

Outcome of Antenatal Care Planned VBAC Versus Unplan VBAC

Aisha Assmani Adam^a, Ohayla Hassan^b

Obstetrician and Gynecologist^a, Senior registrar OB/Gyne^b, Armed Forces Hospital, Saudi Arabia
ESID-5649-1369-2022^b

Abstract

Background: The primary target when setting policies in obstetrics and gynaecology is gaining successful delivery with the minimum fetomaternal adverse outcome. Studying the difference between planned and unplanned vaginal birth after caesarean section expected to serve such goal by monitoring and evaluating the possible risks in unplanned VBAC such as risk of rupture uterus and other relevant complication.

Materials: all pregnant women with one previous caesarean section planned for VBAC either in the ANC or labour pain.

Results: A total of 245 pregnant women had been enrolled in this study. The age of both groups found to be similar to each other. the education level had significant effect on the type of delivery in group A the majority of the women was university graduate while in group B who were unplanned for VBAC the majority are secondary. Most of both groups are from urban area. In group A, most of the patient parity are vary between I-IV as follow (87.6%) while in group B I-IV (84.6%). Group A had high visit rate for ANC most of them went to referral clinic (51.1%). While in group B (68.9%) went to health center. The commonest indication for a previous CS was failure to progress in both groups. The success rate of VBAC in both groups was similar (68%) in group A while in group B (67%). the commonest type of previous C/S was emergencies in both groups. In group A (94%) had been counseled for VBAC and majority was counseled by registrar while the majority in group B had not been counseled for VBAC. The maternal outcome in group A was (1.4%) for PPH & (1.4%) for uterine rupture while in group B (1%) for PPH and (2.9%) for uterine rupture and the majority of both groups had no complication. The neonatal outcome in group planned for VBAC was good (99%) alive baby while in group B (7%) had FSB. Group B recorded much rate admitted to ICU (18%).

Conclusion: The study highlighted that the success rates of VBAC in planned group were significantly higher than the unplanned group. There was no significant different in the maternal morbidity, the neonatal outcome in group planned for VBAC was better than in group B. Group B recorded much rate admitted to NICU among them the birth asphyxia was high than group planned for VBAC.



International Journal of Applied Technology in Medical Sciences

Vol 1 Issue 1 (2022) 4 - 18

DOI: 10.54878

Emirates Scholar

Available at www.emiratesscholar.com





1. Introduction

In recent decades the Caesarean section rates have continued to rise to 32% of births in Australia in 2011⁽¹⁾ and 23.6% of births in New Zealand in 2010⁽²⁾. The World Health Organization has stated that national cesarean rates greater than 10-15% indicate unnecessary maternal risk. Nevertheless, the current cesarean rate in the US is 32.2%⁽³⁾. With this high rate of cesarean delivery, the question of the route of delivery for subsequent pregnancies becomes ever more important. As a consequence, there are increasing numbers of women who need advice regarding options for birth in subsequent pregnancies. Each option, elective Caesarean section or labour with a view to vaginal birth, has its benefits and risks. Patient differences give rise to a variation of patient preference, risk spectrum and of success rates for vaginal birth. Patients and clinicians conjointly need to consider the options with a view to planning mode and place of birth for each mother who has had a previous Caesarean delivery. There are no large prospective randomized controlled trials assessing birth options.⁽⁴⁾ Success of VBAC is affected by Previous safe vaginal birth, Previous successful VBAC, Spontaneous onset of labour, and Uncomplicated pregnancy without other risk factors. success is reduced if there is previous Caesarean section for dystocia, coexisting fetal, placental or maternal conditions⁽⁵⁾. It is also decreases with maternal BMI greater than 30 Kg/m², fetal macrosomia of 4 kg or more, advanced maternal age, short stature, more than one previous Caesarean section, and risk factors associated with an increased risk of uterine scar rupture.

VBAC has Less maternal morbidity for index pregnancy and future pregnancies, major surgery is avoided, so earlier mobilization and discharge from hospital, and the Patient gratification in achieving vaginal birth if this is desired.

perinatal loss is increased compared with ERCS at 39 weeks (1.8 per 1000 pregnancies), there is a risk of stillbirth after 39 weeks gestation, beside the risk of intrapartum death or neonatal death, hypoxic ischemic encephalopathy (HIE) risk (0.7 per 1000) is related both to labour and vaginal birth and to scar rupture, Pelvic floor trauma, and finally increased morbidity of emergency Caesarean section⁽⁹⁾.

All women electing to labour after previous Caesarean section should have ready access to Obstetric, Neonatal, Paediatrics, Anaesthetic, operating theatre and resuscitation services (including availability of blood products) in the event that complications occur⁽¹⁰⁾. By virtue of remote location, patients should be informed of limitations of services available and the implications for care should a uterine rupture occur. In most circumstances this will result in either an elective repeat Caesarean section or alternatively antenatal transfer to a higher centre for a trial of labour⁽⁶⁾.

A woman undergoing planned VBAC should be assessed in early labour. Members of the care team should be notified in a timely manner of the admission and of the relevant clinical circumstances. There should be continuous midwifery support and fetal monitoring. Intravenous access should be established once labour is established, and blood sent for group & save with access to prompt cross-match if required. Oral intake should be restricted⁽¹⁰⁾.

RCOG guidelines state, "There is no single pathognomonic clinical feature that is indicative of uterine rupture but the presence of any of the following peri-partum should raise the concern of possibility of this event, abnormal CTG, severe abdominal pain especially persisting between contractions chest pain or shoulder tip pain, sudden onset of shortness of breath, acute onset of scar tenderness, abnormal vaginal bleeding or haematuria, cessation of previous efficient uterine activity,



maternal tachycardia, hypotension or shock, loss of station of the presenting part. ⁽¹⁰⁾

Cesarean deliveries have been increasing in recent decades in the United States. ⁽¹¹⁾ The World Health Organization has stated that national cesarean rates greater than 10-15% indicate unnecessary maternal risk. Nevertheless, the current cesarean rate in the US is 32.2% (CDC). With this high rate of cesarean delivery, the question of the route of delivery for subsequent pregnancies becomes ever more important. Famously, Edwin Bradford Cragin, an obstetrician in 1916, is quoted as saying “once a cesarean, always a cesarean” and historically this had been true. ⁽¹¹⁾ However, in 1980 the National Institute of Health (NIH) and the American Congress of Obstetricians and Gynecologists (ACOG) endorsed trial of labor after cesarean delivery (TOLAC) leading to an increase in vaginal birth after cesarean (VBAC) in the US ⁽¹¹⁾. This increase in TOLAC also revealed an increase in TOLAC related complications ⁽¹²⁾ “Uterine rupture is associated with an increased risk of severe maternal complications, such as hysterectomy, hemorrhage, as well as severe fetal complications, such as hypoxic ischemic encephalopathy and perinatal death”. ⁽¹³⁾ The corresponding rise in TOLAC related complications prompted a 1998 ACOG recommendation that TOLAC should only be considered in higher equipped institutions ⁽¹²⁾. A few months after releasing this recommendation, ACOG revised the wording from “readily available physicians” to “immediately available physicians” to provide emergency care. This had a significant impact on hospital policy and caused a rapid decline in the number of institutions willing to consider TOLAC as an option for patients, as well as introduced concerns about medical liability claims. ⁽¹²⁾ The women who desire several children are not good candidates for elective primary cesarean delivery on maternal request as per ACOG and the International Federation of Gynecology and Obstetrics ^(14,15), it can be

a reasonable alternative to planned vaginal delivery. When a health care provider cannot support this request, refer to another health care provide is appropriate ⁽¹⁶⁾.

In women with prior cesarean delivery, maternal complications are highest among those with failed VBAC (14.1%), (3.6%) in planned cesarean delivery, and the lowest among successful vaginal birth (2.4%) ⁽¹⁷⁾, failed TOLAC carried the highest morbidity ⁽¹¹⁾, additional risk of perinatal death from attempted VBAC was 1.4 per 10,000, and in 5% of uterine ruptures the baby died ⁽¹⁸⁾

Multiple tools have been developed meant to predict the likelihood of Caesarean, but none of the current tools have been able to definitively predict patient outcomes. ⁽¹¹⁾

There are several advantages of ERCD, including more convenient timing, certainty of outcome, and a less painful delivery, a known delivery date and time allows the parents to schedule days off from work ⁽¹⁹⁾. With VBAC there is 30-50% chance that a repeat cesarean will be required if trial of labor fails. Also, with an elective cesarean there is no need to suffer the pain of contractions, so it is relatively painless during the actual delivery ⁽¹²⁾. For women ERCD is theorized to be protective for the pelvic floor. However, some of the risk of pelvic floor weakness is due to the pregnancy itself and not the method of delivery, it avoids the risk of scar rupture. It is uncertain what the true risk of scar rupture is with VBAC, as there are many factors that affect this risk. Several studies have been done to examine risk factors and predictors of uterine scar rupture in pregnancies following prior cesarean deliveries, however clear correlations have proven elusive ⁽²⁰⁾. The rate of perinatal death is 11 times higher in VBAC than for ERCD, but this risk is shown to be equivalent to that of a fetus of a primigravida mother ⁽²¹⁾. Neonates who are small-for-gestational-age has same risk for complications whether delivered

by VBAC or ERCD ⁽²²⁾. The absolute risk is only 4.5 per 10,000 births, but other sources found that the risk of perinatal death was 0.2% for VBAC and 0.1% for ERCD delivery ⁽²¹⁾. There is an increased risk of neonatal birth trauma and postpartum hemorrhage in operative vaginal delivery if required. Smith et al found that the risk of death was 2.8 per 10,000 with trial of labor and 2.4 per 10,000 with elective cesarean. Significantly, no maternal deaths in their study were attributed to scar rupture. ⁽¹³⁾

There is a significant amount of confusion in the literature over the definition of uterine scar rupture, which contributes to the difficulty in determining its risk during VBAC. The rate of asymptomatic scar rupture has been shown to be the same for VBAC or ERCD in some studies. Overall the rate of uterine scar rupture is approximately 0.5% or 1 in 200, although, some sources have reported it as low as 0.3% or as high as 1.5% ⁽²³⁻²⁴⁾. The largest combined study reported 0.35% risk of uterine scar rupture. Occasionally hysterectomy is required after trial of labor, with a reported risk of 3.4 per 10,000. Statistically, this means that 2941 ERCD would need to be performed to prevent one hysterectomy after trial of labor ⁽²³⁾. Patient selection for VBAC It has been shown that women with a 60-70% chance of TOLAC success have no greater morbidity if they undergo TOLAC than if they undergo an ERCD. ⁽²⁵⁾ This fact emphasizes the importance of evaluating candidates for VBAC. Patient selection should be based on several factors, both medical and non-medical. Medical considerations include indication, incision type, and number of previous cesarean sections, physical factors such as advanced cervical opening, effacement, and labor progression, along with obstetric history like gravidity, parity, and prior vaginal delivery ^(11,24,26). Several studies have also shown that maternal demographic factors such as age, weight, height, and ethnicity play a role in predicting VBAC success as well

⁽¹¹⁾. Some non-medical factors to consider include, patient preference, provider comfort with the method of delivery, and delivery unit rates of successful VBAC. ⁽²⁵⁾ The indication for previous cesarean is important in determining the risk of complications in following deliveries. If the reason for prior cesarean was cephalopelvic disproportion, for example, there is a 50-75% chance of successful VBAC, since this is dependent on the size of the child, which varies for each pregnancy. The size of the mother's pelvis and the fetus may have a significant influence on a successful VBAC, which supports the importance of accuracy of fetal size estimates. Records indicate that VBAC has a >90% success rate if there have been prior vaginal births. One study showed that out of 938 successful VBAC patients, 33.8% had a previous successful VBAC and 6.5% of those who failed VBAC had a previously successful VBAC ($p < 0.001$). The authors found that women with a history of previous VBAC were 7 times more likely to have subsequent VBAC success ⁽²⁷⁾. Patients with multiple previous cesareans are reported to be more at risk for surgical complications, abnormal placenta implantation (placenta previa, placenta accreta), and scar rupture than women with only one prior Cesarean ⁽²⁸⁾.

Tahseen reported overall success for VBAC was 71.1%, scar rupture to be 1.36% and perinatal risk to be 0.09% for VBAC after more than one previous cesarean, both of which are 3 times greater than VBAC after once prior cesarean. They also found that the overall maternal mortality was the same as that for ERCD ⁽²⁹⁾.

Another investigator concluded that VBAC success after >2 prior cesareans was 79.2%, with no cases of uterine rupture, and equal rates of overall maternal morbidity when compared to ERCD ⁽³⁰⁾. Similarly other one found that 2 prior CS have a 65% chance of achieving VBAC, which is similar to the 69% success rate of women with only 1 prior CS. ⁽³¹⁾ induction of

labor with PGE2 resulted in significantly higher rates of uterine scar rupture.^(26, 32, 33)

Ravasia et al reported that scar rupture rate after spontaneous labor is 0.45% while it is 1.4% induced labor. Prostaglandin E2 (PGE2) induced labor was associated with 6 times scar rupture rate compared to spontaneous labour. 0.7%.⁽³²⁾, 7-fold increased rate is observed by others^(36,37). There is no significant difference in the rate of scar rupture between oxytocin and misoprostol in the literature⁽³⁴⁾. Additionally, labor duration for TOLAC was slower compared to nulliparous labor, particularly for induced labor⁽³⁵⁾.

To this theory investigated by many authors and they found association between uterine thickness and uterine rupture^(38,39).

2. Problem Statement

Caesarean section rate has increased worldwide in the last decade. In our country we are facing the problem of poor antenatal care, so the rate of women with unplanned VBAC is high, which may increase the risk of adverse maternal and fetal outcome and also could increase the risk of emergency caesarian section with its complication. This study was carried out to compare between the maternal and fetal outcome of planned VBAC in ANC versus labour room.

Studying the difference between planned and unplanned vaginal birth after Caesarean section expected to serve such goal by monitoring and evaluating the possible risks in unplanned VBAC such as risk of infection and other relevant complication, since studies indicated high successful vaginal deliveries when VBAC is planned.

This study was conducted to compare between the maternal and fetal outcome of planned VBAC in the ANC versus labour room from November to May 2017, It was directed to measure the success rate of ANC planned VBAC versus labour room, to determine the

common fetal and maternal morbidity and mortality associated with both ANC and labour room planned VBAC, and to compare between the outcomes of ANC and labour room planned VBAC.

3. Materials and methods:

This was descriptive, cross-sectional hospital -based study conducted in Khartoum north teaching Hospital. On a period of 6 month, all pregnant women with one previous Caesarean section planned for VBAC either in the ANC or labour room who had no obstetric condition necessitate emergency Caesarean section were included in the study. Those who had obstetric condition necessitate emergency Caesarean section were excluded. Direct interview of women after their consent was established using structured questionnaire (attached). This study included two hundred and forty-five pregnant women with one previous Caesarean planned for VBAC either in the ANC or labor room, attended Khartoum north teaching hospital in 2017. The study conducted to compare between the maternal and fetal outcome of the planned vaginal birth after cesarean in the ANC versus labor room. Group A was the group who planned for VBAC (142)& group B was the one who did not planned for VBAC (103).

- Ethical clearance was obtained from Research Ethical committee at Khartoum state ministry of health and SMSB. Data was analyzed using (SPSS) software version 20.

3.1. Results

The first group age was 49% between the age 20-30 and the majority was between 30-40 years old 50% only 1% was more than 40. While in the second group the majority were between the age 30-40 and 49% between 20-30 years old as shown in figure 1.

Regarding level of education, first group who were planned for VBAC shows that most of the patient were university graduate, while 31.7% is secondary school level, 16.2% is primary school and only 6.3% is illiterate. In contrast to the other group 30.1% are secondary school, 29.1% are illiterate, 28.2% are primary school while 12.6% are university as shown in figure 2. There was no significant difference between the two groups in the origin.

Result of parity group 1 contains 44% para I, 43.6% para II-IV, 12% >V. group 2 contain 34% para I, para II-IV 50.4% and 15.6 for >V parity as shown in figure 4.

Majority (52.1%) of Group A attend ANC, While (22.3%) of group 2 had no ANC during their pregnancy as shown in figure 9 & 10.

Group 1 reveal that 65% of previous C/S were emergency C/S and 35% were elective C/S, while in the other group 75% were emergency and 25% were electives figure 6. The indication for their previous C/S are shown in figure 7

In the group A 93.7% have previous successful 1-2 VBAC, while the other group 71.8% of the cases had 1-2 previous successful VBAC figure 8.

The majority (94%) of group 1 ladies were counseled, while 90% of group 2 were not. successes rate was high 68% and 67% in group 1 and 2 respectively.

Maternal outcome in both group was pretty good. In the first group 97% had no complication only 2% had PPH and 1% had rupture uterus while in the second group 96% had no complication only 1% had PPH and 3% had rupture uterus as shown in figure 13.

Fetal outcome was good in the first group 99% were alive and 1% had FSB. The other group 93% was alive and 7% had FSB as shown in figure 14.

NICU admission was 10% and 18% did in group 1 and 2 respectively. reasons. In the second group 3.9% were

for birth asphyxia, 2.9% for observation and 9.7% for other reasons as shown in figure 16

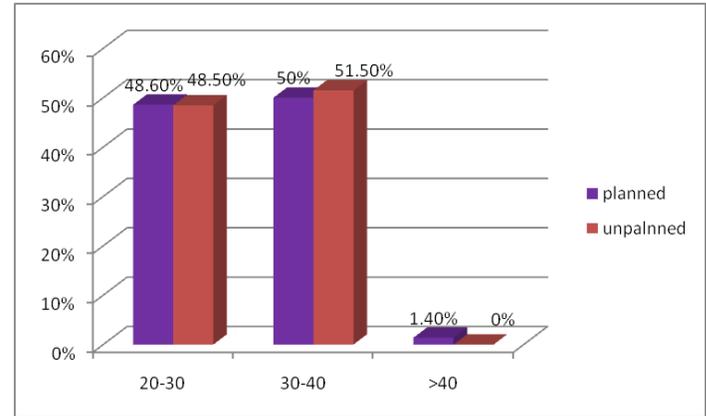


Figure 1: Distribution of study population according to the patient age who had planned VBAC versus unplanned VBAC.

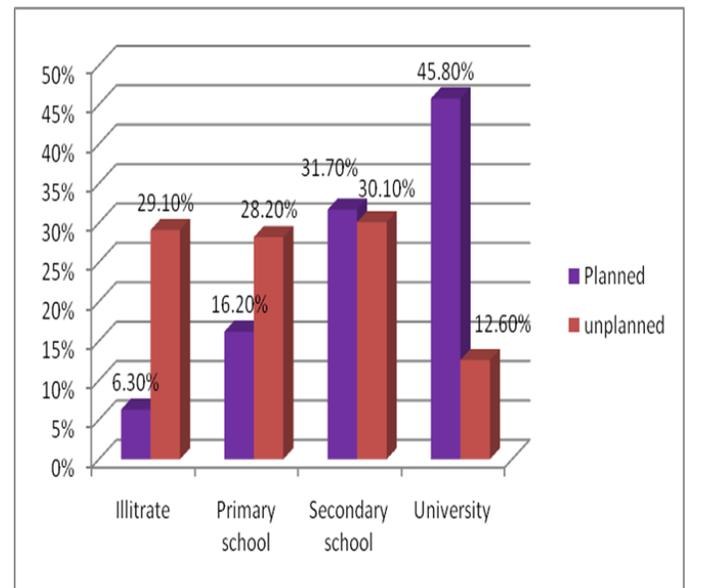


Figure 2: Distribution of study population according to the patient level education who were planned for VBAC versus unplanned VBAC.

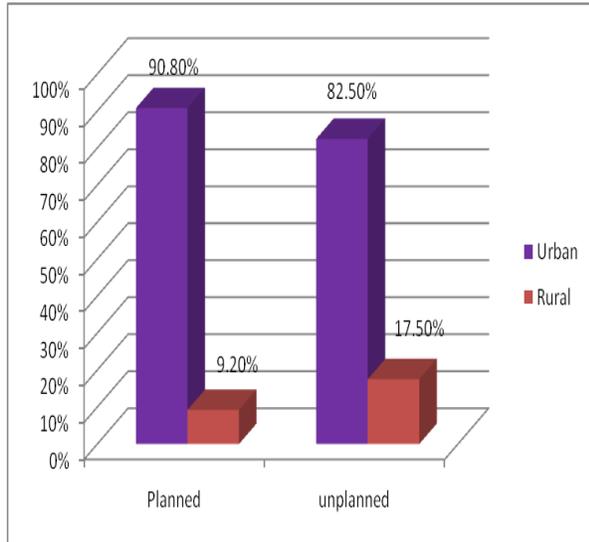


Figure3: Distribution of study population to the patient residence who were planned for VBAC versus unplanned

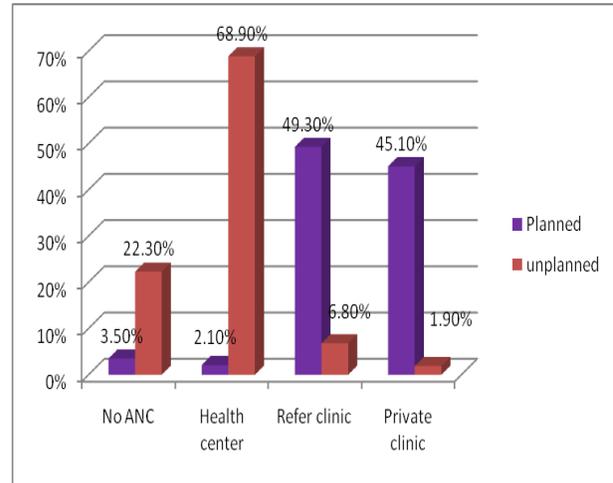


Figure 5: Distribution of study population according to the patient ANC who were planned for VBAC versus unplanned

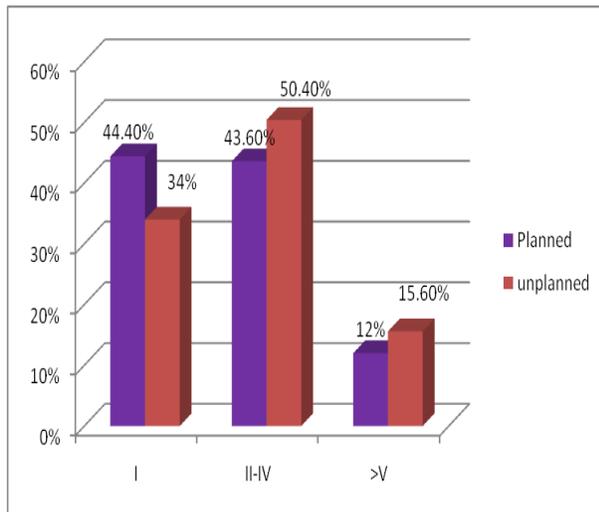


Figure 4: Distribution of study population according to the patient parity who were planned for VBAC versus unplanned

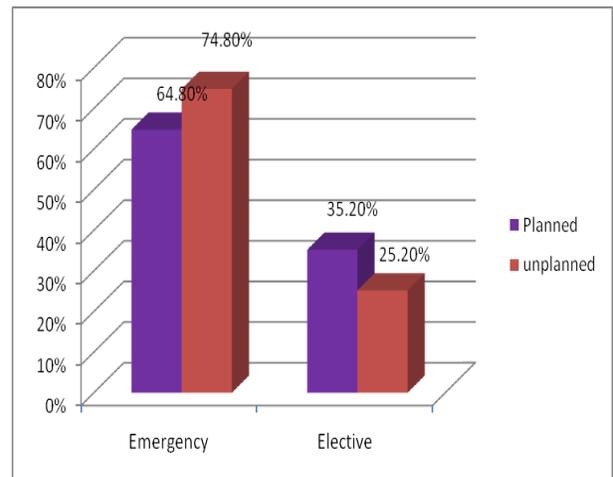


Figure 6: Distribution of study population according to Previous C/S to patient who was planned for VBAC versus unplanned

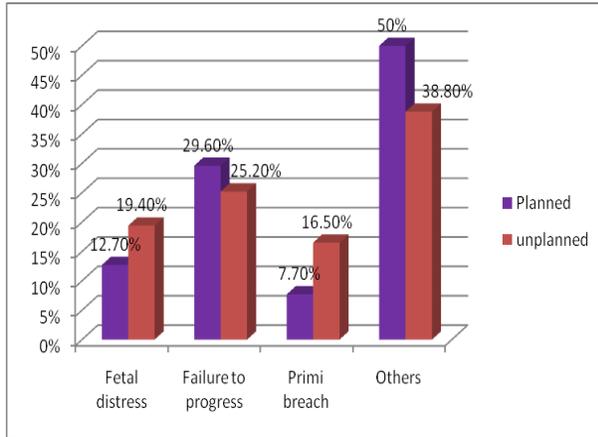


Figure 7: Distribution of study population according to the indication for previous C/S to patient who was planned for VBAC versus unplanned

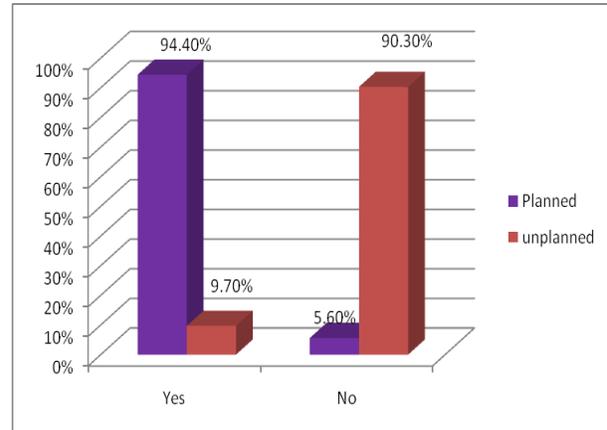


Figure 9: Distribution of study population according to if they counseled for VBAC in ANC to patient who was planned for VBAC versus unplanned

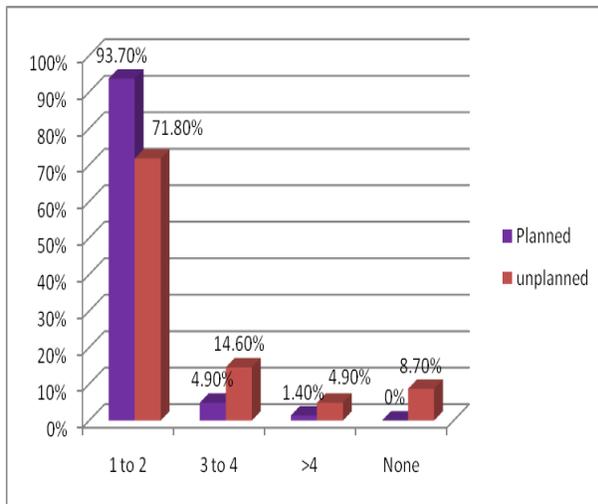


Figure 8: Distribution of study population according to number of previous successful VBAC to patient who was planned for VBAC versus unplanned

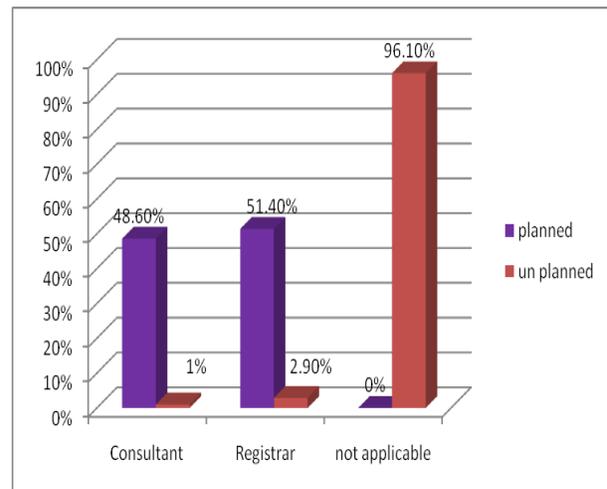


Figure 10: Distribution of study population according to who made the counseling to patient who was planned for VBAC versus unplanned

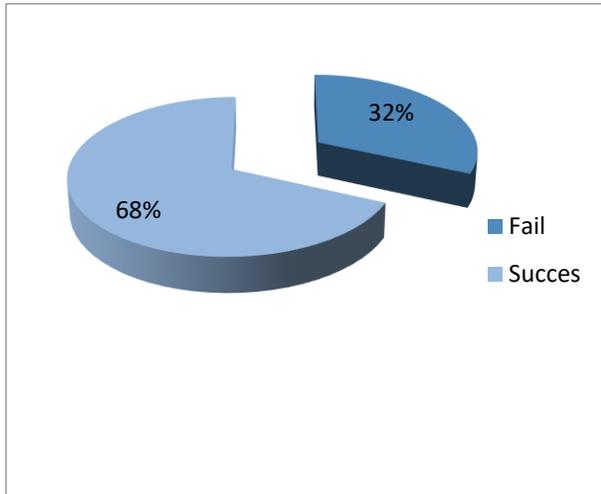


Figure 11: Distribution of study population according to success rate of current VBAC to patient who was planned for VBAC.

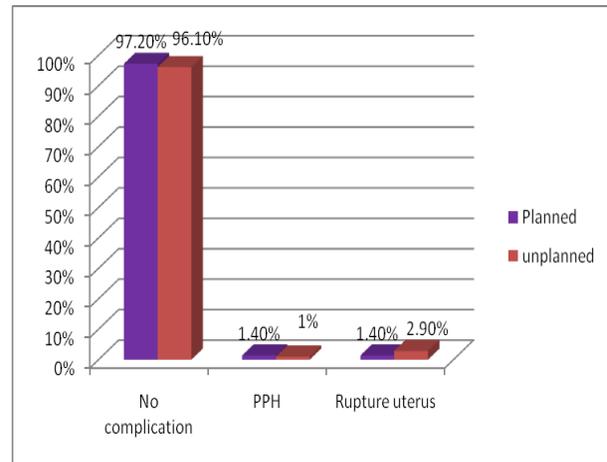


Figure 13: Distribution of study population according to the maternal outcome to patient who was planned for VBAC versus unplanned

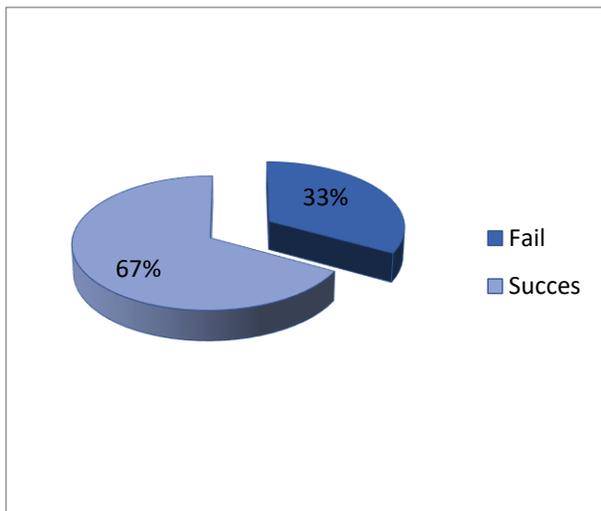


Figure 12: Distribution of study population according to success rate of current VBAC to patient who was unplanned for VBAC

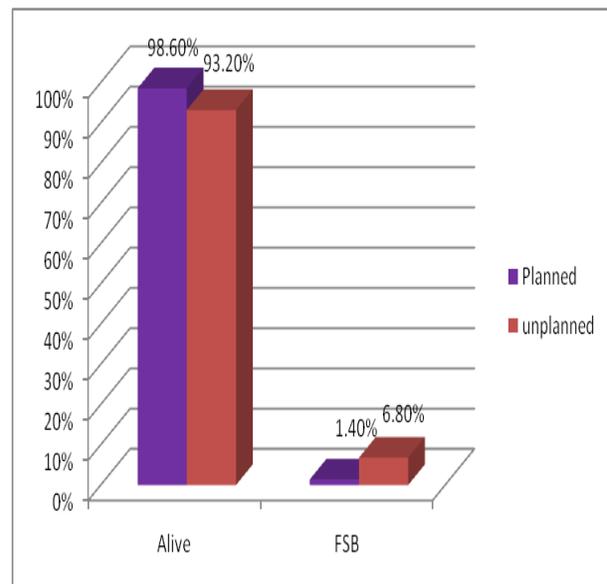


Figure 14: Distribution of study population according to the fetal outcome to patient who was planned for VBAC versus unplanned

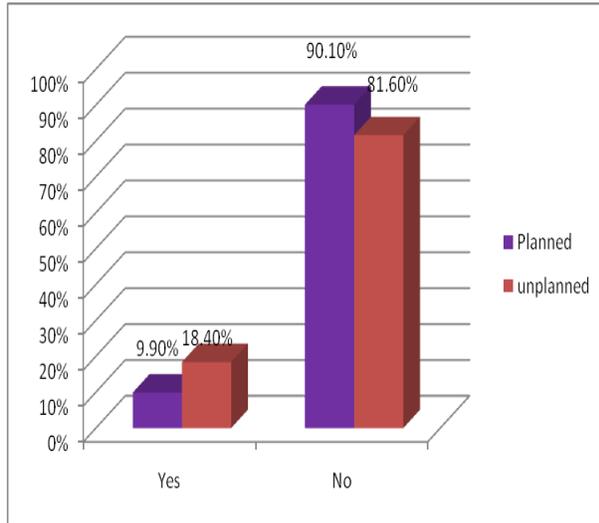


Figure 15: Distribution of study population according to baby admission to the NICU in patient who was planned for VBAC versus unplanned

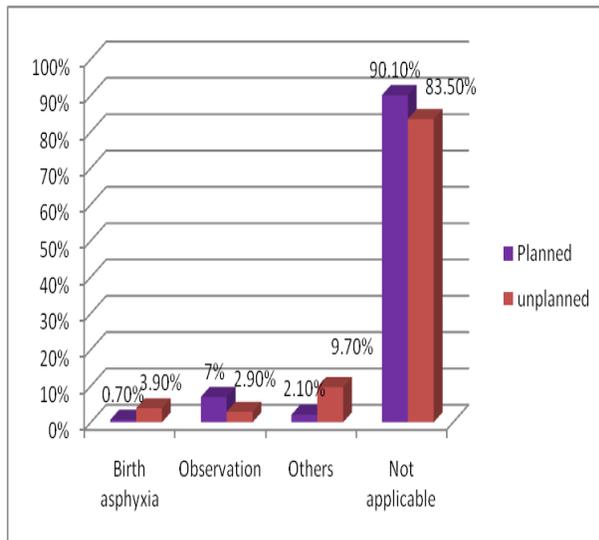


Figure 16: Distribution of study population according to the cause of admission in patient who was planned for VBAC versus unplanned

	Fetal outcome		Total
	Alive	FSB	
Fetal weight <2.5kg	8	0	8
Fetal weight 2.5-4kg	131	2	133
Fetal weight >4kg	1	0	1
Total	140	2	142

Table 1: Cross tabulation between fetal weight and fetal outcome in planned VBAC

P value (0.934) not significant

compare the fetal weight with maternal outcome in the same group there is no association between fetal weight and outcome.

	Maternal outcome			Total
	No complication	PPH	Rupture uterus	
Fetal weight <2.5kg	6	2	0	8
Fetal weight 2.5-4kg	131	0	2	133
Fetal weight >4kg	1	0	0	1
Total	138	2	2	142

Table 2: Cross tabulation between fetal weight and maternal outcome in planned VBAC

P value (0.000) significant

		Maternal outcome			Total
		No complication	PPH	Rupture uterus	
Fetal weight	<2.5kg	8	1	1	10
	2.5-4kg	88	0	2	90
	>4kg	3	0	0	3
	Total	99	1	3	103

Table 3: Cross tabulation between fetal weight and fetal outcome in unplanned VBAC

P Value (0.032) significant

		Fetal outcome		Total
		Alive	FSB	
Fetal weight	<2.5kg	8	2	10
	2.5-4kg	86	4	90
	>4kg	2	1	3
	Total	96	7	103

Table 4: Cross tabulation between fetal weight and maternal outcome in un planned VBAC

P value (0.021) significant

4.1 Discussions

Assessment of the individual case with regard to the possibility of a successful VBAC is necessary while taking the decision. The unending dilemma of an obstetrician is about the management of subsequent labor, once the patient has a scar on the uterus. Some suggest an elective CS for such cases, whereas others choose a trial of labor. Many take a middle route, that is, individualization of case. By far, the

greatest problem for the attendant in subsequent labor is the integrity of the uterine scar. Uterine rupture has the potential for causing serious harm to the pregnant woman as well as the baby. This is the most important risk to be noted, but the advantage which the vaginal delivery imparts largely outweighs the risks associated with a repeat CS.

The age of both groups found to be similar to each other. the result reveal that education level had significant effect on the type of delivery women would undergo in group A the majority of the women was university graduate while in grope B who were unplanned for VBAC the majority are secondary, illiterate and primary graduate as follow [30.1%, 29.1%, 28.2%]. Most of both groups are from urban area.

In group A most of the patient parity are vary between I, II, III,IV as follow (88%) while in group B I, II, III, IV (84.4%) and > V are (15.6%).

The study reveals that patient who planned VBAC had high rate for ANC (96.5%), most of their ANC were in refer clinic 52.1% and 47.9%. went to private clinic. While in group B (22.3%) had no ANC, (68.9%) went to health center. The commonest indication for a previous CS was failure to progress in both group planned grope was (29.6%) unplanned group was (25.2%).. Similar results (68 to 83%) have been reported by other workers. ^(40, 41). In our study, the commonest type of previous C/S was emergencies in both groups (65%) in group b (75%). In group A (94%) had been counseled for VBAC and majority was counseled by registrar while the majority in group B did not counseled for VBAC and (3%) were counseled by registrar. Success rate for current planned VBAC in both group were similar (68%) in group A while in group B (67%).). Similar results (68 to 83%) have been reported by other workers. ^(40, 41). A systematic review with meta-analysis of success rate and adverse outcomes of VBAC-2 versus VBAC-1 and repeat (third)

Caesarean sections and found that overall success for VBAC was 71.1%.⁽³⁰⁾

The maternal outcome in group A was (1.4%) for PPH & (1.4%) for uterine rupture while in group B (1%) for PPH and (3%) for uterine rupture and the majority of both groups had no complication. Several investigators reported highest complications among women who attempted vaginal birth and failed (14.1%)⁽¹⁷⁾, the relationship between the fetal weight and fetal outcome in planned group is statistically not significant but when we compare it with maternal outcome is statistically highly significant. The same correlation in the unplanned group is statistically significant.

VBAC is found to be more effective, less expensive, and had the lowest mortality compared to ERCD⁽¹⁸⁾, however failed TOLAC carried the highest morbidity⁽¹¹⁾ It was concluded that the additional risk of perinatal death from attempted VBAC was 1.4 per 10,000 (95% CI 0-9.8). This means that 7,142 ERCD would have to be performed to prevent one baby death.⁽¹⁸⁾ The maternal death rate with all vaginal births is 1 per 10,000, compared to 4 per 10,000 for Caesarean section. The maternal death rate with elective Caesarean is 2 per 10,000 versus the maternal death rate with a normal vaginal birth of 0.5 per 10,000.⁽²⁵⁾ Smith et al.⁽¹³⁾ found that no maternal deaths in their study were attributed to scar rupture.⁽¹³⁾ Another found that labor duration for TOLAC was slower compared to nulliparous labor, particularly for induced labor.⁽³⁵⁾

4.2 Conclusion

Success rate of VBAC was similar in both groups, there is no significant difference in the maternal morbidity in both groups regarding the PPH, while rupture uterus was more in group B, we found no maternal mortality in both groups. The fetal mortality and NICU admission are higher in group B than group A,

on the NICU admitted babies, birth asphyxia was high in group B.

Recommendation to

Increase the awareness among the health care provider to encourage the ladies who had previous C/S to have VBAC, early referral of the patient with high-risk pregnancy from health centers to precede their ANC in secondary level hospital, and to adopt multidisciplinary team and Further study is required to enhance and improve the outcome of VBAC.

References

1. Australian Institute of Health and Welfare (AIHW), Hilder L, Zhichao Z, Parker M, Jahan S, Chambers GM. Australian mothers and babies 2012.
2. New Zealand Ministry of Health. Clinical Indicators. 2012. Available from: <http://www.health.govt.nz/publication/new-zealand-maternity-clinical-indicators-2012>.
3. American College of Obstetricians and Gynaecologists (ACOG). Clinical Management Guidelines Vaginal Birth after Previous Caesarean Section. 2010.
4. Jozwiak M, Dodd JM. Methods of term labour induction for women with a previous caesarean section, Cochrane Database Syst Rev. 2013;3:CD009792.
5. Gregory KD KL, Fridman M et al. Vaginal birth after Cesarean : clinical risk factors associated with adverse outcome, Am J Obstet Gynecol. 2008(198):452-5.
6. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists July 2015.
7. Pallasmaa N, Ekblad U, Aitokallio-Tallberg A, Uotila J, Raudaskoski T, Ulander VM, et al. Cesarean delivery in Finland: maternal complications and obstetric risk factors,

- ActaObstetGynecol Scand. 2010;89(7):896-902.*
8. Allen VM, O'Connell CM, Liston RM, Baskett TF. Maternal morbidity associated with cesarean delivery without labor compared with spontaneous onset of labor at term, *Obstet Gynecol. 2003;102(3):477-82.*
 9. Regan J, Thompson A, DeFranco E. The influence of mode of delivery on breastfeeding initiation in women with a prior cesarean delivery: a population-based study, *Breastfeed Med. 2013;8:181-6.*
 10. Royal College of Obstetricians and Gynaecologists. Birth after Previous Caesarean section. 2007.
 11. Ugwumadu A (2005) Does the maxim "once a Caesarean, always a Caesarean" still hold true? *PLoS Med 2(9): e305.*
 12. Wells CE, Cunningham FG (2015) Choosing The Route of Delivery After Cesarean Birth. *Up to Date.*
 13. Smith GC, White IR, Pell JP, Dobbie R (2005) Predicting cesarean section and uterine rupture among women attempting vaginal birth after prior cesarean section. *PLoS Med 2(9): e252.*
 14. American College of Obstetricians and Gynecologists (2013) ACOG committee opinion no. 559: Cesarean delivery on maternal request. *ObstetGynecol 121(4): 904-907.*
 15. International Federation of Gynecology and Obstetrics (FIGO) (2009) Committee for the Ethical Aspects of Human Reproduction and Women's Health. Ethical aspects regarding caesarean delivery for nonmedical reasons. *Ethical issues in obstetrics and gynecology by the FIGO Committee for the Study of Ethical Aspects of Human Reproduction and Women's Health. London, FIGO, p. 72-73.*
 16. (2006) National Institutes of Health state-of-the-science conference statement: Cesarean delivery on maternal request March 27-29, 2006. *ObstetGynecol 107(6): 1386-1397.*
 17. Landon MB, Hauth JC, Leveno KJ, Spong CY, Leindecker S, et al. (2004) Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery. *N Engl J Med 351(25): 2581- 2589.*
 18. Guise JM, McDonagh MS, Osterweil P, Nygren P, Chan BK, et al. (2004) Systematic review of the incidence and consequences of uterine rupture in women with previous caesarean section. *BMJ 329(7456): 19-25.*
 19. Cox KJ (2014) Counseling women with a previous cesarean birth: toward a shared decision-making partnership. *J Midwifery Womens Health 59(3): 237-245.*
 20. Eden KB, McDonagh M, Denman MA, Marshall N, Emeis C, et al. (2010) New insights on vaginal birth after cesarean: can it be predicted? *ObstetGynecol 116(4): 967-981.*
 21. Smith GC, Pell JP, Cameron AD, Dobbie R (2002) Risk of perinatal death associated with labor after previous cesarean delivery in uncomplicated term pregnancies. *JAMA 287(20): 2684-2690.*
 22. Turitz AL, Friedman AM, Gyamfi-Bannerman C (2016) Trial of labor after cesarean versus repeat cesarean in women with small-for-gestational age neonates: a secondary analysis. *J Maternity Fetal Neonatal Med 29(18): 3051-3055.*
 23. French L (2004) Trial of Labor After Cesarean Section Is Relatively Safe. *AmFam Physician 70(9): 1761-1762.*

24. Studsgaard A, Skorstengaard M, Glavind J, Hvidman L, Uldbjerg N (2013) Trial of labor compared to repeat cesarean section in women with no other risk factors than a prior cesarean delivery. *ActaObstetGynecolgyScand* 92(11): 1256-1263.
25. Fagerberg MC, Maršál K, Källén K (2015) Predicting the chance of vaginal delivery after one cesarean section: validation and elaboration of a published prediction model. *Eur J ObstetGynecolReprodBiol* 188: 88-94.
26. Smith GC, Pell JP, Pasupathy D, Dobbie R (2004) Factors predisposing to perinatal death related to uterine rupture during attempted vaginal birth after caesarean section: retrospective cohort study. *BMJ* 329(7462): 375.
27. Gyamfi C, Juhasz G, Gyamfi P, Stone JL (2004) Increased success of trial of labor after previous vaginal birth after cesarean. *ObstetGynecol* 104(4): 715-719.
28. Landon MB (2010) Predicting uterine rupture in women undergoing trial of labor after prior cesarean delivery. *SeminPerinatol* 34(4): 267-271.
29. Tahseen S, Griffiths M (2010) Vaginal birth after two caesarean sections (VBAC-2)-a systematic review with meta-analysis of success rate and adverse outcomes of VBAC-2 versus VBAC-1 and repeat (third) caesarean sections. *BJOG* 117(1): 5-19.
30. Cahill AG, Tuuli M, Odibo AO, Stamilio DM, Macones GA (2010) Vaginal birth after caesarean for women with three or more prior caesareans: assessing safety and success. *BJOG* 117(4):
31. Miller ES, Grobman WA (2015) Obstetric outcomes associated with induction of labor after 2 prior cesarean deliveries. *Am J ObstetGynecol* 213(1): 89.e1-89.e5. 422-427.
32. Ravasia DJ, Wood SL, Pollard JK (2000) Uterine rupture during induced trial of labor among women with previous cesarean delivery. *Am J ObstetGynecol* 183(5): 1176-1179.
33. Hoffman MK, Grant GH (2015) Induction of labor in women with a prior cesarean delivery. *SeminPerinatol* 39(6): 471-474.
34. Lin C, Raynor BD (2004) Risk of uterine rupture in labor induction of patients with prior cesarean section: an inner city hospital experience. *Am J ObstetGynecol* 190(5): 1476-1478.
35. Grantz KL, Gonzalez-Quintero V, Troendle J, Reddy UM, Hinkle SN, et al. (2015) Labor patterns in women attempting vaginal birth after cesarean with normal neonatal outcomes. *Am J ObstetGynecol* 213(2): 226.e1-226.e6.
36. Bujold E, Mehta SH, Bujold C, Gauthier RJ (2002) Inter delivery interval and uterine rupture. *Am J ObstetGynecol* 187(5): 1199-1202.
37. Blumenfeld YJ, Caughey AB, El-Sayed YY, Daniels K, Lyell DJ (2010) Single-versus double-layer hysterotomy closure at primary caesarean delivery and bladder adhesions. *BJOG* 117(6): 690-694.
38. Rozenberg P, Goffinet F, Phillippe HJ, Nisand I (1996) Ultrasonographic measurement of lower uterine segment to assess risk of defects of scarred uterus. *Lancet* 347(8997): 281-284.
39. Carroll CS Sr, Magann EF, Chauhan SP, Klausner CK, Morrison JC (2003) Vaginal birth after cesarean section versus elective repeat cesarean delivery: Weight-based outcomes. *Am J ObstetGynecol* 188(6): 1516-1520.



International Journal of Applied Technology in Medical Sciences

Vol 1 Issue 1 (2022) 4 - 18

DOI: 10.54878

Emirates Scholar

Available at www.emiratesscholar.com



40. Phelan JP, Clark SL, Diaz F, Paul RH. Vaginal birth after caesarean. *Am J Obstet Gynecol.* 1987;157:1510-5.

Hoskins IA, Gomez JL. Correlation between maximum cervical dilatation at caesarean delivery and subsequent vaginal birth after caesarean delivery. *ObstetGynaecol.* 1997;89:591-3.