ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE, SCHOOL OF ALLIED HEALTH

DEPARTEMENT OF NURSING & MIDWIFERY

POSTGRADUATE PROGRAM

FACTORS ASSOCIATED WITH SUCCESSFUL VAGINAL BIRTH AFTER CESARAEN SECTION AND ITS OUTCOME IN ASELLA TEACHING AND REFERRAL HOSPITAL, ETHIOPIA, 2018.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACOG- American Congress of Obstetricians and Gynecologists

CS- Cesarean section

EFW- Estimated fetal weight

LSCS- Lower segment cesarean section

NIH- National Institutes of Health

OPD- Out Patient Department

RCS- Repeated Cesarean Section

TOL- Trial of labor

TOLAC- Trial of labor after cesarean

VBAC- Vaginal birth after cesarean section

TOLAC- Trial of labor after cesarean

COR- Crud odds' ratio

AOR- Adjusted odds' ratio

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ABSTRACT

Background: Vaginal delivery after previous one cesarean section for a non recurring indication has been described by several authors as safe and having a success rate of 60–80%. Planned VBAC is appropriate for and may be offered to the majority of women with a singleton pregnancy of cephalic presentation at 37 weeks or beyond who have had a single previous lower segment caesarean delivery, with or without a history of previous vaginal birth. Labor should be conducted in a centre with suitable expertise and recourse to immediate surgical delivery.

Objectives: The objective of the study was to assess factors associated with successful VBAC and its outcome in Asella Referral and Teaching Hospitals.

Methods: An institutional based case-control study was conducted in Asella Referral and Teaching Hospital in a two years period. The data was collected from patients' charts after tracing a patient's number and a double proportion sampling technique was used to determine sample size of 288 using EPIinfo version 3.5.4. Sample size was determined using unmatched case control.

Result: Two hundred eighty-eight mothers with history of one previous cesarean delivery attempted vaginal birth after cesarean section. We found between successful vaginal birth after cesarean section and previous vaginal birth, prior successful vaginal delivery after cesarean section, presented with cervical dilatation more than or equal to 4 cm and intact membrane at admission ($P<0.0001$). Whereas, factors like meconium > grade I and duration of labor >481minute and weights did not affect vaginal birth after cesarean section outcome.

Conclusion and Recommendation: Careful selection of patients is the corner stone for successful vaginal birth after cesarean section with special consideration of gestational age and condition of membrane, and develop national evidence-based clinical practice guidelines is crucial.

CHAPTER ONE: INTRODUCTION

1.1 Background

Vaginal birth after cesarean (VBAC) is usually safer for the mother than a repeat caesarean section specially, if the wish for an additional pregnancy is estimated to be high. Although it does carry a very small risk of uterine rupture, the current guidelines state that this risk should neither dissuade women from choosing VBAC nor prevent service providers from offering a trial of labor to women who choose this option (1).

VBAC is associated with less blood loss during delivery, shorter duration of hospitalization, and decreased rate of blood transfusion, intra partum and postpartum infection and thrombo embolic events. Increase rate of VBAC would decrease economic burden of nations and individuals.(2)

Extensive research is done to identify the factors influencing the success of VBAC, its morbidities and risks of uterine rupture. Of these factors strongly influencing are prior VBAC, prior caesarean section for non recurrent indication, Bishop score of more than 4 and spontaneous onset of labor. While factors against the success are induction/augmentation, previous caesarean for recurrent cause (CPD, dystocia), non reassuring fetal heart at the time of admission.(3)

In May 1985, the National Consensus Conference on Aspects of Cesarean Birth in Canada recommended that a trial of labor be offered to women with “one previous low transverse CS, a singleton vertex presentation, and no absolute indication for CS (such as placenta previa).”Among women who attempted a trial of labor after a previous low transverse cesarean section, 60 to 80 percent had vaginal deliveries, and morbidity is lower among women who have had a vaginal delivery after a previous CS than among women who elected to undergo a second CS (4). In the United States, for most of the 20th century, the saying “once a cesarean, always a cesarean” was a rule. Today, the National Institutes of Health (NIH) opposes the dictum and urges women to consider TOLAC. However, the factors that lead to a successful outcome remain unclear, as research continues to be conducted in hopes of creating a predictive model for VBAC success (5).

1.2 Statement of the problem

Vaginal delivery after previous one CS has been described by several authors as safe but predicting success of VBAC is a difficult task due to lack of a validated prediction tool . The factors that were significantly associated with an increased likelihood of vaginal delivery (i.e., successful TOL) were maternal age less than 40 years, prior vaginal delivery (particularly vaginal delivery after cesarean), a non recurrent indication for the prior CD, and favorable cervical factors.(6)

The factors that were significantly associated with a decreased likelihood of vaginal delivery (i.e., failed TOL) were an increasing number of prior CD, gestational age greater than 40 weeks, birth weight greater than 4000 g, and augmentation of labor. (6)

The recent increase in total number of CS has been caused by a steady increase in primary CS and a persistent decrease in VBAC (7). In an effort to decrease the rate of CS ACOG has recommended that most pregnant women with single previous lower segment CS (LSCS) be counseled about VBAC and be offered a TOL. With the world wide rising trend of cesarean delivery, modern obstetric practice deals with a new group of mothers carrying reproductive performance upon a scarred uterus with obvious risk in feto-maternal outcome (7).

A World Health Organization (WHO) survey in Latin America identified that women with singleton cephalic pregnancy with prior cesarean section, despite their smaller pool, were the greatest contributors to the overall CS rate. Successful TOL and VBAC results in decreased maternal morbidity in terms of blood transfusion, hysterectomy, and febrile morbidity as compared to RCS (8).

In Southeastern Anatolia, Nigeria, there is cultural resistance to CS, with most women insisting on vaginal birth to be able to bear more children, resulting in large families. Women with a history of CS mostly undergo initial labor at home and present to hospitals with advanced labor to ensure vaginal delivery, opt for vaginal delivery at home, or present at hospitals with complications (9).

Trial of VBAC represents one of the most significant changes in obstetric practice in the recent time. Because of the documented safety, effectiveness and success rate of trial of VBAC, it is now advocated that women without contraindications to vaginal delivery but with one previous lower segment caesarean section should be offered trial of VBAC (10).

In Ethiopia, a study conducted in three hospitals in Addis Ababa, had shown that mothers who experienced successful VBAC after the past caesarean section had a higher chance of success with a significant statistical association (11).

A history of stillbirth in the past was found to be related with failed VBAC. According to Birara , there was no significant relationship between success and past vaginal delivery before the previous CS. Regarding the current delivery of major factors, those mothers who were admitted after rupture of membrane, at active first stage of labor and having occipito-anterior position were having a higher chance of vaginal delivery which was found to be strongly statistically significant (11). Caesarean rate is increasing in Ethiopia because of the flourishing private hospitals in major towns. Even though teaching hospitals offer trial of labor for mothers with one scar, there is no study done which shows the rate of VBAC acceptance and success in Ethiopian Hospitals (11).

1.3 Significant of the study

Vaginal birth after cesarean has been a research topic of widespread interest in the last decade, with research focus on characterizing risks and benefits and identifying prognostic factors. Little is known about factors that lead to success of VBAC at Asella Referral and Teaching hospital. This study there fore identify those factors associated with successful VBAC. This enable the institution and the health care providers to have data when counseling women for VBAC. It also help in informing evidence-based protocols on VBAC in a local setting. Like many other obstetrics population statistics, and similar to many sub-Saharan countries, the national rate of VBAC and associated factors in Ethiopia is not adequately studied. The importance of this study to improve future quality of care provided for woman who needs VBAC in the hospital, use for policy makers, for researchers and practitioners .The study was to asses factors associated with successful VBAC and its outcome in Asella Referral and teaching Hospital

CHAPTER TWO:LITERATUER REVIEW

2.1.Vaginal berth after cesarean section

Vaginal birth after cesarean section is a safe choice for most women who have had a c-section (10). Many women who have had a CS in the past will still be able to give birth vaginally. The New Zealand Guidelines Group recommended that women without additional risk factors with a previous caesarean section should be offered a VBAC. However, a recent large cohort study has shown that an elective repeat caesarean section (RCS) significantly reduced the risk of fetal death or infant death compared to those women who had a VBAC (12). Despite this, some women who plan VBAC would rather end up having a CS again (13).

Vaginal birth after cesarean section is a safe alternative to a routine repeat cesarean. If a women has a healthy pregnancy, a low horizontal scar on the uterus and goes into labor on own at term, then the likelihood of a safe normal birth of both the baby and the mother would be about 70 to 75% (14).

Delivery rate by cesarean section (CS) varies internationally from 10-25%, and over last two decades vaginal birth has experienced considerable decline. A national study in the nineteen province of Iran in 1994 showed that the cesarean rate was 21% in governmental hospitals and 42% for non – governmental hospitals. Similar data in year 2000 showed an increase in cesarean rate to 27% and 58% for governmental and nongovernmental hospitals respectively (4).

2.2 Factors associated with successful vaginal birth after cesarean section

Vaginal birth has physical as well as psychological benefits for both the mother and the baby. The laboring process during a vaginal birth is something that matters to many women. Prior vaginal delivery, indication of complication of prior cesarean, race, location of delivery, macrosomia and body mass index (BMI) are some of the ante partum factors that are associated with the success of VBAC(1).

Intra partum factors that determine the success of VBAC include progress of labor, use of epidural, augmentation and induction (1). These facts together with the lower reported incidence of uterine rupture and consequent maternal and fetal compromise strongly support for the trial of labor in carefully selected patients with previous CS (1).These ante partum and intra partum factors are briefly described.

Ante partum factors

Prior vaginal delivery*:* A prior history of vaginal delivery was consistently reported to increase likelihood of VBAC approximately three- fold (with range odds ratio of 1.83 to 28). Among women requiring induction of labor, limited evidence also suggested a higher rate of VBAC among those with prior vaginal delivery (OR 6.8; 95 percent CI: 3.04 to 13.9) (6, 15, 16).

Indication for prior cesarean*:* Women with prior cesarean delivery for malpresentation /breech were more likely to have a VBAC (75 percent, range 60 to 86 percent) compared with women with prior cesarean delivery for fetal distress (60 percent, range 49 to 69 percent) or failure to progress/cephalopelvic disproportion (54 percent, range 48 to 60 percent) (6, 15, 16).

Race: Hispanic and African American women were more likely to have a TOL but less likely to have a VBAC compared with non-Hispanic and white women, respectively (20 to 49 percent)(15).

Location: Women at rural and private hospitals had a decreased likelihood of TOL and a decreased likelihood of VBAC (57 percent versus 66 percent for tertiary care centers) (6, 15, 16).

Macrosomia: There was decreased likelihood of VBAC in infants weighing 4,000 grams or greater (odds ratio 0.62; 95 percent CI: 0.54 to 0.71). Infants weighing 4,500 grams or greater were less likely to be delivered via VBAC (1.3 to 5.8 percent) compared with 4,000 to 4,499g infants (11.6 to17.4 percent)(15).

Body mass index: VBAC rates ranged from 68 to 77 percent in the studies of obese women. Women with a body mass index (BMI) of less than 40 had VBAC rates of 52.1 to 70 percent (6, 15, 16).

Intra partum factors

Progress of labor: A greater progress of labor--as determined by more advanced dilation, lower station, and higher Bishop Score-predicted a higher likelihood of VBAC (15).

Augmentation: Augmentation of labor with oxytocin was associated with a rate of 68 percent VBAC, although the strength of this evidence was low (15).

Induction: Sixty-three percent of women with IOL had a VBAC (PGE2=63 percent, oxytocin=62 percent, misoprostol=61 percent). Fifty-four percent of women induced with a Foley Catheter had a VBAC (6, 15, 16).

Planned VBAC success is generally in the range of 60–80%. Factors which increase vaginal birth occurring include: Previous vaginal birth, whether before or following the CS, is a strong predictor with a VBAC rate approaching 90% ,younger maternal age , Caucasian /white ethnicity, body mass index (BMI) less than 30 kg/(m2) and weight loss increases VBAC success in women who were overweight or obese before their first CS birth, prior CS indication not related to arrest of labor, spontaneous onset of labor at less than 41 weeks gestation, cervical dilatation greater than 4cm on admission and birth weight less than 4 kg (17).

VBAC is associated with lower maternal mortality and less overall morbidity for mothers and babies. However, based on a limited number of randomized, controlled trials that compared outcomes for women planning a repeat elective CS birth with women planning a vaginal birth , the currently available evidence demonstrates that VBAC is a reasonable and safe option for most women with previous CS (13). A successful VBAC has distinct advantage over repeat caesarean section by decreasing the operative mortality and morbidity as well as bringing down the length of stay and the expenses (3, 18).

Certain factors influence the likelihood of successful TOL to a greater extent than others. For example, a history of any prior vaginal delivery, particularly VBAC, is much more highly associated with successful TOL than maternal age. However, many studies that have identified factors associated with TOL success did not address the independence of and potential interactions among these factors. In addition, although knowledge of factors associated with success or failure of TOL can provide some guidance, they are insufficient to predict TOL outcomes (19, 20).

Successful VBAC has been associated with several benefits, including shorter maternal hospitalizations, less blood loss, fewer infections and fewer thromboembolic events compared with repeat cesarean. While it has been shown that VBAC is safer when successful, clinicians and patients are still concerned about catastrophic obstetrical outcomes that are most commonly related to or attributed to VBAC failure (18, 21).

2.3.Outcome of vaginal birth after cesarean section

Table.1.Outcome of vaginal birth after cesarean section

Increased Chance of Success	Decreased Chance of Success
Prior vaginal delivery	Maternal obesity
Prior VBAC	Short maternal stature
Spontaneous labor	Macrosomia
Favorable cervix	Increased maternal age (>40 y)
Nonrecurring indication (breech presentation, placenta previa, herpes, etc.)	Induction of labor
Preterm delivery	Recurring indication (cephalopelvic disproportion, failed second stage)
	Increased interpregnancy weight gain
	Latina or African American race/ethnicity
	Gestational age ≥41 wk
	Preconceptional or gestational diabetes mellitus

Successful VBAC and uterine rupture are specific outcomes of interest that have been well investigated as related to TOLAC. Other outcomes are certainly of interest, including neonatal outcome, hysterectomy, and maternal mortality. However, few studies have focused on these outcomes, and poor outcomes occur too rarely to be well represented in established databases (15, 22).

At an individual level, VBAC is associated with a decreased maternal morbidity a decreased risk of complications in future pregnancies, and a decrease in the overall cesarean delivery rate at the population level (23, 24).

Arrest of labor is associated with decreased VBAC success and uterine rupture. Patients with a macrosomic fetus (EFW > 4000 gm), especially those with no previous vaginal birth, are more likely to experience outcomes related to arrest of labor, and require careful monitoring (23).

2.4 Justification of the study

There is a constant increase in caesarean section rate for varied indications. Though the safety of caesarean section has improved the morbidity rates are still high in compared to the vaginal delivery. Associated morbidities like abnormal placentation, post operative pain, infection, long hospital stay are still rampant even after advancements in operative techniques and broad spectrum antibiotics (3).

Previous Caesarean section is a common indication for planned caesarean section. Therefore, making VBAC as a safe and successful option has been proposed as an effective way of reducing the planned Caesarean section rate. It has been introduced in to clinical practice I n many obstetric units worldwide (25).

An international drive is recommended to reduce cesarean rate through vaginal birth for patients who had prior cesarean delivery. However, rise in cesarean delivery has been associated with decline in vaginal birth after previous cesarean. There is variability in achieving a vaginal delivery after cesarean delivery (18). Trial of vaginal birth after CS represents one of the most significant changes in obstetric practice in the recent time. Encouraging the vaginal birth after CS has been considered a key method of reducing the cesarean rate (20).

The American College of Obstetricians and Gynecologists states that women with a history of one previous low transverse cesarean delivery, a clinically adequate pelvis, and no prior

classical uterine scar or rupture are good candidates for a VBAC trial provided that they are at an institution with adequate resources including physicians and anesthesiologists (20).

From the late 1980s to mid-1990s VBAC rates had increased in North America. This was a response to public and professional concerns about rising caesarean section rates and increasing evidence indicating that in the absence of contraindications, VBAC is a safe choice. However, since the mid-1990's, the rate of VBAC has declined dramatically in Canada, with the RCS rate having increased from 64.7% in 1995 to 82.4% in 2008. This increase had occurred despite a consensus, reflected in professional guidelines, that VBAC is a safe and appropriate option for most women who have had a previous CS (26).

The VBAC rate of hospitals in sub-Saharan Africa is between 37 to 97%. A Meta-analysis conducted in Sub-Saharan Africa countries showed a VBAC success rate of 63–75%(1). According to the study mothers who had experienced successful VBAC after the past CS had a higher chance of success with significant statistical association. History of stillbirth in the past was found to be related with failed VBAC. We didn't find significant relationship between success and past vaginal delivery before the previous CS (1).

Regarding the current delivery, those mothers who were admitted after rupture of membrane, at active first stage of labor and having occipito-anterior position were having a higher chance of vaginal delivery. Presence of meconium stained liquor and labor stayed more than four hours after admission were associated with higher failure rate of VBAC which was also statistically significant (1).

In countries like Kuwait and Egypt where, large family is encouraged by social and cultural norm, the TOLAC should be considered in woman who has no contraindications, to avoid the limitation of the family size and to reverse rising cesarean rate and its complications (20). Meanwhile, midwives are qualified to manage care during pregnancy, labor and birth for a woman planning a VBAC if appropriate arrangements for medical consultation and emergency care are in place. Developing a scoring system by midwives, could be reflective of evidence-based practice, enables to predict the chances of success of VBAC section and lower repeated cesarean rates in general (20).

2.5 Conceptual framework

Based on review of literatures done in different parts of the world, success of VBAC identified by **a**nte partum and intra partum factors, and increased and decreased chance of success as shown in fig. 1. Ante partum and intra partum factors are increase or decrease the chance of successful VBAC, and both determine the outcome of a successful VBAC.

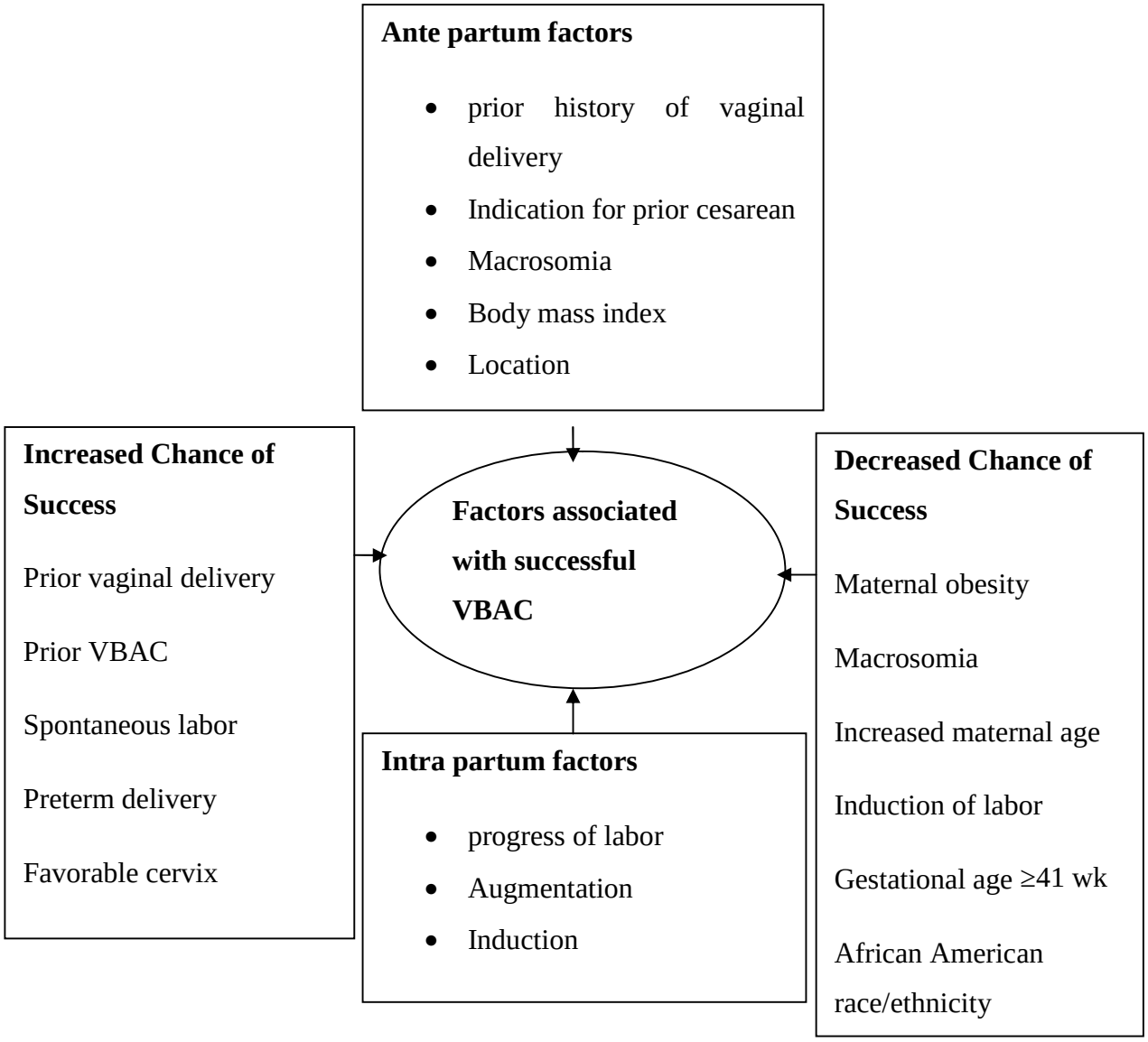

Figure 1. Conceptual frame work of factors associated with VBAC and its outcome.(Developed by principal investigator after reviewing different literature)(27)

CHAPTER THREE: OBJECTIVES

3.1. General objective

Assessment of factors associated with successful vaginal birth after cesarean section and its outcome among delivered Mother in Asella hospital, from march 1 to march 30,2018.

3.2. Specific objectives

1. To identify factors associated with successful vaginal birth after cesarean section.
2. To identify the outcome of vaginal birth after cesarean section.

CHAPTER FOUR: METHODOLOGY

4.1. Study area and Period

Asella is located in Arsi Zone, Oromia regional state 175 km away from the capital city Addis Ababa at 2431 m. The city is located at a latitude and longitude of 7°57′N and 39°7′E, respectively. The 2007 national census reported a total of 67,269 people of which 33,443 were women. About 67.43% of the population worshiped Orthodox Christianity, 22.65% Islam, and 8.75% of the population worshiped Protestant (28).

Asella Hospital is a referral and teaching Hospital. The Hospital was established in 1958 and it is attributed to the Ethio-italian cooperation. Since 2008, it has been incorporated as part of ASTU to give different services and the hospital has been undergoing various up- grading and modifications to meet standards of a university hospital. The Hospital provides different medical service to 3.5 million people around Arsi zone (29).The hospital has 321 beds and 371 staffs. In the hospital obstetric ward 36 beds with 3 delivery cochs,18 midwife,4 gynecologist and obstetricians and performed 5,312 total deliveries in 2008 E.C. (First in Oromia region) and 1,318 emergency CS in the same year (29).The Hospital is the only well-equipped and organized referral hospital in the area .It provides different medical services to the people of Asella town and its surrounding sub-towns. The hospital is administered by Arsi University. The study was conducted in Asella Referral and Teaching Hospital, labor ward from March 1 to March 30, 2018.

4.2. Study design

A retrospective institution based case-control study was conducted to identify factors associated with successful VBAC among mothers with one previous CS and offered trial of labor. Cases were all deliveries with only one previous scar, allowed VBAC according to the hospitals protocol, started labor spontaneously or by induction and delivered by vaginal route. Controls were those who delivered by CS after-a-trial of labor.

4.3 Population

4.3.1 Source population

The source population were all women who were registered and had previous CS scar prior to the study period at Asella referral Hospital from March 1, 2018 to March 30, 2018.

4.3.2 Study population

The study population were all women who were on VBAC and deliver the babies was cases and all women who had trial of labor after CS and deliver with CS was controls group at Asella Referral and Teaching Hospital during the period.

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria.

- All registered women who had delivered babies through induction of labor or spontaneous labor after one CS at maternity wards at Asella Referral and Teaching hospital from January 1, 2016 to December 30, 2017.
- Previous one lower segment cesarean section.
- No contraindication to trial of labor.
- Patient came with spontaneous labor.

4.4.2. Exclusion criteria

- Women who had not previous CS and women who without full document.
- High risk pregnancy.

4.5. Sample size and sampling technique

A double proportion sampling technique was used to determine sample size using EPIInfo version 7.1.4.0.(30) Sample size was determined using unmatched case control. To determine the exact sample size a 95% confidence level, power of 80%, case to control ratio of 1:1 and odd ratio of 2 and 43.7% was taken from previous study in Addis Ababa Teaching Hospitals.

The primary sources of the data was the admission log books at outpatient department (OPD) where the card numbers of patients admitted with previous caesarean scar was traced. Then those offered VBAC was identified from delivery log books and ward discharge summaries. Cases and controls was selected from the available charts in the study period until the maximum sample size is fulfilled.

4.6. Operational definitions

- **VBAC**: Trial of labor after previous cesarean section and vaginal delivery.
- **Successful VBAC:** Vaginal birth following one previous CS.
- **Failed VBAC**: Fail to progress of labor and delivery with CS.
- **Labor:** Regular and painful uterine contractions that cause cervical change.
- **Adequate Labor:** Contractions every 3 minutes lasting at least 45 seconds that palpate strong abdomen.
- **Non-reassuring Fetal heart rate:** Fetal heart either below or above normal range following induction of labor or spontaneous labor.
- **Cesarean section:** Delivery with transverse abdominal surgery.
- **Case:** Mothers deliveries with only one previous scar, allowed VBAC, started labor spontaneously or by induction and delivered by vaginal route.
- **Control:** Mothers who delivered by CS after-a-trial of labor.
- **Rural:** Mothers who lives outside the town.
- **Urban**: Mothers who lives in the town.

4.7. Study variables

4.7.1. Dependent variable

- Vaginal birth after cesarean section.

4.7.2. Independent variable

- Socio demographic variables: Maternal age, marital status, Parity, Gestational age and Address.

- Past Obstetric variables: Indication for the primary C/S, inter delivery interval, Prior successful VBAC and Spontaneous vaginal delivery (SVD), history of still birth.
- Current obstetric and fetal factors : Status of membrane at admission and duration of rupture, presence of meconium, cervical dilatation at admission and position of the presenting part, duration of labor and birth weight.

4.8. Data collection tools

The data was collected from patients' charts after tracing a patient's number. Data was collected by professional health workers after training on the data collection tools and procedures. The information was collected using a checklist adapted from(26, 31). The checklist includes maternal socio demographic, past obstetric and current obstetric and fetal factors.

4.9. Data collectors

Three nurses and five card room workers who are working in the other unit during the investigation was filled predesigned performs from women record after they receive two days training. Two supervisors with first degree in Midwifery was trained to supervise the data collection process closely. The principal investigator was oversee the the entire data collection process and work closely with the supervisors. Data was collected each day by principal investigator and was checked for any error. Then appropriate measure was taken accordingly.

4.10. Data processing

The data was coded and entered into EPI Info version 3.5.4 and will be transferred to Statistical Package for Social Science (SPSS) version 21.0 soft ware for analysis.

4.11. Data quality control

Pre test: was done in Adama Referral hospital before conducting actual data collection with 5% of the sample.

Training: was given for data collectors and supervisors about research objectives, data collection tools and procedures for two days. The principal investigator, together with two supervisors (first degree Midwife) was supervised technique of data collection and completeness of tools on the daily basis.

4.12. Ethical consideration

Ethical clearance was obtained from Addis Ababa University Department of Nursing and Midwifery research and publication committee and submitted to the hospital's clinical directors. Permission obtained from deferent responsible units. The data was collected from patients' charts after tracing a patient's number.

4.13. Dissemination of the result

The findings was presented to the Addis Ababa University scientific community and submitted to the department of Nursing and Midwifery, college of health science. The findings was also be communicated to Arsi University Asella Referral and Teaching Hospital, local health planners and other relevant stake holders the area to enable them take recommendations in to consideration during their planning process. Publication in peer reviewed, national or international journals was also published

CHAPTER FIVE:RESULT

5.1.Sociodemographic factors

A total of 144 cases and 144 controls were involved in our study which constitutes 288 & of response rate. Ninety eight(68%) of cases and 53(36.8%) of controls were from rural areas. About 87(60.4%) of cases and 86((59.7%) of controls were between age range of 25-35years. (table 2)

Table 2: Socio-demographic factors of mothers who had trial of labor after cesarean section in Asella Referral and Teaching hospital.(n=288)

Socio-demographic factors	Frequency		Percentage	
	Case	Control	Case	Control
Address – Ruler	98	53	68	36.8
Urban	46	91	32	63.2
Total	144	144	100	100
Maternal age in years – 18- 25yrs	25	23	17.4	16
25-35yrs	87	86	60.4	59.7
>35yrs	32	35	22.2	24.3
Total	144	144	100	100
Gestational age in wks - <37weeks	48	38	33.3	26.4
37-42weeks	96	106	66.7	73.6
Total	144	144	100	100
Parity – II-III	56	85	38.9	59
IV-VI	73	50	50.7	34.7
>VII	15	9	10.4	6.3
Total	144	144	100	100

5.2.Past Obstetric factors

Chance of successful VBAC was more if primary cesarean section was done for fetal macrosomic 43(29.8%) of case groups. Sixty five (45.2%) of controls and 35(24.3%) of cases were had mother's primary cesarean section indication unknown. Inter delivery interval 25-60months were 84(58.3%)of cases and 85(59,1%) of controls group. Mothers who had not experienced successful VBAC after the past caesarean section were a higher chance of failed trial of labor 143(99.3%) and previous spontaneous vaginal delivery Was found significant relationship from successful VBAC. History of stillbirth in the past was not related with both group.

Table.3.Past obstetric factors among mothers who had trial of labor after cesarean section in Asella Referral and Teaching hospital.(n=288)

Past obstetric factors	Frequency		Percentage	
	Case	**Control**	**Case**	**Control**
Indication of previous CS - Fetal distress	23	13	16	9
APH	21	7	14.6	4.9
Failure of labor progress	5	20	3.5	13.9
Malpresentation	5	3	3.5	2.1
Failed induction	12	16	8.3	11
Macrocosmic	43	20	29.8	13.9
Unknown	35	65	24.3	45.2
Total	**144**	**144**	**100**	**100**
Delivery interval in months- <24months	55	51	38.2	35.4
25-60months	84	85	58.3	59.1
>61months	5	8	3.5	5.5
Total	**144**	**144**	**100**	**100**
Prior successful VBAC- Yes	19	1	13,2	0.7
No	125	143	86.8	99.3
Total	**144**	**144**	**100**	**100**
Previous SVD – Yes	67	19	46.5	13.2
No	77	125	53,5	86.8
Total	**144**	**144**	**100**	**100**
History of still birth – Yes	_	_	_	_
No	144	144	100	100
Total	**144**	**144**	**100**	**100**

5.3.Current obstetric and fetal factors

Having occipitoanterior position121(84%) of case groups were having a higher chance of vaginal delivery which was found to be strongly statistically significant and labor stay 241-480 minute after admission 65(45.1%) of controls group were associated with higher failure rate of VBAC. The initial pelvic examination at the time of admission >4cm was recorded for each woman attempting VBAC 70(48.6%) of cases.

Table.4. Current obstetric and fetal factors in mother who had attending trial of labor in Asella Referral and Teaching Hospital.(n=288)

Current obstetric and fetal factors		Frequency		Percentage	
		Case	Control	Case	Control
Status of membrane at admission –	Rupture	64	33	44.4	22.9
	Intact	80	111	55.6	77.1
	Total	**144**	**144**	**100**	**100**
Duration of membrane rupture in minute-	30-240 min	45	19	70.3	57.6
	241-480 min	15	11	23.4	33.3
	481-720 min	4	3	6.3	9.1
	Total	**64**	**33**	**100**	**100**
Presence of meconium –	Yes	17	6	26.6	18.2
	No	47	27	73.4	81.8
	Total	**64**	**33**	**100**	**100**
If present meconium –	Grade I	15	1	88	16.7
	Grade II	2	2	12	33.3
	Grade III	0	2	0	33.3
	Grade I**V**	0	1	0	16.7
	Total	**17**	**6**	**100**	**100**
Cervical dilatation at admission –	Closed	12	11	8.3	7.6
	2-4 cm	62	66	43.1	45.8
	>4 cm	70	67	48.6	46.6
	Total	**144**	**144**	**100**	**100**
Position of presenting part –	Occipitoanterior	121	114	84	79.2
	Other position	23	30	16	20.8
	Total	**144**	**144**	**100**	**100**
Duration of labor in minute –	30-240 min	39	5	27	3.5
	241-480 min	54	65	37.6	45.1
	481-720 min	37	51	25.7	35.4
	>720 min	14	23	9.7	16
	Total	**144**	**144**	**100**	**100**
Birth weight -	<2500g	28	23	19.4	16
	2500-4000g	116	121	80.6	84
	Total	**144**	**144**	**100**	**100**

Regarding the current delivery, those mothers who were admitted with intact membrane 80(55.6%) and Presence of meconium stained liquor grade I was less likely effective of case group.

Table .5.Duration of rupture membrane in minute * group Cross tabulation

Variable		Group		Total
		Case	Control	
Duration of rupture in minute	30-240	45(44.4%)	19(57.6%)	64(66%)
	241-480	15(23.4%)	11(77.1%)	26(27%)
	481-720	4(6.3%)	3(9.1)	7(7%)
Total		64(100)	33(100)	96(100)

In this study neonatal birth weight 2500 -4000g (80.6%) chance of successful VBAC increased and <2500g (19.4%)in case group.

Neonatal weight distribution of groups to birth weight in gram

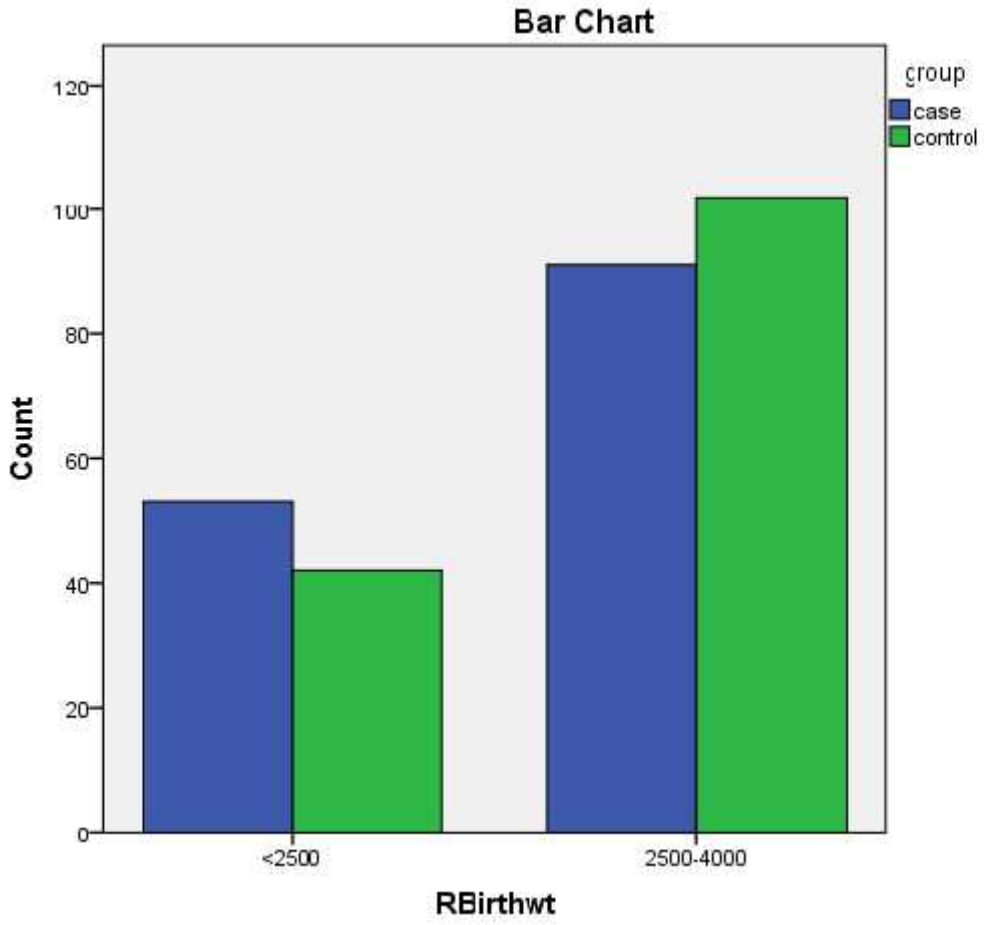

Figure. 2. Graphical presentation of neonatal birth weight who delivered from mothers attending trial of labor in Asella Referral and Teaching Hospital, from January 1, 2016 to December 30, 2017.

Generally the independent factors found to be associated with successful VBAC by the multivariate analysis with logistic regression were address, prior successful VBAC, previous spontaneous vaginal delivery, Status of membrane at admission and duration of labor(see table.6).

Table.6. Multivariate analysis of independent variables associated with successful VBAC

Variable		Case	Control	CR OR(95% CI)	AOR (95%CI)
Address -	Rural	98(68%)	53(36.8%)	1.00	
	Urban	46(32%)	91(63.2%)	3.658(2.247-5.954)***	2.419(1.356-4.316)**
Previous spontaneous vaginal delivery					
	Yes	67(46.5%)	19(13.2%)	1.00	3.723(1.911-7.254)***
	No	77(53.5%)	125(86.8%)	5.725(3.195-10.257)***	1.00
Status of membrane at admission					
	Rupture	64(44.4%)	33(22.9%)	1.00	2.349(1.287-4.287)**
	Intact	80(55.6%)	111(77.1%)	2.691(1.618-4.477)***	

P<0.05*, P<0.01**, P<0.001***

CHAPTER SIX: DISCUSSION

In this study, success rate of VBAC in age group of 18-25 years is small. This result is consistent with studies by Malede Birara and Yirgu Gebrehiwot (11) they concluded that women <25 years of age were more likely to experience unsuccessful trial of labor. In the present study mothers who lived in outside the Asella town (AOR=2.419, 95%CI 1.356, 4.316) was associated with successful VBAC.

A history of prior vaginal delivery (AOR= 3.723, 95%CI 1.911,7.254) particularly VBAC, is much more highly associated with successful VBAC than maternal age and the same to the study Robinson B, Grobman WA (19). In present study having occipito-anterior position 121(84%) of case group were having a higher chance of vaginal delivery which was found to be strongly statistically significant and also Malede Birara and Yirgu Gebrehiwot (11).

In this study mothers with no previous vaginal birth 125(86.8%) of case group were more likely to experience outcomes related to failure of labor progress, as compared to Scott JR study and require careful monitoring (23). The study was not found significant relationship between success and history of stillbirth, but Ghafarzadeh M study in the past was found to be related with failed VBAC (1).

Status of membrane at admission (AOR=2.349,95%CI 1.287,4.287) was found to be important factor in predicting success of VBAC. Mothers admitted with intact membrane had a higher likelihood of success, but study from Addis Ababa mothers who were admitted after rupture of membrane was having a higher chance of vaginal delivery (11)

In present study, meconium stained liquor GII,GIII and GIV, and labor stayed more than 720 min after admission were associated with higher failure rate of VBAC and this result is consistent with studies by Ghafarzadeh M (1). Present study demonstrated that mothers who had experienced successful VBAC after the past caesarean section 19(95%) of case group(AOR=15.471,95%CI 1.878,127.444) had a higher chance of success with significant statistical association and also the study in Addis Ababa were successful VBAC after the past caesarean section had a higher chance of success with significant statistical association (11) .

Mothers who had unknown indications for past cesarean section have been found strongly associated with high failurity. Macrosomia have been found strong association with success from indications fetal distress, malpresentations, APH, failure of labor progress and failed induction as compared to other study.

The strongest factor determining success in this study was cervical dilatation at admission. Those who were admitted with cervical diameter greater 4 cm (Active first stage of labor) had a strong likelihood of vaginal delivery than those admitted at cervical diameter of less than or equal to 4cm the same from the study in Addis Ababa(11). The study proposed that women beyond 40 weeks of gestation could attempt VBAC, although there is an increasing risk of VBAC failure as compared to the study done in Bahrain (18).

In this study, mothers who had between 37wks to 42wks gestational age in the successful group was found association and the same to study by Archana Maurya et al (2). Present study shown that there was no association between birth weight of baby and success of VBAC whereas study done by Archana Maurya et al shown that increasing neonatal birth weight chance of successful trial of labor is reduced (2).

CHAPTER SEVEN:STRENGTH AND LIMITATIONS OF THE STUDY

7.1.Strength of the study

- This study may be considered the first to factors associated with successful VBAC and its outcome in Asella Referral and Teaching Hospital.
- Adequate sample size was applied according to double proportion formula.
- Multiple logistic regression was used to control associated factors in order to assess independent variables
- The data was collected by registered midwife nurses**.**

7.2.Limitations of the study

- The study was limited by the retrospective use of a database, allowing only the available variables to be used. In this particular hospital, for example, information on general medical and all past obstetric history were not routinely and clearly recorded.
- Comparison and discussion was difficult. Due to shortage of similar studies carried out in Ethiopia
- The study was not supported by qualitative methods.

CHAPTER EIGHT: CONCLUSION AND RECOMMENDATION

8.1.Conclusion

The present study concludes that factors associated with successful VBAC are maternal age 25-35 years, rural residence, fatal macrocosmic, prior successful VBAC, previous spontaneous vaginal delivery, intact membrane at admission, position of presenting part and duration of labor. In consideration of these factors, patients should be counseled for or against trial of labor. Also, responsible and sufficient staff, use of partogram and presence of all emergency services should be available in the centre where trial of previous CS is opted.

8.2. Recommendation

- The hospital should have quality assurance programs and VBAC policies, including safety tools such as checklists, to ensure that successful VBAC are performed only for acceptable indications.
- The hospital should facilitate availability of facilities for assessing maternal and fetal well-being.
- Future research should be directed to conducting a multicenter study of similar objectives to provide national data set for evaluating and monitoring this important intervention, and provide information for health services provision.
- Ministry of health with its partner should develop national evidence-based clinical practice guidelines for mothers who had previous CS, attending trial of labor and monitor its implementation.

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10 . APPENDIX

Annex I. Checklist

Part.1.Sociodemographic factors

Variable	Case	Control	Total
Maternal age 1- 18-25 yrs 2- 25-35 yrs 3- >35 yrs			
Address 1. Rural 2. Urban			
Parity 1- II-IV 2- V- VI 3- >VII			
Gestational age 1- <37 wks 2- 37-42wks			

Part.2.Past Obstetric factors

Variables	Case	Control	Total
Indication for the primary C/S **1.** Fetal distress **2.** Ante partum hemorrhage 3. Failure of labor progress 4. Malpresentation 5. Failed induction 6. Macrosomic 7. Unknown			
Inter delivery interval 1- <24 months 2- 24-60 months 3- >60 months			
Prior successful VBAC 1. Yes 2. No			
Previous Spontaneous vaginal delivery 1. Yes 2. No			
History of still birth 1. Yes 2. No			

Part.3.Obstetric and fetal factors

Variable	Case	control	Total
Status of membrane at admission 1. Ruptured 2. Intact			
Duration of rupture 1- 30-240 min 2- 241-480 min 3- 481-720 min			
Presence of meconium 1. Yes, if yes, if yes GI GII GIII GIV 2. No			
Cervical dilatation at admission 3. Closed 4. 2-4 5. >4			
Position of the presenting part 1. Occipito anterior 2. Other(specify)			
Duration of labor 1- 30-240 min 2- 241-480 min 3- 480-720 min 4- >720 min			
Birth weight 1- <2500g 2- 2500-4000g			

APPROVAL SHEET

ADDS ABABA UNIVERSITY

COLLEGE HEALTH SCIENCE SCHOOL OF ALLIED SCIENCES

DEPARTMENT OF NURSING AND MIDWIFERY

I, the undersigned MSC student, declare that I have submitted my original work on a title Factors Associated with Successful Vaginal Birth after Cesarean Section and Its Outcome in Asella Teaching and Referral Hospital, Ethiopia, 2018 for the examination.

Submitted by:

Hulemenash Teshome _____ _____

Name of student Signature Date

This thesis work has been submitted for examination with my approval as an advisor.

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2.Mr Endalew Gemechu _____ _____
Name of Co-Advisor Signature Date

3._____ _____ _____

Name of examiner Signature Date

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RESEARCH ADVISORS:

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