**ORIGINAL ARTICLE**

# Relationship of BMI to Success of Vaginal Delivery in Women Attempting Trial of Labour after Cesarean Delivery

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## ABSTRACT

**Background:** The cesarean section rate is on a rise in industrialized countries with rates in the United States reachinga level of 32.3% in 2008,highest ever in history. To reduce the rate of cesarean delivery, most pregnant women with a single previous low transverse cesarean delivery be counselled about VBAC and be offered a trial of labor in lines with recommendations of American College of Obstetricians and Gynaecologists(ACOG). Obesity increases the likelihood of cesarean delivery in all circumstances, so for all the more reason it contributes towards failed VBAC.

**Aim:** To determine frequency of successful VBAC based on BMI in patients with bishop score 5 or above.

**Study design & duration:** Descriptive case series, Six months from 26th April 2012 to 25th October 2012

**Study setting**: Department of Obstetrics and Gynecology Benazir Bhutto Hospital, Rawalpindi.

**Results:** Accordingly to BMI distribution of the patients; Group A (BMI<19.8) with total number of patients 35, reveals mean and sd 19.6±0.243 with success rate of VBAC 91.43%. In Group B (BMI 19.8-26) with total number of patients 40, reveals mean and sd 22.48±1.96 with success rate of VBAC 87.5%. Group C (BMI 26.1-29) with total number of patients 30, reveals mean and sd 27.25±0.882 with success rate of VBAC 80.0%.Group D (BMI>29) with total number of patients 30, reveals mean and sd 29.84±0.4014 with success rate of VBAC 80.0%. P value was 0.05 which is statistically significant.

**Conclusion:** In view of the results of the study it is concluded that ascompared to international statics, relatively high success rates of VBACobtained even with high BMI.

**Key words:** Maternal obesity, BMI, VBAC

## INTRODUCTION

The increasing cesarean section rate is on a constant rise in industrialized countries with rates in the United States reaching a level of 32.3% in 2008[1]highest level ever.In Japan; the rate was 19.8-34.1% around the same time[2,3].
VBAC is the best choice to reduce overall cesarean rate. According to ACOG guideline VBAC should be attempted in institutions where emergency services[4] are available round the clock.

Major contributing factors for rise in the total CD rate is rise in the rate of primary CD and fall in the rate of vaginal birth after cesarean delivery (VBAC) to 8.5% in 2006 (from a maximum of 31% in 1998)[5]. In an attempt to lower the rate of CD and its complications, ACOG recommended that most pregnant women with a single previous low transverse CDshould beoffered a trial of labor (TOL) after proper couselling[6].

Pregnant women with a previous section may be delivered through either planned VBAC or ERCS. Number of women who opt for ERCS contribute to increased overall rates of caesarean birth[7,8].Previous VBAC is associated withsuccess rate ofapproximately 87–90% ,while induced labour, no previous vaginal birth, BMI>than 30, previous caesarean section for dystocia are associated with failure of VBAC. With all these factors present, only 40% of cases achieve VBAC [9].

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The ability to predict women with high probability of successful vaginal delivery based on prognostic factors would help guide clinicians in making good clinical decision[2]. Trail of scar after one LSCS should be encouraged with strict monitoring provided no contra-indication exists[10]. Research suggests that overweight women or obesewomen are at a greater risk of undergoing CS with all its associated complications regardless of past obstetric history[11].

There is a significant linear association between pre-pregnancy maternal obesity and risk of cesarean deliveries in pregnancies at term[4]. Obese patients with prior cesarean section have a lower rate of vaginal delivery than non obese patients with prior c-section (23.6% vs 43.8 %; P< 0.01)[12].

Excessive weight gain during pregnancy and obesity both decreases success of VBAC, success rates for underweight, normal weight, overweight and obese patients were 83%, 80%, 69% and 68% respectively in an international study[13]. But in our experience results are different with relatively high success rates observed even with high BMI compared to above stated study. To best of our knowledge, local statistics of said study are not available, hence this study will surely help gynecologists in better decision making of trial of VBAC.

The objective of the study is to determine frequency of successful VBAC based on BMI in patients with bishop score 5 or above.

## MATERIAL AND METHODS:

This descriptive case series was conducted in the Department of Gynae & Obs, Benazir Bhutto hospital,

Rawalpindi during a period of 6 months. Sample size was 135 patients divided into groups 1-4 based upon BMI.

**Inclusive Criteria:**

- All pregnant ladies at 37 to 40 weeks of gestation with history of previous I cesarean section.
- Cephalic presentation.
- Reactive fetal heart rate pattern.
- Bishop score 5 or above.

**Exclusion Criteria:**

- Previous classical cesarean or hysterotomy scars.
- Previous two or more cesareans.
- Previous LSCS with contracted pelvis.
- Presence of signs & symptoms of scar dehiscence.
- Non-reactive fetal heart rate pattern.
- History of previous uterine rupture or scar.
- With any medical or obstetric complication like eclampsia, pre eclampsia, placenta previa& diabetes mellitus.

**Data collection procedure:** The patients were selected from obstetric outpatient department and maternal BMI was calculated based upon maternal height and weight measurements provided during pregnancy booking at or before 20 weeks gestation. Women with a BMI of <19.8 were classified as Group 1, women with BMI 19.8-26 were classified as Group 2, women with BMI 26.1-29 (Overweight) were classified as Group 3 and women with BMI >29 (Obese) were classified as group 4. An informed consent was obtained from them for investigating in detail and using their data for research. A detailed history including medical, surgical, gynecological, obstetric and family history and indication of previous cesarean section was obtained.. All patients were ordered blood group, blood CP, random blood sugar, urine RE, viral serology and obstetric ultrasound for fetal well being. As, these patients are booked cases, were followed during labour and thorough examination including general physical examination, abdominal examination and pelvic examination was carried out and partogram was maintained to determine the length of labour by trainee researcher or equivalent. All these findings were noted on performa. Total of 135 patients were identified based on inclusion criteria. Number of selected patients in Group 1, Group 2, Group 3 and Group 4 were 35, 40, 30 & 30 respectively.

All patients were also monitored with cardiotocography and ultrasonogram to assess fetal well being. Some of the parameter namely patient's age, prior vaginal birth, reason for first cesarean section, admission cervicaleffacement and dilatation was reviewed. After evaluating the patients were counseled regarding potential benefits and harms of undergoing trial of labor.

During trial of labor patients were monitored by vital signs, fetal cardiac activity, lower abdominal pain, tenderness, fetal distress, vaginal bleeding & loss of presenting part.

Facility for emergent cesarean section was available throughout the trial.At any stage where the progress of labour endangered life of mother or child, delivery has been under taken by cesarean section.

**Data analysis:** Data has been analyzed on SPSS. For qualitative variables like success in different BMI groups i.e., frequency, percentage has been calculated. Chi-square test has been carried out to determine the difference in successful VBAC in different groups of BMIs (which is applied in BMI's group # 3 & 4). P value<0.05 has been considered successful.

## RESULTS

A total of 135 patients fulfilling the inclusion/exclusion criteria were enrolled to determine the effect of maternal BMI on frequency of successful VBAC. Results of our study of four Groups (1 - 4) of selected 135 patients based on their BMI are as follows.

**Group 1 - BMI <19.8:** This group contains those cases where BMI value is less than 19.8. A total of 35 samples were collected in this particular group with a Mean of 19.6 and a standard deviation (S.D) of 0.243. In this group the success rate of the cases of trial of VBAC was **91.43%** as shown in table-1.

**Group 2-BMI 19.8-26:**

This group contains those cases where BMI value is between 19.8 and 26. A total of 40 samples were collected in this particular group with a Mean of 22.48 and a standard deviation (S.D) of 1.96. The success rate of the cases of trial of VBAC was **87.5%** as shown in table 1.

**Group 3-BMI 26.1-29:** This group contains those cases where BMI value is between 26.1 and 29. A total of 30 samples were collected in this particular group with a Mean of 27.25 and a standard deviation (S.D) of 0.882. The success rate of cases of trial of VBAC was **80.0%** as shown in table -1.

**Hypothesis:** Patients having BMI value between 26.1 and 29 have 80% chance of getting successful VBAC.

To test the above hypothesis, the collected data was further analyzed using Chi Square ($X^2$) test with d.f 1 and significance level (P-Value)of 0.05 and the value of chi-square is 3.84 where the calculated value of $X^2$ is 10.8, **hence supporting the hypothesis.**

**Group 4 - BMI >29:** This group contains those cases where BMI value is greater than 29. A total of 30 samples were collected in this particular group with a Mean of 29.84 and a standard deviation (S.D) of 0.4014. The success rate of the cases of trial of VBAC was **80%** asshown in table1.

**Hypothesis:** Patients having BMI value greater than 29 have 80% chance of getting successful VBAC.

To test the above hypothesis, the collected data was further analyzed using Chi Square ($X^2$) test with d.f 1 and significance level of 0.05 (P-value ) and the value of chi-square is 3.84 where the calculated value of $X^2$ is 10.8, **hence supporting the hypothesis**

Table 1

| Group | Samples | Minimum | Maximum | Mean | Std. Deviation | %age of successful VBAC |
|---|---|---|---|---|---|---|
| BMI-Group1 | 35 | 19.0 | 19.6 | 19.309 | 0.2430 | 91.43% |
| BMI-Group 2 | 40 | 19.80 | 25.80 | 22.4800 | 1.96093 | 87.5% |
| BMI-Group 3 | 30 | 26.00 | 28.50 | 27.2567 | 0.88266 | 80 % |
| BMI-Group 4 | 30 | 29.20 | 30.60 | 29.8433 | 0.40145 | 80% |

## DISCUSSION

Cesarean section rates have increased dramatically since the 1980s. Accordingly, an increasing proportion of pregnant women attending for care have had a previous cesarean and face the problem of mode of delivery. As cesarean rates increased, so was the interest about measures in reducing the rate of repeat cesarean, which is the most common indication for CD[14]. Cragin described cases of women surviving vaginal birth after cesarean (VBAC)[15].

For most of the 20th century, it was believed a woman who had undergone a cesarean delivery, would require cesarean delivery in future pregnancies. In 1960s studies suggested that this does not always hold true[20]. If there are no contraindications, a woman with previous scar should be couselled about trial of labour after Caesarean with thorough discussion of maternal and perinatal risks and benefits[16].Vaginal birth after cesarean (VBAC) is not only a safe and reasonable option for most women with prior low transverse cesarean delivery but can also serve as an effective tool to lower cesarean delivery rate. Identifying patient related factors associated with success of VBAC, in particular modifiable factors , could improve patient counseling and ultimately result in reduction of unnecessary cesarean deliveries[17].

The advantages of attempting a VBAC include a lower risk of maternal morbidity or mortality, a lower rate of respiratory problems in the newborn and the elimination of the risk of prematurity due to mistaken dates. However, the success rate depends upon many factors like indication for the previous caesarean birth ,previous VBAC, high BMI, macrosomic baby and malposition in current pregnancy[18]**.** Obesityis an alarming health issue in developed as well as developing countries. Worldwide, prevalence of obesity is around 15-20%[19],while in Iranit is around 36.7% in urban regions[20].

A study from Islamabad showed that obesity was seen more in women than men and women were more susceptible tocomplications[21]. Body mass index >30 kg/m2 is internationally classified as obesity, while BMI 25-29.9 kg/m2 as overweight[22].Different cut-off levels of BMI are recommended for Asians on account of higher body fat percentage than Europeans at same BMI[23]. Study in a public sector hospital of Karachi reported that 82%of married females, presenting to medical out- patient department were obese[24]. Women having high pre-pregnancy BMI are at increased risk of antepartum intrapartum and postpartum complications[25].

One of the international study shows that, excessive weight gain during pregnancy and obesity both decreases success rate of VBAC, success rates for underweight ,normal weight, overweight and obese women were 83.1%, 79.9%, 69.3% and 68.2% respectively[26]. But in our study results were different with relatively high success rates observed even with high BMI compared to above stated study. Hence this study will surely help gynecologists in better decision making of trial of VBAC.

Study carried out at Ohio, USA, 337(66%) out of 510 women attempting trial of labour after cesarean were successful .VBAC was less successful in obese (54.6%) but not overweight (65.5%) women as compared to women with normal BMI (70.5) and was most successful in underweight women as comparedto women of normal BMI[27]. Results of this study is showing VBAC success rates of obese and overweight patients are much lower than obtained in our study.

In Study, which was done at University of Chicago. Increasing BMI was not only associated with failed trial of VBAC but also increased risk of rupture/dehiscence as well as five-fold risk of neonatal injury.[28]

As regards obesity it is not a contraindication for VBAC, but these patients needs proper counseling regarding the risk of attempting VBAC. The purpose of my work was to identify predictors of successful VBAC and specifically, to evaluate VBAC outcomes in patients obese and overweight patients.

According to a study in France there is a linear association (chi 2 for linear trend, $P < 0.001$) between maternal weight and risk of caesarean deliveries, with the thin mothers having the best rate of vaginal delivery.[13]

Maternal obesity is well recognized risk of maternal, peripartum and neonatal complications[29].Obese women are more likely to have an inadequate contraction pattern which prolongs the duration of labour process.

## CONCLUSION

In view of the results of the study it is concluded that success of VBAC significantly depends upon BMI. Our study shows relatively high percentages of VBAC success in obese and overweight patients as compare to figures shown in reference study.

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