

**Comparative study of maternal and fetal outcomes in assisted vaginal deliveries by vacuum versus forceps delivery**

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**Conflicts of Interest:** Nil

**Abstract**

Background: In the current saga of obstetrics, assisted vaginal delivery is truly a vanishing art and caesarean delivery has increased during the last few decades. A successful assisted vaginal birth avoids a caesarean section and concerns for future pregnancies.

The goal of this study is to evaluate and compare the contributions of forceps and vacuum to modern obstetrics, as well as to profile mother and fetal outcomes by assisted vaginal delivery.

**Results:** In this study, we have compared the maternal and fetal outcomes in assisted vaginal deliveries using kiwi cup and forceps. Fetal distress accounts for most

common indication in both the modes of assisted deliveries (33.3%, 42.7% respectively).

**Conclusion:** The mother and newborn outcomes of forceps assisted and vacuum assisted vaginal deliveries were studied.

When compared to forceps assisted vaginal delivery, vacuum assisted vaginal deliveries causes far less maternal trauma. Both groups show no remarkable differences in foetal morbidity. To do operative deliveries safely, the operator must have sufficient clinical experience and be properly trained.

**Keywords:** Vaginal assisted delivery, forceps, vacuum, kiwi cup

## Introduction

Cesarean delivery has increased during the last few decades, whereas aided vaginal deliveries have decreased. To alleviate the high incidence of cesarean birth, it is suggested that the use of assisted vaginal delivery be increased. These guidelines for tackling the rise in cesarean sections are based on the notion that assisted vaginal delivery is safer than cesarean delivery. The timing and choice of instrument, indications, and contraindications to that procedure, the maternal and fetal risks of using either instrument, the urgency of the need to expedite delivery, the experience and skills of the birth assistant, and the risks associated with the alternative choice of cesarean delivery should all be taken into account when determining whether or not the birth requires assistance. A successful assisted vaginal birth avoids a cesarean section and the uterine scar that comes with it, as well as the concerns for future pregnancies.

Although, in recent years, there has been a decrease in the use of operative forceps in favor of the vacuum extractor. But there is still debate about their safety and effectiveness, and the reintroduction of this technique has a place in emergency obstetrics. The goal of this study is to evaluate and compare the contribution of these instruments to modern obstetrics, as well as to profile mother and fetal outcomes by assisted delivery mode (forceps vs. vacuum)

## Results

Table 1: Distribution of the subjects based on indication for assisted labour in relation to mode of delivery

Indication for Assisted Labour	Mode of Delivery	
	Forceps	Vacuum
Severe Anemia	6(8.0%)	7(9.3%)
Failure of Secondary	15(20.0%)	21(28.0%)

## Materials and methods

The present study was undertaken for women who are admitted for delivery in the department of Obstetrics and Gynecology in King George hospital, Visakhapatnam from December 2020 to November 2021. 75 cases of forceps delivery were compared with 75 cases of vacuum delivery. The cases were chosen based on the criteria for inclusion. Indication for application for operative vaginal delivery was noted and cases were followed thoroughly for the final outcome in terms of maternal morbidity, perinatal morbidity, and mortality were noted and conclusions were drawn.

### Inclusion criteria

1. Singleton deliveries
2.  $\geq 37$  weeks
3. Cephalic presentation
4. EFW 2.5-3.5kg
5. Second stage of labor  $\geq 1$ hr
6. Cervical dilation of  $\geq 8$ cms
7. Attained +3/5 fetal station
8. Rotation completed
9. 1 previous LSCS

### Exclusion criteria

1.  $< 37$ weeks, 2.non cephalic presentation 3. Multiple pregnancy 4. IUD or anomaly5. Previous 2 cesarean section 6. Estimated fetal weight  $< 2.5$ kg or  $> 3.5$ kg

Forces		
Prolonged second stage of labour	7(9.3%)	11(14.7%)
Fetal Distress	32(42.7%)	25(33.3%)
Severe Preeclampsia/ Eclampsia	9(12.0%)	6(8.0%)
Cardiac Disease	3(4.0%)	2(2.7%)
Post LSCS	3(4.0%)	3(4.0%)
Total	75(100%)	75(100%)
Chi-square = 3.625 df-7 p value: 0.822		

Table 2: Distribution of the subjects based on Apgar score at 1minute in relation to mode of delivery

Apgar Score at 1min	Forceps	Vacuum
1-3	3(4.0%)	1(1.3%)
4-6	19(25.3%)	27 (36.0%)
7-10	53(70.7%)	47(62.7%)
Total	75(100%)	75(100%)
Chi-square =2.751 df-2 p value: 0.253		

Table 3: Distribution of the subjects based on fetal morbidity in relation to mode of delivery

Fetal Morbidity	Mode of Delivery		
	Forceps	Vacuum	Total
Cephalohematoma	0(0.0%)	1(1.3%)	1(0.7%)
Facial Marks	8(10.7%)	0(0.0%)	8(5.3%)
Scalp Laceration	2(2.7%)	2(2.7%)	4(2.7%)
Jaundice	0(0.0%)	3(4.0%)	3(2.0%)
None	65(86.7%)	69(92.0%)	134(89.3%)
Total	75(100%)	75(100%)	150(100%)
Chi-square = 12.119 df-4 p-value: 0.016			

Table 4: Distribution of the subjects based on maternal morbidity in relation to mode of delivery

Maternal Morbidity	Mode of Delivery		
	Forceps	Vacuum	Total
No Complications	34(45.3%)	61(81.3%)	95(63.3%)

Perineal Tear	10 (13.3%)	5(6.7%)	15(10.0%)
Cervical Tear	10(13.3%)	2(2.7%)	12(8.0%)
Vaginal lacerations	8(10.7%)	0(0.0%)	8(5.3%)
Extension of Episiotomy	7(9.3%)	7(9.3%)	14(9.3%)
Hematoma	1(1.3%)	0(0.0%)	1(0.7%)
Traumatic PPH	5(6.7%)	0(0.0%)	5(3.3%)
Total	75(100%)	75(100%)	150(100%)

**Discussion**

Table 4: Distribution based on Indications of either group

S No	Indication	Shihadeh et al F (%) V (%)		Achanna et al F (%) V (%)		Present study F (%) V(%)	
		F (%)	V (%)	F (%)	V (%)	F (%)	V (%)
1	prolonged 2nd stage	10	4.76	58	66	9.3	14.7
2	Fetal distress	44.67	38.1	12	12	42.7	33.3
3	Failure of secondary forces	37.3	45.2	10	15	20	28

In the present study, fetal distress being the most common indication of operative vaginal delivery followed by failure of secondary forces. This is similar to the Shihadeh et al study. In Achanna et al study, prolonged second stage of labour is the most common indication of assisted vaginal deliveries.

Table 5:

	Arun H Nayak		Present study	
	Forceps	Vacuum	Forceps	Vacuum
Scalp lacerations	3.29%	14.23%	2.7%	2.7%
Face marks	8.9%	-	10.7%	-
Cephalhematoma	2.35%	9.23%	-	1.3%
Jaundice	2.25%	8.84%	-	4%
Convulsions	1.41%	1.92%	-	-
Skull fractures	0.47%	-	-	-

In the present study, fetal outcome in both these groups did not vary significantly. This in contrast to some of the studies done by other authors where they found increased incidence of jaundice and intracranial hemorrhage in the vacuum group

Table 6: Distribution based on incidence of maternal complications in both groups.

	K. R. Damania		Broekhuizen et al		Present study	
	Forceps	Vacuum	Forceps	Vacuum	Forceps	Vacuum
Cervical tear	4%	0%	6%	3.9%	13.3%	2.7%
Vaginal laceration	11%	5%	23.7%	10.5%	10.7%	0%
Extension of episiotomy	12%	4%			9.3%	9.3%

In the present study, there is increase in maternal morbidity compared to the vacuum delivery (58.7% vs 18.7%).

**Conclusion**

The mother and newborn outcomes of forceps assisted and vacuum assisted vaginal deliveries were studied. When compared to forceps assisted vaginal delivery, vacuum assisted vaginal deliveries causes far less maternal trauma. Both groups show no remarkable differences in foetal morbidity.

Vacuum extraction causes more scalp injuries, such as cephalhaematoma. However, when operative intervention is required in the second stage of labour, the options, risks, and advantages of vacuum, forceps, and caesarean section must be weighed.

Because no one intervention is neither clearly safer or more effective than the other, the decision of intervention must be made on an individual basis.

To do operative deliveries safely, the operator must have sufficient clinical experience and be properly trained.

**List of abbreviations**

- CPD: Cephalopelvic Disproportion
- IUD: Intrauterine Death
- BPD: Biparietal Diameter

ACOG: American College of Obstetricians And Gynecologists

G: Gravida

P: Para

LSCS: Lower Segment Caesarean Section

LOA: Left Occipitoposterior

ROA: Right Occipitoposterior

OA: Occipitoanterior

OP: Occipito Posterior

**Authors contribution**

JSS and KKM conducted and interpreted the patient data of outcomes in vacuum and forceps delivery. KVSM and IVJ analysed the results and gave a major contribution in writing the manuscript. All authors read the final manuscript.

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