

# A 10-year review of instrumental vaginal delivery at the University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria

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## ABSTRACT

**Background:** Instrumental vaginal deliveries are conducted for either maternal or fetal indications to shorten the second stage of labour. Global trends show a diminished instrumental delivery rates.

**Objectives:** To determine the prevalence, indications, complications, and the trend of instrumental vaginal deliveries at the University of Port Harcourt Teaching Hospital.

**Materials and Methods:** This was a retrospective study of 164 women who had an instrumental vaginal delivery over a 10-year period at the University of Port Harcourt Teaching Hospital from January 1, 2008, to December 31, 2017. Data obtained from the labour ward registers and case notes of patients were entered into a proforma and analyzed using EPI-info ver. 7. *P* value of 0.05 was set as significant at 95% confidence interval.

**Results:** The incidence of instrumental vaginal delivery was 0.67% of all deliveries. Vacuum delivery accounted for 0.63% whereas forceps delivery was 0.04%. Delayed second stage of labour (56; 34.15%) and severe pre-eclampsia/eclampsia (42; 25.61%) were the most common indications. Senior resident trainees conducted majority (121; 73.78%) of the deliveries. The most common maternal complications were perineal tears (13; 50%) and primary postpartum haemorrhage (11; 42.31%). These maternal complications significantly occurred more with vacuum delivery (*P* value = 0.001). About half of the babies (80; 47.62) had birth asphyxia.

**Conclusion:** The instrumental vaginal delivery rate in this study is very low despite being an alternative to caesarean section. Therefore, efforts should be made toward training and retraining of doctors on this skill to reduce maternal and fetal morbidity associated with the procedure, and also reduce the caesarean section rate.

**Key words:** Forceps delivery; instrumental vaginal delivery; Port Harcourt; trend; vacuum delivery.

## Introduction

Instrumental vaginal delivery (IVD) is a key element of essential obstetric care, and significantly reduces maternal and newborn morbidity and mortality especially in resource poor countries.<sup>[1]</sup> It is an alternative to caesarean section (CS) especially in our environment with a high aversion to CS. The decision as to whether a particular birth requires assistance, the choice, and timing of any intervention depends on

weighing the risks against the benefits of the particular procedure chosen, the skills of the operator, and the urgency to expedite delivery.<sup>[2]</sup> There has been a progressive decline in the rate of IVD especially in developing countries, with a

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shift from the use of forceps to vacuum extractor, which now accounts for almost four times the rate of forceps-assisted vaginal delivery.<sup>[3-5]</sup> This may be because the skill is easily acquired compared with the forceps and is considered safer with less maternal and fetal complications compared with use of forceps.<sup>[6,7]</sup> Also, it is easier to train the non-specialist doctors to use the vacuum extractor because it has an in-built safety mechanism which makes it a safe instrument even in the hands of the inexperienced. The vacuum extractor can be used in the late first stage of labor at 8 cm cervical dilatation and above for fetal distress or cord prolapse.<sup>[6]</sup> This is a very significant advantage over the forceps in our environment.

The rate of IVD varies from one country to another, and even in the same country, from one obstetric unit to another. It ranges between 10% and 15% in the United Kingdom and 4.5% in the United States,<sup>[8]</sup> while in Istanbul and India, rates of 1.4% and 2.8% were reported, respectively.<sup>[9,10]</sup> In Nigeria, the IVD rate is between 0.69% and 3.7%.<sup>[11-13]</sup> While the forceps delivery rate ranged from 0.9% to 6%,<sup>[14]</sup> vacuum delivery rates of between 1.5% and 3.5% have been reported from Zaria, Enugu, Ilorin, Benin, Maiduguri, and Kano.<sup>[15-18]</sup> The indications for IVD include delayed second stage of labour, poor progress of labour due to maternal fatigue or exhaustion, and fetal distress or non-reassuring fetal heart rate tracing the second stage of labour.<sup>[19]</sup> Other maternal indications include medical conditions such as cardiac diseases, especially New York Heart Association (NYHA) class III/IV, or neurologic diseases, including uncorrected intra-cerebral vascular malformations as well as hypertensive crisis, myasthenia gravis, spinal cord injury patients at risk of autonomic dysreflexia, and proliferative retinopathy.<sup>[19]</sup> Instrumental vaginal deliveries still maintain a place of importance in modern obstetric practice, and in this regard, this study sought to determine the prevalence, indications, complications, and trend of IVD at the University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt.

## Materials and Methods

### Study site

The UPTH is a tertiary hospital with an average of 3,000 deliveries conducted annually. The hospital has approximately 900 bed spaces with the obstetric unit having a total of 135 beds. There are five units; each unit has four consultant obstetricians, four specialist senior registrars, and three registrars with many experienced nurses and midwives. The obstetric unit caters for both booked and unbooked clients.

### Methods

This was a retrospective study of all women who had instrumental vaginal deliveries at the UPTH, Port Harcourt, over a 10-year period, from January 1, 2008, to December 31,

2017. Data were retrieved from the labour ward registers and case notes over the period under review and entered into a pre-structured proforma created for this purpose. The variables collated included the age, parity, gestational age, cadre of accoucher, indication/type of instrumental delivery, blood loss, and neonatal and maternal complications. Ethical approval for this study was obtained from the Hospital Ethics Committee.

### Statistical analysis

EPI-info ver. 7.0 was used for analysis. The results are presented in simple percentages and tables. *P* values < 0.05 was considered statistically significant.

## Results

There were 164 instrumental vaginal deliveries out of 24,578 deliveries within the 10 years under review, giving a prevalence rate of 0.67%. The incidence rate for vacuum delivery was 0.63%, while that for forceps was 0.04%. Vacuum delivery accounted for more IVD (154; 93.90%), as against forceps (10; 6.10%). The ages of the patients ranged between 16 and 40 years with a mean of  $28.57 \pm 4.48$  years. The mean gestational age at delivery was  $38.71 \pm 2.0$  weeks. Majority of the IVD (147; 89.63%) were performed on term neonates (Gestational age  $\geq 37$  weeks). The socio-demographic characteristics of the patients are shown in Table 1. Table 2 shows that delayed second stage of labour (56; 34.15%) was the most common indication for IVD, followed by severe pre-eclampsia/eclampsia (42; 25.61%) and fetal distress (22; 13.41%). The instrumental delivery rate was fairly constant over the period under review and did not show any statistically significant trend between CS rate and IVD rate [Figure 1]. Majority (121; 73.78%) of the procedures were conducted by senior residents, and consultant obstetricians conducted 23 (14.02%) procedures [Figure 2]. Table 3 shows that the most common maternal complications were perineal tears (13; 50.0%) and primary postpartum haemorrhage (11; 42.31%). These maternal complications/morbidities were significantly higher with the vacuum extractor than forceps as shown in Table 4. Of the 143 live babies delivered, about half (80; 47.62%) had birth asphyxia while 15 (8.93%) were of low birth weight. Twenty-five (14.88%) had perinatal death although the deaths were not directly related to the IVD. This is shown in Table 5. They were mainly as a result of the maternal complication the mothers presented with especially severe pre-eclampsia/eclampsia. Seven (4.17%) neonates were admitted in the Special Care Baby Unit (SCBU) and were all discharged to their mother after treatment.

## Discussion

The overall rate of IVD in this study was 0.67% and is

**Table 1: Sociodemographic characteristics**

Characteristics (n=164)	Frequency (%)
Mean age (years)	28.57±4.48
Age range	
<20	5 (3.05)
20-24	21 (12.80)
25-29	73 (44.51)
30-34	50 (30.49)
≥35	15 (9.15)
Parity	
0	105 (64.02)
1	40 (24.39)
2	14 (8.54)
3	2 (1.22)
4	2 (1.22)
≥5	1 (0.61)
Mean GA	38.71±2.0
Gestational age (weeks)	
<37	17 (10.37)
≥37	147 (89.63)

**Table 2: Indications for instrumental vaginal delivery**

Indications (n=164)	Frequency (%)
Delayed second stage of labor	56 (34.15)
Elective-shortening of second stage of labor	
Severe pre-eclampsia/eclampsia	42 (25.61)
Twin gestation	4 (2.44)
Abruptio placenta	6 (3.66)
Preterm delivery	6 (3.66)
Medical disorders	8 (4.89)
Cord prolapse	4 (2.44)
Fetal distress	22 (13.41)
Not indicated	16 (9.76)

**Table 3: Maternal complications/morbidities**

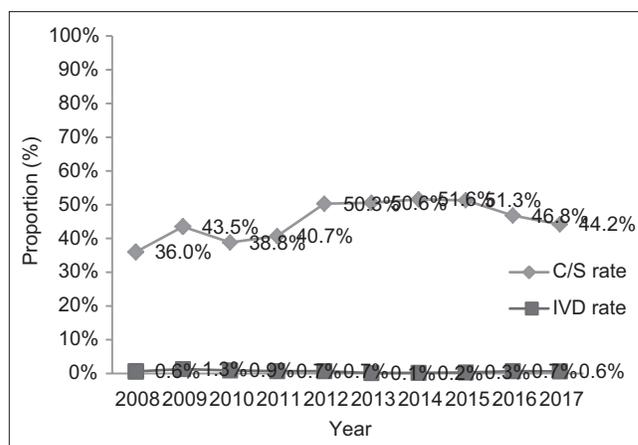
Complications (n=26)	Frequency (%)
Perineal tears	13 (50.0)
Postpartum haemorrhage	11 (42.3)
Cervical tear	2 (7.7)
Maternal death	0 (0.0)
Ruptured uterus	0 (0.0)

**Table 4: Association between maternal complications/morbidities and type of IVD**

Maternal complications	Type of IVD		Total	χ <sup>2</sup> (P)
	Vacuum	Forceps		
Perineal tears	12 (46.15)	1 (3.85)	13 (50.0)	12.41 (0.001)*
Postpartum haemorrhage	11 (42.31)	0 (0.0)	11 (42.31)	13.95 (0.001)*
Cervical tear	2 (7.69)	0 (0.0)	2 (7.69)	0.52 (0.471)
Total	25	1	26	

\*Statistically significant (P<0.05)

comparable with the study from Bauchi, Northeast Nigeria, which also gave a rate of 0.69%.<sup>[11]</sup> It is, however, much

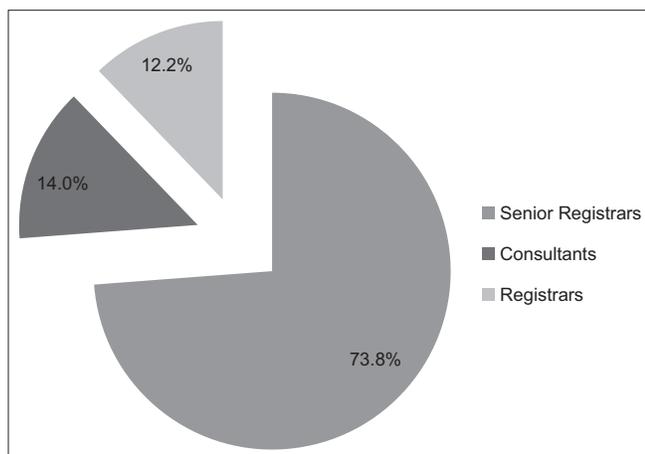


**Figure 1: Trend of CS and IVD over 10 years**

lower than that reported from Sokoto, Ibadan, Enugu, Zaria, and Abakaliki, with reported rates of 1.06%, 1.57%, 1.5%, 3.6%, and 3.7%, respectively.<sup>[12-15,20]</sup> It is also lower than the recommended rate of 8.5% by the Royal College of Obstetricians and Gynaecologists (RCOG) and much lower than the rates in developed countries.<sup>[19]</sup> This difference may be due to early recourse to CS in our centers due to inexperience on the part of practitioners on instrumental delivery methods. In this study, majority of the instrumental deliveries were conducted by vacuum extraction, by application of silastic cups, while the forceps delivery was performed by application of low outlet forceps (Wrigley's forceps). The incidence of vacuum delivery was 0.63%, while that of forceps was 0.04%. Similar rates were obtained in Sokoto.<sup>[12]</sup> The preference for vacuum over forceps as the instrument of choice found in this review is similar to findings from previous studies.<sup>[12,14,20]</sup> Over the years, there has been a gradual shift from the use of forceps to the vacuum. This may be because the vacuum is safer, the skill is more easily acquired, and it has an in-built safety mechanism.<sup>[6,7]</sup> On the contrary, application of forceps is more difficult technically and requires more time to acquire the skill. The rate of IVDs was fairly constant during the period under review despite the rising CS rate unlike in developed countries where the rates are declining due to litigations.<sup>[19,21]</sup> Most of the parturients that had IVD were primigravidae, hence predisposed to delays in second stage of labour due to maternal exhaustion, anxiety, and uterine inertia. This finding is comparable with the reports from India, Bauchi, and Sokoto.<sup>[10-12]</sup> Majority of the vacuum procedures were carried out at term, which is the acceptable practice. Most authorities consider it a contraindication if the gestational age is less than 34 weeks, due to increased risk of cephalhaematoma.<sup>[6]</sup> The most common indication for IVD was delayed second stage from uterine inertia, poor maternal effort, and exhaustion. This is similar to findings from previous studies.<sup>[11,12,14,15,18,20,22]</sup> This may be due to

**Table 5: Neonatal outcome**

Outcome (n=168)	Frequency (%)
Alive	143 (85.12)
Apgar score <7 at 1 min	80 (47.62)
Perinatal death	25 (14.88)
Low birth weight (<2.5 kg)	15 (8.93)
Neonatal admission in SCBU	7 (4.17)

**Figure 2: Cadre of accouchers**

the similar demographic and obstetric characteristics in the parturients in those regions. However, it is at variance with the report from Istanbul and Ethiopia, which showed fetal distress as the most common indication for IVD.<sup>[9,23]</sup> The procedures were conducted mainly by resident doctors. This is because majority of the patients presented as unbooked emergencies late at nights when these doctors are on call duty. A similar finding was reported in Sokoto.<sup>[12]</sup> The most common maternal complication was perineal tears, followed by primary postpartum haemorrhage. Surprisingly, these were commoner in the parturients that had vacuum delivery. This may be due to extension of an already given episiotomy or due to failure to give an episiotomy before the procedure was carried out. Also, the primary postpartum haemorrhage may have been as a result of delay in suturing the different degrees of perineal tears, cervical lacerations, and episiotomy. Similar reports were obtained from other studies.<sup>[9-11,15,23]</sup> Thus, prompt suturing of tears and episiotomy and active management of the third stage of labour will help to reduce complications arising from IVD. However, it is at variance with the findings from other studies which showed primary postpartum haemorrhage as the most common complication.<sup>[12,18]</sup> This difference may be due to the skill of the birth attendant and the choice of instrument used. Birth asphyxia was the most common neonatal complication, occurring in about half of the parturients. This is not surprising considering the different indications for which the procedures were carried out. This finding is comparable with previous

reports,<sup>[1,10,12,23]</sup> but at variance with the report from India which showed cephalhaematoma as the most common neonatal complication.<sup>[24]</sup>

## Conclusion

IVD rate is low in our center, and the use of forceps is almost a disappearing art while the use of vacuum remained constant over the period under review. There is need for concerted efforts to have the consultants with the requisite skills present during calls to improve uptake of IVDs. This will go a long way to also impart the required skills to the junior residents. The provision of skill laboratories in tertiary facilities as an important component of residents' training and increased update courses to bridge the knowledge gap will go a long way in improving the gross underutilization of IVDs. When IVDs are performed by skilled providers whose numbers would be increased by the steps outlined, these become a credible alternative to caesarean delivery in carefully selected patients, especially in our environment where there is a high aversion to CS.

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## Conflicts of interest

There are no conflicts of interest.

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