

## Instrumental vaginal delivery “A dying Act” in low resource setting

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### Abstract

#### Background

The appropriate selection and timely application of instrumental vaginal delivery in the second stage of labour can significantly reduce perinatal morbidity and mortality as well as reduce caesarean section rates.

**Materials and method:** The delivery register and the electronic medical records of women seen and managed in our delivery ward between 1<sup>st</sup> January 20014 to 31<sup>st</sup> December 2019 were searched and such information as the bio-data, booking status, instrumental vaginal delivery and their indications as well as the fetomaternal outcome were extracted and analysed. Results are presented in percentages and figures.

**Results:** There were 8595 deliveries with 102 cases of instrumental vaginal delivery during the period under review giving a rate of 1.2%. Vacuum delivery accounted for 88.2% while Forceps accounted for the remaining 11.8%. The common indications for instrumental vaginal delivery are delayed second stage of labour, pre-eclampsia and maternal exhaustion in second stage. Both instruments are relatively safe as there was no statistically significant difference in fetomaternal outcome.

**Conclusion:** Instrumental vaginal delivery though an essential obstetric skill is on the decline in their popularity especially obstetric Forceps despite its relevance in low resource setting as it can reduce the cost of care and fetomaternal morbidity and mortality associated with caesarean sections. Though there is a rise in the use of vacuum over forceps, fetomaternal outcome is similar in both groups therefore there is need for deliberate and concerted effort to pass the skill down to the younger ones before the act is lost.

**Key words:** Fetomaternal outcome, incidence, indications, instrumental vaginal delivery, Low resource setting

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### I. Introduction

Instrumental vaginal delivery is the use of special instruments namely obstetric forceps and ventouse (Vacuum) to effects vaginal delivery for either maternal or fetal indications or both<sup>1</sup>. It is a key component of basic emergency obstetric care services and has remained an essential clinical skill in the hands of trained obstetricians.<sup>2</sup> Though the use in obstetric practice dates back to the times of the Chamberlens many centuries ago, the popularity of obstetric forceps has witness a downward trend over the years among younger obstetricians especially in low resource countries partly due to either lack of skill or equipment or both.<sup>3</sup> In a multicentre prospective population based study, Margo S Harrison et al reported a decline in instrumental vaginal delivery rate from 1.6% to 0.3% while caesarean section rate increased from 6.4% to 14.4% same period.<sup>4</sup> Individual/obstetrician preference and dexterity as well as unit protocol, the clinical presentation and maternal choice usually influence the choice of either instruments in clinical practice.

The use of instrumental vaginal delivery in most obstetric units is on the decline especially among younger obstetricians in low resource setting despite the potential in reducing caesarean section rates and the advances and safety measures put in place over the years.

The incidence of instrumental deliveries varies considerably ranging between 1% and 25% of deliveries worldwide.<sup>5,6</sup> The incidence is higher in high income countries as against low and middle income countries partly due to lack of skill and/or equipment in the latter nations. Reported incidence in Africa is 1-4%<sup>6-9</sup>, 10% in the United Kingdom and 4.5% in the United States.<sup>10,11</sup> In Nigeria incidence of 0.69% -3.6% have been reported.<sup>8,9</sup>

The steady rise in popularity of vacuum over forceps in recent years may not be unconnected with the perceived ease and safety of the instrument, however, evidence of improved safety over forceps in a well trained hand is limited. A randomized controlled trial failed to demonstrate significant difference in long-term maternal pelvic floor function between forceps and vacuum and there was no difference in 5<sup>th</sup> minute Apgar score of babies in both groups.<sup>12&13</sup>

The caesarean section rate has been on the increase globally with a wide range of indications including delayed second stage and fetal distress in stage second of labour. Instrumental vaginal delivery can significantly reduce the caesarean section rate as some of the indications overlapped. This should be of interest in low and middle income countries where aversion to abdominal delivery is common and may not be readily available. With proper patient selections and appropriate application of either forceps or vacuum, deliveries of such cases can be done safely thereby reducing the cost of care and feto-maternal morbidity and mortality associated with caesarean section.

The objective of the study was to determine the incidence, indications and feto-maternal outcome of instrumental vaginal deliveries in Keffi North Central Nigeria.

## II. Materials And Method

**Study Setting:** The study was carried out at the Obstetric unit of Federal Medical Centre Keffi. Federal Medical Centre Keffi is a Tertiary Health facility that serves Nasarawa State in North central Nigeria and its environs as well as neighbouring states of Kaduna, Benue, Niger, Kogi and Federal Capital Territory in Nigeria. The obstetric unit has 30-bed space capacity with average delivery rate of 150 per month and emergency caesarean section rate of 12.5%.

**Study design:** The study was a cross sectional retrospective study spanning 6 years from 2014 to 2019.

**Study population:** The study involved all parturient who had instrumental vaginal deliveries at Federal medical Centre Keffi from 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2019. A total of 102 parturient were involved in the study.

**Data collection and analysis:** Using the delivery register in the labour ward and patient’s electronic medical records, relevant data including age, parity, booking status, type of instrumental delivery and feto-maternal outcome were extracted and analyzed using SPSS software version 20. Results were presented in percentages, figures and charts.

## III. Results

There were 8595 deliveries with 102 cases of instrumental vaginal delivery during the period under review giving a rate of 1.2%. Vacuum delivery accounted for 88.2% while Forceps accounted for the remaining 11.8%.

The age of the women ranged from 18 to 35 years with mean of 27.09 ±5.479. Most of the women were aged 25-34 years (54.9%). Primigravida constitute half (50%) of the parturient with their parity ranging from 0-7, mean of 1.44 ±2.149. Those that are booked were 64.7% as against 35.3% that were un-booked. (Table 1)

Variables	Frequency	Percentage
<b>Table 1: Socio-demographic characteristics N=102</b>		
<b>Age (years)</b>		
<20 yrs.	9	8.8
20 – 24 yrs.	24	23.5
25 – 29	30	29.4
30 – 34	27	26.5
35 yrs. & above	12	11.8
<b>Mean ±SD; min.; max.</b>	<b>27.09 ±5.479; 18; 35</b>	
<b>Parity</b>		
Primigravida	51	50
Primiparous	24	23.5
Multiparous	18	17.6
Grand multiparous	9	8.8
<b>Mean ±SD; min.; max</b>	<b>1.44 ±2.149; 0; 7</b>	
<b>Booking status</b>		
Booked	66	64.7
Unbooked	36	35.3

**Table 2A: Type of instrumental delivery**

	Frequency	Percent
Vacuum	90	88.2
Forceps	12	11.8
Total	34	100.0

**Table 2B: Cadre of Doctors and Instrumental vaginal delivery**

	Cadre of doctors		Total
	senior registrar	consultant	
Vacuum	60 66.7%	30 33.3%	90 100.0%
Forceps	3 25.0%	9 75.0%	12 100.0%
Total	63 61.8%	39 38.2%	102 100.0%

Vacuum delivery is clearly the instrument of choice here as it accounted for 88.2% while Forceps represented 11.8%, 66.7% cases of Vacuum deliveries was undertaken by resident doctors as against 25% for Forceps. (Table 2a & 2B respectively)

**Table 3: Indications**

	Frequency	Percent
pre eclampsia	12	11.8
Delayed 2nd stage	45	44.1
Maternal exhaustion	15	14.7
Fetal distress	9	8.8
Chronic hypertension	18	17.6
SCD	3	2.9
Total	102	100.0

Table 3 shows the indications for instrumental vaginal delivery in the centre. Delayed second stage of labour accounted for 44.1%, hypertensive disorders in pregnancy (preeclampsia and chronic hypertension) was 29.4% while maternal exhaustion in second stage, fetal distress and sickle cell disease accounted for 14.7%, 8.8% and 2.9% respectively.

**Table 4: Maternal complications**

	Frequency	Percent
Nil	81	79.4
episiotomy extension	15	14.7
cervical laceration	3	2.9
perineal laceration	3	2.9
Total	102	100.0

Table 4 shows maternal complications. Majority (79.4%) had no complications, 14.7% had extension of episiotomy incision while cervical laceration and perineal laceration accounted for 2.9% each.

**Table 5: Fetal Outcome**

**N= 102**

Variables	Frequency	Percentage
<b>SCBU admission</b>		
Yes	27	26.5
No	75	73.5
<b>Apgar score 1<sup>st</sup> minute</b>		
<7	42	41.2
>= 7	60	58.8
<b>Mean ±SD</b>	<b>6.35 ±1.59;2;8</b>	
<b>Apgar score 5<sup>th</sup> minute</b>		
<7	12	11.8
>=7	90	88.2
<b>Mean ±SD; min.; max.</b>	<b>7.79 ±1.250 ;5;9</b>	
<b>Birth weight (grams)</b>		

Normal (2500 – 3900g)	96	94.1
Macrosomic (>=4000g)	6	5.9
<b>Mean ±SD; min.; max.</b>	<b>3.266 ±0.380; 2.6; 4200</b>	

Table 5 shows fetal outcome where 26.5% of the babies were admitted into special care baby unit (SCBU) while 11.8% had Apgar score less than 7 at 5 minutes

**Table 6: Maternal complications and Type of instrumental delivery**

	Maternal complications				Total
	Nil	episiotomy extension	cervical laceration	perineal laceration	
Vacuum	78 86.7%	6 6.7%	3 3.3%	3 3.3%	90 100.0%
Forceps	3 25.0%	9 75.0%	0 0.0%	0 0.0%	12 100.0%
Total	81 79.4%	15 14.7%	3 2.9%	3 2.9%	102 100.0%

Pearson Chi-Square 2.595<sup>a</sup> df1 Asymp. Sig. (2-sided) .107

No significant difference in maternal complications in both instruments as seen on table 6.

#### IV. Discussion

The use of specialized instrument in aiding vaginal delivery remains an essential obstetric skill though the use of obstetric Forceps seems to be on the decline while that of vacuum is on the rise globally.

A total of 8595 deliveries were recorded during the period under review with 102 cases of instrumental vaginal deliveries giving an incidence rate of 1.2%. Vacuum accounted for 88.2% while forceps accounted for 11.8%. This is similar to figures in some Nigerian studies and other low and middle income countries.<sup>4,6,14</sup> This may not be unconnected to similar level of health care delivery services and the early recourse to caesarean section by health care providers probably due to lack of skill and/or equipment for assisted vaginal delivery. The rate is however lower than the rates from Zaria, UK, USA and Canada.<sup>8,10 &11</sup> Over the years it has been noted that instrumental vaginal delivery rates are higher in high income countries than low and middle income nations probably due to better health care delivery services with more skilled birth attendants at delivery and readily available equipment. This ensures that such skills as instrumental delivery are passed down to successive generation of younger obstetricians.

Most of the women were aged 25-34 years (54.9%) with mean age of 27.09 ± 5.479, this is the most active reproductive years. The parity of the parturient ranged from 0-7 with mean of 1.44 ±2.149. Majority of the women were primigravida (50%) this is similar to the Zaria study<sup>8</sup>.

Vacuum delivery was the most widely used (88.2%) as against Forceps (11.8%) in the centre. This is similar to most studies in resource constrain countries<sup>7,15</sup> except the Zaria study where forceps was the preferred instrument of choice.<sup>8</sup> The popularity of Vacuum may be due to its presumed ease and safety especially among the younger colleagues. As shown from the study 75% of all forceps deliveries at the centre were undertaken by consultants while Vacuum was more popular among the residents. This may be due to lack of skills for Forceps and the fear of complications. This underscores the need for deliberate and concerted efforts to pass the skill down to the younger ones before the ‘act’ of Forceps is lost.

The commonest indications for instrumental vaginal delivery in my centre was delayed second stage of labour representing 44.1%, others include maternal medical conditions like pre eclampsia, chronic hypertension and sickle cell disease where on due maternal effort in second stage of labour is not encouraged and may be out rightly hazardous. Maternal exhaustion and fetal distress are the other reasons for instrumental vaginal delivery. This is similar to other findings from Ilorin, Zaria, Bauchi, and Jos.<sup>6,8,12,16</sup>

Both instruments are relatively safe when used properly and in a well trained hand (Table 6), majority of our parturient had no complications (79%). Some of the observed maternal morbidities include extension of episiotomy incision, cervical laceration and perineal tear. There was no statistically significant difference in maternal morbidity with either instrument. This is supported by a randomized controlled trail that failed to demonstrate significant difference in long-term maternal pelvic floor function between forceps and vacuum.<sup>15</sup> The main fetal morbidity associated with the procedure was birth asphyxia as 11.8% of the babies had Apgar score less than 7 at 5 minutes while 26.5% of the babies were admitted into special care baby unit (SCBU). The fetal outcome was however similar between the two groups as there was no statistically significant difference (p-value >0.05). This is supported by findings from other studies and randomized controlled trials<sup>12</sup> this may be due to better patient selection and adherence to safety measures.

## V. Conclusion

Instrumental vaginal delivery though an essential obstetric skill is on the decline in their popularity especially obstetric Forceps despite its relevance in low resource setting as it can reduce the cost of care and fetomaternal morbidity and mortality associated with caesarean section. Though there is a rise in the use of vacuum over forceps, fetomaternal outcome is similar in both groups therefore there is need for deliberate and concerted efforts to pass the skill down to the younger ones before the act is lost.

**Conflict of interest:** None.

**Sponsorship:** None

**Ethical Approval:** Ethical approval was obtained from the hospital ethical committee

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