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Frequency of Vaginal Birth after C-Section and Factors Associated with Successful Trial of Vaginal Birth after C-Section

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ABSTRACT

A repeat cesarean section is often a more favorable and comfortable option for women who have previously undergone a cesarean section. **Objective:** To determine the prevalence and the maternal and obstetric factors influencing the likelihood of a successful vaginal birth after cesarean (VBAC) among women attempting a trial of labor. **Methods:** This descriptive case series was conducted at the Gynecology Unit 3 of Sir Ganga Ram Hospital, Lahore, from August 2023 to February 2024. A total of 158 women with a history of one prior lower-segment cesarean section were enrolled through a non-probability sampling technique. Labor progression was monitored using the WHO labor guide, which guided the decision for either a repeat cesarean section or a vaginal birth. Data on factors associated with a successful VBAC were collected and analyzed by comparing their frequency between successful and unsuccessful cases. **Results:** Among the women undergoing a trial of labor, 115 (72.78%) achieved a successful vaginal delivery. When comparing maternal and obstetric factors between successful and unsuccessful groups, the following differences were observed: maternal age below 30 years (55.65% vs. 39.53%), gestational age under 40 weeks (59.13% vs. 48.84%), BMI less than 25 kg/m^2 (57.39% vs. 30.23%), and an inter-delivery interval exceeding two years (80.0% vs. 60.47%). **Conclusions:** This study found that the success rate of vaginal delivery in women with a prior cesarean section undergoing a trial of labor was 72.78%. Several maternal and obstetric factors were associated with an increased likelihood of successful VBAC.

INTRODUCTION

The incidence of caesarean-section is different in the different region of the world. In most of the states, it is above the WHO recommended rate. World Health Organization suggests the caesarean-section rate of 15% or less. In order to decrease the surge in caesarean-section rates, one has to undergo the vaginal birth after cesarean-section technique [1]. During past, it was believed that the patients who have once undergone cesarean-section will always have cesarean-section in future deliveries. This previous old concept is totally changed now due to highly expert staff and advance facilities that a patient can have successful vaginal birth after her first cesarean after fulfilling selected criteria [2]. Many studies conducted in past years to show the success of (VBAC) vaginal birth after cesarean section. The vaginal delivery after caesarean-section was 84% and independent association of gestational age, estimated birth weight, previous vaginal birth, body mass index, cervix bishop score etc. with vaginal birth after cesarean section. [3]. According to WHO experts, there is 10-15% surge in caesarean- section cases

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in many countries of the world. The main factor of increase in caesarean section is pointed out to be repeat caesarean-section in a patient [4, 5]. Cervical dilatation, fetal head station, and premature rupture of membrane, are factors leading to successful vaginal birth after C-section (VBAC) [6]. 72.13% women were successful for trial of labor (vaginal delivery) after caesarean-section [7]. In addition to above mentioned life threats, the repeated caesarean-section further cause various extremely dangerous health hazards like infection, bladder injury and placenta accrete [8]. When vaginal delivery is compared with caesarean section, there is 5-10 times increase in health issues of patients in later case [9]. Vaginal birth after caesarean section is the only option to avoid health hazards associated with repeated caesarean section [10]. Complications of (VBAC)vaginal birth after cesarean section include ruptured uterus, postpartum hemorrhage, and neonatal and maternal morbidity and mortality [11]. Health care experts should know the merits and demerits of (VBAC) vaginal birth after caesarean section.so that they are able to guide patients properly and manage them accordingly to achieve successful vaginal birth after caesarean section [12]. In order for medical professionals to better assist patients in having a successful vaginal birth following a caesarean section, my study aims to determine the prevalence and related factors (obstetric and maternal) that contribute to successful vaginal birth with prior one caesarean section undergoing trial off labor in the local population. Health care professionals should be aware of the benefits and drawbacks of vaginal delivery following cesarean section in order to effectively guide and manage patients in order to have a successful vaginal birth following cesarean procedure.

Although vaginal birth after cesarean section (VBAC) is considered a safe and effective strategy to reduce repeat cesarean deliveries, limited local evidence is available regarding its success rate and the maternal and obstetric factors influencing successful trial of labor after cesarean (TOLAC) in Pakistani women. Rising cesarean section rates continue to increase maternal morbidity and healthcare burden, while uncertainty regarding predictors of successful VBAC affects clinical decision-making. Therefore, this study aimed to determine the frequency of successful VBAC and identify the maternal and obstetric factors associated with successful vaginal delivery among women with one previous cesarean section undergoing trial of labor.

METHODS

This study was a descriptive case series, conducted in Gynaecology Unit 3, Sir Ganga Ram hospital, I Lahore from August 02, 2023 till Feb 01,2024 by non-probability consecutive technique. The study received ethical clearance from the ethical review board of the college (Ref No: CPSP/REU/OBG-2020-059-10155). After taking written informed consent, details about age, co-morbidities, gestational age were taken from the patient. A total of 158 females were estimated using the expected proportion of vagina delivery after Cesarian section is equal to 72.1% with 95% confidence level and 7% margin of error was used. Pregnant patients with a singleton pregnancy at 37 weeks of gestation with vertex presentation, an acceptable pelvis with cervical dilatation, and an interest to go through a scar trial were included in the study, as were women who had one lower segment cesarean section for a non-recurrent reason, while females with history of medical disorders, with previous classical cesarian section , previous myomectomy , intrauterine growth , fetal distress and estimated fetal rate >3.5 kg were excluded from study. Information regarding BMI and inter-delivery interval was taken from antenatal cards. Information regarding previous caesarean section indication and scar was taken from previous caesarean section notes. Clinical examination was performed and cervical dilatation, fetal head station, and premature rupture of membrane, were assessed and noted. Fetal weight, fetal lie, and fetal presentation were assessed during ultrasound. A decision regarding an additional a cesarean or a vaginal delivery following a C-section was made based on the patient's observation during labor utilizing the WHO labor guide. The information on the elements that led to a successful VBAC was then collected, and the frequency of these elements in the successful and unsuccessful groups was compared. To reduce bias, the researcher gathered all of the data herself, and the inclusion/exclusion criteria were closely adhered to. SPSS version 26.0 was utilized for statistical analysis of the data. Mean and standard deviation (±SD) was calculated for numerical variables i.e., age, BMI, gestational age, inter-delivery interval, fetal weight, total duration of active stage of labour. Frequency and percentage were calculated for categorical variables i.e., successful vaginal delivery, cervical dilatation ≥4cm, fetal head station at or below -2, BMI <25 kg/m^2, GA <40 weeks, interdelivery interval >2 years, fetal weight 3-3.5 kg, labour 6-7 hours and premature rupture of membranes on admission. Chi-square test was used to compare the factors between the groups (vaginal delivery vs c-section).

RESULTS

The age range in this study was 18 to 40 years old, with a mean age of 28.54 ± 4.52 years.The majority of the cases, 81 (71.27%), involved people under 30.A mean of 39.42 ± 1.74 weeks was the gestational age.A mean BMI of 24.77 ± 4.76 kg/m^2 was recorded.The average time between deliveries was 3.14 ± 1.23 years.At admission, the average cervical dilatation was 5.21 ± 1.89 cm. Fetal weight was 3.19 ± 0.87 kg on average.The average labor lasted 6.22 ± 1.78 hours.Table I displays the average number of patients incorporating extra factors that contribute to confusion.

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Table 1: Demographic and Clinical Profile of Subjects (n=158)

Variables		Category	Frequency (%)
Age	28.54 ± 4.52 Years	≤30 years	81 (51.27)
		>30 years	77 (48.73)
Gestational Age (Weeks)		<40 weeks	89 (56.33)
		≥40 weeks	69 (43.67)
BMI (Kg/m^2)		<25 kg/m^2	79 (50.0)
		≥25 kg/m^2	79 (50.0)
Inter-Delivery Interval		≤2 years	40 (25.32)
		>2 years	118 (74.68)
Cervical Dilation On Admission		≤4 cm	49 (31.01)
		>4 cm	109 (68.99)
Fetal Head Station on Presentation		≤-2 station	30 (18.99)
		>-2 station	128 (81.01)
PROM		Yes	71 (44.94)
		No	87 (55.06)
Fetal Weight (Kg)		<3 kg	128 (81.01)
		3.0-3.5 kg	30 (18.99)
Duration of Labour (Hours)		≤7 hours	110 (69.62)
		>7 hours	48 (30.38)

In my study, frequency of successful vaginal delivery among women with a previous caesarean section undergoing trial of labour was found in 115 (72.78%) patients as shown in Figure 1.

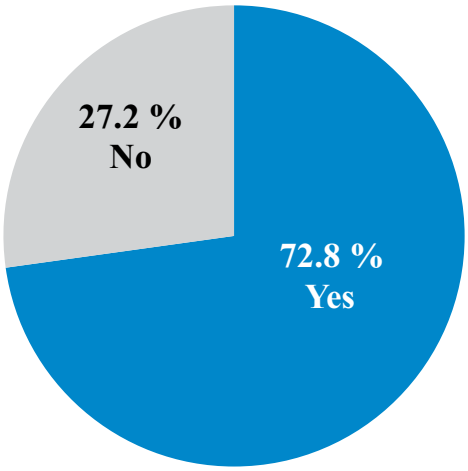

Figure 1: Frequency of successful vaginal delivery among women with a previous caesarean section undergoing trial of labour (n=158)

Comparison of the frequency of maternal and obstetric parameters linked with the better vaginal delivery among successful and unsuccessful groups were as follows; age <30 years in 55.65% vs 39.53%, gestational age <40 weeks in 59.13% vs 48.84%, BMI <25 kg/m^2 in 57.39% vs 30.23%, inter-delivery interval >2 years in 80.0% vs 60.47%, cervical dilatation ≥4 cm in 72.17% vs 60.47%, fetal head station ≤-2 in 15.65% vs 27.91%, PROM in 38.26% vs 62.79%, Fetal weight 3-3.5 kg in 90.43% vs 55.81% and duration of labour ≤7 hours in 70.43% vs 67.44% respectively (Table 2).

Table 2: Comparison of the prevalence of obstetric and maternal traits correlated with positive and negative vaginal deliveries

Variables	Category	Successful Frequency (%)	Unsuccessful Frequency (%)	p-Value
Age <30 Years	Yes	64 (55.65%)	17 (39.53%)	0.071
	No	51 (44.35%)	26 (60.47%)	
Gestational Age <40 Weeks	Yes	68 (59.13%)	21 (48.84%)	0.246
	No	47 (40.87%)	22 (51.16%)	
BMI <25 Kg/m^2	Yes	66 (57.39%)	13 (30.23%)	0.002
	No	49 (42.61%)	30 (69.77%)	
Inter-delivery interval >2 Years	Yes	92 (80.0%)	26 (60.47%)	0.012
	No	23 (20.0%)	17 (39.53%)	
Cervical Dilation ≥4 cm	Yes	83 (72.17%)	26 (60.47%)	0.157
	No	32 (27.83%)	17 (39.53%)	
Fetal Head station ≤ -2	Yes	18 (15.65%)	12 (27.91%)	0.081
	No	97 (84.35%)	31 (72.09%)	
PROM	Yes	44 (38.26%)	27 (62.79%)	0.006
	No	71 (61.74%)	16 (37.21%)	
Fetal Weight 3.0-3.5 Kg	Yes	11 (9.57%)	19 (44.19%)	0.0001
	No	104 (90.43%)	24 (55.81%)	
Duration of Labor >7 Hours	Yes	34 (29.57%)	14 (32.56%)	0.716
	No	81 (70.43%)	29 (67.44%)	
	Total	115 (72.8%)	43 (27.2%)	-

DISCUSSION

The most frequent and main reason for a repeat vaginal delivery is a prior one. Reduction in cesarean section rate can be obtained by giving trial of labour in such patients [13]. For this purpose, we have to follow certain practical guidelines made by local national medical associations, but there is disparity among different countries.Keeping in mind, VBAC is considered relatively successful and safe as compared to repeat cesarean section.But in recent era, reduction in TOLAC rates have been observed throughout world [14, 15].Trial of labour when given to a patient with previous cesarean section, provides a last opportunity to go through normal vaginal labour process [16]. However, repeat cesarean section has less complications, but if VBAC is failed, it will end up with increased chances of maternal and perinatal morbidity. If we want to enhance the success of VBAC, then we have to carefully and accurately select the patients opting for choice of trial of labour. [17]. In addition to it, if we discuss and communicate with patient regarding success of VBAC and get their opinions, it will help us. In this study, 115 (72.78%) of the women who had previously undergone a caesarean section and were undertaking a trial of labor had a successful delivery via the vaginal canal. Comparison of the frequency of maternal and obstetric characteristics related with success of vaginal delivery among successful and unsuccessful groups were as follows; age <30 years in 55.65% vs 39.53%, gestational age <40 weeks in 59.13% vs 48.84%, BMI <35 kg/m^2 in 57.39% vs 30.23%, inter-delivery interval >2 years in 80.0% vs 60.47%, cervical dilatation ≥4 cm in 72.17% vs

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60.47%, fetal head station ≤-2 in 15.65% vs 27.91%, PROM in 38.26% vs 62.79%, Fetal weight 3-3.5 kg in 90.43% vs 55.81% and duration of labour ≤7 hours in 70.43% vs 67.44% respectively. In a study conducted by Tesfahun *et al.*, 2023, the vaginal delivery after caesarean-section was 84% [18]. According to WHO experts, there is 10-15% surge in caesarean-section cases in many countries of the world. The main factor of increase in the caesarean section has been pointed out to be a repeat caesarean-section in a patient [19]. As well as maternal wish for caesarean-section is known to be another leading factor of increase in caesarean-section rate. A study conducted by Zhang *et al.*, 2021, 122 women were entered in study, out of which 72.13% (88) women were successful for trial of labour (vaginal delivery) after caesarean-section [20].They discovered that characteristics linked to a successful trial of vaginal delivery following caesarean section included mother age 26.8 ± 4.28, body mass index ≤ 25 kg, trimester age ≤ forty weeks of pregnancy, and inter-delivery duration < 2 years (P<0.000). A study by Majzoobi MM *et al.*, 2014, reported trial of labour in 65% patients but successful vaginal birth in 35% women and Memon S *et al.*, 2023, associates in 83.5% of cases. Brattele and associates reported success in 65.6% [21, 22]. Another study reported by Soh *et al.*, 2020, observed the percentage of (VBAC) that how many pregnant women delivered vaginally who have previously delivered baby by Caesarean section. 74% of pregnant women delivered through vaginal route successfully who delivered baby previously by cesarean section, and no significant maternal and mortality identified in these cases. Most patients who have had a Caesarean delivery in the past can safely and successfully give birth through the vagina. There are certain factors which are related with success of VBAC. If patients have previous vaginal delivery before cesarean section, normal range body mass index before pregnancy, young maternal age, non-recurring indication or cesarean section, chances of success are more [23]. There are certain parameters which are important during labor, like spontaneous onset of labor, favorable bishop score, amniotic membrane and cervical status, station of fetal head and weight of baby, much play crucial role in success of vaginal birth after cesarean section [24].

This study was limited by its single-center design, relatively small sample size, and use of non-probability sampling, which may reduce the generalizability of the findings. In addition, neonatal outcomes, long-term maternal complications, and patient satisfaction were not assessed. Future multicenter studies with larger and more diverse populations are recommended to validate these findings and develop predictive models for successful VBAC. Further research should also evaluate maternal and neonatal safety outcomes to improve counseling and clinical management of women undergoing TOLAC.

CONCLUSIONS

This study found that the following common factors are associated with effective vaginal delivery of babies after cesarean section: age <30 years, BMI <25 kg/m^2, inter-delivery interval >2 years, cervical dilatation ≥4 cm, PROM, and fetal weight 3-3.5 kg. The frequency of a positive the genital tract delivery among women with a previous caesarean section undergoing trial of labor was 72.78%. So, we recommend that all these factors should be taken into consideration before any women undergoing TOLAC for a better future outcome in every aspect to reduce adverse maternal outcome.For this purpose, we have to follow certain practical guidelines made by local national medical associations.If we want to enhance the success of VBAC, then we have to carefully and accurately select the patients opting for choice of trial of labour.

Authors' Contribution

Conceptualization: MJ, FJ
Methodology: QM, IZ
Formal analysis: SZS, AZ
Writing and Drafting: SZS, AZ
Review and Editing: SZS, AZ, MJ, FJ

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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