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Original Research Article

## Outcome of instrumental vaginal delivery in university of Abuja teaching hospital: a five-year review

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### ABSTRACT

**Background:** Most women will achieve spontaneous vaginal delivery; however, a few will need assistance in form of Instrumental vaginal delivery (IVD). These are employed to shorten the second stage on labour and to minimize the incidence of cesarean section. The aim of the study was to determine the prevalence and outcomes of instrumental vaginal delivery at the University of Abuja teaching hospital.

**Methods:** This was a retrospective study of women who had instrumental vaginal delivery over a 5-year period at the University of Abuja teaching hospital. Data on socio-demographic variables, type of instrumental delivery performed, Apgar scores of neonates delivered, indications and complication were obtained from the labour ward registers and case notes of patients and entered into a proforma and analysed using SPSS software for Windows version 23.

**Results:** Instrumental vaginal delivery (IVD) rate performed for both Vacuum or Forceps) was 0.99%, Forceps delivery was 0.30% and vacuum accounted for 0.69% of all deliveries. The mean maternal age was 27.53±5.5 years and 51 (54.8%) of the parturient were primigravidae, 55 (59.1%) were booked patients. Delayed second stage of labour (38.7%) was the most common indications for IVD. Maternal complications noted were genital tract laceration 17 (18.3%) and primary post-partum haemorrhage 10 (10.8%). The mean APGAR scores was 6 and 8 in the first and fifth minutes respectively, live births were 85 (91.4%), stillbirths were 7 (7.5%) and one early neonatal death was recorded (1.1%) due to asphyxia as a result of difficult forceps delivery.

**Conclusions:** The IVD rate at UATH is low with good maternal and fetal outcome and preference for vacuum delivery

**Keywords:** Vacuum and forceps deliveries, Complications, Abuja, Nigeria

### INTRODUCTION

Instrumental vaginal delivery is the delivery of a baby vaginally using any type of obstetrics forceps or vacuum extraction. The term operative vaginal delivery and instrumental vaginal delivery are used interchangeably. It is an age-long obstetric practice used to expedite delivery or avert recourse to caesarean delivery.<sup>1</sup> It is a vital component of basic emergency obstetric care worldwide and remains an integral part of the obstetrician's duties. It may take the form of instrumental deliveries, employing obstetric forceps and vacuum extractor to shorten the second stage of labor.

The goal is to expedite delivery with minimal maternal and fetal morbidity and mortality and the relevance of these procedures cannot be over emphasized in a resource constraint setting like ours where poverty, ignorance and obnoxious cultural practices have led to a very high morbid aversion for cesarean section among obstetric women.<sup>1</sup> The advent of obstetric forceps and use of vacuum devices have revolutionized obstetric practice. Despite the use of newer designs of vacuum cups which have greatly reduced the risk of injury to the baby, and forceps availability as against its rarity in the era of the Chamberlains, many authorities believe that these vital obstetric arts are moving towards extinction.<sup>2,3</sup>

The incidence of assisted vaginal delivery varies among the different regions of the world and even among the different regions within the same country. Even within regions of same country it varies among different obstetric units.<sup>3</sup> In the Royal College of Obstetricians and Gynecologist (RCOG) consultants conference, instrumental vaginal delivery rate of 10.5% was reported with a range of 4-20%. The consensus at the conference was to aim lower the rate to an average of 8.5% in the US.<sup>4,5,10</sup> In low resource countries IVD should provide a good alternative for caesarean delivery. However, IVDs are underused in low resource settings.<sup>11</sup> Rate of IVD are generally lower in developing countries with an incidence as low as 1% reported in Niger, Burkina Faso, and Mali, and higher in developed countries where an incidence as high as 15% has been reported.<sup>4,5,8,9,10</sup> Data on IVD rates are scanty in Nigeria. Most studies were done on forceps delivery and its rate ranged from 0.9% to 6%.<sup>10</sup> In Ahmadu Bello University Teaching Hospital in Zaria, Nigeria, IVD constitutes 3.6% of all deliveries.<sup>11</sup> The current rate of forceps delivery in Ibadan, Nigeria is 1.57%.<sup>12</sup> Vacuum delivery rate of 1.5%, 1.6%, 1.7% were reported from Enugu, Ile-Ife and Ilorin, Nigeria respectively.<sup>13-15</sup> The choice of instrument also varies within the developed countries with vacuum extraction more commonly done in the US due to medico-legal reasons, while the forceps is more commonly used in Europe.<sup>4</sup>

According to the WHO and other UN agencies, assisted vaginal delivery is one of the six critical functions of basic emergency obstetric care.<sup>16</sup> This means that IVDs are such vital procedures and should be made available and accessible everywhere especially in developing countries where the need is high and cesarean section as alternative is not always available. It is carried out in the maternal interest, fetal interest or both. It is a procedure with a long history spanning more than two centuries and had undergone modifications and refinement to the present day.<sup>4</sup> Broadly speaking, the traditional indications for vacuum extraction are delayed labour, distress on the part of the baby or mother and medical conditions requiring shortening of the second stage of labour.<sup>10,16,17</sup> Other benefits such as reduction in caesarean section rate, reduction in the cost of delivery and brighter obstetric future are obvious hence the need for more studies in this area to provide practitioners with more information on this procedures to improve its utilization and safety.

In order to determine the incidence and indications of IVD at the University of Abuja teaching hospital, Nigeria and to compare the foetal and maternal outcomes of vacuum and forceps deliveries we studied the outcomes of the procedures over a five-year period.

## METHODS

Awareness about this study was created among hospital staff including the doctors, nurses and record staff at

labour ward, postnatal ward and record departments of University of Abuja teaching hospital, Abuja. Over a 5-year period relevant information on socio-demographic variables, type of instrumental delivery performed, Apgar scores of neonates delivered, indications and complication of either of the IVD were obtained. Data analysis was done using IBM SPSS, inc, software for Windows version 23, Chicago, IL USA. and results we expressed in numbers and percentages. Quantitative variables were described using measures of central tendency (mean), and measures of dispersion (range, standard deviation) as appropriate.

## Study type

This was a retrospective study carried out on all patients that had IVD

## Study location

The study was carried out at Department of Obstetrics and Gynecology, University of Abuja teaching hospital, Abuja, Nigeria; a 350- bed Tertiary Health Facility.

## Period of study

The study was conducted between January 2015 and December 2019. After obtaining approval to conduct the study from the college and the Hospital's research and ethical committee.

## Selection criteria

Over a 5-year period, information on all patients with complete data that had IVD were obtained from the hospital records which included the age, parity, booking status, and type of procedure performed, the APGAR scores and birth weight of the babies and complications in the parturient

## RESULTS

During the period under review there were 10,416 deliveries and 104 patients had vacuum or forceps delivery, giving an incidence rate of 0.99%. The incidence of vacuum delivery was 0.69% while forceps delivery was 0.30%. Complete information was obtained for 93 patients giving a retrieval rate of 89.4%. The mean maternal age was  $27.53 \pm 5.5$  years with a range of 17-46 years. Majority of the cases (40.9%) were in the age group of 26-30 years and 51 (54.8%) of the parturient were primigravidae, 55 (59.1%) were booked patients as shown on Table 1.

Delayed second stage of labour 36 (38.7%) mainly due to occipito-posterior position was the most common indication for IVD followed by poor maternal effort 17 (18.3%), others were, severe PET/eclampsia 14 (15.1%), fetal distress 10 (10.8%), prematurity 9 (9.7%). Medical conditions 4 (4.3%) and abruptio placentae 3 (3.2%). These are depicted on Table 2.

**Table 1: Distribution of age and parity of patients.**

Age in years	Frequency	Percentage (%)
≤20	12	12.9
21-25	21	22.6
26-30	38	40.9
≥31	22	23.7
Total	93	100
<b>Parity</b>		
0	51	54.8
1	26	28.0
2	9	9.7
3	2	2.2
4	4	4.3
5	1	1.1
Total	93	100.0
<b>Booking status</b>		
Booked	55	59.1
Unbooked/booked elsewhere	38	40.9
Total	93	100

**Table 2: Indications of instrumental vaginal delivery.**

	Frequency	Percentage (%)
<b>Abruptio placentae</b>	3	3.2
<b>Delayed 2nd stage</b>	36	38.7
<b>Fetal distress</b>	10	10.8
<b>Medical condition</b>	4	4.3
<b>Poor maternal effort</b>	17	18.3
<b>Prematurity</b>	9	9.7
<b>Severe PET/eclampsia</b>	14	15.1
<b>Total</b>	93	100

**Table 3: Foetal outcome of instrumental deliveries.**

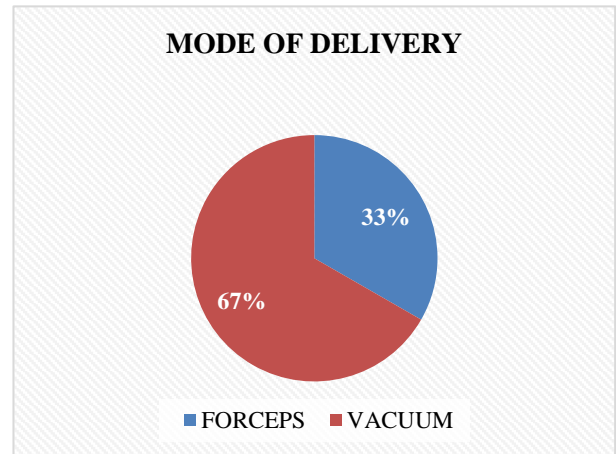
Fetal outcome	Mode of delivery		Total
	Forceps	Vacuum	
<b>ALIVE</b>	28	57	57
	90.3%	91.9%	91.9%
<b>FSB/MSB</b>	2	5	5
	6.5%	8.1%	8.1%
<b>END</b>	1	0	0
	3.2%	0.0%	0.0%
<b>Total</b>	31	62	62
	100.0%	100.0%	100.0%

Table 3 shows the fetal outcome with vacuum and forceps deliveries. While, live births were 85(91.4%), fresh stillbirths (FSB) and macerated stillbirths (MSB) were 7(7.5%) and one early neonatal death (END) was recorded (1.1%). The baby that had an early neonatal death had forceps delivery.

The commonest maternal complications as shown in table 4 were genital tract laceration 17 (18.3%) mainly due to

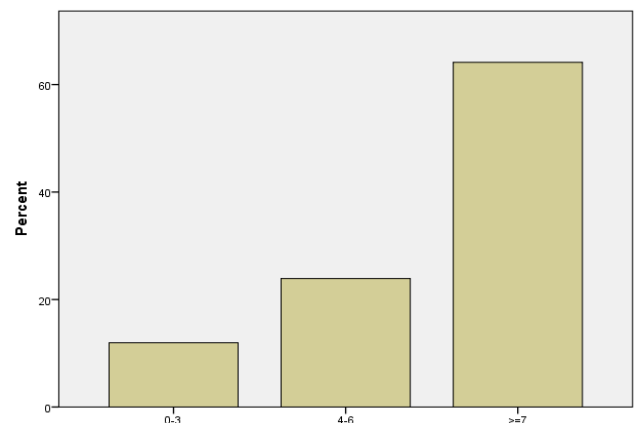
extension of episiotomy and primary post-partum haemorrhage 10(10.8%).

Mode of delivery is illustrated in Figure 1 with vacuum accounting for 67% of the cases and forceps representing the remainder.

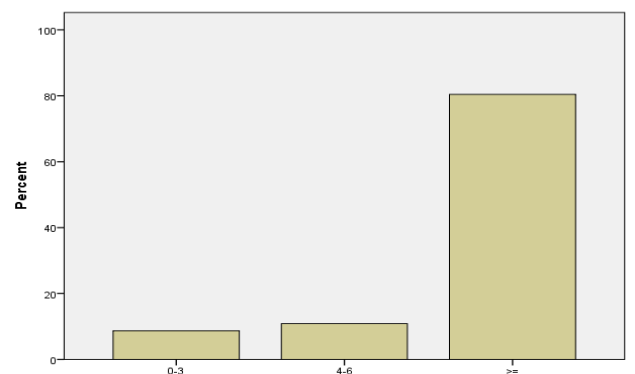


**Figure 1: The mode of instrument used.**

The mean APGAR scores were 6 and 8 in the first and fifth minutes respectively as illustrated in Figure 2 and 3 respectively.



**Figure 2: APGAR at first minute.**



**Figure 3: APGAR score at 5<sup>th</sup> minutes**

**Table 4: complications of instrumental vaginal delivery.**

Complication	Frequency	Percentage
<b>Genital laceration</b>	17	18.3
<b>Post-partum haemorrhage</b>	10	10.8

## DISCUSSION

From the results above, the overall rate of instrumental delivery (IVD) in this study was 0.99%. The rate of vacuum delivery was 0.69% while, the rate of forceps delivery was 0.30%. The low rates may be attributed to lack of experienced personnel to carry out the procedures in our facility as most procedures were done by the residents. Perhaps, the increased cesarean section (CS) rate, however, may have also limited the rise in the IVD rate in our centre, possibly because CS is used as an alternative to IVDs. The overall rate, however, is similar to what was reported from other developing countries in West Africa such as Niger, Burkina Faso, and Mali.<sup>4</sup> It is however lower than the 3% reported from Nouakchott which may be due to a better health care delivery system compared to what we have in our environment.<sup>4,8</sup> It is also much lower than 3.6% and 2.06% reported from Zaria and Sokoto respectively in Nigeria.<sup>2,4</sup> This may probably be due to underutilization of the instruments by doctors or underutilization of the hospital facilities by pregnant women. It is also very much lower than 8.5% recommended by RCOG and also lower than what is reported from developed countries like the UK and the USA.<sup>18,19,21-25</sup> The rate of forceps delivery (0.30%) in this study is lower than 1.57% reported from Ibadan, Nigeria with better facilities and more experienced personnel.<sup>10</sup> The vacuum delivery rate (0.69%) is also lower than what is reported elsewhere.<sup>14,15,20</sup>

The result showed that vacuum delivery was carried out more than forceps delivery which may be due to lack of expertise to conduct forceps delivery by young residents and the fear that it is more associated with complications and fear of litigation. Similar reasons for low utilization of IVD were noted by Daru et al in similar studies done at Jos, North central Nigeria.<sup>21</sup> These findings, however, contradicts previous study in northern part of Nigeria that revealed forceps delivery was carried out more than vacuum.<sup>20</sup>

Primigravidae are more likely to have dysfunctional labour and an increased need for intervention during labour, which might be the explanation why instrumental vaginal deliveries were carried out more on them. This may also explain why it was more in the younger age group who were mostly primigravidae. In contrary, parity of the parturient from previous studies did not show any correlation with the use of IVD.<sup>4,21</sup>

The success and safety of these procedures are based on skill of the operator skill, proper timing, and ensuring that

all indications are met before carrying out these procedures.<sup>21</sup> Vacuum was more commonly used than forceps in this study which is in conformity with the reported trend in Africa.<sup>8</sup> As seen in this study, the instrument of choice in US also, is the vacuum.<sup>9,14,22</sup> The choice of the vacuum for IVD in Africa may be because of simplicity of use and the ease with which the skill to use it is acquired. In addition, it is more tolerant of incorrect assessments of the fetal head position These may be the same factors which made the vacuum the most used instrument in our centre. In the US however, legal issues also play a role in determining the choice of which instrument to use for IVD.<sup>22</sup>

Vacuum and forceps delivery are associated with significant complications both maternal and fetal. The finding that most of the instrumental vaginal deliveries carried out in this study had no complication indicates that the goal of performing the procedure has been achieved. It has been well documented that instrumental vaginal delivery is indicated both for fetal and maternal conditions with the aim of shortening the second stage of labour.<sup>10,13,22</sup>

The indications for instrumental vaginal deliveries in this study do not differ from those documented in previous studies.<sup>15,17,20-25</sup> Delayed second stage of labour was found to be the most common indication and this may be because it has been demonstrated that there is increased maternal morbidity after 3 hours of the second stage of labour which is further increased after 4 hours.<sup>26</sup>

A review of the fetal outcome in this study showed that there were 85 (91.4%) were live birth with 7(7.5%) fresh stillbirth/macerated stillbirth; these deaths were not related to the procedure as the neonates were already dead before the use of the instrument. However, there was an early neonatal death (1.1%) following severe asphyxia which may be attributed to the difficulty in application of the obstetrics forceps.

The APGAR scores at the fifth minute showed an improvement from what was obtained at the first minute, which could be attributed to the effective resuscitation by the attending neonatologist. This was also seen in other studies locally and globally.<sup>10,13,22,26</sup>

The low rate of IVDs should be improved by maintaining and improving the skills for this procedure through training of the residents in order to enhance the benefits for both mothers and their babies.

## CONCLUSION

This study has shown that IVD is a key element of essential obstetric care whose role has often been undervalued and that rate of instrumental vaginal delivery is much lower than that reported in some centres in Nigeria and globally. The most common indication was delayed second stage of labour due to malposition. Majority of the cases had no



complication and fetal outcome was good for most of the cases indicating that the procedure can be safe in an experienced hand. Training and retraining resident doctors and taking a concerted campaign on how to apply these instruments will produce better maternal and neonatal outcomes and reduce the incidence of caesarean section. This study was retrospective and will therefore be limited by factors that are known to influence the strength of retrospective studies

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