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# Operative Vaginal Deliveries in a Teaching Institute in Manipur: A Cohort Study

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## ABSTRACT

**Background:** Operative vaginal deliveries are vaginal deliveries accomplished with the use of a vacuum device or forceps. These are devices which help in the delivery of the fetal head by applying traction. The precise incidence of operative vaginal deliveries is unknown but all around the world, 10-20% of all deliveries are with the help of vacuum or forceps. The choice of the methods depends on the clinical circumstances and experience of the operator. Objective: To determine incidence of operative deliveries and any associated variables with the operative vaginal deliveries and to study maternal and fetal complications associated with operative vaginal deliveries. **Methods:** The study was conducted in the department of obstetrics and gynecology, JNIMS. We collected all the records of the all operative vaginal deliveries conducted in the department for two years from January 2016 to December 2017. Descriptive statistics like mean, SD, percentages was used. Chi-square test was used for find the association. A p-value < 0.05 was considered as statistically significant. **Result:** The overall incidence of operative vaginal deliveries was 8.3% of all deliveries. In the most operative vaginal deliveries age group of (20-30) years 55.6% were done by forceps and 66.3% were done by vacuum deliveries. The operative deliveries are mostly done in Nulliparous women i.e. 65.6%. Maternal exhaustion during labor account for 44.4% of forceps and 49.6% of vacuum deliveries. About 31.7% & 46.4% of operative deliveries were done by forceps & ventouse respectively in the birth weight range of (3-3.5) kg. Of all deliveries 65.9% of babies have APGAR score at birth between 7-10. Significant association was found between operative vaginal deliveries with birth weight, maternal injuries and fetal complication. **Conclusion:** In present study, minor maternal complications was more forceps extraction than with vacuum deliveries. There was more of vaginal lacerations and extension of episiotomy in the forceps group compared to vacuum and cervical tear was common in vacuum group. Approaches to improve the adequate clinical experience and appropriate training of the operator are essential to the safe performance of operative deliveries.

***Keywords:*** Forceps, Vacuum, Cervical tears, Vagina laceration, APGAR

## INTRODUCTION

Operative vaginal deliveries are vaginal deliveries accomplished with the use of a vacuum device or forceps. These are devices which helps in the delivery of the fetal head by applying traction. The precise incidence of operative vaginal deliveries is unknown but all around the world, 10-20% of all deliveries are with the help of vacuum or forceps. The choice of the methods depends on the clinical circumstances and experience of the operator. But the chance of failed delivery with the selected instrument is more likely with the vacuum extraction.[1,2] The response to either fetal distress or apparent fetal distress is not necessarily a cesarean section. What is required is a balanced view of the risks and benefits when any means of assisted delivery is chosen.

Hence it is of utmost importance to consider all available options be it non operative options like observation, assessment and augmentation of labour or operative options. While considering instrumental deliveries, the safety and efficacy of both vacuum and forceps are to be kept in mind and which instrument best answer the present need. Though, in recent years there is a decreasing trend in the use of operative forceps with vacuum extraction taking its place. The controversy regarding their safety still remains. This present study is to analyze and study the contribution of these two instruments to the present day obstetrics.

### Aim & objectives

The aim and objectives of the present study was to look into I) the incidence of operative vaginal deliveries II) to study the variables associated with the operative vaginal deliveries III) Maternal and fetal complications associated with operative vaginal deliveries

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## MATERIALS AND METHODS

This study was conducted in the Department of Obstetrics and Gynecology, JNIMS. We collect all the records of all operative vaginal deliveries conducted during the time period of two years from 1st January 2016 to 31st December 2017. The total no. of deliveries in two years was 11171 patients. All the 926 cases of operative vaginal deliveries were chosen as sample. For this purpose, characteristics of the women i.e. age, parity, foetal weight at birth, indications of the instruments and the associated maternal and fetal complications was recorded and analysed. All the operative vaginal deliveries are conducted by experienced operators in the institution. The choice of the instruments was decided by the the consultants and the senior residents on duty at the time of delivery. For forceps application the ACOG 2000 classification of outlet and low forceps should be fulfilled. As institutional policy mid and high forceps are no longer used. Then we found out variables associated with those operative vaginal deliveries.

### Statistical analysis

All the operative vaginal deliveries cases were entered into Ms Excel and data cleansing was performed. Data was then transferred into IBM SPSS Version 22 software and analysed. Descriptive statistics like mean, SD, percentages was used. Analytical statistics like chi-square test was applied. A p-value is less than 0.05 was considered as statistically significant.

### Inclusion criteria

1. All operative vaginal deliveries conducted in the Department of Obstetrics and Gynecology, JNIMS during the time period of two years from 1st January 2016 to 31st December 2017.

### Exclusion criteria

1. All operative vaginal deliveries with known congenital anomalies and non cephalic presentations.

## RESULTS

**Table 1: Distribution of patients of deliveries in 2 yrs.**

| Type of deliveries in 2 years | No. of deliveries | Percentage |
|---|---|---|
| Total no of LSCS | 5919 | 53% |
| Total no of non operative vaginal deliveries | 4326 | 38.7% |
| Percentage of operative vaginal deliveries | 926 | 8.3% |
| Total no. of deliveries in 2 yrs. | 11171 | 100 |

All the cases operative vaginal deliveries conducted during the time period of two years from 1st January 2016 to 31st December 2017 was analysed in the study. During the study period there were total of 11171 deliveries. Out of this, 926 (8.3%) were done operative vaginal deliveries. The overall incidence of operative vaginal deliveries was 8.3% of all deliveries [Table 1]. During the study period, out of the 926 operative vaginal deliveries 63(6.8%) deliveries were done by forceps and 863(93.2%) deliveries were done by vacuum. [Table 2]

**Table 2: Incidence of operative vaginal deliveries**

| Type of operative Vaginal deliveries | No. of Patients. | Percentage |
|---|---|---|
| Forceps deliveries | 63 | 6.8% |
| Vacuum deliveries | 863 | 93.2% |
| Total No. | 926 | 100 |

**Table 3: Distribution of operative vaginal deliveries patients according to age-wise.**

| Age category | No of forceps cases( %) | No of ventouse cases(%) |
|---|---|---|
| <20 yrs | 11 (17.5%) | 81 (9.9%) |
| 20-30 yrs | 35 (55.6%) | 572 (65.6%) |
| >30 yrs | 17 (26.9%)) | 210 (24.5%) |
| Total | 63 (100) | 863 (100) |
| $X^2$ =5.051 with 2 d.f, p-value=0.080> 0.05, insignificant | | |

**Table 4: Distribution of Operative delivery according to parity.**

| Parity | Forceps | vacuum | Total |
|---|---|---|---|
| | No of cases (%) | No of cases (%) | |
| Nulliparous | 46 (73.0%) | 561 (65.0%) | 607(65.6%) |
| Primiparous | 11 (17.5%) | 198 (22.9%) | 209(22.5%) |
| Multiparous | 6 (9.5%) | 104 (12.1%) | 110(11.9%) |
| | 63(100) | 863(100) | 926 |
| $\chi^2$ = 1.672 with 2 d.f; p-value= 0.433>0.05, insignificant | | | |

**Table 5: Indications of forceps and vacuum based on maternal or foetal complications.**

| | | Forceps | Ventouse | Total |
|---|---|---|---|---|
| | | No of cases (%) | No of cases (%) | |
| Maternal indications | maternal exhaustion | 28 (44.4%) | 431(49.9%) | 459 (49.6%) |
| | prophylactic | 10 (15.9%) | 104 (12.1%) | 114 (12.3%) |
| foetal indications | presumed foetal distress | 25 (39.7%) | 328 (38.0%) | 353 (38.0%) |
| | | 63 (100) | 863 (100) | 926 |
| $\chi^2$=1.098 with 2 d.f; p-value= 0.578 > 0.05 ; insignificance | | | | |

In the present study it was observed that most of operative vaginal deliveries are done in the age group of 20-30 years. In this age group, 55.6% were done by forceps and 66.3% were done by vacuum deliveries. [Table 3] Most of the operative deliveries are done in Nulliparous i.e. 65.6%. The incidence of forceps in Nulliparous was 73 % and the incidence of vacuum was 65%. [Table 4] The most common indications of operative deliveries were because of

maternal factors. Maternal exhaustion probably due to prolonged labor account for 44.4% of forceps and 49.6% of vacuum deliveries. Fetal distress is the next common indication of operative deliveries in our study. There was no significance in occurrence of fetal and maternal complication and mode of assisted delivery p=0.578 > 0.05. [Table 5]

In the present study, most operative deliveries were done in the fetal weight between 3kg – 3.5kg. 31.7% & 46.4% operation were done by forceps & ventouse respectively in the birth weight range of (3-3.5) kg. There was significant association between being operative vaginal deliveries with birth weight p=0.000>0.05 [Table 6]

In 65.9% of babies born by forceps or vacuum, the APGAR score at birth was between 7-10. Out of this 64% of babies in forceps and 66% of babies in vacuum deliveries. Incidence of severely depressed babies were 4.8% and 2% in forceps and vacuum deliveries respectively. [Table 7]

**Table 6: Association between Operative deliveries and birth weight.**

| Birth weight | Forceps No of cases (%) | Ventouse No of cases (%) | Total(%) |
|---|---|---|---|
| <2.5kg | 10(15.9%) | 28(3.2%) | 38(4.1%) |
| 2.5kg -3kg | 18(28.6%) | 318(36.8%) | 336(36.3%) |
| 3kg -3.5kg | 20(31.7%) | 400(46.4%) | 420(45.5%) |
| >3.5kg | 15(23.8%) | 117(13.6%) | 132(14.3%) |
| total | 63 | 863 | |
| $\chi^2$= 31.016 with 3 d.f.; p-value=0.000<0.05, Significant | | | |

**Table 7: APGAR score of baby at birth.**

| APGAR score | Forceps No of cases (%) | Vacuum No of cases(%) | Total (%) |
|---|---|---|---|
| <3 | 3 (4.8%) | 17 (2%) | 20 (2.2%) |
| 4-6 | 20 (32%) | 276(32%) | 296 (32.0%) |
| 7-10 | 40 (64%) | 570 (66%) | 610 (65.9%) |
| Total | 63 (100) | 863 (100) | 926 (100) |
| $\chi^2$=2.178 with 2 d.f; p-value=0.336 > 0.05; insignificant | | | |

In this present study, vaginal lacerations and extension of episiotomy incision were the most common complications seen in forceps. But there were no significant complications in 60.3% of forceps and 68.0% of vacuum deliveries. Vaginal lacerations were more common in forceps but cervical complications were more common with vacuum. There was significant association between being operative vaginal deliveries with birth complications. [Table 8].

Minor facial marks and scalp injuries were the most common fetal complications seen in forceps and vacuum deliveries. There was insignificant association between being operative vaginal deliveries with fetal complications. [Table 9]

**Table 8: Maternal injuries during operative deliveries**

| Complications | Forceps No of cases (%) | Vacuum No of cases (%) | Total(%) |
|---|---|---|---|
| vaginal lacerations | 9 (14.3%) | 86 (10.0%) | 95 (10.3%) |
| cervical tears | 5 (7.9%) | 155 (18.0%) | 160(17.3%) |
| extension of episiotomy wound | 9(14.3%) | 34 (3.9%) | 43 (4.6%) |
| vulval hematoma | 2 (3.2%) | 0 (0.0%) | 2 (0.2%) |
| no significant complications | 38 (60.3%) | 588 (68.0%) | 626(67.6%) |
| Total | 63(100) | 863 (100) | 926 (100) |
| $\chi^2$= 45.944 with 4 d.f; p-value= 0.000 <0.05; significant | | | |

**Table 9: Operative deliveries by incidence of fetal complications.**

| Fetal complication | Forceps No of cases (%) | Vacuum No of cases (%) | Total (%) |
|---|---|---|---|
| Facial marks & abrasios | 6 (9.5%) | 0 (0.0%) | 6 (0.6%) |
| Scalp injuries | 3 (4.8%) | 68 (7.9%) | 71 (7.7%) |
| Convulsion | 3 (4.8%) | 19 (2.2%) | 22 (2.4%) |
| Jaundice | 4 (6.3%) | 86 (10.0%) | 90 (9.7%) |
| Nil | 47(74.6%) | 690 (80.0%) | 737(79.6%) |
| Total | 63 (100) | 863 (100) | 926(100) |
| $\chi^2$=85.556 with 4d.f; p-value=0.000>0.05, insignificant | | | |

## DISCUSSION

The present study shows the incidence of operative vaginal deliveries was 8.2% of all the deliveries conducted during the time period. This is similar to the incidence reported worldwide. According to study conducted in UK by Menira Gi and Royal College of Obstricians & Gynaecologists Audit Committee the rates of operative vaginal deliveries was between 10%and 13%.[7,8]

In the present study, the incidence of forceps in nulliparous was 73% and the incidence of vacuum was 65%. It was high compared to the rates of use of forceps 66% and vacuum 60% in a study by G Sharmila et.al.[4] But similar incidences were found in use of forceps was 78% &76% compared to vacuum which were about 82% &74% in the studies by Jhonson et. al.[6] and Shihadeh et.al.[5] The higher incidence in nulligravidea & primigravidae may be due to inexperience about the delivery and maternal fatigue and exhaustion because of prolonged labor in compared multigravidae.

In the present study the maximum numbers of OPV are conducted on patients in the age between 20-30 yrs of age. This was similar to the study done in Kannur by Asokan K M et.al.[9] where the age group 20-25 yrs is maximum.

Most common birth weight group of the babies in the present study were in between 3.1- 3.5 kg. In this study, 31.7% in forceps and 46.3% in vacuum deliveries were in the group of 3.1- 3.5 kg. This was similar to the study by Shihadeh, et al.[5] where the most common weight group of babies between 3.1-

3.5 kg were 24% in forceps and 31.9%in vacuum. But in a study by Jhonson, et al.[6] weight of babies between 2.5-4 kg were 82% in forceps and 84% in vacuum. In our study, there was significant association between being operative vaginal deliveries with birth weight but the study by Shihadeh, et al.[5] there was no significant association between being operative vaginal deliveries with birth weight.

The APGAR score of babies in the first minute between 7-10 was 63.5% in forceps and 66% in ventouse deliveries in this present study. Only 4.8% of babies in forceps and 2% babies in vacuum group have Apgar score less than 3. On the other hand, in the study by A. Shihadeh, et al,[5] the incidence of APGAR score between 7-10 was 65% in forceps and 63.5% in vacuum. In another study by G Sharmila et al the APGAR score at birth between 7-10 was 64% in forceps and 70% in vacuum deliveries.

In the study by A. Shihadeh, et al,[5] perineal injuries, extension to fornix and vaginal laceration were all significantly more common in forceps group, as were cervical tears ($p< 0.05$) But in our study laceration of the vaginal walls and extension of episiotomy wound were the most common maternal complication encountered in forceps delivery. On the other hand minor cervical tear was more common in ventouse delivery.

Study by A. Shihadeh, et al,[5] showed facial cuts and abrasions were more in forceps group with significance difference. In our study also facial cuts and abrasions were more in forceps group with significance difference.

## CONCLUSION

The overall incidence of operative vaginal deliveries in our study was 8.3%. There is less maternal and fetal complication with vacuum extraction than with forceps deliveries. Jaundice is more common with the vacuum extraction while facial marks and abrasions are more common with forceps delivery. There were more of vaginal lacerations and extension of episiotomy in the forceps group compared to vacuum and cervical tears was common in vacuum group. The results of the present study confirmed that forceps deliveries are more traumatic to the mother than vacuum extraction.

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