yekatit 12 hospital from September 1989 to August 1992 show unacceptably high perinatal mortality rate [19].

Because ultrasonography provides a wealth of important information in term breech presentation (congenital anomalies, type of breech, hyperextension of fetal head, cord position, estimated fetal weight (EFW), and amniotic fluid volume), it is felt that this examination should be performed before making a decision for planned vaginal birth[20].If diagnosis of breech presentation is made for the first time in labor, and the estimate of fetal weight, by clinical examination or U/S, is greater than 4,000 gms, delivery by C/S is recommended [20].

In our hospital, even though indication for cesarean section and prerequisite for vaginal breech delivery is used; the use of strict selection criteria of determinants affecting route of breech deliveries for appropriate candidates for a trial of vaginal breech delivery is lacking and has never been elaborated.

It was the aim of this study therefore to identify the determinants of breech presentation which can aid early recognition of it; during the study period in our hospital, at obstetrics ward of JUMC.

CHAPTER TWO

2.1 LITERATURE REVIEW

About 3–4% of all pregnancies have breech presentation at term [21]. The incidence of breech presentation decreases with increasing gestational age. It is a common occurrence in early pregnancy when the fetus is highly mobile within a relatively large volume of amniotic fluid. While 20 to 25 percent of fetuses under 28 weeks are breech, only 7 to 16 percent are breech at 32 weeks, and only 3 to 4 percent are breech at term. Spontaneous version may occur at any time before delivery, even after 40 weeks of gestation [21, 22]. A prospective longitudinal study using serial ultrasound examination reported the likelihood of spontaneous version to cephalic presentation after 36 weeks was 25 percent [23].

The prevalence of breech presentation varies across the world. For instance, study done in maternity hospital in Kuala Lumpur (2007) was 3.8% [24]. Research done in India studied during Jan 2007 to Sep 2009 at Pt. J.N.M. Medical College and associated Dr. B.R.A.M. Hospital Raipur Chhattisgarh was 2.1% [25]. A 15-Year Review at the Yaoundé General Hospital (a cross-sectional analysis of data collected from March 1992 to March 2007) was found to be 2.98% the study was comparable to the range of 2.4%–3% reported in studies in Nigeria, South Africa and Gabon[26]. In the 4 years retrospective study of all singleton term breech deliveries covering the period of January 2004 to December 2007 study period, in university teaching hospital in eastern Nigeria, the prevalence of singleton term breech deliveries was 2.6 % [18]. In a three year period (September 1989 to August 1992), at Yekatit 12 hospital in Ethiopia showed a 4% incidence rate at a gestational age of 28 weeks and above [19]. There is no figure in JUMC.

The earlier the gestational age, the higher the prevalence of breech presentation will be. They found a small increase of breech presentation at week 38 compared to weeks 35-37. This increase was iatrogenic. It was the result of the policy performing elective pre-labor cesarean sections for breech from 38 weeks on. By doing so, we created an artificial peak in the number of births in breech presentation in that specific week and we certainly prevented some fetuses the opportunity as yet to turn spontaneously. Subsequently,

beyond 39 weeks, there were almost no women with a baby in breech position left to give birth. Therefore the decrease in breech delivery beyond 39 weeks was also iatrogenic [27].

Gestational age and birth weight are interrelated. However, at birth, breech neonates weighed less than vertex neonates after being controlled for relevant factors. This is found on several occasions and the relationship between intrauterine growth retardation and breech presentation in both preterm and term infants has been clearly demonstrate [28, 29-31].

Multiparity and a female sex are associated with breech presentation at birth, it has been suggested that this is a fetal size effect [29]. Indeed, infants born to primiparous women are lighter than those born to multiparous women, and girls, on average, are smaller than boys [32]. However, in this study, parity and gender were independent determinants. Factors, other than birth weight must play a role and a report from Norway [33] suggests that women who delivered a baby in breech presentation, mostly after cesarean section less frequently decide to have another pregnancy. This may explain the higher frequency of primiparity in breech presentation [33]. Witkop [34]. et al. performed prenatal ultrasound in 7045 women and found that a non-vertex fetus at 35 weeks in nulliparous women had twice the risk of staying in that position at delivery compared to multiparous women. This is probably due to the more relaxed muscle tone of the uterine and abdominal wall in multiparous women [35]. And it may also be the reason why the success rate of external cephalic version is significantly higher in multiparous women [36].

Half a century ago, Morgan and Kane [28]. Reported a higher incidence of breech presentation in female compared to male offspring, other studies have supported this finding [29, 30, 37-40]. but no clear etiology has been put forward to elucidate this association. Soernes and Bakke showed that, due to differences in intrauterine fetal motor activity, the umbilical cord is shorter in babies born in breech than in vertex presentations [39]. They also reported that the mean cord length is somewhat shorter in female compared to male infants, suggesting a higher fetal activity in boys; consequently, female babies are more prone to be born in breech presentation [39].

The importance of fetal anomalies cannot be overemphasized. Malformations of the central nervous system complicate 1.5% to 2.0% of breech births: the incidence of hydrocephalus is tenfold greater, and that of anencephaly twofold to fivefold greater, than it is among infants presenting as vertex. Up to 1% of infants in breech presentation have a significant chromosomal abnormality: 1 in 200 has Down syndrome, and the incidence of other autosomal trisomies is increased as well. Of those infants presenting as breeches, the incidence of major congenital anomalies is 17% among premature infants, 9% among term infants, and 50% among term infants who die in the perinatal period [41].

A previous cesarean section increased the risk for breech presentation by 44 percent. Two studies, one from France [42] and one from Greece [43] Showed that women with previous cesarean deliveries had double risk of breech presentation at term compared to women with previous vaginal deliveries. Unfortunately they were unable to identify the reason for the previous cesarean. However, Luterkort et al. [28] did not find a difference in placental location between breech and cephalic presentation.

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 after coming shoulders, head, and arms are at greater risk of harm from dystocia than in the cephalic presenting fetus. Cord prolapse is also more common in breech presentation [44]. Footling breech presentation carries a higher risk of cord prolapse than other types of breech presentation and about 15 times more than cephalic presentation [45]. Study done in Nigeria (from 200_2007) cord prolapse accounted for 50% of intrauterine deaths prior to admission, followed by entrapped after coming head, which accounted for (25%) of the deaths in breech presentation[18]. The magnitude of these risks, whether they can be reduced by use of management guidelines, and how the fetal risks compare with maternal risks from cesarean delivery, has been a matter of debate for decade [44].

Breech deliveries, in comparison with cephalic presentations, are associated with increased maternal complications during labor, delivery and postpartum period. Study done in Hayatabad Medical Complex Peshawar (2000) vaginal versus cesarean delivery shows maternal mortality after cesarean section was 3-7 times higher than after vaginal

birth. Study done at Sorlandet Hospital Kristiansand between 2001 and 2011 Ninety seven (97%) mothers had no complications during delivery while (3%) had complications including one cervical and two vaginal tears. Maternal morbidity in breech vaginal delivery is low and it is significantly higher in the caesarean section. The study showed only 3% maternal morbidity [46].

Breech presentation and deliveries also carries higher fetal and neonatal complications. Perinatal mortality is increased 2- to 4-fold with breech presentation, regardless of the mode of delivery. Deaths are most often associated with malformations, prematurity, and intrauterine fetal death. A study conducted in Kuala Lumpur (2007), shows the perinatal mortality (PNM) of breech infants was 79/1000 compared to 30/1000 in the controls and 39/1000 for the hospital. PNM due to CS in breech is 6/1000 and in breech vaginal delivery is 72/1000. However, most of the perinatal deaths in the vaginal delivery group involved premature breech less than 34 weeks. As study done in Ethiopia, Yekatit 12 hospital (September 1989 to August 1992) the gross perinatal mortality rate for breech delivery in the first 24 hours was 330 per 1,000 deliveries, which was significantly higher than for the total number of deliveries [19].

Compared to infants born by elective cesarean section, those delivered vaginally or by intra-labor

Cesarean section were more likely to have low 5-minute Apgar scores (4.1% vs. 17.77%; $P < .001$), require admission to neonatal unit (08.21. % vs. 13.63%; $P < .001$), and have an increased risk for perinatal mortality (0% vs. 05.68%; $P < .001$). Trial of vaginal delivery of term infants in breech presentation was associated with significantly increased risk of perinatal death and neonatal morbidity [47].

A number of neonatal morbidity develops in breech deliveries. Birth trauma is three times higher in and comparable in both in vaginal and emergency cesarean deliveries when compared with elective cesarean deliveries[48]. There is also, increased admission to neonatal intensive care unit more than 4 days, cephalhematoma, bone fracture, respiratory

distress syndrome, mechanical ventilation treatment, continuous positive airway pressure (CPAP) treatment (Sorlandet Hospital Kristiansand, 2001_2011)[46].

In breech deliveries there are determinants affecting route of breech deliveries. In an attempt to balance both maternal and fetal risks, there were proposed selection criteria for appropriate candidates for a trial of labor. In 1965, Zatuchni and Andros retrospectively analyzed 182 breech births, of which 25 infants had poor outcomes [49]. Therefore, they devised a score based on six clinical variables at the time of admission that identified those patients destined to manifest difficulties in labor for whom prompt and appropriate interventions could be made. The score used parity, gestational age, estimated weight, prior successful breech vaginal delivery, dilation and station to ascertain likelihood of successful vaginal delivery. However, the parturient herself could increase the score by presenting later in labor; other factors that affect the score are less modifiable. At least three subsequent prospective studies applied the Zatuchni-Andros system and found it to be both sensitive and accurate in selecting candidates for successful vaginal delivery [49-50]. A Zatuchni-Andros score of less than 4 in these studies accurately predicted poor outcomes in patients with infants presenting as a breech. In applying the scoring system, only 21 to 27 percent of patients failed to qualify for a trial of labor [49].

Following strict criteria during vaginal breech delivery can reduce perinatal complications. Study done in Sweden in 1986 shows using Westin's feto-pelvic scoring system based on X-ray pelvimetry, estimated fetal weight, type of breech, and outcome of previous vaginal deliveries. The vaginal delivery rate was 45.1% and cesarean section rate 54.9%. 81.5% of cesarean sections were planned in advance, based on the scoring system. Corrected neonatal mortality was nil and persistent morbidity was 0.4% for the whole material. Asphyxia, defined as 5 min Apgar score <7, occurred in only 1% of cases, evenly distributed among vaginal and planned cesarean deliveries. The study shows possible means of the scoring system to identify a group of women who could give birth vaginally, without any mortality or persistent morbidity [51].

In breech delivery the type of breech may influence perinatal outcome. The literature showed a significantly increased perinatal mortality/morbidity in footling breech, due principally to an increased incidence of cord prolapse and entrapment of the after coming head by an incompletely dilated cervix [52]. The circumference of the breech is somewhat less when the foot/feet are delivered before the breech than when the hips are flexed. Average figures for circumference of presenting breech are 32 cm for complete breech, 27 cm for frank breech, and 24 cm for footling [53]. According to study done in two departments of obstetrics at Rigs Hospitalet (1959), out of three intrapartum death of term breech infant One infant had an entrapped after-coming head, one had prolapse of the umbilical cord and the third had sepsis following PROM which showed that the risk of perinatal death was 35 times increased in breeches compared with vertex at term [54].

From the above literature review, we have seen that the determinants; effects and magnitude of breech presentation across varies countries. But in Ethiopian context, there is only limited information; particularly at JUMC there is no even baseline study on the issue. Lack of this baseline information might contribute its share to high maternal and perinatal mortality in the country; so this study may fulfill these gaps.

2.2 significance of the study

Breech presentation and delivery is one of the high risk pregnancies because of 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. Even though the above is known about breech delivery globally, in Ethiopia much is not known about the risk factors, magnitude and different complications related with breech delivery.

Some studies had been carried out on the magnitude and outcomes of singleton term breech delivery in Ethiopia; including from Jimma University Medical Center recently even though unpublished one; but still there is no single report about the determinants of breech presentation.

Findings of this study will be used to plan and implement standard obstetrics and neonatal care by identify the determinants of breech presentation which can aid early recognition so as to decrease maternal and perinatal complications from breech presentation & delivery; Further it can helps to provide a baseline data in the area for further study.

2.3 Conceptual frame work

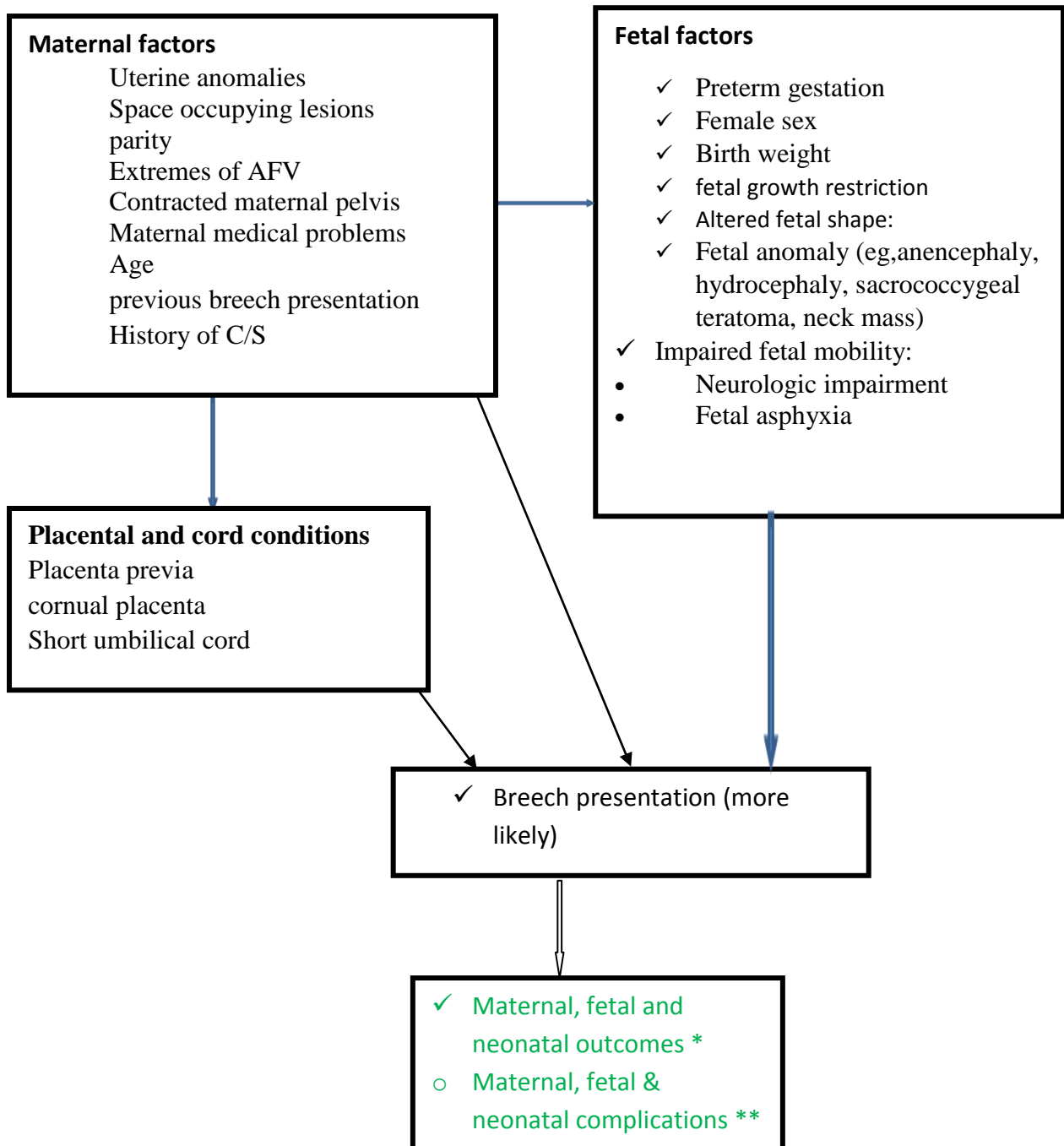


Figure 2. Conceptual framework to assess determinants of breech presentation at parturition among singletons women presenting to the labor ward from 28 completed weeks of gestation at Jimma University Medical Center from July, 2016 to July, 2017.

- Both needs other study (*, **)

CHAPTER THREE

OBJECTIVE

Study objective

To assess determinants of breech presentation at parturition among women presenting to the labor ward from 28 completed weeks of gestation at Jimma University Medical Center from July, 2016 to July, 2017.

Hypotheses

1. Previous history of breech presentation will have a positive association with subsequent breech presentation
2. Fetal weight will have a positive association with fetal breech presentation
3. Fetal malformation is associated with increased risk of breech presentation
4. Increase in maternal age is associated with increased risk of breech presentation
5. Increase in Parity is associated with increased risk of breech presentation
6. Previous history of C/S is associated with increased risk of breech presentation
7. Being female fetus is associated with increased risk of breech presentation
8. Extremes of Amniotic fluid volume associated with increased risk of breech presentation
9. uterine anomalies, leiomyoma & placental location associated with increased risk of breech presentation

CHAPTER FOUR

METHODS & MATERIALS

4.1 Study area and period

The study was conducted from 1st of July, 2016 to 30th July, 2017 in the Oromia region, Jimma zone, Jimma town, at Jimma University Medical Center (JUMC) which is located 357 kms South-West of Addis Ababa. Jimma University Medical Center is one of the teaching hospitals in the country giving services to people living in Jimma zone and serving as a referral hospital in the South-West Ethiopia.

JUMC is also serving as a clinical post graduate specialty teaching hospital for Obstetrics and Gynecology, Internal Medicine, Pediatrics & Child Health since 2005 and for Ophthalmology, and in Surgery since 2007.

Department of Obstetrics /Gynecology have two wards (Gynecology and Maternity), MCH clinic, Gynecologic OPD, family planning clinic, survivals of sexual assault clinic, and one general ob/gyn referral clinics. The labor ward had six beds in first stage room, and three delivery couches in the second stage room, and forty beds in maternity ward and also two operation rooms. The activity was performed by 25 diploma midwives, 6 clinical diploma nurses and 10 BSc clinical nurses. It has eight Obstetricians & Gynecologists and 42 residents from year I–VI.

4.2- Study design

Institution based case-control study design matched on gestational Age was used.

4.3- Population

4.3-1 Source population

The source population was all laboring mothers from 28 completed weeks of gestation arriving at the labor ward of JUMC during the study period

4.3.2 Study Population

The study population comprised of all Cases, which were sampled laboring mothers with breech presentation from 28 completed weeks of gestation, while Controls were sampled laboring mothers with cephalic presentation and had same gestational age with case in Labor ward of JUMC.

4.3.3 Inclusion Criteria

All laboring mothers with breech presentation from 28 completed weeks of gestation arriving at the labor ward of JUMC during the study period was considered using LNMP, early ultrasound, fetal biometrics (femoral length, biparital Diameter).

4.3.4 Exclusion Criteria

- Women who presented with uterine rupture, that was due to recession of the fetal presenting part and can have different presentation in the peritoneum and twine pregnancy.

4.4 Sample Size and Sampling technique /Sampling procedures

- Sample size was calculated by Open Epi software by using sample size for two population proportion formula. The assumptions used for sample size calculation were OR of xx, proportion exposed among case %, proportion of exposed among control %, (reference), 95 % CI, and 80 % power, control to case ratio 3. Therefore, the required total sample size be come 612 (153 cases, 459 controls).

- Sampling technique was consecutively until the required number of cases were achieved and for each case three controls were selected by matching with gestational age

4.5 Data collection and measurement

4.5.1 Study variables

I. Dependent variables

Breech presentation

II. Independent variables

Gestational age

Female sex

Birth weight

Fetal anomaly

Uterine anomalies

Space occupying lesions

Parity

Extremes of amniotic fluid volume

Maternal medical problems

Maternal age

Previous breech presentation

History of C/S

Placenta previa

4.5.2 Operational Definitions

ANC status was assessed by asking the mother whether she visited or booked for ANC, her response was coded as ANC unbooked-if had no ANC follows up at all other wise ANC booked, had ANC follow up in any governmental or private, NGO health facility of at least one visit. And ANC Unrecorded: mother whose ANC follow up status was not known. APGAR score: was measured at birth and after five minutes based on the standard [Heart rate 100 beats/minute or more (2 points),less than 100 (1 point), none (0 points), Respiratory effort regular breathing (2 points),irregular (1 point), none (0 points), Muscle tone active (2 points), moderate (1 point), limp (0 points), Reflex irritability

crying (2 points),whimpering (1 point),silence (0 points), Color pink (2 points), bluish extremities (1 point), totally blue (0 points) and added to compute the Apgar score, results 7-10 normal and <7 distress and generally require further intervention]

Birth Weight: Weight of the newborn immediately after birth using Detecto Beam type Baby Scale.

Gestational age: was an estimated age of the fetus calculated from the first date of LNMP or with Ultrasound or Ballard score and categorize into

- Preterm = when GA was between 28 and 37weeks
- Term = GA between completed 38weeks and completed 42weeks
- Early term = completed 37 – completed 38weeks
- Full term = completed 39 – completed 40weeks
- Late term = completed 41wks but <42 weeks

Post-term = when the GA was greater than or equal to 42weeks

Gravidity: Number of pregnancy experiences irrespective of the outcome.

Parity: Number of deliveries of after 28 completed weeks of gestation

Para one - single delivery experience

Multipara – deliveries experience between two – five

Grand multipara – deliveries experience greater than five

Great grand multipara- delivery experience greater than or equal to ten

Major congenital anomalies: congenital anomalies that is incompatible with extra uterine life.

PPH: Bleeding which occurs after the delivery of the fetus/es defined as more than 500ml for singleton vaginal delivery, more than 1000ml after cesarean delivery or twin vaginal delivery or more than 1500ml after peripartum hysterectomy that is depending on the surgeons or birth attendants clinical estimation, the other methods are vital sign derangement or hematocrit drop of more than 10% from the baseline value, and data collectors will gate these information from patient's charts or documentations.

4.5.3 Data collection instruments

Semi-Structured questionnaires prepared for data collection, women's chart, operation and delivery log books of the patient with breech deliveries, patient specific demographic characteristics and information on breech deliveries, recorded on the day of surgery from patients' record and the responsible surgeon, when necessary.

4.5.4 Data collection procedures

Ten Obstetrics & Gynecology second year residents were recruited and oriented as data collectors. The principal investigator was considered as supervisor and follows daily the supervision activities. Laboring mothers were followed from the time of admission to time of delivery & ultrasound evaluation will be done for all breech presentation mothers in labor after full 28 weeks. In addition, each day the responsible ward resident approaches the mother and/or the fetus to find out any complication until discharge.

Women's chart, operation and delivery log books history of the patient with breech deliveries, patient specific demographic characteristics and information on breech deliveries recorded on the day of surgery from patients' record and the responsible surgeon when necessary.

4.6 Data processing and analysis

Data edited manually; codes given before entry to a computer and then data entered to SPSS software version 21; then after, analyzed. A descriptive analysis conducted to check for outliers, inconsistencies, and missed values as well as to compute determinants; proportions for breech presentation, maternal and child outcomes. Tables, figures, pie charts and graphs used to describe the determinants; magnitude and birth out of singleton breech deliveries. Finally interpretation, discussion and recommendation made based on the findings of the research.

4.7 Data quality control

Pretests made by collecting ten questionnaires from the targeted group by interviewers. And crosscheck made before actual data were collected. Questionnaires were prepared in English and revised by advisors. Data collectors were selected from obstetrics and gynecology residents' year- II. Close supervision was undertaken during data collection.

A total of ten residents trained on objective of the study, each variable on the questionnaire and record reviewing .Each questionnaire was crosschecked daily by the principal investigator. During data collection, principal investigator checked the filled questionnaire at the end of each day for data completeness.

4.8 Limitation of study

It may not be a representative of the general population; since the study was facility based review.

4.9 Ethical consideration

The ethical approval and clearance was obtained from Jimma University medical colleges Ethical Clearance Committee and cooperation letter written to the hospital from health service management and Permission for conducting the study was first obtained from chief executive officer. The study subjects were informed about risk and benefits and necessary explanation about the purpose of the study and its procedure, assurance of confidentiality, and the right not to participate were assured and finally verbal consent was obtained from each study participant.

4.10 Dissemination plan

The result will be presented for Jimma University College of Public Health and Medical Sciences, department of obstetrics and gynecology. Further effort will be made to publish on a peer reviewed journal.

CHAPTER FIVE: RESULT

During the study period, a total of 612 mothers of singletons (153 cases, 459 controls) from 28 completed weeks of gestational age were involved from July, 2016 to July, 2017.

A. Socio-demographic Characteristics

Table I shows the distributions of Socio-demographic characteristics of mothers of singleton breech cases and controls. Compared with the mothers of nonbreech infants, mothers of breech infants were more likely to be older than 30years and above (25.5 vs.20.3); but those lower than 20years are equal in proportion for both groups (17%). For both case and control groups majority (70.6 vs. 62.3) of the clients were living in Jima town; more than three fourth (78.4 vs. 69.3) were Oromo by ethnicity and (70.6 vs. 64.5) Muslim in religion respectively. With regard to education and occupation of mothers of singleton breech cases and controls nearly half (45.1Vs 41.2) can't read and write and (49.7 Vs 43. 1) of theme were house wife respectively. For both case and control groups almost all (99.3 vs. 97.4) mothers enrolled in this study from both groups were married. This table also shows six maternal characteristics (older age, outside jimma, religion, ethnicity, occupation, and marital states) associate with breech presentation at $P < 0.25$.

Table 1: Socio-demographic characteristics of the study cases: JUMC, 1st July, 2016 to 30th July, 2017.

VARIABLES		Breech Presentation				P. value	COR	95 % CI
		NO		Yes				
		Frequency	%	Frequency	%			
Age of the mother	Lower than 20	80	17.4	26	17.0	.831	1.06	.64 - 1.75
	20-29	286	62.3	88	57.5		1	
	30 and above	93	20.3	39	25.5	.171	1.36	.87 - 2.12
Address	Jima town	286	62.3	108	70.6		1	
	Outside jima	173	37.7	45	29.4	.065	1.45	.98 - 2.16
Religion	Muslim	296	64.5	108	70.6	.111	1.79	.88 - 3.65
	Orthodox	114	24.8	35	22.9	.304	1.50	.691 - 3.28
	Protestant	49	10.7	10	6.5		1	
Ethnicity	Oromo	318	69.3	120	78.4	.123	3.21	.73 - 14.09
	Amhara	85	18.5	23	15.0	.288	2.30	.50 - 10.68
	Kafa	33	7.2	5	3.3	.787	1.29	.226 - 7.35
	Dawuro	17	3.7	2	1.3		1	
	Others*	6	1.3	3	2.0	.160	4.25	.57 - 31.94
Education	can't read & Wright	189	41.2	69	45.1	.356	1.29	.75 - 2.24
	1-8	91	19.8	32	20.9	.487	1.25	.67 - 2.32
	9-12	101	22.0	30	19.6	.871	1.05	.56 - 1.97
	Above 12	78	17.0	22	14.4		1	
Occupation	House wife	198	43.1	76	49.7	.135	1.49	.88 - 2.50
	Farmer	91	19.8	36	23.5	.157	1.53	.85 - 2.77
	Merchant	69	15.0	17	11.1	.896	.96	.48 - 1.90
	Employee	93	20.3	24	15.7		1	
	student	8	1.7	0	0.0	.999	.00	.00-
Marital states	Married	447	97.4	152	99.3		1	
	Others**	12	2.6	1	0.7	.178	4.08	.53 - 31.64
Income	Poor	29	6.3	7	4.6	.272	1.62	.68 - 3.86
	Low	199	43.4	78	51.0	.653	1.22	.51 - 2.90
	middle	231	50.3	68	44.4		1	

*Yem 6, silte 3

** 4 unmarried, 7 divorced, 2 widowed

b. Obstetric characteristics

Table 2 shows the distributions of Obstetric characteristics of mothers of singleton breech cases and controls. Compared with the mothers of nonbreech infants, mothers of breech infants were more likely to be parous; that is Para 2 and above 65.4 vs. 58.2 respectively; but Gestational ages distributions preterm (31.4 vs. 30.9), term (64.7 vs. 64.3), and post term (3.9 vs. 4.8) were proportional for both cases and controls respectively because Controls were sampled mothers with cephalic presentation with same gestational age with cases. Compared with the mothers of nonbreech infants, mothers of breech infants has significantly higher (10.5 vs. 2.2) proportions of Previous history of breech delivery; but has lower (7.8 vs. 8.5) proportions of Previous history of C/D. Maternal medical therapies were not significantly different (one epileptic and one gestational diabetic vs. One epileptic) for both mothers of cases and controls groups respectively. From these characteristic three of them (parity, Previous history of breech delivery and maternal medical therapy) were associated with breech presentation at P value <0.25.

Table 2: Obstetric characteristics of the study cases: JUMC, 1st July, 2016 to 30th July, 2017.

VARIABLES		Breech Presentation				PV	COR	95 % CI
		NO		Yes				
		Frequency	%	Frequency	%			
Parity	1	192	41.8	53	34.6		1	
	2 & above	267	58.2	100	65.4	.117	.74	.50 - 1.08
Gestational age	Preterm	142	30.9	48	31.4	.255	1.26	.85 - 1.89
	Term	295	64.3	99	64.7		1	
	Post term	22	4.8	6	3.9	.771	.87	.34 - 2.21
Previous history of breech delivery	Yes	10	2.2	16	10.5	.000	5.24	2.33 - 11.82
	No	449	97.8	137	89.5		1	
Previous history of c/d	Yes	39	8.5	12	7.8	.800	.92	.47 - 1.79
	No	420	91.5	141	92.2		1	
Maternal medical therapy*	Yes	1	0.2	2	1.3	.142	6.07	.55 - 67.37
	No	458	99.8	151	98.7		1	
ANC follow up	un booked	20	4.4	4	2.6	.772		.66 - 2.08
	booked	439	95.6	149	97.4		1	

* 1 epileptic and 1 GDM vs. 1 epileptic

c. Labor and delivery characteristics

Table 3 shows the distributions of labor and delivery characteristics of mothers of singleton breech cases and controls. Compared with the mothers of nonbreech infants, mothers of breech infants have significantly higher proportions of both extremes of amniotic fluid volume; polyhydramnios (5.2 vs.0.9) and oligohyramnios (11.1 vs. 3.9) respectively. Compared with cases and controls group; did not find a difference in placenta previa (3 vs. 5) and fetal congenital anomaly (3 hydrocephalus and 2 anencephaly vs. 2 hydrocephalus) between breech and cephalic presentations respectively. Compared with the mothers of nonbreech infants, three mothers of breech infants have uterine leiomyoma (for two mother intramural at LUS and fundal and for one mother at LUS which was multiple - intramural) and uterine anomaly (two unicornet and one arcuate uterus) respectively. AF (SDP) and fetal congenital anomaly are the two characteristics from this table associated with breech presentation at P value < 0.25.

Table 3: Labor and delivery characteristics of the study cases: JUMC, 1st July, 2016 to 30th July, 2017.

VARIABLES		Breech Presentation				PV	COR	95 % CI
		No		Yes				
		Frequency	%	Frequency	%			
AF (SDP)	0-2	18	3.9	17	11.1	.001	3.22	1.62 - 6.43
	2.1-8	439	95.6	129	84.3		1	
	Above 8	4	0.9	8	5.2	.002	6.83	2.02 -23.04
Placenta previa	Yes	5	1.1	3	2.0	.418	.55	.13 - 2.33
	No	454	98.9	150	98.0		1	
Fetal congenital anomaly *	Yes	2	0.4	5	3.3	.015	7.720	1.48 - 40.21
	No	457	99.6	148	96.7		1	
Uterine myoma ¥	Yes	0	0	3	2.0	.999	49.54	.000
	No	459	100.0	150	98.0			
Uterine anomaly ¨	Yes	0	0	3	2.0	.999	49.54	.000
	No	459	100.0	150	98.0			

* 3 hydrocephalus and 2 anencephaly vs. 2 hydrocephalus

¥ LUS & fundal (intramural) (2) and LUS (intramural) (1)

¨ unicornet uterus (2) and arcuate uterus(1)

d. Perinatal Outcome characteristics

Table 4 shows the distributions of selected infant outcome characteristics of singleton breech cases and controls. Compared with controls, breech infants were more likely to have low birth weight < 2500 gm (22.8 vs. 7.9); and concerning to gender offspring compared with non breech, breech infants have significantly high proportions of female (53.6 vs. 41.2) and vice versa (46.4 vs. 58.8). Both fetal characteristics were associated with breech presentations at P value <0.25.

Table 4: Perinatal Outcome characteristics of the study cases: JUMC, 1st July, 2016 to 30th July, 2017.

VARIABLES		Breech Presentation				P. value	COR	95 % CI
		No		Yes				
		Frequency	%	Frequency	%			
weight at birth	1000-1499	5	1.1	8	5.2	.002	5.82	1.87 - 18.15
	1500-2499	31	6.8	27	17.6	.000	3.17	1.82 - 5.53
	2500-3999	40	88.0	111	72.5			
	4000 and above	19	4.1	7	4.6	.519	1.34	.55 - 3.27
Gender of the new born	Male	270	58.8	71	46.4		1	
	Female	189	41.2	82	53.6	.008	.61	.42 - .88

e. Independent predictors of breech presentation at birth in singletons

Table 5 shows Independent predictors of breech presentation at birth in singletons after a multivariate logistic regression were applied using backward: LR method to determine the best predictors since most of the characteristics have associations in the binary logistic regression analysis at P value < 0.25.

Mothers who have previous history of breech delivery have significant statistical association with breech presentation (p-value .000) and having history of breech delivery increase the risk for breech presentation by 5.47 times compared with those who did not have history of breech delivery (95% CI 2.36 to 12.69).

A female gender has significant statistical association with breech presentation (p-value .017). Being a female offspring has a chance of breech presentation by 1.61 times compared with being a male offspring (95% confidence interval 1.09 to 2.37).

On the other hand as new born birth weight decreased, there was a smooth, continuous increase in risk of breech presentation. Birth weight in between 1500gm – 2499gm has significant statistical association with breech presentation (p-value .001); when it compared with birth weight in between 2500gm – 3999gm. Having birth weight in between 1500gm – 2499gm; increase the risk for breech presentation by 2.62 times compared with those in between 2500gm – 3999gm (95% confidence interval 1.45 to 4.74). And birth weight in between 1000gm -1499gm has also significant statistical association with breech presentation (p-value .007); when it compared with birth weight in between 2500gm – 3999gm. Having birth weight in between 1000gm -1499gm; increase the risk for breech presentation by 5.09 times compared with those in between 2500gm – 3999gm (95% confidence interval 1.55 to 16.72). But having birth weight 4000gm and above has no association with breech presentation when compared with birth weight in between 2500gm – 3999gm.

Mothers who have polyhydramnios have significant statistical association with breech presentation (p-value .027); when it compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume. Having polyhydramnios (above 8cm) of single

deepest pocket of amniotic fluid volume; increase the risk for breech presentation by 4.428times when compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume (95% confidence interval 1.18 -16.56).and oligohyramnios have also significant statistical association with breech presentation (p-value .006); when it compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume. Having oligohyramnios (0 – 2cm) of single deepest pocket of amniotic fluid volume; increase the risk for breech presentation by 2.920 times when compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume (95% confidence interval 1.36 -6.28)

Table 5: Multivariate analysis results for independent predictors of breech presentation at birth in singletons: presented to labor ward, JUMC, from 28 completed weeks of gestation, from July, 2016 to July, 2017 (153 cases)

CHARACTERISTICS		P-Value	AOR	95% C.I.for AOR
Gender offspring	Male		1	
	Female	.017	1.61	1.09 -- 2.37
Birth weight	2500-3999		1	
	1000 -1499	.007	5.09	1.55 -- 16.72
	1500 - 2499	.001	2.62	1.45 -- 4.74
	4000 and above	.454	1.43	.56 -- 3.60
Previous History of breech delivery	No		1	
	Yes	.000	5.47	2.36 -- 12.69
Amniotic fluid volume	2.1 – 8 cm		1	
	0 - 2	.006	2.92	1.36 -6.28
	Above 8	.027	4.43	1.18 -16.56

CHAPTER SIX

DISCUSSION

This study indicated that the risk of breech presentation increased with decreasing birth weight, regardless of gestational age. Having birth weight in between 1500gm – 2499gm; increase the risk for breech presentation by 2.62 times compared with those in between 2500gm – 3999gm (p-value .001, 95% confidence interval 1.45 to 4.74). Having birth weight in between 1000gm -1499gm; also increase the risk for breech presentation by 5.09 times compared with those in between 2500gm – 3999gm (p-value .007, 95% confidence interval 1.55 to 16.72) (Table 5). Several studies have also reported an association between low birth weight and breech presentation [56, 57, 58]. Each 500gm decrease in birth weight was associated with an approximate 1.3-fold proportional increase in risk of breech. For example, this suggests that, relative to 3000 gm infants, 2000 gm infants would be about 1.7 times as likely (1.32^2) and 1500 gm infants 2.3 times as likely (1.32^3) to be in the breech position at birth.

But having birth weight 4000gm and above has no association with breech presentation when compared with birth weight in between 2500gm – 3999gm; other previous studies also supports this finding [59]. Larger fetuses may be more likely to be forced into the vertex position in the uterus, whereas smaller fetuses may be less constrained to a specific position.

A female gender has significant statistical association with breech presentation (p-value .017); and has a higher chance of being breech presentation by 1.61 times compared with being a male offspring (95% confidence interval 1.09 to 2.37) (Table 5). Other studies have also supported this finding [29, 30, 37-40]. Unfortunately they were unable to identify the clear reason to elucidate this association. Soernes and Bakke showed that, due to differences in intrauterine fetal motor activity, the umbilical cord is shorter in babies born in breech than in vertex presentations [39]. They also reported that the mean cord length is somewhat shorter in female compared to male infants, suggesting a higher fetal activity in boys; consequently, female babies are more prone to be born in breech presentation [39]. whereas one prior study reported that girls, on average, are smaller than boys [32].

Mothers who have previous history of breech delivery have significant statistical association with breech presentation (p-value .000) and having history of breech delivery increase the risk for breech presentation by 5.47 times compared with those who did not have history of breech delivery (95% confidence interval 2.36 to 12.69) (Table 5). Analysis of data from a population based registry showed that the risk of breech presentation in a second pregnancy was 9 percent if the first infant was breech and 2 percent if the first infant was non breech [13]. After two consecutive breech deliveries, the risk of another breech presentation rises to 21 to 28 percent [13, 14]. And after three consecutive breech deliveries the risk is 38 percent [13].

The previously documented associations between breech position and extremes of amniotic fluid volume (oligohydramnios, polyhydramnios) [56, 60]; were also substantiated by this study. Mothers who have polyhydramnios (above 8cm) of single deepest pocket of amniotic fluid volume; increase the risk for breech presentation by 4.43 times when compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume (p-value .027, 95% confidence interval 1.184 -16.557).

Oligohydramnios have also significant statistical association with breech presentation (p-value .006); when it compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume. Having oligohydramnios (0 – 2cm) of single deepest pocket of amniotic fluid volume; increase the risk for breech presentation by 2.92 times when compared with normal range (2.1 – 8 cm) of single deepest pocket of amniotic fluid volume (95% confidence interval 1.357 -6.281).

It is hypothesized that a normally proportioned active fetus in a normal volume of amniotic fluid adopts the cephalic presentation near term because this position is the best fit in the intrauterine space. If any of these variables are disrupted by underlying maternal, fetal, or placental conditions, then breech presentation becomes more likely.

The previously documented associations between breech position and maternal age [55], parity [29, 50], and previous history of C/S [42, 43], were not substantiated by this study. After, a multivariate approach was applied to determine best determinants of breech presentations.

Though there were several reports on the relationship between breech position and uterine abnormalities [5, 6, 61-62]; placental location [7, 63], fetal congenital anomaly [3] and maternal medical therapies [12, 64-65]; but this study was unable to assess the impact of these variables on fetal position; because of the overall incidence of these variables were significantly small to assess the association due to institution based shorter study period.

The overall incidence of the uterine anomalies and leiomyomas in these study were only 3 respectively;but in a study report of 108 uterine anomalies (mostly septate or bicornuate uteri), breech presentation amounted to 50% [62] and found afifty percent higher incidence in breech presentation (OR: 1.5, CI: 1.3-.9) in women with leiomyomas [63]. In this study Placenta previa (3 vs. 5) for cases & control groups were few to assess the associations (table 5); but others hospital-based studies have found associations between breech presentation and placenta previa [60, 66, 67]. These all uterine related (anomalies, abnormal placentation and leiomyomas) variables can mechanically prevent the turning of the fetus.

In this study fetal congenital anomalies were only five (3 hydrocephalus and 2 anencephaly vs. 2 hydrocephalus) between breech and cephalic presentations respectively. Several studies have reported presence of any recorded congeni-tal malformation of the infant was associated with an approximate doubling of the risk of breech presentation, and hydrocephalus detected at birth was associated with a greater than 11 -fold increase in risk (95% confidence interval 1.3 to 97.0) due to the quality of general movements of the fetus has been reported to be affected by neurologic defects [68].

Finally maternal medical conditions in this study were also only three reports (one epileptic and one gestational diabetic vs. one epileptic) for both mothers of cases and controls groups respectively. Report of established (non gestational) maternal diabetes was associated with an approximate 2.8-fold increase in risk of breech presentation [64,65]; as well maternal anticonvulsant therapy [12] has associations with breech presentations. These pregnancies have been reported to be associated

with decreased fetal move-ment and increased risk of fetal congenital developmental defects [64, 65].

LIMITATION

On the other hand this study was even unable to assess the impact of some variables like; uterine related issues (anomalies, abnormal placentation, and leiomyoma); fetal congenital anomalies and maternal medical therapies on fetal presentations; because of the overall incidence of these variables were significantly small to assess the association due to institution based shorter study periods.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION

This study found that Several different maternal, fetal and placental and cord factors appear to contribute independently to the increased risk of breech presentation suggesting that there may be several different biologic mechanisms leading to breech presentation.

In this study factors associates with increased risk of breech presentations in Jimma University medical center, labor ward are: low birth weight, extremes of amniotic fluid volume (oligohyramnios, polyhydramnios), History of breech delivery and female gender.

7.2 RECOMMENDATION

Medical Practitioners (medical interns, residents, midwives & obstetrician and gynecologist) in Jimma university specialized hospital who works at obstetric and gynecologic department would be recommended to consider especially those factors significantly associates with increased risk of breech presentations In this study; to early anticipate breech presentation and plane the further management.

Since some of the previously documented associations between breech presentation and determinants of breech presentations like; maternal age [55], parity [29, 50], and previous history of C/D [42, 43], were not substantiated by this results. Therefore further prospective study is recommended on larger sample size over a longer study periods; to assess the associations of variables with few incidences; the variables which has no associations, to make the relative risks solid and the confidence intervals close into the risk factors and potential mechanisms of breech presentation.

REFERENCE

1. Colleajv: current management of breech presentation. *Clin obstet gynecol* 1980; 23:525.
2. Thorngren-Jerneck K, Herbst A. Perinatal factors associated with cerebral palsy in children born in Sweden. *Obstet Gynecol* 2006; 108:1499.
3. Westgren M, Edvall H, Nordström L, et al. Spontaneous cephalic version of breech presentation in the last trimester. *Br J Obstet Gynaecol* 1985; 92:19. G Justus Hofmeyr, MD, Charles J Lockwood, MD, Vanessa A Barss, MD, Overview of breech presentation Feb 14, 2013.
4. 'Midwifery Skills needed for Breech' Mary Cronk Midwifery Matters Issue No 78, Autumn 1998
5. Ben-Rafael Z, Seidman DS, Recabi K, et al. Uterine anomalies. A retrospective, matched-control study. *J Reprod Med* 1991; 36:723.
6. Michalas SP. Outcome of pregnancy in women with uterine malformation: evaluation of 62 cases. *Int J Gynaecol Obstet* 1991; 35:215.
7. Fianu S, Václavínková V. The site of placental attachment as a factor in the aetiology of breech presentation. *Acta Obstet Gynecol Scand* 1978; 57:371.
8. Ranney B. The gentle art of external cephalic version. *Am J Obstet Gynecol* 1973; 116:239.
9. Soernes T, Bakke T. The length of the human umbilical cord in vertex and breech presentations. *Am J Obstet Gynecol* 1986; 154:1086.
10. Moessinger AC, Blanc WA, Marone PA, Polsen DC. Umbilical cord length as an index of fetal activity: experimental study and clinical implications. *Pediatr Res* 1982; 16:109.
11. Hall MH, Carr-Hill R. Impact of sex ratio on onset and management of labour. *Br Med J (Clin Res Ed)* 1982; 285:401.
12. Robertson IS. Breech presentation associated with anticonvulsant drugs. *Am J Obstet Gynecol* 1984; 4:174.

13. Albrechtsen S, Rasmussen S, Dalaker K, Irgens LM. Reproductive career after breech presentation: subsequent pregnancy rates, interpregnancy interval, and recurrence. *Obstet Gynecol* 1998; 92:345.
14. Ford JB, Roberts CL, Nassar N, et al. Recurrence of breech presentation in consecutive pregnancies. *BJOG* 2010; 117:830.
15. Nordtveit TI, Melve KK, Albrechtsen S, Skjaerven R. Maternal and paternal contribution to intergenerational recurrence of breech delivery: population based cohort study. *BMJ* 2008; 336:872.
16. Gini PC, Njoku O. The outcome of breech deliveries. *Trop. Journ. Obset. Gynaecol*, 1990; 8920:15-18.29
17. Glezerman, M., Five years to the term breech trial: the rise and fall of a randomized controlled trial. *American journal of obstetrics and gynecology*, 2006. 194(1): p. 20-25.
18. Ojiyi, E., et al., Outcome of Singleton Term Breech Deliveries at a University Teaching Hospital in Eastern Nigeria.
19. Mekbib, T., Breech delivery and foetal outcome: a review of 291 cases. *Ethiopian medical journal*, 1995. 33(3): p. 175-182.
20. Cheng, M., et al., Supported by grants from the Medical Research Council of Canada; Institute of Clinical Evaluative Sciences; and the Hospital for Sick Children Foundation; Policy, 1994.
21. Holst, M., et al., Development of auditory evoked fields in human fetuses and newborns: a longitudinal MEG study. *Clinical Neurophysiology*, 2005. 116(8): p. 1949-1955
22. Hickok, D.E., et al., The frequency of breech presentation by gestational age at birth: a large population-based study. *American journal of obstetrics and gynecology*, 1992. 166(3): p. 851-852.
23. Neri, I., et al., Acupuncture plus moxibustion to resolve breech presentation: a randomized controlled study. *Journal of Maternal-Fetal and Neonatal Medicine*, 2004. 15(4): p. 247-252.

24. Nordin, N.M., An audit of singleton breech deliveries in a hospital with a high rate of vaginal delivery. *The Malaysian journal of medical sciences: MJMS*, 2007. 14(1): p. 28.
25. Singh, A., N. Mishra, and R. Dewangan, Delivery in Breech Presentation: The Decision Making. *The Journal of Obstetrics and Gynecology of India*. 62(4): p. 401-405.
26. Ngowa, J., et al., Neonatal Outcome of Term Breech Births: A 15-Year Review at the yaoundã© General Hospital, Cameroon. *Clinics in Mother and Child Health*. 9(1).
27. H.commu et al./ *European journal of obstetrics and gynecology and reproductive biology* 2 177 (2014) 106-109
28. Luterkoet M, Persson PH, Weldner BM. Maternal and fetal factors in breech presentation. *Obstet Gynecol* 1984;64:55-9.
29. Roberts CL, Algert CS, Peat B, Henderson –Smart D. Small fetal size: a risk factor for breech birth at term, *Int J Gynaecol Obstet* 1999;67 (1): 1-8.
30. Fruscalzo A, Londero AP, Salvador S, Bertozzi S, Biasioli A, Della Martina M, Driul L, Marchesoni D. New and old predictive factors for breech presentation: our experience in 14,433 singleton pregnancies and a literature review. *J Matern Fetal Neonatal Med* 2013, doi.10.3109/14767058.2013.806891(Epubagead of print).
31. Sherer DM, Spong CY. Minior VK, Salafia CM, increased ibdidebe of fetal growth restriction in association with breech presebtation in preterm dekliveries < 32 weeks. *Am J Perinatol* 1997;14 (1) : 35-7.
32. Devlieger H, Martens G, Bekaert A, Eeckels R. Standaarden van geboortegewicht voor zwangerschapsduur voor de Vlaamse boreling. *Tijdschr Geneesk* 2000;56:1-14 (article in Dutch).
33. Albrechtsens S, Rasmussen S, Dalaker K, Irgens L. Reproductive career after breech presentation: subsequent pregnancy rates, interpregnancy interval and recurrence. *Obster Gynecol* 1998;92:345-50.
34. Witkop CT, Zhang J. Sun W, Troendle J. Natural history of fetal position during pregnancy and risk of nonvertex delivery. *Obstet Gynecol* 2008; 111 (4): 875-80.

35. Rayl J, Gibson J, Hickok DE. A population-based case-control study of risk factors for breech presentation. *Am J Obstet Gynecol* 1996;174:28-23.
36. Kok M, Cnossen J, Gravendeel L, van der post J, Opmeer B, Mol BW. Clinical factors to predict the outcome of external cephalic version: a metaanalysis. *Am J Obstet Gynecol* 2008; 199 (6): 630.e 1-7.
37. Jonas O, Roder D. Breech presentation in South Australia, 1987-1989. *Aust NZJ Obstet Gynaecol* 1993;33 (1): 17-21.
38. Schrage R. Are more girls than boys in breech presentation compared with head presentation? *Z Geburtshilfe perinatol* 1976; 180 (2) 145-8 (article in German).
39. Soernes T, Bakke T. The length of the umbilical cord in vertex and breech presentations. *Am J Obstet GYNECOL* 1986; 154: 1086-7.
40. Ford JB, Roberts CL, Nassar N, Giles W, Morris JM. The Recurrence of breech presentation in consecutive pregnancies. *BJOG* 2010; 117 (7):830-6.
41. danforth p 46-41
42. Venditelli F, Riviere O, Crenn-Hebert C, et al. Is a breech presentation at term more frequent in women with a history of cesarean delivery? *Am J Obstet Gynecol* 2008; 198: 521? E 1-6.
43. Kalogiannidis I, Masouridou N, Dagklis T, Masoura S, Goutzioulis M, Prapas Y, Prapas N. Previous cesarean section increases the risk for breech presentation at term pregnancy, *Clin Obstet Gynecol* 2010; 37(1): 29-32.
44. Andersen, G.L., et al., Is breech presentation a risk factor for cerebral palsy? A Norwegian birth cohort study. *Developmental Medicine & Child Neurology*, 2009. 51(11): p. 860-865.
45. Gabbay-Benziv, R., et al., Umbilical cord prolapse during delivery-risk factors and pregnancy outcome: a single center experience. *The Journal of Maternal-Fetal & Neonatal Medicine*. 27(1): p. 14-17.
46. Vistad, I., et al., Vaginal breech delivery: results of a prospective registration study. *BMC pregnancy and childbirth*. 13(1): p. 153.
47. J .D. Kemfang Ngowa, 1 J.K. Kasia,1 A.Ekotarh, 2 and C .Nzedjom3.Neonatal Outcome of Term Breech Births: A 15-Year Review at the Yaounde General Hospital, Cameroon.

48. Rauf, B. And T. Ayub, Maternal and perinatal outcome in term singleton breech presentation. *Journal of Postgraduate Medical Institute (Peshawar-Pakistan)*. 18(3).
49. Van Loon, A.J., et al., Pelvimetry by magnetic resonance imaging in breech presentation. *American journal of obstetrics and gynecology*, 1990. 163(4): p. 1256-1260.
50. Luterkort, M., et al., Role of asphyxia and slow intrauterine growth in morbidity among breech delivered infants. *Early human development*, 1986. 14(1): p. 19-31.
51. Barlãv, K. And G.r. Larsson, Results of a five-year prospective study using a fetopelvic scoring system for term singleton breech delivery after uncomplicated pregnancy. *Acta obstetrica et gynecologica Scandinavica*, 1986. 65(4): p. 315-319.
52. Schupp Christian, S., et al., Vaginal breech delivery: a five-year prospective evaluation of a protocol using computed tomographic pelvimetry. *American journal of obstetrics and gynecology*, 1990. 163(3): p. 848-855.
53. Krebs, L, Breech at term. *Danish medical bulletin*, 2005. 52: p. 234-52.
54. HARTNACK THARIN, J.E., S. Rasmussen, and L. Krebs, Consequences of the term breech trial in Denmark. *Acta obstetrica et gynecologica Scandinavica*. 90(7): p. 767-771.
55. Judith Rayl, phd; P. Joseph Gibson, MPH; and Durlin E. Hickok, MD, MPH" risk factors for breech presentation Seattle, Washington .P.29 2.56.
56. Hall JE, Kohl S. Breech presentation. *AMJ OBSTET GYNECOL* 1956; 72:977-90.
57. Hickok DE, Gordon DC, Milberg JA, et al. The frequency of breech presentation by gestational age at birth: a large population based study. *AMJ OBSTET GYNECOL* 1992; 166:851-2.
58. Morgan HS, Kane SH. An analysis of 16,327 breeches births. *JAMA* 1964; 187:262-4

59. Lazer S, Biale Y, Mazor M, et al. Complications associated with the macrocosmic fetus.] *Reprod Med* 1986; 31:501-5.
60. Pritchard JA, macdonald PC, Gant NF, eds. *Williams' obstetrics*. Norwalk, Connecticut: Appleton-Century-Crofts, 1985:651-5.
61. Zlopasa G, Skrablin S, Kalafatic D, Banovic V, Lesin J. Uterine anomalies and Pregnancy Outcome following resectoscope metroplasty. *Int J Gynecol Obstet* 2007; 98:129-. 33
62. Stout mj, odibo ao, graseck as, macones ga, crane jp, cahill ag. Leiomyomas At routine second-trimester ultrasound examination and adverse obstetric outcomes. *Obstet gynecol* 2010;116(5):1056-.63
63. Sekulic s, ilincic m, radeka g, novakov-mikic a, simic s, podgorac j, kekovic g. Breech presentation and the corneal-fundal location of the placenta. *Croat med J* 2013;54:198-202
64. Wender-Ozegowska E, Bieganska E, Banach A, Szczapa], biczyskor. Analysi of unsuccessful outcomes in a group of pregnancies with diabetes. *Ginekol Pol* 1994; 65:290-6.
65. Devoe LD, Youssef AA, Castillo RA, Croom CS. Fetal biophysical activities in third trimester pregnancies complicated by diabetes mellitus. *AMJ OBSTETGYNECOI*1994; 171:298-303.
66. Thomson AM, Barron SL. Perinatal mortality. In: Barron SL, Thomson AM, eds. *Obstetrical epidemiology*. San Francisco: Academic Press, 1983:388-92.
67. Kian LS. The role of placental site in the aetiology of breech presentation.] *Obstet gynecoi*1963;70:795-7.
68. Siva DA. Studies on fetal motor behaviour in normal and complicated pregnancies. *Early Hum Dev* 1993; 34:13-20

ANNEX – I THE QUESTIONNAIRE

JIMMA UNIVERSITY COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCES, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, QUESTIONNAIRE FORMAT ON A PROSPECTIVE ANALYSIS OF DETERMINANTS OF BREECH PRESENTATION AT BIRTH IN SINLETONS IN LABOR WARD AT JUMC, SOUTH WEST ETHIOPIA APRIL, 2016.

INSTRUCTIONS

You are kindly requested to answer all questions genuinely.

Part I – Socio-demographic Information			
No	Question	Response category	Co de
	Date of admission.....		1
	Age of the mother in years		2
Q2	Address	Urban Rural	1 2
Q3	Ethnicity	Oromo	1
		Amhara	2
		Gurage	3
		Tigre	4
		Other.....	
Q4	Religion	Musilim	1
		Orthodox	2
		Protestant	3
		Others (specify)	4
Q5	Educational status of the mother	Illiterate (can't read & write)	1
		Read & write (specify level)	2
Q6	Occupation of the mother	House wife	1
		Farmer	2
		Merchant	3
		Employee	4
		Other(specify)	
Q7	Marital status of the mother	Married	1
		Separate	2
		Divorced	3
		Widowed	4
		unmarried	5
Q8	Income of the family per month	Birr.....	

Q9	Was there any maternal medical therapy?	Yes No	1 2
Q10	If the answer for number 9 is yes, mention it.....		
Part II - Obstetric Conditions			
Q11	Parity	
Q12	Was LNMP known?	Yes No	1 2
Q13	GA by	LNMP (if known)..... Amenorrhea.... early U/S..... Urine HCG Ballard score.... U/S done at admission (delivery)...	1 2 3 5 6
Q14	ANC Follow up?	Yes No	1 2
Q15	If the answer for number 15 is yes, where was it?	Hospital Health center Health post FGA Private clinic	1 2 3 4 5
Q16	Is the presentation breech?	Yes No	1 2
Q17	What was the type of breech during digital exam?	Complete breech Frank breech Footling breech	
Q18	History of previous breech delivery?	Yes No	1 2
Q19	If yes for, Q17 how many times.....		
Q20	If yes for Q18, is it consecutive ?	Yes No	1 2
Q21	When was the breech diagnosed?	During ANC During Intrapartum	1 2
Q22	How was the breech diagnosed?	Leopold's exam U/S PV	1 2 3
Q23	Was she referred?	Yes No	1 2
Q24	If yes for Q23, from where was the referral?	Hospital Health center Health post FGA Private clinic	1 2 3 4 5
Q25	If yes for Q23, reason for referral?	Specify.....	

Q26	What was pre delivery hematocrit (hct)...?	Specify.....	
PART III- Labor and Delivery Condition			
Q27	What was fetal status at the time of admission?	Alive	1
		dead	2
Q28	If the answer No.30 is dead, what was the cause...?		
Q29	Was the U/S done at admission?	Yes	1
		No	2
Q30	If the answer for No. 34 is yes;	EFW (gm)...	1
		GA (wks.)... (If LNMP not known)	2
		How is the neck (flexed, extended)	3
		SDP of amniotic fluid(cm...)	4
		placental location.....	5
Q31	Was any congenital anomaly picked on the U/S?	Yes	1
		No	2
Q32	If the answers for No.36 yes, specify the anomaly.....		
Q33	Was any uterine leiomyomata picked on the U/S?	Yes	1
		No	2
Q34	If the answer for No.38 is yes, where was the location?		
Q35	Was there any problem during intrapartum follow up?	Yes	1
		No	2
Q36	If the answer for No.40 is yes, what was the problem?	NRFHRP	1
		cord prolapse	2
		uterine rupture	3
		others (specify)...	4
Q37	What was the mode of delivery?	Vaginal breech delive	1
		Emergency C/S	2
		Elective C/S	3
		destructive delivery	4
		Laparotomy for uterine rupture in the hospital	5
		Laparotomy(destructive delivery under direct vision)	6
Q38	If laparotomy (or during Cesar) had done, was there any uterine malformation identified?	Yes	1
		No	2
Q39	If laparotomy (or during Cesar) had done, was there any uterine leiomyomata picked?	Yes	1
		No	2

Q40	If the answer to No.44 is yes, specify the location of uterine leiomyomata		
Q41	What was the duration of stay from admission to delivery? (In hrs.).....		
Q42	What was the type of vaginal breech delivery?	Spontaneous breech delivery Assisted breech delivery total breech extraction Destructive delivery	1 2 3 4
Q43	If there was emergency cesarean delivery, what was the indication?	Prolonged latent phase cord prolapse NRFHRP Big baby arrest/protraction disorder footling other (specify)	1 2 3 4 5 6 7
Q44	What was the cervical dilatation at the time of decision for cesarean delivery (cm).....?		
Q45	How was the cord length after delivery? (In cms) -----		
Q46	History of C/S?	Yes No	1 2
Q47	If the answer to No.53 is yes, specify the indication.....		
Part IV - Postpartum Assessment			
Q48	Is there any problem encountered during delivery?	Yes No	1 2
Q49	If the answer for No.2 is yes, what was it?	Uterine atony Genital tract laceration (tear) Maternal death Uterine rupture others (specify)	1 2 3 4 5

Q50	Is there any problem encountered after delivery?	Yes No	1 2
Q51	If the answer for No.5 is yes, what was it	Puerperal sepsis surgical site infection PPH Others (specify)	1 2 3 4
Q52	Duration of hospital stay in hrs or days.....		
Q53	Condition at discharge	improved died	1 2
Q54	If there was maternal death, what was the cause? Specify it...		
Q55	What was post-delivery hct?		
Part V- Neonatal Assessment			
Q56	Intrauterine fetal condition	Alive Dead	1 2
Q57	Fetal outcome immediate after delivery	Alive Dead	1 2
Q58	If alive 1st and 5th minute Apgar score...;		
Q59	Neonatal Weight in grams.....		
Q60	Sex	Male Sex	1 2
Q61	Was there need for resuscitation?	Yes No	1 2
Q62	Was there need for referral to neonatal unit?	Yes No	1 2
Q63	Indication for Referral to neonatal unit? Specify.....		
Q64	Diagnosis made at neonatology for the referred cases (specify)...		
Q65	If there was neonatal death, what was the cause? (Specify).....		

Name of data collector..... SignatureDate of data collection.....

Thank you for your time!