

## FETO-maternal outcome following a Vaginal birth after caesarean section (VBAC): a cross-sectional study in RIMS, Manipur

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### Abstract

**Background:** Increasing number of women face the issue of mode of delivery in their subsequent pregnancy between a vaginal birth after prior caesarean and elective repeat caesarean delivery. The objective of this study was to determine the fetomaternal outcome and also to find out the maternal and perinatal morbidity and mortality following vaginal birth after CS.

**Methods:** A cross sectional study was carried out in the department of Obstetrics and Gynaecology, Regional Institute of Medical Science, Imphal, Manipur. Data was collected using a self-administered structured interview questionnaire. Ethical clearance was obtained from the Research Ethics Board to carry out the study. Data were entered in IBM SPSS version 21 software for Windows.

**Results:** The totals of 339 pregnant women were included in the study. Most of the pregnant women were in the age group of less than 26 years with the mean age of  $29.50 \pm 4.45$  years. Only 127 (37.6%) underwent vaginal delivery out of which only 54 (15.9%) underwent spontaneous normal vaginal delivery and 73 (21.3%) were instrumental vaginal delivery. Out of instrumental delivery in VBAC most of the patients delivered by ventouse 60 (82.2%).

**Conclusion:** Only one-third of the participant had vaginal birth after caesarean-section. Further longitudinal studies is needed to uncover more on the VBAC.

**Keywords:** VBAC, Cross-sectional, Pregnant women, Ventouse

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### I. Introduction

Pregnancy and child birth is a normal physiological phenomenon of life cycle of women. Though vaginal delivery is a natural process of childbirth, approximately 10% are considered high risk and might require a caesarean section. A caesarean section (CS) is a life-saving surgical procedure when certain complications arise during pregnancy and labour.<sup>1</sup>

A study from Canada shows that the risk of severe maternal morbidities such as haemorrhage, uterine rupture, anaesthetic complications, shock, cardiac arrest, acute renal failure assisted ventilation, venous thromboembolism, major infection, or in-hospital wound disruption or haematoma, that requires hysterectomy or transfusion with multidisciplinary approach was increased 3 fold for CS delivery.<sup>2</sup> There are also risk concerns regarding the long term risk associated with caesarean delivery, particularly those associated with subsequent pregnancies. The incidence of placental abnormalities, such as placenta praevia, in future pregnancies increases with each subsequent CS delivery, from 1% with 1 prior CS delivery to almost 3% with  $\geq 3$  prior CS deliveries. In addition an increasing number of prior CS are associated with morbidity of placental praevia: after 3 CS the risk that a placenta praevia will be complicated by placenta accreta nearly 40%.<sup>3</sup> This combination of complications not only significantly increases maternal morbidity but also increases the risk of adverse neonatal outcomes such as neonatal intensive care unit admission and perinatal death.<sup>4,5,6</sup> Thus, CS is not only associated with the increase morbidity and mortality, but also have a huge impact on the fetal and maternal outcome in subsequent frequency.<sup>6</sup>

International Healthcare Community states that there is no additional benefits of CS when the CS rate is more than 10-15%.<sup>7</sup> This increased rate may indicate malpractice instead of indicating increased health care utilization. But the caesarean sections have become increasingly common in both developed and developing countries.<sup>8</sup> Recent statistics from 150 countries shows a global CS rate of 18.6% of all births – almost 1 in 5 women around the world will give birth via c-section.<sup>1</sup> In India, over 21 years to 2014, CS has gone up from 5% to 18% according to a recent analysis of national health data.<sup>10</sup> The reason for increasing CS create are medical-

led view of pregnancy and birth, leading to higher rates of interventions, fear of birth and labour pain, fear of medical litigation, belief as C-section prevent trauma and damage to the pelvic floor, belief CS is less traumatic to the baby, convenience to care provider and mother, low tolerance of anything less than the perfect birth outcome, cultural considerations, such as birth date being lucky for future or destiny.<sup>10</sup>

In a subsequent delivery of post-caesarean section women, 8.8% delivered spontaneously, 48.1% delivered by vacuum extraction, 15.2% delivered by forceps and 27.8% delivered by emergency repeat caesarean section<sup>11</sup>. In Northeastern states of India, the rate ranges from 5.9 - 21.1%, with Manipur 21.1%, Sikkim 20.9%, Assam 13.4%, Mizoram 12.7%, Arunachal Pradesh 8.9%, Meghalaya 7.6% and Nagaland 5.9% of the total life birth.<sup>12</sup> Therefore this study was planned to carry out for determination of fetal and maternal outcome of vaginal birth (VBAC) after caesarean -section.

## **II. Materials And Methods**

A Cross-sectional study was conducted out at Obstetrics and Gynaecology department, Regional Institute of Medical Sciences, Imphal, one of the two tertiary care teaching hospital in the state from September 2017 – March 2019. The study population consisted of patients with a history of previous one caesarean section more than 18 years, who delivered in the present pregnancy in tertiary care centre, RIMS, Imphal during the study period. Those who does not give consent, multiple caesarean section, those who were very ill, any pregnant mother with pre-existing systemic disease and those with premature rupture of membrane were excluded from the study. Sample size was 336 using the incidence of elective caesarean section<sup>15</sup> with 32%, absolute allowable error (L) of 5% and 95% confidence level by using prevalence formula. Consecutive sampling method was used to recruit the participants for the study. Age, address, religion, socio-economic status, period of gestation, parity, gravida, history of previous caesarean section, last child birth, onset of labour, trial of labour outcome, birth weight and apgar score were utilized as independent variable. Whereas, maternal outcome following delivery (VBAC), duration of stay in the hospital and admission of neonates in NICU and NICU stay were utilized as outcome variable.

### **Operational definition:**

The cases that have three or more antenatal checkup under the same unit in RIMS were considered booked. TOLAC is the trial of labour after caesarean. VBAC is the vaginal birth after caesarean. PPH: Post partum haemorrhage is defined as blood loss of >500 ml in Vaginal delivery and >1000 ml in caesarean delivery. Haemoglobin level <11 gm /dl was considered anaemia. Birth weight <2.5 kg was considered as low birth weight.

Data were collected using a pre-designed proforma consisting of patient profile, history taking general physical examination, systemic examination, outcome variables and investigations. History was taken for those who are willing to participate in the study after obtaining consent. Details of the previous caesarean section, apgar score of the baby was noted and recorded soon after birth and the mother was observed post delivery till the time of discharge from the hospital.

SPSS software version 21(IBM) was used for analyzing the data. Before analysis, data were checked for consistency and completeness. The data collected were analyzed using relevant descriptive and analytical statistical techniques. Descriptive statistics like percentage, mean and standard deviation were used. Analytical statistics like Chi square test and likelihood ratio was used for categorical data, whereas T-test was used for continuous data.

Ethical approval was obtained from Institutional Research Board, RIMS, Imphal before the study Ref no. A/206/REB-Comm(SP)/RIMS/2015/347/90/2017. Consent was obtained from the participating individuals. A unique code number was given but no name was mentioned to maintain confidentiality.

## **III. Results and Observation**

The study was done in the Obstetrics and Gynecology department of RIMS, Imphal. Total delivery during the study time period was 14290, out of which 4750 (33.2%) caesarean sections were done and 1494 were previous one caesarean section. 339 pregnant women were included in the study, of these 291 were booked in the hospital. Mean systolic blood pressure of the participants was 119.66±10.72 and mean diastolic blood pressure was 79.86±8.69. Mean haemoglobin of the participating women was 11.59±1.09 gm/dl. Mean lower uterine thickness in ultrasound was 2.52±0.29 cm. Most of the pregnant women were in the age group of less than 26 years with the mean age of 29.50±4.45 years. Maximum of the participants were Hindu (79.9%) by religion, followed by Muslim (14.5%) and Christian (5.6%). Maximum were homemakers (90.6%) followed by working women (9.4%).

Majority 205(60.5%) of the participants belonged to the middle socio-economic status with 129(38.1%) belonging to low status. Maximum of the participants 234(69%) completed the high school while 56(16.5%) have completed graduation, 23(6.8%) did not go to school at all. Maximum of the participants had

normal placenta in location 315(92.9%) with only 10(2.9%) had placenta praevia. Majority 186(54.9%) of the participants were in the second gravida. Maximum of the participants 299(88.2%) were in parity 1 while 28(8.3%) and 12(3.5%) were in 2 and 3 parity respectively. Only 127(37.6%) of the participants underwent vaginal birth after caesarean delivery out of which only 54(15.9%) underwent spontaneous normal vaginal delivery and 73(21.3%) were instrumental vaginal delivery. Out of instrumental delivery in VBAC most of the patients delivered by ventouse 60(82.2%), while 13(17.8%) were forceps.

Only 127(37.9%) of the women underwent VBAC of which first, second and third stage took mean duration of  $6.30\pm 4.26$ ,  $21.15\pm 13.06$  and  $4.42\pm 1.23$  respectively. No fourth stage complication was noted. Out of these 137(40.3%) underwent elective CS, where 65(30.6%) were due to cephalopelvic disproportion, 32(15.09%) maternal request, 10(4.7%) breech presentation, 9(4.2%) gestational diabetes mellitus, 9(4.2%) severe preeclampsia, 7(3.30%) placenta praevia and 5(2.35%) transverse lie. Emergency caesarean section constitute of 75(35.37%) out of total caesarean section. Most of the indication for Emlscs 25(33.3%) due to failed progress of labour while trying for VBAC, due to foetal distress 20(26.7%), due to impending rupture 20(26.7%), and 10(13.3%) were due to oligohydramnios, placenta praevia. Majority of the participant (11.7%) who underwent Elective CS had PPH. However, 22.7% of those who underwent emergency CS had extension of uterine wound extension and those who underwent VBAC only 3.9% had haematoma as complication. Mean days of hospitalization was  $3.80\pm 0.59$  with maximum 4 days for caesarean without complication and 6 to 7 days for caesarean with complication and VBAC patient stays maximum of 2 days.

Patients had birth weight 2.6 to 3.5 kg (85.3%), 11.5% had 1.6 to 2.5 kg, 3.2% had 3.6 to 4 kg. Maximum of the participants delivered male babies (57.2%). The ratio of male and female ratio at birth is 1.3:1. There was significant association between VBAC and apgar score (p-value-0.019).

#### **IV. Discussion**

Total delivery during this period was 14290 and caesarean section was done on 4750 patients (33.2%) which is corresponding with the global trends in the study conducted by Betran et al<sup>1</sup>. Out of these there were 1494 with previous one caesarean section. In my study 339 pregnant women were included in the study. Out of these, only 291 were booked in the hospital as some of the women were referred from the periphery centres in Manipur. Most of the pregnant women were in the age group of less than 26 years with the mean age of  $29.50\pm 4.45$  years. Majority of the participants belong to the middle socioeconomic status. Most of the patients completed the high school with only 16.5% being graduation. Majority of the participants were in the second gravida and parity one.

Amniotic fluid index was  $12.58\pm 3.99$  cm, lower uterine thickness was  $2.52\pm 0.29$  cm.

Majority of the participants presented at term. In my study 89.4% of the women did not have scar tenderness while 26.7% presented with impending rupture and scar tenderness which is comparable with the findings of Shakti V et al<sup>11</sup> 22.7%, Goel SS et al<sup>15</sup> 18.9%, Jain R<sup>30</sup> 28.12% for which emergency caesarean section was done. Maximum of the participants undergone elective caesarean section due to cephalo-pelvic disproportion (30.60%) which is comparable with the study conducted by Villar J et al<sup>25</sup> in which it was 35%. Second most common indication in my study is maternal request(23.4%) which is comparable to the study conducted by Ramachandrapa A et al<sup>23</sup> at 18%, the reason being fear of labour pain, trauma and damage to pelvic floor, belief of CS being less traumatic to the baby as describe by Betran AP et al<sup>1</sup>.

In my study most of the emergency caesarean section was done due to failed progression after trial of labour (33.3%) which is significantly comparable with the study conducted by Kumar P et al<sup>14</sup> at 29.1%, 44.12% in the study conducted by Patel S et al<sup>9</sup>, 23.2% in Kumar P et al<sup>14</sup>. Second most common indication was fetal distress (26.7%) which is comparable with the study conducted by Villar J et al<sup>25</sup> 26%, Kumar P et al<sup>9</sup> 20.5%, Goel SS et al<sup>15</sup> 45.94%.

Difficulty in opening the abdomen due to adhesion were encountered in both elective and emergency caesarean in 8.6% and 34.6% patients respectively which is comparable with the findings of Bhowmick J et al<sup>28</sup> 41.11%, Jain R<sup>30</sup> 16.4%. Scar dehiscence were seen in 8% in emergency caesarean and 6.6% in elective caesarean which is less as compared to the other studies, 22.7% in Shakti V et al<sup>11</sup>, 23.52% in Patel S et al<sup>9</sup>. Retained placenta were seen in 2.35% patients which is well comparable with Bhowmick J et al<sup>28</sup> 1.66%.

Postpartum haemorrhage occurred in 11.7% elective caesarean and 17.3% in emergency caesarean which were mostly due to uterine atony, which is comparable with the findings of Landon MB et al<sup>17</sup> in which 19.51% were seen, 32% in Goel SS et al<sup>15</sup>.

Out of 339 participants 152 patients underwent Trial of labour, vaginal birth after caesarean section (VBAC), of which 21.3% delivered by instrumental, 16.3% delivered by spontaneous and 33.3% underwent emergency caesarean for failed progress of labour. First, second, third stage of labour for those patients who successfully undergone VBAC took mean duration of  $6.30\pm 4.26$ ,  $21.15\pm 13.06$ ,  $1.48\pm 1.23$  respectively which is comparable to the study carried out by Guise et al<sup>4</sup>. In my study successful VBAC is only 37.46% which is less in comparison to the study conducted by Hareesh D et al<sup>21</sup> which was 75%, 67.8% in Goel SS et al<sup>15</sup>, 46.70% in

Jinturkar AA et al<sup>20</sup>, 87% in Jeanne Marie Guise et al<sup>4</sup>. The low percentage is due to turning down of VBAC after explaining risk or complication associated with VBAC and also due to fear of medical litigation among the obstetricians and also lack of emergency OT for doing LSCS at any moments. These findings are in accordance with the study conducted by Betran AP et al<sup>1</sup>.

Instrumental delivery for VBAC was done to cut short the second stage of labour in 21.3% which is comparable to the study conducted by Moffat MA et al<sup>13</sup> 23.1% was seen, Hareesh D et al<sup>21</sup> 30%, Shakti V et al<sup>11</sup> 63.29%. Among the patients who undergo VBAC, vacuum delivery were done in 47.1% patients and forceps in 10.23% patients which is well comparable with study conducted by Shakti V et al<sup>21</sup> and Hareesh D et al<sup>21</sup>. In my study, chances of vaginal delivery were 64.8% when the interval of pregnancy is <18 months and 93.9% when the interval of pregnancy is >18 months which is comparable with the study conducted by Jain R<sup>30</sup>.

In VBAC post partum haemorrhage was seen 1.6% in my study which is comparable to the findings of Shakti K et al<sup>21</sup> in which 0.5%. Vaginal haematoma was noted in 3.9% in my study which is comparable with the study of Patel S et al<sup>9</sup> in which 1.8% were noted.

Maximum of the participant delivered male babies, the mean birth weight of a child was 3.00±0.38 kg which is comparable to the findings by Shakti V et al<sup>11</sup>. APGAR score of the child at 5 minutes which is <7 and >7 were statistically significant with p<0.05. Signore C Klebanoff M<sup>24</sup> stated that neonatal mortality and morbidity increased in CS with high risk pregnancy, in my study no high risk patients were included. Patel RM<sup>16</sup> found no significant neonatal outcome between CS and VBAC.

NICU admission in elective Caesarean were 6% and emergency Caesarean were 21% which is comparable with the study conducted by Goel SS et al<sup>15</sup>. Out of emergency caesarean NICU admission 2 perinatal death (2.66%) occurred, which is comparable with the study conducted by Jain R<sup>30</sup> in which it was 1.56%. Overall NICU admission is higher in repeat caesarean section than in VBAC which is comparable to the study conducted by Ramachandra A et al<sup>23</sup>. Patient with VBAC were discharged from the hospital after 2 days. NICU admitted patients were discharged in 7 days.

Due to rise in Caesarean section rate as a primary mode of delivery in the past few years, the number of pregnancies with previous one caesarean section has also increased. Rising trends of caesarean section has been associated with increased risk of fetomaternal outcome. If primary caesarean is reduced, the complication associated with repeat caesarean section can be decreased. Substantial reduction in the repeat caesarean section rate can be achieved safely and efficiently by encouraging the trial of labour in labour with single previous delivery. A few limitation of this study were sample size of the study was less as compared to other similar studies done previously.

## V. Conclusion

More than one-third of the participants underwent VBAC. VBAC has least number of hospital stays and less complication. Instrumental delivery results in more favourable apgar score at 5min. Further longitudinal study with the more number of study size and more variable to determine the feto-maternal outcome.

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**Table 1. Baseline characteristics**

Characteristics	N	%
Age Groups		
20-26	103	30.4
27-28	57	16.8
29-32	83	24.5
33-40	96	28.3
Religion		
Hindu	271	79.9
Muslim	49	14.5
Christian	19	5.6
Occupation		
Homemaker	307	90.6
Working women	32	9.4
Socio-economic status		
Low	129	38.1
Middle	205	60.5
High	5	1.5
Education Status		
Illiterate	23	6.8
Primary School	6	1.8
Middle School	20	5.9
High School	234	69
Graduate and above	56	16.5
Location of Placenta		
Normal	315	96.9
Placenta Praevia	10	3.1
Gravida		
2	186	54.9
3	113	33.3
4	24	7.1
5	16	4.7
Parity		
1	299	88.2

2	28	8.3
3	12	3.5
Mode of Delivery		
Vaginal Delivery- Spontaneous	54	15.9
Instrumental	73	21.3
Caesarean Delivery- Elective	137	40.3
Emergency	75	22.1
Type of intervention of Instrumental Delivery		
Ventouse	60	82.2
Forceps	13	17.8

**Table 2.** Obstetric characteristics of VBAC

Characteristics	Successful trial of labour	Failed progress
History of vaginal delivery before and after previous CS	37(92.5%)	3(7.5%)
Inter-pregnancy interval		
<18 months	35(64.8%)	19(35.2%)
>18 months	92(93.9%)	6(6.1%)
Infant birth weight		
1.6-2.5kg	13(92.8%)	1(7.2%)
2.6- 3.5kg	114(83.8%)	22(16.2%)
3.6-4kg	1(33.4%)	2(66.6%)
Duration of different stages of labour for those who underwent VBAC		
First stage	6.30±4.26	
Second stage	21.15±13.06	
Third stage	4.42±1.23	
Maternal complications following VBAC		
PPH	2(1.6%)	
Haematoma	5(3.9%)	
Days of hospitalization following VBAC	3.80±0.59	
Maximum	4	
Minimum	2	
Birth weight of the baby		
1.6-2.5	39(11.5%)	
2.6-3.5	289(85.3%)	
>3.6	11(3.2%)	

**Table 3** Association between VBAC and apgar score at 5.

Apgar score	Spontaneous	Instrumental	P-value
≤7	3(10.7%)	4(14.2%)	<b>0.019</b>
>7	52(16.7%)	69(22.2%)	

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