Factors associated with the success of trial of vaginal birth after cesarean delivery

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Abstract:

Background: For many years, it was assumed that once a woman had a cesarean section, all future babies would be delivered this way. However, this is not always true women can choose to have a vaginal birth after cesarean section in a future pregnancy, but has different risks after benefits.

Objective of this paper: to study the factors associated with success of vaginal birth in women who had previous cesarean section at Al-khadra hospital

Methods and material: The study was retrospective, case series for three hundreds and seven patients with previous one cesarean section and went for trial of vaginal delivery

Statistical analysis was (SPSS version 22) that used for data entry and analysis.

Results: Among 307 women who had previous one cesarean section, all of the women had trial of vaginal delivery and the result will be presented as following:

1-Mode of delivery The success rate of vaginal delivery trial after one cesarean section was 38.1%. The rest of the women underwent cesarean section (61.9%).

2-Indication of current C/S The most common indication for current cesarean section was dystocia (38.3%) followed by fetal distress (24.7%), cephalopelvic disproportion CPD (16.4%) then postdate (8.2%)..

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3-Age of the patients. The mean age of the participants who had successful vaginal delivery was (35±11.3years)

4-Obstetric history. B- Regarding the parity, 76.1% of the successful VBAC group and 90.2% of the failed VBAC group were between para 1 and para 3,

5-Gestational age. the current study showed that the mean gestational age for the patients who had successful vaginal delivery was 39.19 weeks and the mean gestational age of the patients who had failed vaginal delivery was 38.6 weeks.

6- Factors affecting the delivery. A-The majority of the patients in the both groups presented with cervical dilatation equal or less than 4cm (63.3% of the successful group and 88% of the failed group. B- The relation between previous vaginal delivery and the current mode of delivery was statistically significant (P value 0.0001) .C-The relation between the inter-delivery interval from the last cesarean section and the current delivery was statistically insignificant with p value 0.444.

Conclusion and recommendation: In patients without any contraindication to vaginal delivery, TOLAC is a safe option. In this study, successful VBAC was associated with the age of the patients, the past obstetric history, cervical dilatation, and history of previous vaginal delivery.

Keysword:vaginaldelivery after cs . factors affecting success rate.

■ **ملخص:**

لسنوات عديدة كان من المفترض أنه بمجرد أن تكون المرأة لديها عملية قيصرية سيتم تسليم جميع الأطفال في المستقبل بهذه الطريقة مع ذلك إذا اختارت النساء الولادة المهبلية بعد الولادة القيصرية في المستقبل عادة ما يكون الاختيار منا ولكن له فوائد ومخاطره عديدة وتهدف الدراسة للتعرف على العوامل المرتبطة بنجاح الولادة المهبلية بعد الولادة القيصرية. حيت تم اجراء الدراسة في مستشفيي الخضراء يناير2018حيت تم اختيارثلاثمائة وسبعة الذين تم إجراء الدراسة عليهم وكانت النتائج كالاتي: معدل نجاح الولادة المهبلية بعد الولادة القيصرية38.1 ٪ وكان المؤشر الأكثر شيوعا للولادة القيصرية عسر الولادة 38.3 ٪ تليها الضيق الجنيني24.7 ٪تم إتمام موعد الولادة8.2 ٪ بالاضافة ان متوسط العمر

بالنسبة للمرضى الذين لديهم ولادات ناجحة 35 سنة ومتوسط العمر الجيني كان 39 اسبوعاً والعوامل التي تساعد في نجاح الولادة الطبيعية هي كالاتي اتساع عنق الرحم نسبته63.3 ٪ والمدة التي بعد القيصرية كانت علاقة موجبة .ومن هنا نستنتج أن الولادة الطبيعية يمكن أن تكون آمنة بعد الولادة القيصرية شريطة أن تكون هناك عوامل أخرى متحكمة فيها منها العمر والتاريخ المرضي واتساع عنق الرحم والمدة التي بعد الولادة الأولى.

● **الكلمات المفتاحية:** نجاح الولادة الطبيعية بعد العملية القيصرية.العوامل المساعدة على النجاح

Introduction:

As a result of improvements in obstetric care, it is now relatively safe for an attempt a vaginal birth after Cesarean section (VBAC). VBAC is thus being recommended as a relatively safe way of decreasing the ever rising rate of Cesarean delivery globally, vaginal delivery is associated with fewer risks, requires less anesthesia, poses a lower potential for postpartum morbidity, involves a shorter hospital stay, is more affordable, and encourages earlier and better bonding between mother and infant. These advantages are significant, especially in our resource poor setting where sociocultural aversion to Cesarean delivery is common [1].

Women who have undergone a previous cesarean delivery have the option of proceeding with a trial of labor after cesarean (TOLAC) delivery or planned repeat cesarean delivery (PRCD) in a subsequent pregnancy. Planned TOLAC may result in labor with vaginal birth (VBAC) or unplanned intrapartum cesarean delivery. Decision-making regarding mode of delivery must take into consideration the patient's personal preferences, obstetrical history, scientific data on risks and benefits of TOLAC versus PRCD, and availability of TOLAC in the selected birth setting [2].

Material and Methods

Study design: This study is designed as a descriptive, cross sectional retrospective.

Study setting: The study was conducted in Al-khadra General Hospital, Tripoli/Libya.

Study period: The study was conducted from 1/January 2018 to 31/ December 2018.

Study population: All women who had previous one cesarean section and went for trial of vaginal delivery were that took place at labour word at al- khadra General Hospital during the year 2018 were randomly selected for the study. This retrospective study was carried on 307 patients with previous one cesarean section and went for trial of vaginal delivery. Age ranged from 20 years -51 years.

Inclusion criteria, All women who had previous one cesarean section and went for trial of vaginal delivery.

Exclusion criteria, patients with missing medical notes.

Study collection tool: The data was collected using a structured case sheet filled from patient files and their medical records with previous one cesarean section and went for trial of vaginal delivery. The case sheet was designed to collect data about study participant's age, gravidity, parity, abortion, gestational age, maternal outcome, mode of current delivery, indication of repeated C/S, and neonatal outcome.

Data management: Data was checked for completeness and consistency before data entry format then the completed questionnaire was coded and computerized analysis performed by statistical package for social science (SPSS) software version (22). A comparative analysis of outcome parameters performed.

Statistical analysis: Simple descriptive statistics will be used (mean ± standard deviation for quantitative variables, and frequency with percentage for categorized variables). Statistical test will be used accordingly with a p value < 0.05, will be considered significantly**.**

Data presentation and discussion: The results presented in tables and graphs, important results discussed, and then compared with other similar studies**.**

Conclusion and recommendation: Conclusions based on the study objectives, relevant recommendation will be presented**.**

Ethical and consent: Ethics approval was obtained from official consent taking from the medical stuff and the institute to collect the data and managed after discussing the nature and the importance of this study. Data was collected from patients' medical record, and confidentiality of the information was maintained throughout by excluding names as identification in the study.

Result

Among 307 women who had previous one cesarean section, all of the women had trial of vaginal delivery. Among 307 women who had previous one cesarean section, all of the women had trial of vaginal delivery and the result will be presented as following:

1-Mode of delivery (success rate of the trial). The success rate of vaginal delivery trial after one cesarean section was 38.1%. The rest of the women underwent cesarean section (61.9%).

2-Indication of current C/S (indication of failed trial). The most common indication for current cesarean section was dystocia (38.3%) followed by fetal distress (24.7%), cephalopelvic disproportion CPD (16.4%) then postdate (8.2%). The result also showed that about 7.3% of the patients had C/S due to macrosomia and 5.1% due to tender scar.

3-Age of the patients. The highest percentage of the patients in the both groups (who had successful trial vaginally delivery and who failed the trial and underwent C/S) was between 30 and 39 years old (64.9% for patients who succeed and 48.5% for patients who failed). The mean age of the participants who had successful vaginal delivery was (35±11.3years) and those who failed to have vaginal delivery (31.8±62.5years). The result was statistically significant with p value of 0.047.

4-Obstetric history. A-In respect to gravidity, about 68.3% of the patients who had successful VBAC were between gravida 2 and 4 compared to 85.7 % who had failed VBAC. The result also showed that 28.3% of successful group and 15.2 % of the failed group were between gravida

5 and 7. On the other side, 2.9% of successful group and 3.6% of the failed group had more than 7 pregnancies. The result was statistically significant with p value of 0.0001. B- Regarding the parity, 76.1% of the successful VBAC group and 90.2% of the failed VBAC group were between para 1 and para 3, 21.7% of the successful VBAC group and 7.6% of the failed VBAC group were between para 4 and para 6, 2.2% of both groups were more than para 6. The result was statistically significant with p value of 0.01. C-Regard the abortion, the majority of the patients in both groups had no previous history of abortion (74.1% of the successful group and 70.7% of the failed group). The result was statistically insignificant with p value of 0.478.

5-Gestational age. Regarding the gestational age, the current study showed that the mean gestational age for the patients who had successful vaginal delivery was 39.19 weeks and the mean gestational age of the patients who had failed vaginal delivery was 38.6 weeks. Most of the patients in both groups had term pregnancy (80.4% of the successful group and 78.4% of the failed group). The result was statistically insignificant with p value of 0.635.

6- Factors affecting the delivery. A-The majority of the patients in the both groups presented with cervical dilatation equal or less than 4cm (63.3% of the successful group and 88% of the failed group). The percentage of patients who had cervical dilatation more than 4cm was higher in the successful group (36.7%) than the failed group (12%). The result was statistically significant with p value of 0.0001.

B- The relation between previous vaginal delivery and the current mode of delivery was statistically significant (P value 0.0001). The result showed that 49.6% of the patients who successful vaginal delivery had previous vaginal delivery and about 24.4% of the patients who failed to have vaginal delivery had previous history of vaginal delivery.

C-The relation between the inter-delivery interval from the last cesarean section and the current delivery was statistically insignificant with p value 0.444. about 56.4% of the successful group and 60.5% of the

failed group had interval below 2 years. About 43.6% of the successful group and 39.5% of the failed group had interval more than 2 years.

7-Neonatal outcome. A- Regarding the gender of the neonate, the percentage of males was higher in the failed group (54.3%) than in the success group (45.3%) while the percentage of females was higher in the success group (547%) than the failed group (45.7%). The result was statistically p value 0.316. B-With regard the birth weight, most of the neonates in both groups had average birth weight (80.4% of the success group and 87.9% of the failed group). The percentage of low birth weight (LBW) was as following; 9.4% of the success group and 2.3% of the failed group. On the other hand, the percentage of macrosomia (birth weight is above 4.5kg) was 10.2% for the success group and 9.8% of the failed group. P value 0.737.

Mode of delivery:

In respect to the mode of delivery, the success rate of vaginal delivery after one cesarean section was 38.1%. The rest of the women underwent cesarean section (61.9%).

Table 1: Distribution mode of delivery among the patients

Mode of delivery	(Frequency (Percentage
Vaginal delivery	**(38.1%) 117**
C/S delivery	**(% 61.9) 190**
Total	**(100%) 307**

Indications of cesarean section in the current pregnancy:

The result of the present study reported that the most common indication for current cesarean section was dystocia (38.3%) followed by fetal distress (24.7%), cephalopelvic disproportion CPD (16.4%) then postdate (8.2%). The result also showed that about 7.3% of the patients had C/S due to macrosomia

and 5.1% due to tender scar.

Table 2: Indications of cesarean section in the current pregnancy

The current C/S Indication	Frequency (Percentage)
Cervical dystocia	74 (38.3%)
Fetal distress	49 (24.7%)
Undiagnosed CPD	26 (16.4%)
Postdate	16 (8.2%)
Macrosomia	14 (7.3%)
Tender scar	11 (5.1%)
Total	190 (100%)

The distribution of mode of delivery among the patients by the age

The highest percentage of the patients in the both groups (who had successful trial vaginally delivery and who failed the trial and underwent C/S) was between 30 and 40 years old (64.9% for patients who succeed and 48.5% for patients who failed). The mean age of the participants who had successful vaginal delivery was (35±11.3years) and those who failed to have vaginal delivery (31.8±62.5years). The result was statistically significant with p value of 0.047.

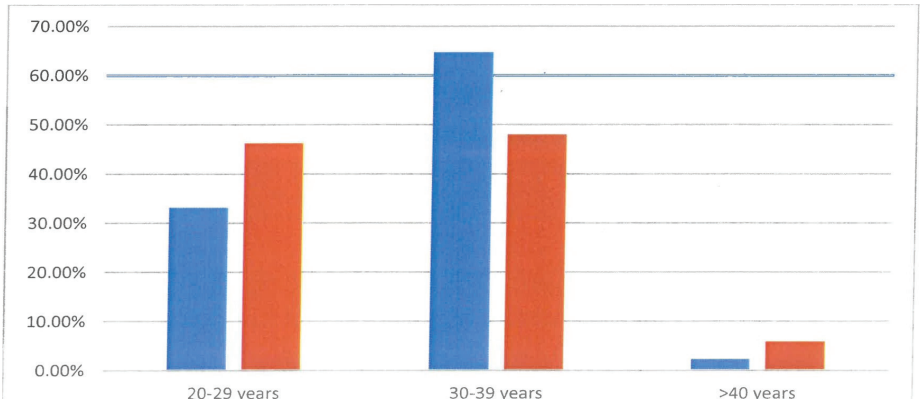

Figure 1: Distribution of the mode of delivery by the age

Distribution of the mode of delivery by the parity

Regarding the parity, the result showed the following; 76.1% of the successful VBAC group and 90.2% of the failed VBAC group were between para 1 and para 3, 21.7% of the successful VBAC group and 7.6% of the failed VBAC group were between para 4 and para 6, 2.2% of both groups were more than para 6. The result was statistically significant with p value of 0.01.

Table 3: Distribution of the mode of delivery by the parity

Parity of the patients	VaginalC	/S Delivery
P1 – P3	(90.2%) 171	(76.1%) 89
P4 – P6	(7.6%) 14	(21.7%) 25
P6<	(2.2%) 5	(2.2%) 3
Total	(100%) 190	(100%) 117

Distribution of the mode of delivery by the gestational age

Regarding the gestational age, the current study showed that the mean gestational age for the patients who had successful vaginal delivery was 39.19 weeks and the mean gestational age of the patients who had failed vaginal delivery was 38.6 weeks. Most of the patients in both groups had term pregnancy (80.4% of the successful group and 78.4% of the failed group). The result was statistically insignificant with p value of 0.635.

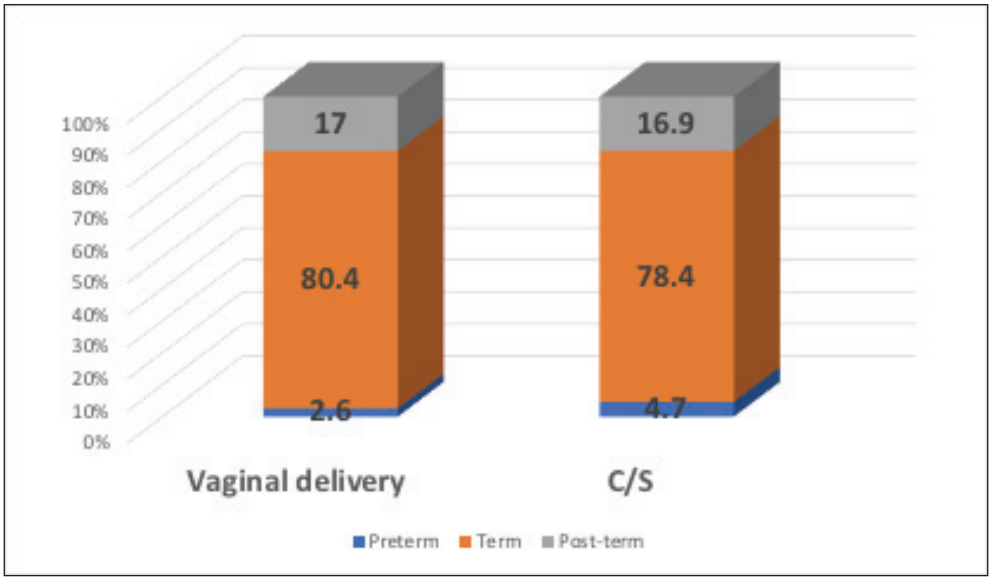

Figure 2: Distribution of the mode of delivery by the gestational age

Distribution of the mode of delivery by the cervical dilatation progression

The majority of the patients in the both groups presented with cervical dilatation equal or less than 4cm (63.3% of the successful group and 88% of the failed group). The percentage of patients who had cervical dilatation more than 4cm was higher in the successful group (36.7%) than the failed group (12%). The result was statistically significant with p value of 0.0001.

Table 4: Distribution of the mode of delivery by cervical dilatation progression

Cervical dilatation	Vaginal delivery	C/S delivery
4cm or Less	74 (63.3%)	167 (88%)
More than 4cm	43 (36.7%)	23 (12%)
Total	117 (100%)	190 (100%)

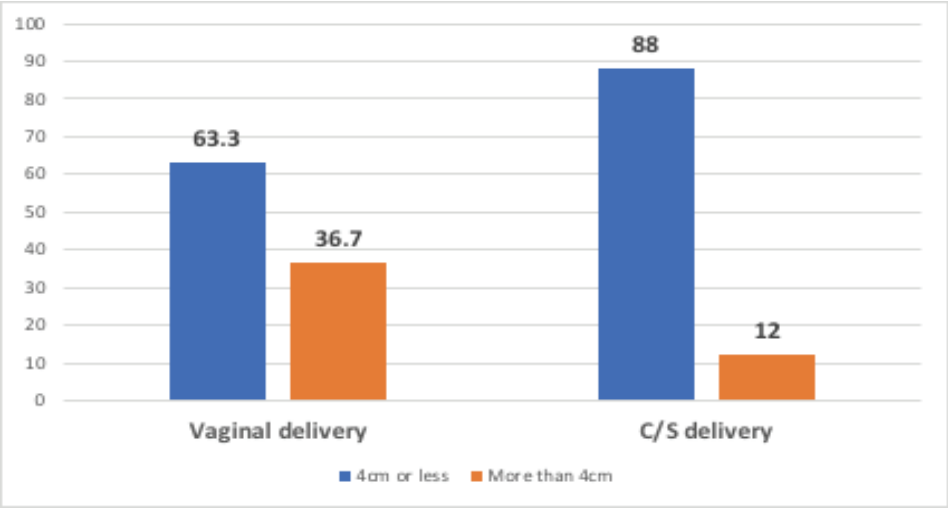

Figure 3: Distribution of the mode of delivery by the progression of cervical dilatation

The relation between H/O previous vaginal delivery and current mode of delivery:

The relation between previous vaginal delivery and the current mode of delivery was statistically significant (P value 0.0001). The result showed that 49.6% of the patients who successful vaginal delivery had previous vaginal delivery and about 24.4% of the patients who failed to have vaginal delivery had previous history of vaginal delivery.

Table 5: The Relation between previous vaginal delivery and current mode of delivery

Previous Vaginal delivery	Vaginal delivery	C/S delivery
Yes	58 (49.6%)	47 (24.4%)
No	59 (50.4%)	143 (75.6%)
Total	117 (100%)	190 (100%)

The relation between the delivery interval between last cesarean section and the current delivery

The relation was statistically insignificant with p value 0.444. about 56.4% of the successful group and 60.5% of the failed group had interval below 2

years. About 43.6% of the successful group and 39.5% of the failed group had interval more than 2 years.

Table 6: The distribution of inter-delivery interval

Inter-delivery interval	Vaginal delivery	C/S
Two years or Less	66 (56.4%)	115 (60.5%)
More than 2 years	51 (43.6%)	75 (39.5%)
Total	117 (100%)	190 (100%)

Gender of the neonate:

Regarding the gender of the neonate, the percentage of males was higher in the failed group (54.3%) than in the success group (45.3%) while the percentage of females was higher in the success group (547%) than the failed group (45.7%). The result was statistically p value 0.316.

Table 7: Distribution gender of the baby

Gender of the baby	Vaginal delivery	C/S delivery
Male	53 (45.3%)	103 (54.3%)
Female	64 (54.7%)	87 (45.7%)
Total	117 (100%)	190 (100%)

Birth weight of the neonates:

With regard the birth weight, most of the neonates in both groups had average birth weight (80.4% of the success group and 87.9% of the failed group). The percentage of low birth weight (LBW) was as following; 9.4% of the success group and 2.3% of the failed group. On the other hand, the percentage of macrosomia (birth weight is above 4.5kg) was 10.2% for the success group and 9.8% of the failed group. P value 0.737.

Table 8: Birth weight of the neonates

Birth weight	Vaginal delivery	C/S delivery
1.5kg-3kg	11 (9.4%)	4 (2.3%)
3kg-4.5kg	94 (80.4%)	164 (87.9%)
>4.5kg	12 (10.2%)	22 (9.8%)
Total	117 (100%)	190 (100%)

Discussion:

There is a widespread public and professional concern about the increasing proportion of births by caesarean section world-wide. Increasing rates of primary caesarean section have led to an increased proportion of the obstetric population who have a history of prior caesarean delivery. Pregnant women with a prior section may be offered either a trial for VBAC or an Elective Repeat Caesarean Section (ERCS). The proportion of women who decline VBAC, is in tum, a significant determinant of overall rates of caesarean birth. New evidence is emerging to indicate that VBAC may not be as safe as originally thought. But reports are conflicting and these factors along with medico-legal concerns have led to a decline in clinicians offering and women accepting trial for VBAC in various parts of the world [(3)].

This study was conducted with the main objective of identifying factors associated with successful vaginal delivery on mothers offered trial of labour after previous lower segment caesarean section. Significant Determinants found were history of abortion, history of successful VBAC, past indication of past C/S, cervical dilatation at admission. In maternal age, gestational age, medical illness, inter delivery interval, and birth weight.

In comparison to the result of the current study (which showed that the success rate of vaginal delivery after cesarean section was 38.1% a previous study in Libya reported that the success rate of vaginal delivery after cesarean section was 50.9% which is higher than the current study [(4)]. Similar result

was reported by Rahman R study in which the rate of success of vaginal delivery after cesarean section was 32.1% [5]. Many previous study reported success rates ranging from 60% to 80% [6,7].

Regarding the age, the current study showed that patients who had successful vaginal delivery have mean age (35±11.3years) higher than those who failed to have vaginal delivery (31.8±62.5years) and the result was statistically significant. Increased age decreases the likelihood of VBAC. Women with advanced age were more likely to fail to VBAC, which was also supported by Eden et al [8,9]. Age ≥ 40 years-old was also a risk for uterine rupture when women undertook TOLAC. So, younger women, especially those < 35-years-old, are more likely to have a successful and safe VBAC [10]. Similar result was reported in a study in India in which the age of the patients who had successful vaginal delivery is higher than those who failed to have vaginal delivery. in contrary the study of Senturk M showed that the mean age of the patients who had successful vaginal delivery was lower than those who failed to have vaginal delivery [11, 12, 13]. In respect to gravidity, about 68.3% of the patients who had successful VBAC were between gravida 2 and 4 compared to 85.7 % who had failed VBAC. The result also showed that 28.3% of successful group and 15.2 % of the failed group were between gravida 5 and 7. On the other side, 2.9% of successful group and 3.6% of the failed group had more than 7 pregnancies. The mean gravidity and the mean parity of the patients who had successful vaginal delivery were higher than patients who had failed vaginal delivery. This was in agreement with Senturk M study which reported that the mean gravidity and parity for patients who had successful vaginal delivery (4.8 and 3.5) was higher than patients who had failed vaginal delivery (3.8 and 2.4) the result was statistically significant for the gravidity and parity [14, 15].

In respect to the gestational age, the current study showed that the mean age for the patients who had successful vaginal delivery was higher than the patients who had failed vaginal delivery. The study also showed that it was statistically significant. This was in agreement with Senturk M study which reported that the mean gestational age for patients who had successful vaginal delivery was higher than the patients who had failed vaginal delivery [16, 17].

The result of Gadmour Y was in disagreement with the current study in which the mean gestational age of the patients who had successful vaginal delivery was 38.5 weeks while the mean age of patients who had failed vaginal delivery was 39.2 weeks [18].

The study showed that woman who had successful vaginal delivery had higher cervical dilatation than those who failed to have vaginal delivery. This was in agreement with many studies such as Senturk M and Gadmour Y studies in which they showed that the likelihood of VBAC increased significantly with each centimeter increase in cervical dilation [19,20].

In this study previous history of vaginal delivery was a significant factor that associated with increase the rate of success of the trial. Other studies reported that women who had previous vaginal delivery had the highest success rate [21, 22].

Another factor that affect the success rate was the cesarean section interval. The study showed that the longer the interval the higher the success rate. Studies showed similar result which agreed that increasing in the delivery interval will [23] increase the success of vaginal delivery after cesarean section. on the contrary the study of Emile N showed that increase in the interval more than 2 years is associated with higher rate of failure to have vaginal delivery [24].

With regard the fetal factors, the current study showed no significant factor that affect the success rate of the vaginal delivery after the cesarean section. Most of the studies showed the same result in which there was no correlation between fetal factors and the success of VBAC .

Conclusion and Recommendations:

In conclusion. In patients without any contraindication to vaginal delivery, TOLAC is a safe option. In this study, successful VBAC was associated with the age of the patients, the past obstetric history, cervical dilatation, and history of previous vaginal delivery. A large number of patients declined a trial for VBAC inspite of being eligible for it. Hence, it is essential to counsel patients with a history of prior LSCS, ideally during the antenatal period,

regarding the benefits and the risks (both maternal and perinatal) of a VBAC, enabling them to make an informed choice early and probably bring down the repeat caesarean rate.

It is possible to prepare a decision tool on the success of VBAC by taking important past and present obstetric and reproductive performance history as predictor.

The purpose of this study was to identify maternal and fetal determinants of successful VBAC in teaching hospitals which make a great help for physicians in the joint physician-patient decision while offering TOL.

VBAC is a safe practice as long as it is offered with proper selection of candidates with factors having a high success rate. Physicians need to be based on knowledge of factors having good outcome before counseling mothers so that failure rates decrease.

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