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EFFECTIVENESS OF A STRUCTURED VBAC CHECK-LIST IN IMPROVING CARE AND SUCCESS OF VBAC AMONG PREGNANT WOMEN WITH ONE PREVIOUS CAESAREAN SECTION

[*2]Jombo Se, [1]Okome Gbo, [1]Momoh Mo, [1]Isabu P, [1]Eifediyi Ra, [2]Onwusulu Dn, [3]Nwali Sa and [2]Ilikannu So

[1]Department of Obstetrics and Gynaecology, Irrua Specialist Teaching Hospital, Irrua.
[2]Department of Obstetrics and Gynaecology, Federal Medical Centre, Asaba.
[3]Department of Obstetrics and Gynaecology, Ae-Futh, Abakiliki.

*Corresponding Author: Jombo Se

Department of Obstetrics and Gynaecology, Irrua Specialist Teaching Hospital, Irrua.

ABSTRACT

Objective: This study evaluated the effectiveness of a structured VBAC checklist in improving care and success of VBAC among pregnant women with one previous caesarean section. **Materials and Methods:** This study was a comparative cohort study that was carried out in two phases. The first phase (Group A) was a prospective study of all women with one previous caesarean section booking for antenatal care who meet the inclusion criterion with the routine use of a structured VBAC checklist. While the second phase (Group B) was a retrospective study of cases of booked women with one previous caesarean section managed within the immediate past two- year period in the hospital just before the commencement of this study, which were selected by systematic random sampling technique. Sixty participants were recruited for group A. Data was collected, computed and analyzed with the IBM Statistical Package for Social Sciences (SPSS) -20. Statistical comparison was done using Chi-Square (X^2). The level of significance was accepted when P-value was equal to or less than 0.05 and confidence interval of 95 %. **Results:** The mean age for group A and B were 33.17±4.64 and 32.92±3.41 years respectively. The prevalence of one previous caesarean section among pregnant women was 16.9 %. Fifty seven (95%) of women in group A and 44(73.3%) in group B, had trial of vaginal delivery after caesarean section. The success rate of VBAC were 54.4% and 40.9% in group A and B respectively(x^2=1.806, P=0.179; OR=1.79 (0.77, 3.81). Failed VBAC were comparable in both groups with poor progress and fetal distress being the commonest indication for repeat caesarean section. Maternal and fetal outcomes were comparable in both groups with blood transfusion as the commonest maternal morbidity and birth asphyxia as the commonest fetal complication. **Conclusion:** The use of a structured VBAC checklist improves success rate of trial of vaginal delivery after one previous caesarean section by 1.33 folds. A structured VBAC checklist should be an essential tool to appropriately select eligible patient and offer women education and counseling for an informed decision.

KEYWORDS: Checklist, One previous c/s, vaginal birth after caesarean section.

BACKGROUND

Checklists are common work aids in many industries, their adoption in medicine has been restricted in the past to equipment operations especially in anaesthesia or as part of clinical algorithm.[1,2] They, however, have a tremendous potentials to improving patient care and outcome. The science of developing checklist in medicine is relatively new but also growing slowly. Its use in medical practice will help guide knowledge and most importantly help patient to receive good evidence based information , best practice, very safe and high quality care.[2,3] The Royal College of Obstetricians and Gynaecologist (RCOG) in her latest review on vaginal birth after caesarean section have recommended the routine use of a VBAC checklist.[4] This has found huge application in developed countries ensuring safety and improve care for women with previous caesarean delivery, unlike in our setting.

The rate of caesarean section is on the increase globally; this is as a result of fear of malpractice and litigation, increase safety of the procedure due to improved technology in safe anaesthesia, safer blood transfusion and potent antibiotics.[5,6 ,7] Secondly, more significantly is the higher rate of repeat or higher order caesarean sections.[7,8 ,9] Lastly is the liberal caesarean section done on maternal request; thisaccounts for 7% of caesarean section in UK and the universal adoption of the term breech trial.[8,9,10,11] This is a big burden and challenge for Africans where there are strong aversion to caesarean section even when it has genuine obstetric indication.[9,12,14] This, therefore, results in a large

obstetric population left with the choice of vaginal birth after caesarean section (VBAC) or elective repeat caesarean section (ERCS) in their next delivery.

The decision for VBAC or ERCS is difficult to make even by the patients, physicians, and organizations, including their risk managers. Each woman is different and has the right to decide for herself based on the best evidence, her previous obstetric experiences and what medical care and support available for her and her family to make informed decision.

Vaginal birth after caesarean section is a safe alternative to a routine repeat caesarean section as previously thought that once a caesarean section always a caesarean section.[3,15,16] In women with one previous delivery by Lower Segment Caesarean Section , majority of them are suitable for a trial for Vaginal Birth after Caesarean Section in a subsequent pregnancy.[4] The chance of successful vaginal delivery is between 72-75%.[4] The incidence of uterine rupture following VBAC is approximately 0.5% (1 in 200).[4,13,15,17,18] Therefore, women with one previous caesarean section need access to comprehensive, accurate and evidence based information to make decision on birth options. This is based on good evidence of benefits of successful VBAC over repeat caesarean in well selected cases.[13,14,15,16]

Although the efficacy and safety of VBAC have been well documented, the most feared is the risk of uterine rupture from previous uterine scar.[13,17,18,19] Uterine rupture is a life threatening obstetric emergency associated with high maternal and perinatal morbidity and mortality.[17,19] The worse may occur when an attempt for VBAC fails requiring emergency repeat caesarean section . This is associated with a 4 folds increased risk of uterine rupture and increase maternal morbidity and mortality.[17,21] To avoid this tragedy a comprehensive assessment of individual women with one previous caesarean is needed during the course of antenatal and intrapartum care.[3,6,7,11,13,17] This is done routinely by skill birth attendant during booking and subsequent follow up. At each visit and with increasing gestational age certain things are checked to rule out contraindication to vaginal delivery based on evidence best practices. Challenges may arise due to human error and fatigue. This is common in our environment where one doctor attends to over 3000 patient as against the World Health Organization (WHO) recommendation of 1 doctor per 600 patients.

Approach to patient safety have in recent times been through the use of checklist for high risk health care.[22,25] This has been strongly recommended by WHO, with the outstanding report of a reduction in surgical complication of 36% and mortality of 47% from the use of surgical checklist.[23] This therefore justifies the need for a structured VBAC checklist that can be locally adapted to ensuring thorough individual patient assessment and suitability for VBAC.[3,17 ,18] This study therefore aim to evaluate the effectiveness of a structured VBAC checklist in improving care and success of VBAC among pregnant women with one previous caesarean delivery .

MATERIALS AND METHODS
This was a comparative cohort study that was implemented in two phases. The first phase (Group A) was a prospective study of all women with one previous caesarean section booking for antenatal care who meet the inclusion criterion. The second phase (Group B) was a retrospective study of booked cases of women with one previous caesarean section managed in the hospital just before the commencement of this study. These women were selected from the birth register by systematic random sampling; every third woman who delivered with one previous caesarean section was selected. Their medical records were retrieved and information on their socio-demographic characteristics, obstetric and gynecological history and maternal and neonatal outcome of pregnancy were noted. They were matched with the prospective group in age and parity.

Inclusion criteria
Women with one previous transverse lower uterine segment caesarean section presenting for antenatal care at ISTH, Irrua.

Exclusion criteria
1. Women with two or more previous caesarean section.
2. Women with previous uterine surgery / injury for examples myomectomy with breach of the endometrium, or uterine perforation from abortal complication.
3. Women with previous uterine rupture.
4. Women with one previous C/S and carrying multiple gestations.
5. Women with coexisting medical diseases (Diabetics mellitus, Hypertension in pregnancy) or co existing uterine masses.

Sample size determination
Sample size is calculated from the formula for cohort study comparing two proportions, [26] given a significant level of 5% and power of 90%. With the assumption that the use of VBAC checklist will double the success rate from 31.46% to 62.92% from the previous report by Abebe et al (2007) in Irrua.[27] I considered a loss to follow up rate of about 10%; thus minimal sample size of 60 in each group was estimated, i.e., a minimum total sample size of 120.

Outcome measure
Primary outcome was the prevalence of women with one previous caesarean section, success rate of VBAC before and after the use of a structured VBAC checklist. Secondary outcomes measure were maternal post-partum haemorrhage (PPH), hysterectomy and blood transfusion. While for the neonate; neonatal birth asphyxia, SCBU

admission and perinatal mortality among women delivering after one previous caesarean section before and after use of VBAC checklist.

Data analysis
Data was entered into a microcomputer with the IBM-Statistics-20. Associations between variables were tested using Chi – Square and fisher's exact test as appropriate. Significant level was set at P < 0.05.and 95% confidence interval. Logistic regression was used to determine the strongest factor for successful VBAC.

Ethical considerations
Approval for the study was obtained from the research and ethic committee of the Irrua Specialist Teaching Hospital. Permission was also obtained from the head of department of Obstetrics and Gynaecology to adopt the structured VBAC checklist in the management of obstetric patients with one previous Caesarean Section for the purpose of the study. Written informed consent was obtained from the subjects before enlistment into the study.

RESULTS
A total of 120 pregnant women with one previous caesarean section participated in this study. Group A were those recruited for the first phase (prospective) and group B were the second phase (retrospective) respectively. There were 60 women in groups A and B respectively. The socio-demographic characteristics were similar in both groups as showed in Table I.

During the period of group A recruitment over a seven months period spanning from March, 2017 to November, 2017, a total of 420 women booked for antenal clinic out of which 71 had one previous caesarean section giving an incidence of 16.9%.

Out of 60 participant in group A, 57 (95%) were eligible for trial of vaginal delivery whereas 44 (73.3%) where allowed for a trial of vaginal delivery after caesarean section in group B as showed in Table 2.

Overall with the use of structured VBAC checklist 31 women had successful VBAC in group A while 18 were able to achieve same in group B , giving a success rate of 54.4% and 40.9% in group A and B respectively. Though this outcome is higher in the checklist group it was not statistically significant (x^2=1.806, P= 0.179) but has a higher odds of association (odd ratio [OR] =1.72 CI=0.77-3.81 as showed in Table 2.

For those selected for trial of vaginal delivery after caesarean section, in group A 26 had failed VBAC while also 26 had failed VBAC in group B. The highest reason for failed VBAC was poor progress of labour in both groups while the least indication was intra-partum haemorrhage, as showed in Figure. 1.

Table 4. Showed maternal and fetal complications associated with trial of vaginal delivery after caesarean section. Blood transfusion was the commonest maternal complication in both groups (25% vs 28% in group A and B respectively) and uterine rupture was the least maternal complication in group A(1.7%) but PPH in group B (5.1%). Both groups have comparable maternal and fetal complications.

In order to determine the independent predictor for successful VBAC, multivariate logistic regression analysis was performed. The important predictors were entered into the regression model as showed in Table 5. Previous history of vaginal delivery, BMI, parity and birth weight were entered into the regression model. They were not statistically significant however there was a higher odds for fetal birth weight and maternal BMI in predicting success of VBAC.
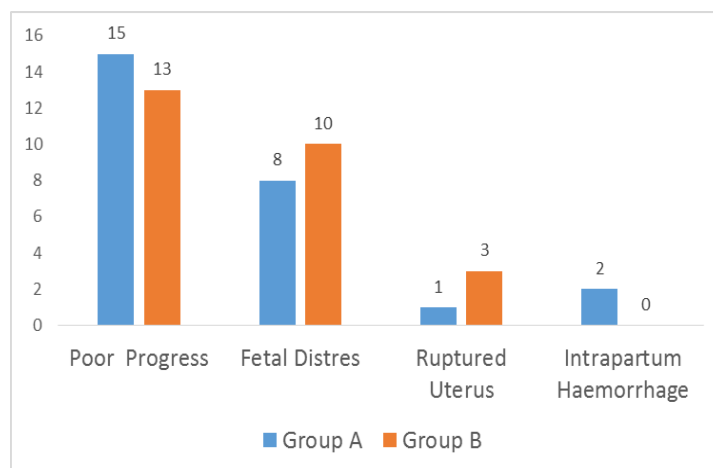

Figure 1. Failed vbac indications for ercs.

Table 1. Socio-demographic features of the participants.

Variables	GROUP A		GROUP B		Chi Square, P-Value
	N	%	N	%	
Mean Age	33.17±4.64		32.92±3.41		
Age Group					
20-24	2	3.3%	4	6.7%	
25-29	9	15.0%	14	23.3%	
30-34	28	46.7%	17	28.3%	
35-39	15	25.0%	20	33.3%	5.248, 0.263
≥40	6	10.0%	5	8.3%	
Tribe					
Esan	37	61.7%	31	51.7%	
Etsako	9	15.0%	20	33.3%	
Beni	7	11.7%	8	13.3%	
Ibo	2	3.3%	1	1.7%	10.102, 0.072
Yoruba	3	5.0%	0	0.0%	
Hausa	2	3.3%	0	0.0%	
Educational Status					
No Formal	2	3.3%	3	5.0%	
Primary	16	26.7%	12	20.0%	
Secondary	20	33.3%	24	40.0%	1.158, 0.763
Tertiary	22	36.7%	21	35.0%	
Parity					
1	18	30.0%	18	30.0%	
2	20	33.3%	20	33.3%	
3	11	18.3%	11	18.3%	
4	6	10.0%	6	10.0%	0.000, 1.000
5	4	6.7%	4	6.7%	
≥6	1	1.7%	1	1.7%	
TOTAL	60		60		

Table 2. Vbac vs ercs among participant.

DELIVERY OPTIONS	GROUP A N %	GROUP B N %
TOLAC	57 (95%)	44 (73.3%)
ERCS	3 (5%)	16 (26.7%)
	60 (100%)	60 (100%)

Table 3. Outcome of vbac.

Variables	Group A		Group B		Chi square, P-value
	N	%	N	%	
Outcome of VBAC					
Successful	31	54.4%	18	40.9%	
Failed	26	45.6%	26	59.1%	1.806, 0.179
Total	57	100.0%	44	100.0%	

Odds ratio [OR]= 1.72, 95% Confidence Interval[CI]: 0.77 - 3.81

Table 4. Maternal and fetal complications.

Variables	Group A		Group B		Chi square, P-value
Maternal Complication					
PPH	8	13.3%	2	3.3%	
Ruptured Uterus	1	1.7%	3	5.0%	4.779, 0.189
Blood Transfusion	15	25.0%	17	28.3%	
None	36	60.0%	38	63.3%	
Fetal Complication					
Birth Asphyxia	0	0.0%	2	3.3%	3.009, 0.390
NICU Admission	1	1.7%	0	0.0%	

Neonatal Death	1	1.7%	1	1.7%
None	58	96.7%	57	95.0%
TOTAL	60		60	

Table 5. Multivariate logistic regression for independent predictor of sucessful vbac.

Variables	B	S.E.	Wald	Df	P-value	OR	95% C.I. for(OR)	
							Lower	Upper
Age	-0.117	0.066	3.193	1	0.074	0.889	0.782	1.011
Parity	-0.033	0.324	0.010	1	0.920	0.968	0.512	1.828
Level of Education	-0.092	0.261	0.124	1	0.725	0.912	0.547	1.522
Previous Vaginal Delivery	-0.706	0.375	3.548	1	0.060	0.494	0.237	1.029
Birth Weight	0.497	0.709	0.492	1	0.483	1.644	0.410	6.601
BMI	0.080	0.046	2.985	1	0.084	1.083	0.989	1.186
Constant	1.691	3.363	0.253	1	0.615	5.424		

DISCUSSION

The success rate of VBAC following the use of a structured VBAC checklist was 54.4% compared to 40.4% when not used; though not statistically significant but there is a higher odd that the use of the structured VBAC checklist improves care and success of trial of vaginal delivery after caesarean section. This could be attributable to the thoroughness and purposeful use of a checklist that ensures compliance to standard evidence based assessment and discussion with individual participants for an informed consent.[1,2,3,22] Aram et al, 2018 in Thailand found success rate of VBAC of 60%,[28] and Ezechi in Lagos also recorded 69.1%[29] which are higher than 54.4% achieved in this study with the use of a structured checklist. Ikechebelu et al, in a similar study in 2010 found success rate of VBAC of 46.7% this is quite lower compared to the 54.4% of this study.[30] Abebe in 2007 recorded VBAC success of 31.46% in same Centre, thus there is an improvement in the outcome of VBAC to 40.4 % without checklist and with the use of checklist up to 54.4% was achieved.[27]

The rate of caesarean section is on the increase globally and in our environment where there are strong aversions for operative delivery, any strategy to reducing caesarean section rate will greatly help.[5,7,15,16,20] Women with one previous caesarean section constitute a greater percentage of the obstetric population. In this study, 16.7% of women booking for antenatal care over the period of recruitment of study participants had one previous caesarean section. Asien et al.[31] in Benin reported 7.5% of antenatal attendee to have had caesarean section, however among women who had caesarean section 30% had one previous scar. Aram et al,[31] opined that previous caesarean section makes the greatest contributions to the overall C/S rate with a relative contribution of 15.4% to 67.7%. As such the number of women with previous CS planning their next delivery constitutes a growing concern over the potential adverse pregnancy outcome.[28]

Management of women with one previous caesarean section therefore requires a pragmatic effort in reviewing, discussing and planning for their next delivery.[4] Every woman has right to decide for herself on her delivery option. It therefore behooves the managing obstetrician to give adequate information, education and counseling for them to make appropriate informed choice.[4] This counseling should be based on evidence, reviewing her past and present obstetric condition. The use of structured checklist institutes a proactive measure to ensuring strict adherence to key and important review toward effective counseling on the risk and benefits of VBAC vs ERCS.[3,4] The use of checklist therefore has a great potential to improving care and outcome of trial of vaginal delivery after a caesarean delivery.[3,4]

Failure of trial of vaginal delivery was comparable in both groups. It was 26(45.6%) in group A and 26(59.1%) in group B. it was not statistically significant($X^2 = 1.806$, P=0.179). There are comparable indications for repeat caesarean delivery in both groups. Commonest indication was as a result of poor progress and fetal distress. This is comparable to the study by Ikechebelu and Ezechi in NAUTH and Lagos respectively.[29,30]

Maternal and fetal outcomes were comparable in both groups. Majority had no maternal and fetal complication (60% vs 63.3% maternal and 96.7% vs 95.0% fetal) in group A and B respectively. Need for blood transfusion was the commonest maternal morbidity in both groups while birth asphyxia was the commonest fetal complication.

On review of the important independent predictor for success of VBAC using logistic regression entering in parity, BMI, birth weight and previous vaginal delivery, all were not statistically significant. History of prior vaginal delivery after a previous caesarean is a strong predictor of VBAC success as have been reported in several studies.[27,32,35] This was not significant in this study; probably the use of checklist ensures that women were eligible for VBAC not necessarily because they have had a prior vaginal delivery.

CONCLUSION
VBAC is a safe and an effective option of delivery for women who have had previous caesarean section especially in our setting where there are strong aversions

to abdominal delivery. The use of VBAC checklist improves trial of vaginal delivery success rate by 1.33 folds. A structured VBAC checklist should be an essential aid to appropriately select eligible patient, offer women education and counseling for an informed decision.

Recommendation
A structure VBAC checklist that can be locally adopted and routinely communicated to health care staff should be an essential tool in management of pregnant women with one prior caesarean section.
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