

**SAINT PAUL'S HOSPITAL MELLINIUM
MEDICAL COLLEGE
DEPARTMENT OF OBGYNACOLOGY**



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St. Paul's Hospital Millennium Medical College

**Factors Associated with the Success of External
Cephalic Version for breech presentation above 36weeks
at SPHMMC, AddisAbaba, ETHIOPIA on 2019 G.C.**

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.

Contents

Acknowledgement	II
List of table	IV
List of figure	V
List of abbreviations	VI
Abstract	VI
1-Introduction	1
1.1– Background	1
1.2 Statement of the problem	2
2. Significance of the study	2
3. Literature review	3
4. Objectives	6
4.1 General objectives	6
4.2. Specific objectives	6
5. Methodology	7
5.1 study area	7
5.2 study period	7
5.3 Study design	7
5.4 Populations	8
5.4.1 Source population	8
5.4.2 Study population	8
5.5 Inclusion and exclusion criteria	8
5.5.1 Inclusion criteria	8
5.5.2 Exclusion criteria	8
5.6 Sample size and sampling procedure	8
5.7 study variables	9
5.7.1 Independent variables	9

5.7.1 Dependent variable	10
5.8. Data collection	10
5.8 Data quality assurances	11
5.9 Data processing and analysis	11
5.10 Ethical consideration.....	11
5.13 Operational definitions.....	12
5.14 Dissemination plan.....	12
6. Result	13
6.1 Demographic characteristics of the participant.....	13
6.2 Obstetric characteristics of the participant.....	14
6.3 Ultrasonographic characteristics	15
6.4 Procedure related factor	16
6.5 Magnitude of ECV	18
6.6 Mode of delivery and successful ECV.....	19
6.7 Factor affecting ECV	20
6.8 Multivariate binary logistic regression analysis results	23
Discussion	25
Strength and limitation.....	28
Conclusion	28
Recommendation	29
8. References.....	30
ANNX-II consent & information sheet	Error! Bookmark not defined.
ANNEX IV: Data collection format	Error! Bookmark not defined.

List of table

Table1: Demographic characteristic of participants, SPHMMC, Addis Ababa Ethiopia, 2019...	14
Table2: Obstetric characteristics of the participants, SPHMMC, Addis Ababa, Ethiopia, 2019..	14
Table 3: Ultrasonographic characteristic of the participants, SPHMMC, Addis Ababa, Ethiopia, 2019.....	16
Table 4: Procedure related factors, SPHMMC, Addis Ababa, Ethiopia, 2019.....	16
Table 5: relationship between ECV and mode of delivery, SPHMMC, Addis Ababa, 2019....	18
Table 6: Bivariate analysis of factor predicting ECV among mothers in SPHMMC, Addis Ababa, Ethiopia, 2019	19
Table 7: Bivariate and multivariate logistic regression analysis of factors associated with ECV, SPHMMC, 2019	21

List of figure

Figure 1: indication of cesarean section among mother, SPHMMC, Addis Ababa, 2019.....18

Figure 2: Magnitude of successful ECV among mothers underwent ECV in SPHMMC, Addis Ababa, Ethiopia, 2019.....19

List of abbreviations

ACOG.....	American College of Obstetrician and Gynecologists
AFI	amniotic fluid index
CI	confidence interval
C/S.....	cesarean section
ECV	external cephalic version
EFW.....	estimated fetal weight
IUFD.....	Intrauterine death
IUGR.....	Intra uterine growth restriction
MVP.....	maximum vertical pocket
NRBPP.....	non reassuring biophysical profile
NRFHBP.....	non reassuring fetal heart beat pattern
OR.....	odds ratio
RCOG.....	Royal College of Obstetrician and Gynecologists
SPHMMC.....	Saint Paulo's Hospital Millennium Medical College
US	Ultrasound
MFM.....	maternal and fetal medicine

Abstract

Background:The External cephalic version (ECV) is a procedure that externally rotates the fetus from a breech presentation to a cephalic presentation.External cephalic version, performed after 36 or 37weeks of gestation, effectively reduces the incidence of breech deliveries and the number of caesarean sections. Various clinical and ultrasound graphic variables, including parity, placental location, and position of the fetal spine, estimated fetal weight, amniotic fluid volume, and type of breech have been reported to affect the success of external cephalic version. Reported success with ECV varies from 60% to 75%, with a similar percentage of this remaining vertex at the time of labor.

Objective: The objective of the study is to assess factors associated with the Success of External Cephalic Version for breech presentation above 36weeks at SPHMMC,2018/19G.C.

Methods: Facility based prospective Analytic cross sectional study was conducted among mothers who has ANC at SPHMMC from june,1-march,30- 2018/19G.C and data was collected with pretested structured questionnaires by trained BSC midwives at u/s room.Women with singleton pregnancies diagnosed at antenatal clinic with breech presentation after36wks of gestation were counseled for ECV by residents, so long as there was no contra-indication.ECV was performed by a dedicated subspecialist obstetrician.Ultrasound will be used to monitor the procedure, and repeated after the procedure to confirm its success and fetal status.Data was entered and analyzed using SPSS version 21. Chi-square test was used for statistical analysis of categorical data.95% confidence interval and p-value set at 0.05 was used to determine the statistical level of significance.

Result: Among 152 mothers participated in this study 71% had successful ECV. The result showed that mothers with posterior placental location were 1.14 times more likely to have successful ECV than mothers with anterior placental location [AOR=1.14(95% CI: 1.03-2.60)]. No level of pain was 14.68 times more likely to have successful ECV than severe pain [AOR= 14.68(95%CI: 1.65-34.97)]. Mothers with relaxed uterine tone were 0.8 time high likely to have successful ECV than mothers with unremarkable uterine tone [AOR=0.08 (95% CI: 0.016-0.39)]. Mothers with multiparous were 1.41 times more likely to have successful ECV than those mothers with nulliparous [AOR= 1.41(95%CI: 0.07-2.35)].

Conclusion: The success rate of ECV done in SPMCH was comparable with most other studies. The success of cephalic presentations at birth after successful ECV was high.The success of vaginal delivery after successful ECV was also high.

1-Introduction

1.1– Background

Breech presentation is a polar alignment of the fetus in which the fetal buttocks present at the maternal pelvic inlet. It is the most commonly encountered mal presentation, accounting for 3 to 4% of births at term. The chance to be breech decrease as the gestational ages advance.

External cephalic version is one of the options of management. It is a skill as well as an art that could be easily acquired & done under C/S setup. External Cephalic Version (ECV) has been practiced since the time of Aristotle (384–322 BC). However external version eventually fell out of favor as a result of several concerns. By the 1970s, studies suggested vaginal breech delivery is more hazardous for the baby both in terms of morbidity and mortality(1).

It has become a valuable option in the management of breech fetus at term. It is preferable to wait until near term before ECV attempted to avoid preterm delivery. Before the resurgence of ECV the only choice for breech deliveries were C/S or trial of labor.

After fetal head is gently disengaged the fetus is manipulated by a forward roll/ back flips. If unsuccessful, it can be repeated for maximum of 3 attempts. Because a dramatic increase in the caesarean section rate for breech presentation, this further increased with the publication of term breech trial (2). Thus measures to reduce the incidence of breech presentation have become more important in form of external cephalic version.

1.2 Statement of the problem

The safety of vaginal breech delivery has been a longstanding controversy preferring c/s better mode of delivery(3). However, external version eventually fell out of favor as a result of several concerns: **firstly**, its high rate of spontaneous reversion if performed before 36 weeks of gestation, **secondly**, possible fetal complications, **and thirdly**, the assumption that an external version converts only those fetuses to vertex that would have converted spontaneously anyway.(5)

The overall result has been a dramatic increase in the caesarean section rate for breech presentation/ up to 100% in some centers/ and low rate of uptake of ECV. But later on after many studies, ECV becomes one of option of breech.

Outcomes of pregnancies after ECV prove that it is a safe and effective intervention(4).

It was estimated that anywhere from 4% to 33% of pregnant people are not given the option of a having a version by their care providers. So, further work should address the barriers to the low acceptance of external cephalic version(5).

However, there are some conflicting evidences, as some studies had shown an increased rate of caesarean delivery even after a successful ECV, whereas others did not(6).

As country level, there are a lot of patients who are eligible for ECV if properly counseled but the procedure is still not widely practiced though it has significant change on c/s rate.

In our hospital the overall c/s rate is high and the contribution of breech presentation is not insignificant.

2. Significance of the study

The findings from various studies & since the prospects are more promising than stated before, and hopefully, more women would be encouraged to choose ECV as an alternative means of managing singleton breech pregnancy. The c/s rate in our hospital is high/ 35% which is significantly contributed by breech presentation. Thus the study is important to assess the success of the ECV undertaken by MFM specialists and to see how significantly reduce the c/s rate in our hospital.

In SPMHC as tertiary hospital, there are a lot patients coming for antenatal care with breech presentation from our catchment & non catchment HC. So the study is important to assess factors affecting the success rate of the procedure and to counsel, select candidate patients for ECV. It will also be an entry point for further study in our setup as there is no study done in this particular topic in this country.

3. Literature review

External cephalic version was effective in reducing breech presentations at term and corresponding caesarean section rates but the procedure uptake rate is low and needs to be improved(4). Factors potentially affecting success of ECV were maternal, fetal & operators related issues.

External cephalic version, performed after 36 or 37 weeks of gestation, effectively reduces the incidence of breech deliveries and the number of caesarean sections(4).

Successful version was reported more often in parous than in nulliparous women and more often between 37 and 39 weeks' gestation than after 40 weeks. In randomized trial 53 of ECV done between 37 and 39 weeks' gestation, success was achieved in 68% of 25 cases in the version group, whereas only 4 of the 23 controls converted to a vertex spontaneously before labor. All of those in whom external version was successful presented in **labor as a vertex (7)**.

Though there are factors affecting the success rate of ECV with candidate patients & skilled personnel, it decreased the rate of c/s significantly which was evidenced with various studies. The rebirth of the use of ECV in USA showed favorable results. In the past two decades C/S for breech presentation increased from 14% to current rate of up to 100% at some institutions without a consequent proportionate drop in perinatal mortality rate(8).

In a study done in china, of the 209, women on whom ECV was attempted, in 132 (63%) it was successful; multiparous women had a higher success rate than those who were nulliparous (75% vs 53 %**(9)**).

There was a study which demonstrated increased rates of successful ECV at approximately 37 weeks' gestation with parity greater than two, posterior placental location, and double footling breech as opposed to frank breech **(10)**. Complete breech also showed increased odds of success, but not to the extent that the double footling breeches did. Relative assessment of amniotic fluid volume was also made, and both "normal" and "abundant" fluid volumes showed improved successes. Two studies demonstrated better results when the amniotic fluid index (AFI) exceeded 7 cm**(11)**.

Various parameters have been reported in the medical literature to be predictive of the outcome of external cephalic version. However, most of these reports were limited by small sample size, with conflicting results.**(4,12-15)**.

In British Journal, engaged breech, difficult to palpate the head & tense uterus were the most significant factors in determining the outcome of external cephalic version. The chance of success of external cephalic version was found to be < 20% if two of these variables were present, 0% if all three were present, and 94% if none were present**(13-17)**.

All women do not present with equal chances of a successful procedure. Thus subject selection would increase success rate of ECV & usually successful within one or two attempts. Along with subject selection gentle approach should be emphasized rather than forceful movement. One should approach the gentle art of external cephalic version

with a flexible attitude. ECV at 35–36 weeks when the breech is not engaged and fetal weight is less has 80% success rate. Concomitantly, the spontaneous reversion rate is approximately 16%. At term the success rate falls to 63% but the reversion rate improves to 6–7%. Although many baby in breech presentation before 34 weeks' gestation will convert spontaneously to a cephalic presentation, the percentage that spontaneously convert decreases as term approaches (4,18).

Use of a number of tocolytics has been reported; however, considerable experience has been reported iv ritodrine but others includes hexoprenaline, salbutamol (albuterol), nitroglycerin, and terbutaline.

A randomized trial 59 of 103 nulliparous patients found that the success rate with subcutaneous terbutaline was 52%, compared with 27% in the control group, and no adverse maternal effects resulting from the drug were found. A recent meta-analysis examining sixteen studies determined that epidural analgesia and tocolysis significantly improved ECV success rates when compared to controls. Data were insufficient to determine the efficacy of, use of spinal analgesia, amnioinfusion, opioids, nitric oxide donors, or calcium channel blockers for improving ECV success rate (19,20).

There was a secondary analysis of data from a randomized controlled trial of 178 (**Columbia university**), concluded that **pre procedural factors** (fundal height, BMI, AFI, parity, placental location, type of breech, fetal position...) & **procedural factors** (pain, number of attempts at ECV, use of tocolytic, uterine tone, palpability of the head, mobility of the fetus, and gestational age.) were determining factors (21).

RCOG & ACOG also recommends that version should be offered for patients who are candidates for the procedure. The term breech trial states that if a trial of labor is attempted and is successful, babies born by

planned vaginal delivery have a small but significant risk of dying or sustaining a debilitating insult in the short term(2,22).

The overall success rate among investigators in the United States was 65%, with an average cesarean delivery rate of 37% among those undergoing an attempted version compared with 83% among controls.

Another experience with 112 patients demonstrated a 49% success rate with ECV. The cesarean delivery rate was 17% among those patients with successful ECV compared with 78% among those patients with an unsuccessful version attempt.

The rate of c/s is rising in our country (0.7% 2000-2% 2016) w/c has associated mortality & morbidity. In 2011 EDHS the c/s rate for A.A was 22%. But as a country level; there is no research on ECV so far & even in Africa. Overall, the researchers found that attempting an external cephalic version at term decreased the relative risk of breech birth by 58% and decreased the relative risk of Cesarean by 43%. The limitation of the study is high chance of bias, experience of expertise, small sample size.

4. Objectives

4.1 General objectives:

To determine factors associated with the Success of External Cephalic Version for breech presentation above 36 weeks of gestational age at SPHMMC, 2019 G.C.

4.2. Specific objectives

- To determine predicting factors of ECV.
- To determine Success rate of ECV immediately after the procedure.
- To assess the success of cephalic presentation at birth after successful ECV.
- To assess the success of vaginal delivery after successful ECV.

5. Methodology

5.1 study area

This is a hospital based study and was undertaken in Saint Paul's Hospital Millennium Medical College in Addis Ababa, capital city of Ethiopia. Saint Paul's hospital is one of the tertiary referral hospitals directly under the federal ministry of health. It is also a teaching hospital for the Millennium Medical College and Addis Ababa University.

The hospital gives service to 200,000 people annually who are referred from all corners of the country. It has a total bed of 425 and on average 650 patients visit the hospital as outpatient and emergency daily. It gives service under different clinical disciplines which include obstetrics and gynecology. Nearly annually 25000 attended antenatal care given and around 800 deliveries per month being attended.

5.2 study period

The study assessed factors associated with a Success of External Cephalic Version at SPHMMC from June 1- to March 30- 2018/19 G.C.

5.3 Study design

Facility based **prospective analytic cross sectional** study will be conducted among mothers who have ANC at SPHMMC from June 1- to March 30, 2018/19 G.C. & all candidates who fulfill criteria for ECV will be selected by residents who are working in the ANC and data will be collected with structured questionnaires by trained BSC midwives in the room.

5.4 Populations

5.4.1 Source population:

The source population was all pregnant women getting antenatal services at Saint Paul's Hospital Millennium Medical College from June 1 to March 30, 2018/19 G.C.

5.4.2 Study population

The study population was all women who were diagnosed to have breech presentation & candidates for ECV during antenatal care during the study period at Paul's Hospital Millennium Medical College.

5.5 Inclusion and exclusion criteria

5.5.1 Inclusion criteria:

Women with singleton pregnancies diagnosed at antenatal clinic with breech presentation after 36 weeks of gestation will be counseled for ECV by residents (with back-up from specialists), so long as there is no contra-indication for vaginal delivery.

5.5.2 Exclusion criteria:

- Presence of an indication for CS such as big baby, placenta previa, NRBPP, infertility.

5.6 Sample size and sampling procedure

Sample size was calculated using the formula for single population proportion

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

n=minimum sample size required

Z= is the standardized normal distribution curve value for the 95% confidence interval (1.96)

P=10% of according to the study conducted in British Columbia University to assess factors associated with ECV (multiparity was taken as best predictor).

d=margin of error taken as 5%

Non-response rate as 10% the sample was calculated as follows

$$n = \frac{(1.96)^2 (0.1) (1-0.1)}{(0.05)^2} = \underline{138}$$

$$138 + 14 = \underline{152}$$

Sampling procedure

All mothers fulfilling the pre-requirement to undergo ECV and who are willing to participate in the study meeting the inclusion and exclusion criteria were included in the study.

5.7 study variables

5.7.1 Independent variables:

- Age
- Parity.
- GA(gestational age)
- Estimated fetal weight(EFW)
- Type of breech presentation
- AFI
- Descent
- Abdominal wall status
- Uterine tone status

- Fetal back position

- Maternal weight

- No- of attempt

- Use of tocolysis

- Expertise

5.7.1 Dependent variable

- Success of cephalic version immediately after the procedure.
- Success of Cephalic presentation at birth after successful ECV
- Success of vaginal delivery after successful ECV

5.8. Data collection

Interviewer administered questionnaires was employed to collect data. The questionnaire was first prepared in English and then translated to Amharic. Before conducting the main study, pretest was carried out on 10 women who were not included in the study. Based on the result, data collectors were reoriented and the questionnaire was modified as necessary.

The sonographic & procedural variables were collected by BSC midwives at u/s room with the assistance of MFM specialist & fellows who were performing the procedure & residents attaching US training. Questionnaires about maternal obstetric and socio-demographic variables, sonographic variables, procedural variables, success rate, and used tocolysis were filled on already prepared well-structured questionnaire. The mode of delivery also reviewed from the patients chart & on call communication for those who delivered in other healthy facility by the principal investigator.

Operational manual for the study was prepared to assure a uniform standard to carrying out the study with good quality control. *All data was collected and stored anonymously. We believe this was the best way to ensure confidentiality of participants.* Each questionnaire was checked for completeness on daily basis by the principal investigators. Post procedure they were observed for 10-15 minutes and then counseled about danger signs and linked to ANC. They were also encouraged to deliver in this hospital to know delivery status easily.

5.8 Data quality assurances

Data collectors were trained in pre-tested check lists and principal investigator cross checked for completeness and accuracy of the data on daily basis. Before embarking upon data collection pre-test of the questionnaire was conducted on 10 women who seek abortion who were not included in the main study to ensure the validity of the instrument. Beside to this while data cleaning the questionnaires was checked and scrutinized for internal consistency and those with missed value of the dependent variable will be discarded.

5.9 Data processing and analysis

Data was entered and analyzed using SPSS version 21. Chi-square test was used for categorical data analysis of results. Binary and multiple logistic regression analysis were done to see association of variables and control confounders. Odd's ratios, 95% confidence interval and p value set at 0.05 was used to determine the level of statistical significance of the associations.

5.10 Ethical consideration

A formal letter of approval was obtained from the college's ethical review committee. Permission to conduct the study was taken from the hospital administration. All the study participants were informed about the purpose of the study and the importance of their participation in the study. Confidentiality was maintained during data collection, analysis and interpretation.

Women should be counseled that ECV has a very low risk rate. A few case reports exist of complications such as placental abruption, uterine rupture and fetal maternal hemorrhage, rupture of membrane, fetal bradycardia and a nonreactive cardiotocograph that are almost invariably transient.

Therefore, there are maternal & fetal complication associated with ECV but the benefit outweighs the risks.

Written consent was obtained from each study participant and also any information obtained from study subjects will be kept confidential. Participants will be asked to response interviewer administered questioners on voluntary basis.

5.13 Operational definitions

Failed ECV: Version attempts should be discontinued, if there is:

- Excessive maternal discomfort/pain
- Persistent abnormal FHR/other complications
- After a maximum of three attempt

Tocolytic agent -- uterine muscle relaxant

Descent--the downward passage of the presenting part through the pelvis
- engaged/unengaged

Normal birth weight

-Birth weight 2500-3999 g.

-big baby(breech)->3.5kg

Pain levelscore

0-no pain

1-3-mild pain--feeling discomfort

4-6 –moderate—feelsannoying, but tolerable

7-10- severe—intolerable, kind of pain limits ones activity

Low AFI—5-6cm / **SDP**-<3cm

Normal AFI—7-24cm / **SDP**—4-8cm

High AFI-->25cm / **SDP**-->9cm

Success of ECV- cephalic version immediately after the procedure
&cephalicpresentationat birth after successful ECV.

5.14 Dissemination plan

The copies of the final result will be disseminated to hospital administration and ministry of health. Attempts will be made to publish in peer reviewed and reputable national and international journals.

6. Result

6.1 Demographic characteristics of the participant

A total of 152 pregnant women were recruited for this study and 152 of them were included in the final analysis yielding a response rate of 100%. The patients who undergone ECV were in the age range of below 20 and above 35yrs. Forty five (42.1%) of mothers had successful ECV and belong to within 26-30 years age group. The Mean age (SD) of the participant was 26.9($\pm$ 4.8) years ranging from 18 to 38 years old.. Almost all of the participants in both group (successful and unsuccessful) ECV were married. 58(53.3) of the successful & 27(62.8%) of the failed ECV groups were orthodox in religion. Sixty two(56.8%) of mother with successful ECV were below 65kg and 28(65.2%) of unsuccessful ECV were above 65kg. Seventy two (66.4%) of the participants who had successful ECV were housewives and 30(69.8%) of the participants who had unsuccessful ECV were also housewives. (Table 1)

Table1: Demographic characteristic of participants, SPHMMC, AddisAbaba Ethiopia,2019.

Variable	ECV		Total	P-value
	Successful n(%) n=109	Unsuccessful n(%) n=43		
Age				
<20	6(4.7)	3(6.9)	9(5.3)	0.397
20-25	33(30.8)	19(44.2)	52(34.1)	
26-30	45(42.1)	16(37.2)	61(40.7)	
31-35	17(15.9)	3(6.9)	20(13.3)	
>35	8(6.5)	2(4.8)	10(7.2)	
Weight of the mother				
≤65	62(56.8)	15(34.8)	77(50.7)	0.210
>65	47(43.2)	28(65.2)	75(49.3)	
Religion				
Orthodox	58(53.3)	27(62.8)	85(56.0)	0.410
Protestant	19(17.8)	8(18.6)	27(17.7)	
Muslim	32(28.9)	8(18.6)	40(26.3)	
Occupation				
Unemployed	11(9.3)	2(4.6)	13(8.0)	0.426
Employed	17(15.9)	10(23.3)	27(17.8)	
Farmer	5(4.7)	1(2.3)	6(4.0)	
House wife	72(66.4)	30(69.8)	102(67.3)	
Other	4(3.7)	-	4(2.7)	
Marital status				
Married	108(99.1)	43(100.0)	152(99.3)	0.525
Divorced	1(0.9)	-	1(0.7)	
		-		
		-		

6.2 Obstetric characteristics of the participant

The procedure was undertaken after determining the gestational age. It was done on both nulliparous and multiparous women. Whereas, 66(60.7%) mothers who had successful ECV, were multiparous and 24(55.8%) of

mothers who had unsuccessful ECV were also multiparous. Sixty nine (63.3%) of mothers who had successful ECV had 37-39 gestational weeks. While 20(46.5%) mothers who had failed ECV had 37-39 gestational weeks.

Table 2: Obstetric characteristics of the participants, SPHMMC, Addis Ababa, Ethiopia, 2019

Variable	EC V		Total	P-value
	Successful (n=109) n(%)	Unsuccessful (n=43) n(%)		
Parity				
Nulliparous	43(39.3)	19(44.2)	62(40.7)	0.578
Multiparous	66(60.7)	24(55.8)	90(59.3)	
Gestational age				
36-37 week	30(27.5)	16(37.2)	46(30.3)	0.057
37-39 week	69(63.3)	20(46.5)	89(58.6)	
>_40weeks	10(9.2)	7(16.3)	18(11.2)	

6.3 Ultrasonographic characteristics

The procedure was undertaken after assessing the amniotic fluid status placentation, type and descent of breech, fetal spine position and after assessing the fetal wellbeing. Sixty four (59.8%) and 11(25.6%) of the participants of successful ECV and unsuccessful ECV mothers had posterior placentation respectively. Eighty five (88.9%) of successful ECV and 39(90.7%) of unsuccessful ECV had normal AFV respectively. Unengaged descent of breech was shown on 79(73.8%) of mothers who had successful ECV while 23(53.5%) of mothers had unsuccessful ECV had unengaged descent of breech. Seventy four (67.3%) of mothers of successful ECV and 20(46.5%) of mothers of unsuccessful ECV had frank type of breech. 95(87.2%) of the successful & 39(90.7%) of the failed ECV

group had normal range of estimated fetal weight respectively. Forty nine (45.8%) of successful ECV & sixteen (37.2%) of unsuccessful ECV had anterior fetal spine respectively. (Table 4)

Table 3: Ultrasonographic characteristic of the participants, SPHMMC, Addis Ababa, Ethiopia, 2019

Variable	ECV		Total	p-value
	Successful (n=109) n(%)	Unsuccessful (n=43) n(%)		
AFV				
Low	8(6.8)	3(6.9) 11(7.2)	0.792	
Normal	95(88.9)	39(90.7) 134(88.2)		
High	6(4.8)	1(2.3) 7(4.6)		
Placentation				
Anterior	30(28.1)	24(55.8) 54(35.5)	0.001	
Lateral	15(12.1)	8(18.6) 23(14.8)		
Posterior	64(59.8)	11(25.6) 75(49.3)		
Descent of breech				
Engaged	30(27.5)	20(46.5) 50(32.2)	0.016	
Unengaged	79(72.5)	23(53.5) 102(67.8)		
Type of breech				
Frank	74(67.3)	20(46.5) 94(60.5)	0.018	
Non frank	35(32.7)	23(53.5) 58(39.5)		
EFW				
Low	8(7.3)	3(7.0) 11(7.2)	0.056	
Normal	95(87.2)	39(90.7) 134(88.2)		
Big baby	6(5.5)	1(2.3) 7(4.6)		
Fetal spine				
Anterior	49(45.8)	16(37.2) 65(42.8)	0.016	
Posterior	25(21.5)	19(44.2) 44(28.0)		
Lateral	35(32.7)	8(18.6) 43(29.2)		

6.4 Procedure related factor

Among mothers who had successful ECV 76(71%) had unremarked abdominal wall status while it was 29(67.4%) respondents from unsuccessful group. Seventy five (70.1%) and 17(39.5%) of mothers with successful and unsuccessful ECV had mild pain while ECV was applied respectively. Concerning uterine tone, 83(77.6%) successful ECV and 7(16.3%) unsuccessful ECV had relaxed uterine tone. Ninety three (85.1%) of successful ECV & thirty two(74.4%) of unsuccessful ECV

forward roll technique applied. Among all participants, 92(84.4%) respondents from successful ECV mothers and 4(9.3%) from unsuccessful ECV were gave birth by vaginal delivery. For all participants uterine relaxant and powder were used during the procedures. For all cases the procedures were done by MFM specialists and fellows. (Table 4)

Table 4: Procedure related factors, SPHMMC, Addis Ababa, Ethiopia, 2019.

Variable	ECV		Total	P-value
	Successful (n=109) n(%)	Unsuccessful (n=43) n(%)		
Abdominal wall status				
Unremarkable	76(71.0)	29(67.4)	105(70.0)	0.009
Thin	29(27.1)	8(18.6)	37(24.7)	
Fat	4(1.9)	6(14.0)	10(5.3)	
Use of uterine relaxant				
Yes	109(100.0)	43(100.0)	152(100.0)	-
Use of powder (for abdominal wall)				
Yes	109(100.0)	43(100.0)	152(100.0)	-
Level of pain				
no pain	19(17.8)	2(4.6)	21(15.4)	0.000
Mild pain	75(70.1)	17(39.5)	92(67.6)	
Moderate pain	10(9.4)	5(11.6)	15(11.0)	
Sever pain	5(2.8)	5(11.6)	10(6.0)	
Uterine tone				
Unremarkable	16(14.9)	17(39.5)	33(22.0)	0.000
Relax	83(77.6)	7(16.3)	90(60.0)	
Tense	10(7.5)	19(44.2)	29(18.0)	
Technique used				
Forward roll	93(85.1)	32(74.4)	125(82.0)	0.125
Back flip	16(14.9)	11(25.6)	27(18.0)	
Operator				
consultants	109(100)	43(100)	152(100)	-
Presentation at birth				
Cephalic	106(97.2)	4(9.3)	110(72.4)	0.000
Breech	3(2.8)	39(90.7)	42(27.6)	
Transverse	-	-	-	
Mode of delivery				
VD	92(84.4)	4(9.3)	96(63.2)	0.000
ABD	3(2.8)	14(32.6)	17(11.2)	
CS	14(12.8)	25(58.1)	39(25.7)	

As indicated on the above table the total caesarean section (CS) done was 39. The indication for each of the CS done is mentioned on figure 1. The major indication for the CS is fetal distress with cephalic presentations. The rate of spontaneous cephalic version & reversion to breech were 4(9.3%) & 3(2.8%) respectively. The success of cephalic presentations at birth after successful ECV was 106/109(97.2%). It meant that the chance of breech presentation at birth decreased by 69.7%. It also showed that the CS rate for breech presentation decreased by 45.8%.

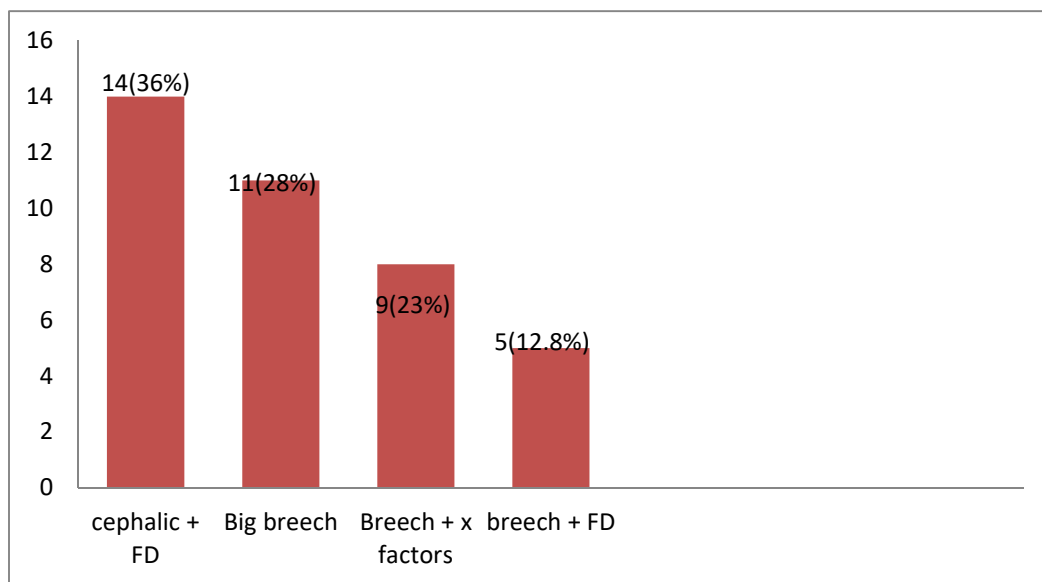


Figure 1: indication of cesarean section among mother, SPHMMC, Addis Ababa, 2019 (n=38)

6.5 Magnitude of ECV

The magnitude of ECV, One hundred nine (71%) of the mother underwent external cephalic version were successful while, unsuccessful ECV was detected among 43 (29%) of the mothers. (Figure 1)

From the total of mothers who had participated in this study 28 mothers had repeated ECV and 17(60.7%) of the mothers had successful repeated ECV while 11(39.3%) of the mothers had failed repeated ECV. 24(85.7%) repeated ECV were for failed ECV than repeated for spontaneous

reversion 4(14.3%). 23 (82.1%) the repeated ECV were done within one week while 5(17.9%) within two weeks after trial of ECV.

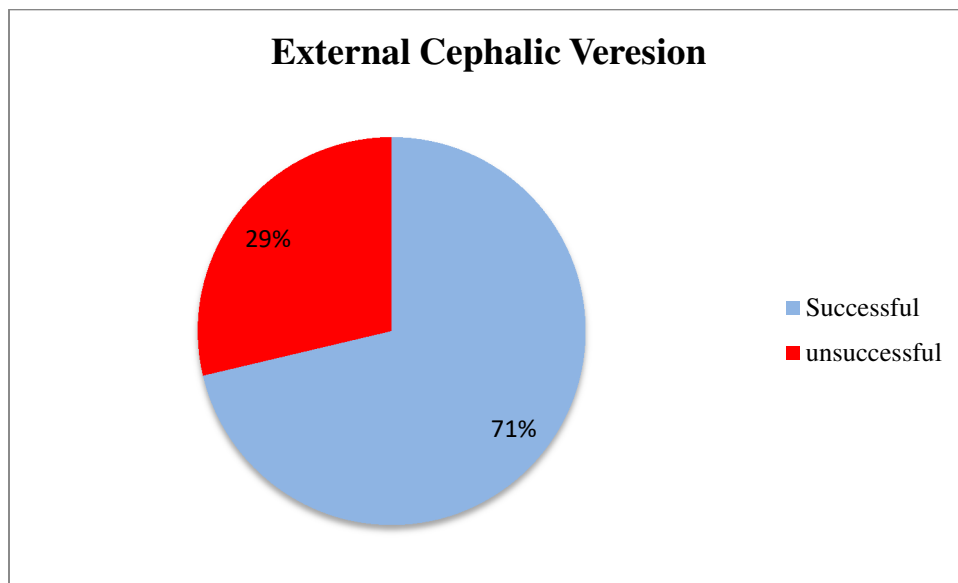


Figure 1: Magnitude of successful ECV among mothers underwent ECV in SPHMMC, Addis Ababa, Ethiopia, 2019

6.6 Mode of delivery and successful ECV

Mothers who had successful ECV and vaginal delivery were 92(84.4%) while 14(12.8%) of mothers had successful ECV and gave birth by CS. (Table 5)

Table5: relationship between ECV and mode of delivery, SPHMMC, Addis Ababa, 2019

Variable	ECV		X ²	P-value
	Successful n(%)	Unsuccessful n(%)		
Mode of delivery				
VD	92(84.4)	4(9.3)	72.78	0.000
ABD	3(2.8)	14(32.6)		
CS	14(12.8)	25(58.1)		

6.7 Factor affecting ECV

Bivariate analysis was performed and taking p-value<0.05 as a cut of point for determining significance, eight variables showed a significant association with the outcome variable (external cephalic version). These were placentation, descent of breech, uterine tone, fetal spine, type of breech, abdominal wall status, level of pain and parity while other variables didn't show significant association.

As the result showed, Placentation was significantly associated with ECV. Mothers with posterior placentation were 1.21 times more likely to have successful ECV than those with anterior placentation [COR=1.21(0.09-1.36)].

The other variable that showed a significant association was descent of breech. Participants who had unengaged descent breech had 0.41 times high likely to have successful ECV than participants with engaged descent breech [COR=0.41(95%CI=0.19-0.85)].

Regarding uterine tone, uterine tone showed a significant association with ECV. Mothers with relaxed uterine were 0.07 times likely to have successful ECV than those mothers with unremarkable uterine tone [COR=0.07(95%CI= 0.02-0.22)]. Parity was also the other predictor for ECV. Mothers with multi parity were 1.82 time more likely to have successful ECV than those mothers with null parity [COR=1.02(95%CI=0.39-1.67)].

Table 6: Bivariate analysis of factor predicting ECV among mothers in SPHMMC, Addis Ababa, Ethiopia, 2019

Variable	ECV		COR (95% C I)	P-value
	Successful n (%)	Unsuccessful n (%)		
Age				
<20	5(62.5)	3(37.5)	1	
21-25	33(63.5)	19(36.5)	0.95(0.21-4.47)	0.958
26-30	45(73.8)	16(26.2)	0.59(0.12-2.77)	0.506
31-35	17(85.0)	3(15.0)	0.29(0.04-1.93)	0.203
>36	7(77.8)	2(22.2)	0.47(0.05-3.98)	0.494
Weight of the mother				
≤65	64(79.5)	15(20.5)	1	
>65	45(62.2)	28(37.8)	2.35(1.12-4.91)	0.261
Parity				
Nulliparous	42(68.8)	19(31.2)	1	
Multiparous	67(73.0)	24(26.9)	1.02(0.39-1.67)	0.004*
Gestational age				
36-37 week	30(65.2)	16(34.8)	1	
37-39 week	69(77.5)	20(22.5)	0.49(0.23-1.02)	0.059
>_40weeks	10(58.8)	7(41.2)		
EFW				
Low	8(70.0)	3(30.0)	1	
Normal	95(70.4)	39(29.5)	0.97(0.24-3.98)	0.976
High/big/	6(83.3)	1(16.7)	0.46(0.03-5.90)	0.556
Placentation				
Anterior	30(55.6)	24(44.4)	1	
Lateral	15(61.9)	8(38.1)	0.76(0.27-2.16)	0.618
Posterior	64(85.3)	11(14.7)	1.21(0.09-1.36)	0.000*
Descent of breech				
Engaged	30(58.3)	20(41.7)	1	
Unengaged	79(77.5)	23(22.5)	0.41(0.19-0.85)	0.017*
Type of breech				
Frank	74(78.3)	20(21.7)	1	
Non frank	35(60.3)	23(39.7)	2.36(1.14-4.87)	0.020*
Amniotic fluid				
Low	17(63.0)	10(37.0)	1	
Normal	92(90.3)	10(9.7)	0.28(0.10-0.76)	0.130
Fetal spine				
Anterior	49(75.4)	16(24.6)	1	
Posterior	25(54.8)	19(45.2)	2.53(1.10-5.79)	0.028*
Lateral	35(81.4)	8(18.6)	0.70(0.26-1.81)	0.463

Abdominal wall status

Unremarkable	76(72.4)	29(27.6)	1	
Thin	29(78.4)	8(21.6)	0.72(0.29-1.76)	0.476
Fat	4(25.0)	6(75.0)	7.86(1.50-41.20)	0.015*

Level of pain

no pain	19(90.5)	2(9.5)	18.04(3.48-93.6)	0.001*
Mild pain	75(81.5)	17(18.5)	2.15(0.45-10.13)	0.332
Moderate pain	10(34.5)	19(65.5)	15.83(2.05-80.06)	0.008*
Sever pain	5(37.5)	5(62.5)	1	

Uterine tone

Unremarkable	16(48.5)	17(51.5)	1	
Relax	83(92.2)	7(7.8)	0.07(0.02-0.22)	0.000*
Tense	10(29.6)	19(70.4)	2.23(0.76-6.53)	0.141

Technique used

Forward roll	93(73.9)	32(26.0)	1	
Back flip	16(59.3)	11(40.7)	1.95(0.82-4.65)	0.130

Number of attempt

1	15(65.0)	7(35.0)	1	
2	66(83.5)	13(16.5)	0.36(0.12-1.09)	0.072
3	26(54.2)	22(45.8)	1.57(0.53-4.62)	0.412

6.8 Multivariate binary logistic regression analysis results

The eight covariates that were significantly associated ($p\text{-value} < 0.05$) with ECV at the bivariate analysis were fitted into the backward stepwise multi variable binary logistic regression model to control for confounding. The final predictors of ECV were parity, placentation, level of pain and uterine tone.

Placentation was significantly associated with the ECV. Mothers with posterior placental location were 1.14 times more likely to have successful ECV than mothers with anterior placental location [AOR=1.14(95% CI: 1.03-2.60)]. Level of pain also showed significant association with ECV. No level of pain was 14.68 times more likely to have successful ECV than severe pain [AOR= 14.68(95%CI: 1.65-34.97)].

Uterine tone was the other variable that showed significant association with ECV. Mothers with relaxed uterine tone were 0.08 time more likely to have successful ECV than mothers with unremarkable uterine tone [AOR=0.08 (95% CI: 0.016-0.39)]. Parity was also the other predictor of ECV. Mothers with multiparous were 1.41 times more likely to have successful ECV than those mothers with nulliparous [AOR= 1.41(95%CI: 0.07-2.35)].

Table 7: Bivariate and multivariate logistic regression analysis of factors associated with ECV, SPHMMC, 2019

Variable	ECV		COR	AOR
	Successful n(%)	Unsuccessful n(%)		
Parity				
Nulliparous	43(68.8)	19(31.2)	1	
Multiparous	66(73.0)	24(26.9)	1.82(0.39-1.67)	1.41(0.07-2.35)*
Placentation				
Anterior	30(55.6)	24(44.4)	1	
Lateral	15(61.9)	8(38.1)	0.76(0.27-2.16)	1.12(0.20-6.29)
Posterior	64(85.3)	11(14.7)	1.21(0.09-1.36)	1.14(1.03-2.60)*
Descent of breech				
Engaged	30(58.3)	20(41.7)	1	
Unengaged	79(77.5)	23(22.5)	0.41(0.19-0.85)	1.10(0.26-4.74)
Type of breech				
Frank	74(78.3)	20(21.7)	1	
Non frank	35(60.3)	23(39.7)	2.36(1.14-4.87)	1.45(0.37-5.62)
Fetal spine				
Anterior	49(75.4)	16(24.6)	1	
Posterior	25(54.8)	19(45.2)	2.53(1.10-5.79)	1.32(0.34-5.19)
Lateral	35(81.4)	8(18.6)	0.70(0.26-1.81)	0.63(0.13-3.06)
Abdominal wall				
Unremarkable	76(72.4)	29(27.6)	1	
Thin	29(78.4)	8(21.6)	0.72(0.29-1.76)	0.28(0.05-1.38)
Fat	4(25.0)	6(75.0)	7.86(1.50-41.20)	3.54(0.29-42.40)
Level of pain				
no pain	19(90.5)	2(9.5)	18.04(3.48-20.60)	14.68(1.65-34.97)*
Mild pain	75(81.5)	17(18.5)	2.15(0.45-10.13)	1.29(0.15-10.59)
Moderate pain	10(34.5)	19(65.5)	15.83(2.05-30.06)	9.74(0.61-35.12)
Sever pain	5(37.5)	5(62.5)	1	
Uterine tone				
Unremarkable	16(48.5)	17(51.5)	1	
Relax	83(92.2)	7(7.8)	0.07(0.02-0.22)	0.08(0.016-0.39)*
Tense	10(29.6)	19(70.4)	2.23(0.76-6.53)	3.89(0.65-23.36)

Discussion

In contrast to cephalic presentations, breech presentation has a higher mortality and morbidity due to the associated incidence of prematurity, congenital malformations or intrapartum asphyxia. Thus, many efforts have been made in order to establish the best performance regarding the birth type: either vaginal delivery (in those women selected after evaluating different fetal and pelvic parameters) or the elective caesarian. On the other hand, the external version can be also considered. It aims to avoid the vaginal breech delivery or caesarian complications by turning a breech presentation into a cephalic presentation(23). This cross sectional study aimed at assessing the magnitude of success rate of ECV and the factors associated with it and subsequent mode of delivery after trial of ECV. In this study, more than half of the participants (71.3%) had successful ECV and factors related to ECV were also assessed. The findings revealed that the successfulness of ECV was significantly associated with placentation, uterine tone, parity and level of pain.

This study found that 71% as the magnitude of successful ECV. This is similar with study done in China which found that 69.5 % as successful ECV rate(24). But, a study in Hong Kong University reported slightly lower (63%) magnitude than this study(25). Other study done in Malaysia the success rate of ECV was 51.4%(26). Rate of success of ECV for breech presentation at term at the Royal Women's Hospital was 37% (27). This could be due to the difference in study setting.

Placentation was one of the factors significantly associated with successful ECV. The finding of this study indicated that mothers with posterior placental location were more likely to have successful ECV than mothers with anterior placental location. This is consistent with a study from Pakistan mothers with posterior placental had significant association with successful ECV(28).

This study found that uterine tone was the other predictor of successful ECV. Mothers with relaxed uterine tone were high likely to have successful ECV than mothers with unremarkable uterine tone. This goes in line with uterine relaxation increases the success of ECV. For all the participants uterine relaxant/nifedipine/ and powder were used. For all cases the procedures were done by MFM specialists and fellows. (24).

Level of pain was also predictor of the success of ECV. Mothers with low level of pain were more likely to have successful ECV than those mothers with severe pain. This is consistent with a study from Canada found that lower score of pain was significantly associated successful ECV (29).

The other predictor variable for the successfulness of ECV was parity; those multiparous mothers were more likely to have successful ECV than mothers with nulliparous. This is consistent with other cross sectional study which found that multiparous mothers were more likely to have successful ECV (30). Multiparity was found to be a significant predictor of ECV converting successfully to cephalic vaginal delivery (27). Other study done in Canada also revealed that multi parity has significant association with success rate of ECV (23).

From the total of participants included in this study 84.4% of the mothers having successful ECV had spontaneous vertex delivery. This is higher than a study done in Malaysia, found that 71.6% was the rate of mothers who had successful ECV had spontaneous vertex delivery (26). This could be due to the difference in study design. Our study was a cross sectional study while the study from Malaysia was three year retrospective study.

The spontaneous reversion rate was 2.8% which lower than in study done in Malaysia (6-7%). This is probably due to time difference during ECV procedure. The success of cephalic presentation at birth after successful ECV was 106/109 (97.2%).

It also showed that the chance of breech presentation at birth decreased by 69.7%, relatively better than Malaysian study, 58.9%. The CS rate for breech presentation decrease to 45.8%, consistent with Malaysian study, 43%.

The success of repeated ECV in this study was 60.7%. The study showed 85.7% of the repeated ECV were for failed ECV while 14.3% of repeated was done for spontaneous reversion. Most (82.1%) of the repeated were done within one week while 17.9% was one within two weeks after trial of ECV.

Before starting the version, the woman must be informed about the importance of the procedure. She must also know that the procedure can be uncomfortable, sometimes it can be painful and can be stopped at any time during the procedure. The external version cannot be performed without her consent or when the abdominal wall shows resistance. For this reason, the woman must be aware of the importance of her cooperation.

Before undergoing ECV procedure, health care provider should consider the wellbeing of the fetus, ultrasound scanning to reveal any contraindications in order to perform the method instead of a vaginal delivery, the fetal estimated weight, the fetus presentation, position and situation, the amniotic fluid index, and the location of the placenta and of the umbilical cord.

Using an ultrasound scan while performing the maneuver is very advantageous, performance of the procedure near operating theatre equipped for an emergency caesarean, in case of potential severe complications. The pregnant woman must be placed in the supine position, in semi-Fowler and with a light in order to facilitate the buttocks move, after given uterine relaxants (23)

Strength and limitation

Strength

- Having high response rate.
- All of the mother undergoing with in the study period were included.
- The study is conducted in one of the biggest hospital having variety of case & offering advanced maternal care.

Limitation

- The experience of operators as a factor affecting the success rate of ECV was not assessed.
- The sample size is relatively small because of limited time for data collection.

Conclusion

Overall, the success rate of ECV in SPMMCH was comparable with most studies. Placental location, uterine tone, parity and level of pain were significantly associated with successfulness of ECV. The success of cephalic presentation at birth after successful ECV was high. The success of vaginal delivery after successful ECV was also high.

Recommendation

To health care provider

- Should consider mainly placental location, parity, uterine tone and level of pain of the mothers before undergoing the procedure.
- Careful evaluation and assessment to the mother throughout ANC follow up is necessary to make the procedure safer and effective.
- Proper patient selection and counseling before the procedure is very important.
- Encouraging residents to practice ECV under senior supervision to improve the low uptake rate and to have further studies in this area.

To researchers

- Further on the practice and skill of health care providers on technical procedure of external cephalic version and ECV complication.

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