



Original article

Rate, Precautions, and Outcome of Vaginal Birth after Caesarean Section in Beni-Suef Governorate

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Abstract

Background: Almost a third of all deliveries now involve a caesarean section (CS). Trial of labor after caesarean (TOLAC) followed by vaginal birth after caesarean (VBAC) is crucial for lowering the total caesarean rate since repeat caesarean is the most prevalent single rationale for caesarean. **Aim:** this study was conducted to assess the incidence, and maternal and neonatal outcomes of vaginal birth after caesarean section. **Methods:** This retrospective cohort study was conducted at the obstetrics and gynecology department in of Beni-Suef General Hospital. The data was obtained from the files of each patient. The collected data included reported history taking, clinical examinations, preoperative and postoperative investigations, details of previous deliveries, and maternal and fetal outcomes of vaginal delivery following caesarean section. The

success rate of TOLAC was (84.9%) while the failure rate was (15.1%). **Results:** The rate of succeeded VBAC was (1.6%) while the rate of CS was (38 %) from all deliveries in 2016 and 2017. There was a difference between succeeded VBAC group and failed group regarding the history of previous vaginal delivery, number, causes, type, indications of prior CS(s), duration between CS and current pregnancy, presentation, medical disorders, fetal heart rate (FHR), Apgar score and need for neonatal intensive care unit (NICU) admission. **Conclusion:** Regarding VBAC precautions, factors that improve success are previous lower segment CS, previous vaginal delivery, cephalic presentation, a single full-term fetus of average weight, good maternal health (free of medical disorder), the patient is in an active phase of the first stage of labor and previous vaginal delivery. VBAC became one of the solutions to avoid the complications of ERCD as there are fewer complications, shorter hospital stays, faster recovery, avoidance of major surgery, and reduced risk of NICU admission.

1. Introduction:

Women who have had a caesarean delivery in the past but choose to have their subsequent child by vaginal delivery are named to have had a vaginal birth after a caesarean section (VBAC). Patients who want to attempt a vaginal birth after caesarean surgery (VBAC) have what is called a "trial of labor" (TOL) (TOLAC) (1). The risks of TOL are low, and the procedure is normally safe. Still, there is a chance of major consequences such as uterine rupture or dehiscence and maternal and/or newborn morbidity (2). The literature showed a large number of pregnant women who have previous CS delivery. Whether it is premeditated or the result of an unexpected labor contraction, patients may have VBAC (3).

The percentage of women who had a successful VBAC rose for all gestational ages 38 and above. The VBAC rate rose 7%, from 14.0 to 15.0 percent, at 38 weeks. VBAC births went from 8.0 to 9.0 percent at 39 weeks and from 33.8 to 37.3 percent at 40 weeks, an increase of 13 and 10 percent (4). It should be attempted soon to determine the fetal weight, either physically or by ultrasonographic evaluation. Given that there are no extremely precise techniques for determining fetal birth weight, this information should be taken into account but not utilized exclusively to decide whether or not to do TOL (5). The American

College of Obstetrics and Gynecology supports this statement that individuals with up to two previous caesarean births are suitable for TOLAC (ACOG) (6).

These situations would also involve past transmyometrial incisions to remove uterine fibroids or to permit open fetal surgery, in addition to prior classical uterine incisions of the "T" or "J" type during caesarean birth (7). Before labor begins at around 36 to 38 6/7 weeks estimated gestational age, scheduled repeat caesarean delivery is advised because patients with a history of uterine rupture also have a higher risk of uterine rupture (8). Facilities that perform TOLAC are needed to be able to carry out an emergency CS. Concern has been expressed that this criterion prevents certain patients, such as those living in remote regions, from having the option of vaginal birth following caesarean section, even if the availability of such services appears reasonable (9). The most recent ACOG Practice Bulletin advised sending such patients to locations that might provide TOLAC as necessary (10). Patients considering TOLAC must get standard prenatal care and extra education about this alternative to a scheduled recurrent caesarean birth (PRCD). If CS is planned, early ultrasound to check gestational age might also be useful (11). In terms of labor management, spontaneous entrance into labor is

recommended since it has a better chance of successfully delivering the baby vaginally and a lesser chance of uterine rupture (12). Although studies have shown higher risks of uterine rupture when prostaglandins (such as misoprostol or dinoprostone) are used for cervical ripening, induction of labor (IOL) is still a viable choice when necessary (13). Uterine rupture, which includes the incision made into the uterus during the preceding CS, is the most serious complication that may happen to patients having TOLAC (14). Fetal acidosis, neonatal intensive care unit (NICU) admission, and even death may ensue after uterine rupture because blood and oxygen aren't delivered to the infant as they should be (15). This study was conducted to assess the incidence, and maternal and neonatal outcomes of vaginal birth after caesarean section.

2. Patients and Methods :

This retrospective cohort study assessed the incidence of vaginal birth after caesarean section at Beni-Suef General Hospital from Jan 1, 2016, till Dec 31, 2017.

2.1. Technical Design

The data presented in this study were obtained from patients' files at Beni-Suef General Hospital (incomplete files were excluded from the data).

2.2. Operational Design

During the preparatory phase, visits to Beni-Suef General Hospital were done to access

medical records and test for the available information. The compilation of useful data was aided by a review of relevant literature and expert comments.

2.3. Administrative Design

The researcher acquired formal authorization to proceed from the hospital's management.

2.4. Data collection

1- Full history taking for each patient:

A- Personal history as name, age, parity, gravidity, occupation, social class, phone number, address, and special habits.

B- Present history as the first day of last menstrual period (LMP), expected delivery date, duration of labor pains, time of rupture of membranes, and duration between CS and current pregnancy.

C- Past history as History of previous CS(s) regarding number, type, and indications, medical disorders or drug intake, history of gynecological and surgical operation or blood transfusion.

D- Family history of any medical disorder.

2- Examinations:

A-General examination (pulse, temperature, blood pressure, chest, and cardiac examination).

B- Abdominal examination (superficial and deep palpation of fundal level, lateral grips, pelvic grips, fetal heart rate, and scar of previous operations).

C- Vaginal examination (state of the cervix, membranes, and presenting part).

3-Investigations:

A- Preoperative hemoglobin level.

B- Ultrasound examination (gestational age, presentation, number of fetuses, fetal heart rate, and placental site).

4- Description of details of vaginal labor: (Catheterization, first stage of labor, episiotomy if needed, intravenous fluids, delivery of the fetus and placenta, hospital stay, etc.).

5-Postpartum vital signs and hemoglobin level.

6-Postpartum complications such as (perineal tear, postpartum hemorrhage, uterine rupture, and urinary tract injury)

7-Apgar score at first and fifth minutes, neonatal weight, and need for NICU admission.

8- Condition of the patients on discharge.

9- Return postpartum visit and contraceptive advice.

3. Results:

This study showed that the total deliveries in 2016 and 2017 were 13768. Regarding caesarean delivery, the rate was 38.24%, while in vaginal delivery, the rate was 61.76% (Table 1)

Table (1): Distribution of delivery according to the type of delivery in 2016 and 2017

Total	Number	Percent
Caesarean delivery	5265	38.24%
Vaginal delivery	8503	61.76 %
Total	13768	100%

The current study demonstrated that 258 cases went for TOLAC, the success of TOLAC was (84.9%). In contrast (15.1%) failed their TOLAC trial. The rate of VBAC was 1.6% of the total deliveries in 2016 and 2017. Failed TOLAC was due to lack of labor progress (32) and fetal distress (7).

2.5. Statistical methodology

SPSS (Statistical Package for the Social Sciences) version 24 was used for data coding and entry. Independent t-test and chi-squared test were employed to compare the two subgroups regarding numeric and nominal variables, respectively. Binary logistic regression analysis was done to assess the exact risk factors in the best-fit model that explains the probability of failed TOLAC. A P-value less than 0.05 was considered significant.

2.6. Ethical consideration

The local IRB of the faculty of Medicine, Beni-Suef University, approved the study protocol with approval number FMBSUREC/03092019/Zahran. All data were anonymous and confidential.

Table (2): Distribution of the sample according to the success of (TOLAC)

	Total (258)	
Successful TOLAC(VBAC)	219	84.9%
Failed TOLAC	39	15.1%
Rate of VBAC	219/13768	1.6%

There was a statistically significantly higher proportion of younger age less than or equal to 20 years (20.5%) and rural residence (61.3%) in failed cases versus (1.3% and 43.4%) in succeeded cases, respectively (P-value<0.05) (Table 3).

Table (3): Comparison between Succeeded TOLAC (VBAC) and failed TOLAC regarding their socio-demographic data

Items		Succeeded cases (n=219)		Failed cases (n=39)		P-value
Age	≤20 years	3	1.34 %	8	20.5%	<0.001*
	21-35 years	169	77.16 %	17	43.6%	
	>35 years	47	21.47%	14	35.9%	
Residence	Urban	124	65.62%	15	38.5%	0.036*
	Rural	95	43.38%	24	61.3%	

**P-value is significant*

There was a statistically significantly higher proportion of preeclampsia (17.9%) and macrosomia (20.5%) as causes of prior CS in failed cases versus (5.9%) and (2.7%) in succeeded cases, respectively (P-value<0.001) (Table 4).

Table (4): Comparison between succeeded TOLAC (VBAC) and failed TOLAC regarding causes of prior CS(s)

causes of prior CS(s)	Succeeded cases (n=219)		Failed cases (n=39)		P-value
Maternal causes (n=102)	102	46.6%	20	51.2%	<0.001*
Oligohydramnios or ROM	63	28.8 %	9	23.1%	
Preeclampsia	13	5.9%	7	17.9%	
Antepartum hemorrhage	7	3.2 %	3	7.7%	
As a doctor's decision (without cause)	19	8.7 %	1	2.6%	
Fetal causes(n=117)	117	53.4%	19	48.8%	
Fetal distress	16	7.3%	0	0%	
Malpresentation	32	14.6 %	2	5.2%	
Twins	8	3.6 %	1	2.6%	
Post date	11	5.1%	6	15.4%	
Decrease in fetal movement	44	20.1%	2	5.2%	
Macrosomic fetus	6	2.7 %	8	20.5%	

**P-value is significant*

This study showed that there was a statistically significantly higher proportion of elective sections (56.4%), lower duration between the last previous CS and current pregnancy (82.1%), and no previous vaginal delivery (79.5%) in failed cases versus (27.9%, 19.6% and 6.5%) in succeeded cases, respectively (P-value<0.05) (Table 5).

Table (5) Comparison between succeeded TOLAC (VBAC) and failed TOLAC regarding the type of previous CS and duration between CS and current pregnancy

Items		Succeeded cases (n=219)		Failed cases (n=39)		P-value
Previous vaginal delivery	No	14	6.5%	31	79.5%	<0.001*
	Yes	203	93.5%	8	20.5%	
Type of previous CS	Elective	61	27.9%	22	56.4%	0.002*
	Emergency	158	72.1%	17	43.6%	
The duration between CS and current pregnancy	1-3 years	43	19.64%	32	82.1%	<0.001*
	3-7 years	114	52.05%	5	12.8%	
	>7 years	62	28.31%	2	5.1%	

**P-value is significant*

This study showed that there was a statistically significantly higher proportion of no ANC follow-up, breech presentation, presence of medical disorders, multiple pregnancies, intact membranes, latent phase of cervical dilatation, and utilization of oxytocin in failed cases than in succeeded cases (Table 6)

Table (6): Comparison between succeeded TOLAC (VBAC) and failed TOLAC regarding ANC follow-up, gestational age, presence of medical disorders, and other risk factors.

Items		Succeeded cases (n=219)		Failed cases (n=39)		P-value
ANC Follow up	Yes	192	87.6%	28	71.8%	0.010*
	No	27	12.4%	11	28.2%	
GA	28-36 wks	25	11.42%	12	30.7%	0.001*
	37-42 wks	194	88.58 %	27	69.3%	
Presence of medical disorder	Yes	17	7.76%	28	71.8%	<0.001*
	No	202	92.23%	11	28.2%	
Presentation	Cephalic	218	99.55%	31	79.5%	<0.001*
	Breech	1	0.45%	8	20.5%	
Number of fetuses	Single	216	98.64%	35	89.7%	0.002*
	Multiple	3	1.36%	4	10.3%	
State of membranes	Ruptured	148	67.6 %	15	38.4%	0.001*
	Intact	71	32.4%	24	61.4%	
Cervical dilatation	Active phase	211	96.34%	6	15.4%	<0.001*
	Latent phase	8	3.66%	33	84.6%	
Oxytocin augmentation	Yes	28	12.8%	22	56.4%	<0.001*
	No	191	87.2%	17	43.6%	

**P-value is significant*

After adjustment of risk factors that may affect the probability of failure (after exclusion of associated independent variables with each other's and non-clinically significant ones as a residence), the best model with the highest adjusted R square was illustrated in table (7). It was demonstrated that after adjustment for age, previous vaginal delivery, rupture membrane, gestational age, presence of medical disorder, and the previous elective section, it was reported that younger age less than or equal to 20 years, ruptured membranes, presence of medical disorders were associated with increased the probability of failure in the studied cases. In contrast, the presence of previous vaginal delivery and gestational age (37-42) were associated with decreased probability of failure. The significant and the non-significant variables were displayed in the forest plot (figure 1).

Table (7) Multivariable binary logistic regression analysis for prediction of the risk factors associated with failure of failed TOLAC

Independent variables	P-value	OR	95% C.I.for OR	
			Lower	Upper
Age				
≤20 years	0.004*	8.391	4.067	92.7
21-35 years	0.288	0.423	0.086	2.071
>35 years	Reference category			
Previous vaginal delivery	<0.001*	0.017	0.004	0.078
Ruptured membrane	0.002*	12.523	2.447	64.098
GA (37-42 wks)	0.022*	0.145	0.028	0.752
Presence of medical disorder	<0.001*	34.493	7.474	59.182
Elective previous CS	0.265	0.426	0.095	1.910
Model summary	Adjusted R ² (Nagelkerke R Square)=0.800 P-value<0.001 DF=7			

OR: odds ratio CI: confidence interval GA: gestational age CS: caesarean section
Df: degree of freedom

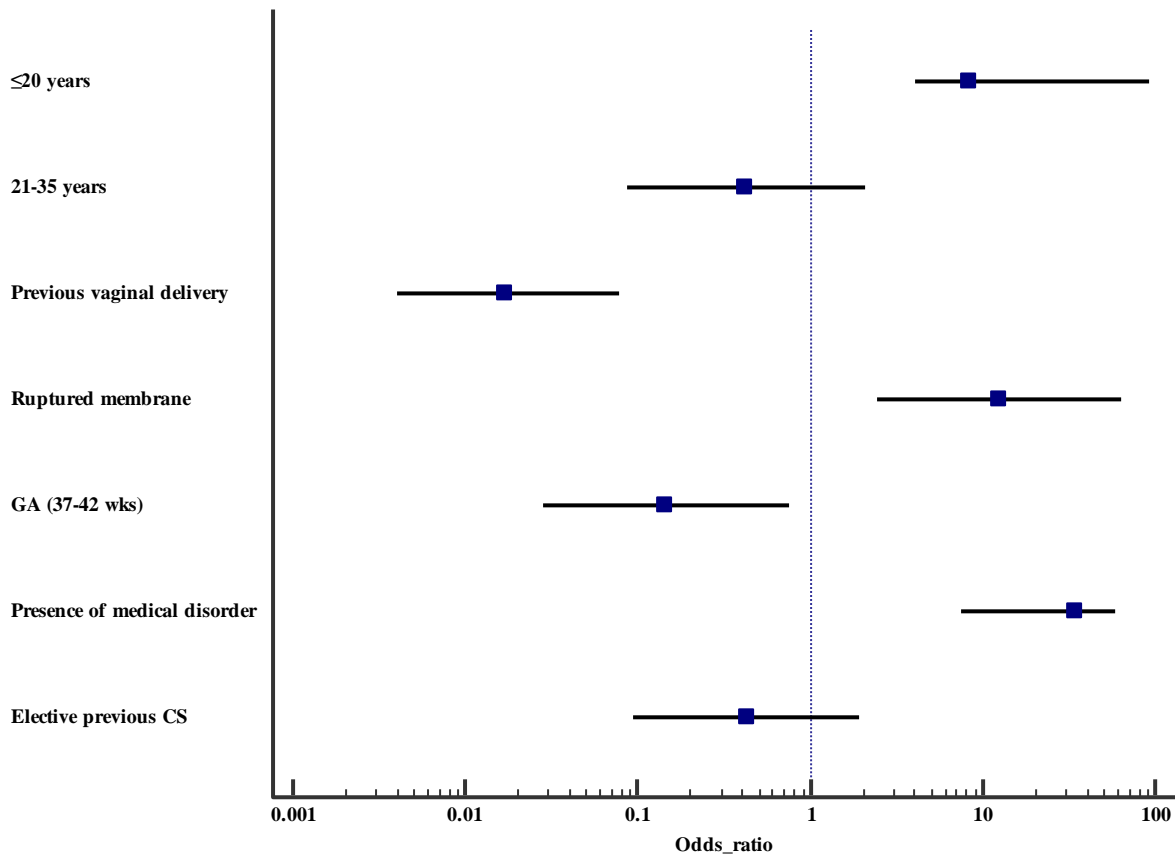


Figure (1) Forest plot indicating the odds ratio of the independent variables affecting the probability of failure TOLAC

Table (8) showed that there was a statistically significantly higher proportion of postpartum hemorrhage and uterine rupture in failed cases than in succeeded cases. The perineal tear was present in 7.8% of succeeded cases (P-value<0.05).

Table (8): Comparison between succeeded TOLAC (VBAC) and failed TOLAC regarding the occurrence of complications

Complications	Succeeded cases (n=219)		Failed cases (n=39)		P-value
No complication	193	88.1%	24	61.5%	0.001*
Perineal tear	17	7.8%	0	0%	
PPH	9	4.1%	4	10.2%	
Uterine rupture	0	0%	2	5.1%	
Urinary tract injury	0	0%	0	0%	
NICU admission	10	4.6%	16	41.0%	<0.001*

**P-value is significant*

Table (9) showed that there was a statistically significant lower fetal heart rate and APGAR score at 1st and 5th minutes in failed cases than in succeeded cases (P-value<0.01).

Table (9) FHR and APGAR score at 1st and 5th minutes in succeeded and failed cases:

Items	Succeeded cases (n=219)		Failed cases (n=39)		P-value
	Mean	SD	Mean	SD	
FHR	136.16	3.5	115.2	5.4	<0.001*
APGAR score in the first minute	8.64	0.7	7.9	1	<0.001*
APGAR score in the fifth minutes	9.44	0.5	9	1.2	<0.001*

**P-value is significant*

4. Discussion:

Worldwide fewer studies are conducted on the effect of counseling on the incidence of VBAC and its benefits and risk. Literature shows a need for counseling mothers about VBAC and its risks and benefits. Therefore, this study aims to examine the effect of counseling on the incidence and maternal and neonatal outcomes of VBAC (16).

The rate of successful VBAC was 1.6% of the total deliveries in 2016 and 2017.

In agreement with our results, **Saadia et al. (2018)** stated that older maternal age and less education have a reduced likelihood of successful TOLAC. (17).

In agreement with our study, Abdulrahman and Ismail wanted to determine the characteristics linked to a successful vaginal birth after CS. Their study included 500 pregnant women with a history of a single lower segment CS were included in the research; 83% (415/500) had a successful vaginal birth

following caesarean section, and 17% (85/500) had a failed trial of labor after caesarean surgery (TOLAC). It was shown that 58% of women who attempted VBAC were previous vaginal births. Pregnant women with consistent prenatal care and waited more than two years between deliveries had a greater incidence of vaginal birth after caesarean. (18).

In the same line as us, Derebe and coworkers wanted to determine what characteristics are related to a successful VBAC. After having one lower uterine transverse caesarean section delivery, their research found that 35.07 percent of women went on to have successful vaginal births. Out of the failed trial of delivery, fetal distress was seen in 38.9% of the delivered babies, followed by failed progress of labor, which was seen in 32.1% of deliveries. They were the main indications for transformation into an emergency caesarean section. Younger maternal age less than or equal to 30 years,

previous successful vaginal delivery after caesarean section, previous vaginal delivery before caesarean section, non-recurrent indication (malpresentation and fetal distress), rupture of membrane, dilatation of cervix for more than or equal 4cm, effacement of the cervix for more than or equal 50%, and low station for more than or equal zero at admission were predictors of successful vaginal delivery after one lower uterine caesarean delivery with transverse section (19).

We agreed with Asgarian and colleagues, who researched VBAC's success rate, associated variables, and potential reasons for failure. According to their findings, VBAC has a very high success rate. VBAC was more successful with fewer problems when there was a considerable time gap between pregnancies and births, namely two to four years. Between 2016 and 2018, researchers in Qom surveyed 150 VBAC hopefuls hospitalized for their pregnancies. Vaginal birth after the caesarean reversal (VBAC) was successful in 85.33 percent of cases, but 14.67 percent of women required a second CS due to vaginal delivery complications. Comparing the successful and unsuccessful groups based on the mean time between the prior CS and the current delivery yielded statistically significant results. ($t_{125} = 2.32, p = 0.002$). Moreover, the findings

indicated that protracted labor and subsequent complications were the leading reasons for VBAC failure [odds ratio was 4.70], full arrest (odds ratio was 2.70), and decline in the fetal heart (odds ratio was 5.31) (20).

We also found that prior vaginal births are strong prognostic predictors of successful VBAC. Trojano and colleagues concurred with us. The success of a VBAC is negatively impacted by maternal obesity and diabetes. (21). We were in the same line with Alkhamis and colleagues who looked at women who had already had one caesarean surgery and tried vaginal birth once the scar healed, as well as women who had already had another caesarean section. Both scheduled and unscheduled c-section deliveries (299 women) were included in this retrospective cohort analysis from a hospital setting. A significant association was established between the etiology of a prior caesarean section and the outcome and between VBAC and spontaneous vaginal births. (22)

We agreed with Oboro et al. that labor inducement and a fetal weight of more than 4,000 grams were risk factors for a failed VBAC (23).

In contrast to us, the study by Adewole and coworkers aimed to evaluate the rate and predictors of successful VBAC after a previous caesarean birth and the maternal and newborn

outcomes of VBAC after a prior caesarean delivery. The significant predictors of successful VBAC were older maternal age of more than 35 years and labor augmentation ($p=0.020$). In contrast, prior vaginal labor ($p=0.108$), parity ($p=0.706$), inter-delivery interval ($p=0.265$), and body mass index (0.240) were not statistically significant **(24)**.

The same as our study, indications for past CS that do not repeat, such as a breech presentation or fetal distress, are linked with a much greater VBAC incidence, according to research by Trojano and colleagues (CPD). There does not seem to be any risk to the mother or baby from attempting a VBAC with a fetus that is larger than average. There is no correlation between a shorter time frame between pregnancies and a lower rate of VBAC success. When the time between attempts rises, the likelihood of success decreases. VBAC is safe and possible even with a twin pregnancy. More than two-thirds of post-dates pregnancies may have a successful VBAC delivery. **(21)**.

We corresponded with Oboro and colleagues, who looked into the causes of VBAC failure and the accompanying morbidity. The effects of VBAC on mothers and their newborns were examined in a cohort study that looked backward. Of the 1,013 women who attempted VBAC, 683 (67.4%) were successful, whereas

330 (32.6%) were not. Having a VBAC attempt fail was linked to an increased risk of complications during labor, including postpartum hemorrhage, chorioamnionitis, uterine rupture, blood transfusion, hysterectomy, and a variety of serious infant illnesses. Increased maternal and newborn morbidity risk has been linked to VBAC failure **(23)**.

Against us, Researchers McWhirter and coworkers sought to distinguish between effective and unsuccessful TOLAC in terms of maternal and newborn outcomes. The percentage of newborns having an Apgar score of 7 or above at 5 minutes was significantly higher in successful TOLAC cases than in cases of failed TOLAC. The number of babies admitted to the neonatal intensive care unit (NICU) was much lower in the failed group than succeeded TOLAC **(25)**.

Adewole and colleagues agreed with us and reported that some morbidities after VBAC as primary postpartum hemorrhage (6.7%) and uterine rupture (3.3%) **(24)**.

Finally, Ugwu and colleagues conducted a prospective observational study to determine maternal and perinatal outcomes of attempted VBAC following one previous CS. There were 2610 births at the center throughout the research period, and 395 mothers had previously had CS.

Non-recurrent signs were present in 370 of the 370 women who had had CS before, and 355 of the 370 pregnant women who had undergone CS before gave permission to participate in the study. However, only around 54% (190/355) were deemed appropriate for a trial of VBAC, and of those, 50% (95/190) were successful. Ninety-five women (50.0%) had failed attempts at VBAC. They were delivered by emergency CS while 35 women (9.8%) had emergency Caesarean section for other obstetric indications (apart from failed VBAC). No cases of uterine rupture or neonatal/maternal fatalities were reported across all study groups. Women who gave birth vaginally showed a higher incidence of low Apgar scores in the first minute than those who gave birth through ERCS ($P=0.03$) (26).

5. Conclusion and Recommendations:

The rate of VBAC was (1.6%) while the rate of CS was (38.23%) of all deliveries in 2016 and 2017. Regarding VBAC precautions, factors that contribute to failure are extreme maternal age groups, history of more than 2 previous caesarean sections, lower duration between the last previous CS and current pregnancy, medical disorders with pregnancy, multiple pregnancies, breech presentation, fetal macrosomia, absence of previous vaginal delivery and prolonged latent phase of cervical dilatation. VBAC

became one of the solutions to avoid the complications of ERCD, such as placental problems. Compared with having another CS, VBAC involved no surgery, shorter hospital stays, and a quicker return to normal daily activities. VBAC is a safe choice for women who only have one prior LSCS, do not have a macrosomic fetus with cephalic presentation, and are in spontaneous labor.

This study recommends that healthcare providers should offer TOLAC to pregnant women with suitable criteria, and clinicians should offer advantages of VBAC to the selected cases to encourage them.

TOLAC should be under the supervision of a well-trained team in well-equipped hospitals and meticulous monitoring for both mother and fetus.

6. Conflicts of interest:

The authors declare that there are no conflicts of interest.

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