



■ Original Research Article

Instrumental Vaginal Delivery in Abuja, Northcentral Nigeria: A 5-Year Review

Alu Francis E.¹, Mai Aminu M.², Nwachukwu Chiemezie N.D.³, Igbinovia Imuentinyan⁴, Anate Abdullahi⁵,
Dennis Mary Clement⁶.

1. Consultant Obstetrician & Gynaecologist/Associate Professor, Department of Obstetrics and Gynaecology, Asokoro District Hospital, Abuja and Nile University of Nigeria, Abuja; Email: drfrankalu@yahoo.com; francis.alu@nileuniversity.edu.ng. 2. Consultant Obstetrician & Gynaecologist/Associate Professor, Department of Obstetrics and Gynaecology, Asokoro District Hospital, Abuja and Nile University of Nigeria, Abuja; Email: aminu.mai@nileuniversity.edu.ng. 3. Consultant Obstetrician & Gynaecologist, Department of Obstetrics and Gynaecology, Maitama District Hospital, Abuja; Email: nduum@yahoo.co.uk. 4. Consultant Obstetrician & Gynaecologist/Lecturer 1, Department of Obstetrics & Gynaecology, Maitama District Hospital, Abuja and Baze University, Abuja; Email: tinyano@yahoo.com. 5. Consultant Obstetrician & Gynaecologist, Department of Obstetrics & Gynaecology, Maitama District Hospital Abuja. Email: abdullahianate@gmail.com. 6. Department of Obstetrics & Gynaecology Maitama District Hospital, Abuja. Email: mardenclem@yahoo.com

ABSTRACT

Background: Instrumental vaginal delivery (IVD) is an important intervention in obstetrics practice. Its main goal is to expedite vaginal delivery with minimal fetomaternal morbidity while obviating the need for caesarean section (CS). There has been a steady decline in the art of IVD worldwide for a number of reasons including over reliance on CS and lack of training of practitioners in the art. Regular audit of this important intrapartum intervention in health institutions is key to improving its practice and outcome. **Aim:** The aim of the study was to evaluate the practice and outcome of IVD in a secondary healthcare facility in Abuja. **Materials and Method:** This was a retrospective analysis of cases of IVD conducted in Maitama District Hospital Abuja, over a 5-year period, between January 1st 2018 to December 31st 2022. **Results:** The IVD rate in this study was 0.65%. Vacuum delivery was the commonest type of IVD accounting for 96.2 % of cases. Majority, (65.4%), were primigravidae. Delayed second stage of labour (76.9%) and fetal distress in the second stage (11.3%) were the commonest indications for IVD. Maternal and perinatal complications were rare and overall fetomaternal outcome was good. **Conclusion:** IVD rate is low in our facility with a preponderance of vacuum delivery. Periodic training, with facilitative supervision by Obstetricians experienced in the art, is key to ensuring sustenance of the practice of IVD and is therefore recommended.

Correspondence:

Dr. Francis E. Alu
Department of Obstetrics &
Gynaecology,
Asokoro District Hospital/Nile
University of Nigeria Abuja
Phone number: +2348037206243
E-mail address:
drfrankalu@yahoo.com;
francis.alu@nileuniversity.edu.ng

Keywords: Instrumental vaginal delivery, vacuum delivery, forceps delivery, fetal outcome, maternal complications, Abuja

INTRODUCTION

Instrumental vaginal delivery (IVD) is an important intrapartum intervention in obstetric practice. The term IVD is used interchangeably with operative vaginal delivery (OVD) and assisted vaginal delivery (AVD). It is defined as vaginal delivery accomplished with the aid of instruments which can be vacuum or forceps.^{1,2} It is performed when certain criteria have been met and when the benefits outweigh the risks. The goal is to expedite vaginal delivery with minimal feto-maternal morbidity.^{1,3} If successful, it obviates the need for emergency caesarean section (CS) with its attendant complications. The incidence of IVD varies widely between regions and within countries and depends on the availability of trained personnel to perform the procedure.^{4,5}

An incidence of 10-15% of deliveries has been reported in the UK and 4.5% in the USA, with rates in primigravid women as high as 30%.^{6,7} In Nigeria, reported IVD rates range from 0.4% to 6% of all deliveries.^{2,8-14}

Indications for IVD can be maternal or fetal, or both, and include fetal compromise in the second stage of labour, delayed second stage of labour due to inadequate uterine activity, malposition, and poor maternal efforts, maternal exhaustion as well as maternal medical conditions where prolonged pushing or Valsalva manoeuvre should be discouraged. These maternal conditions include cardiac disease, respiratory disease, hypertensive crises, cerebral vascular disease, myasthenia gravis, and spinal cord injury.¹

The prerequisites for IVD include maternal informed consent, skilled operator, fully dilated cervix, empty urinary bladder, ruptured fetal membranes, cephalic presentation with the head engaged, the position must be well known, the pelvis must be adjudged adequate, adequate anaesthesia/analgesia, availability of resources for emergency caesarean section and neonatal resuscitation.^{1,3,15}

IVD is not without risks. Complications associated with the procedure include maternal genital tract laceration, primary postpartum haemorrhage (PPH), increased risk of anaemia and blood transfusion, pelvic floor and anal sphincter injury. Fetal complications include cephalhaematoma, retinal haemorrhage, scalp laceration, facial palsy especially with forceps and need for special care baby unit (SCBU) admission.^{16,17} Routine antibiotics prophylaxis has been shown to effectively reduce infectious morbidity in IVD.¹⁸

Generally, most Obstetricians prefer vacuum to forceps delivery due to the former's simplicity of use and the relative ease of acquiring the skill, although vacuum delivery has a higher failure rate than

forceps.^{19,20} The RCOG recommends that IVD should be conducted only by skilled operators in the chosen procedure or by trainees under direct supervision of an experienced trainer to ensure a favourable outcome.⁶

There has been a steady decline in the rate of IVD with a corresponding disproportionate increase in caesarean section rate (CSR) with its associated increased maternal and neonatal morbidity and mortality. The decline in IVD rate is thought to be mainly due to medico-legal concerns and decline in practice of IVD, especially forceps application, in most obstetric units. Other reasons attributed to this decline include lack of training and supervision of trainees on the art, lack of relevant guidelines and policies for IVD, and restriction of use of IVD in HIV positive patients among others.⁵ Vacuum delivery has become more common than forceps with reported vacuum delivery to forceps delivery ratio of 4:1.^{14,21} Regular audit of this important intrapartum intervention in health institutions is key to improving its practice and outcome.

This study aimed to retrospectively review the practice and outcome of IVD in our centre, a secondary healthcare institution in Abuja, Northcentral Nigeria.

MATERIALS AND METHOD

This was a retrospective review of all cases of IVD performed at the Maitama District Hospital (MDH) Abuja over a 5-year period, between 1st January 2018 to 31st December 2022. MDH is a public secondary healthcare facility in Abuja. It is located in the Abuja Municipal Area Council of the Federal Capital Territory. It is accredited for Residency training in Obstetrics and Gynaecology and provides specialized obstetric care and serves as a referral centre for patients from both public and private health institutions in the Federal Capital Territory Abuja and its environs. The Hospital operates an electronic medical records system with secure database for easy data retrieval.

For the study, data were collected from the patients' records on the electronic medical records database and also from the labour ward, postnatal ward and theatre records. The relevant socio-demographic and obstetric characteristics of the patients obtained included the age, booking status, parity, indication for the IVD, and maternal and neonatal outcomes. The data extracted were entered into a computer and analysed using Statistical Package for Social Sciences (SPSS) version 26.0 (IBM, Chicago IL, USA) with results presented in tables and simple percentages. Ethical approval was obtained from the Institution's Research Ethics Committee.

RESULTS

During the period of study, a total of 8,046 deliveries was recorded. Of these, 52 were IVD, giving an IVD rate of 0.65% (Vacuum 0.62%; Forceps 0.03%). Vacuum delivery accounted for the majority 50(96.2%) of IVD, with forceps contributing only 2(3.8%). The trends in IVD rate remained consistently lower than 1% of all deliveries between 2018 and 2022 (0.31% in 2018; 0.89% in 2019; 0.76% in 2020; 0.70% in 2021, and 0.55% in 2022). The lowest rate of IVD (0.31%) recorded in 2018 coincided with the migration to E-Medical Records system in the hospital with possible loss of data.

Table 1: Demographic Characteristics of the Study Participants

Variable	Frequency (n=52)	(%)
Age (years)		
≤20	2	3.8
21-30	30	57.7
31-40	19	36.5
≥40	1	1.9
Booking status		
Booked	42	80.8
Unbooked	10	19.2
Parity		
0	34	65.4
1-4	17	32.7
≥5	1	1.9

Table 1 shows the age distribution, booking status and parity of the study participants. Majority, 30(57.7%), were in the 21-30 age group. Most of them, 42(80.8%), were booked, and 34(65.4%) were primigravidae.

Table 2: Indications For Instrumental Vaginal Delivery

Indication	Frequency (n=52)	Percentage (%)
Delayed second stage of labour	40	76.9
Maternal exhaustion	5	9.6
Severe Preeclampsia	1	1.9
Fetal distress	6	11.5

Table 2 shows the various indications for IVD. Delayed second stage of labour, mainly due to occipito-posterior position and poor maternal effort, was the main indication (76.9%), followed by fetal distress in the second stage of labour (11.5%), and

Table 3: Perinatal Outcome Following Instrumental Vaginal Delivery

Perinatal outcome	Frequency (n=52)	Percent age (%)
Live births	49	94.2
Alive with Apgar score ≥7 at 1 min	26	53.1
Alive with Apgar score <7 at 1 min	23	46.9
Total	49	100.0
Alive with Apgar score ≥7 at 5 min	40	81.6
Alive with Apgar score <7 at 5 min	9	18.4
Total	49	100.0
Perinatal death	3	5.8

maternal exhaustion (9.6%). Maternal exhaustion and fetal distress were more common in the unbooked cases most of whom were referred from primary health care centres in late second stage of labour. Severe preeclampsia was an indication in 1.9% of cases.

Thirteen cases of maternal complications were recorded. Of these, primary PPH occurred in 4(7.7%) of all cases. Two of the PPH cases were due to genital tract laceration. Two resulted from both genital tract trauma and uterine atony. All the cases of PPH had blood transfusion. Genital tract laceration, including two cases of cervical laceration and one case of vaginal laceration occurred in 3(5.8%) of IVD. There was one case of third-degree perineal tear due to extension of an episiotomy during forceps delivery for a failed vacuum delivery. Another case of a failed vacuum delivery resulted in an emergency caesarean section. Some of the women had more than one complication.

There were 49 live births and three perinatal deaths. Of the 49 live births, 26 (53.1%) neonates had Apgar scores ≥7 in the first minute. This number increased to 40(81.6%) at 5 minutes. Nine neonates whose Apgar scores failed to improve at 5 minutes were admitted in the special care baby unit (SCBU). Out of these, one neonate, who had fetal distress and cephalhaematoma, died after 48 hours on admission. The rest were discharged in good condition. There were two fresh stillborn babies (FSB). One followed a failed vacuum delivery completed via forceps delivery. The other was due to severe birth asphyxia following vacuum delivery. One neonate developed neonatal jaundice.

DISCUSSION

This study shows an IVD rate of 0.65% in our facility. This rate is low compared to the rates reported in developed countries.^{6,7} It is, however, comparable with the less than 1% rates reported in some studies in Nigeria and other West African countries^{2,8,11,21} In contrast, our rate is much lower than the rates of 1-6% reported in some centres in Nigeria.^{13-14,25-26} The low rate of IVD in our facility is in tandem with the global trend in decline of the practice of IVD. This might be attributed to the decline in training in the art of IVD, especially with the forceps, and the overall preference for caesarean section as an alternative to IVD. Other factors that could have contributed to the low rate of IVD in our facility include concerns for fetal complications and restriction on conduct of IVD in HIV positive parturients.

Vacuum delivery was the commonest type of IVD, accounting for 50(96.2%). This is not surprising as most Obstetricians prefer the Vacuum because its learning curve is relatively easier, and it is simple to use compared with forceps. These advantages over forceps have also made Vacuum use more popular among other healthcare professionals such Nurses/Midwives and Community Health Extension Workers (CHEW) as part of task-sharing in the health sector. The two cases of forceps delivery recorded in this study were performed for failed vacuum. One resulted in a fresh stillborn while the other was a live birth. The latter was associated with extension of the episiotomy resulting in a third-degree perineal tear. The low incidence of forceps delivery and the indication for their use clearly demonstrate that forceps use has fallen into disrepute in our facility and is only employed in desperate situations to avoid late emergency caesarean section as an alternative. The difficult learning curve for forceps application, and the perception that forceps delivery is associated with more maternal and neonatal complications, are contributory factors for their limited use in our facility. This view has also been expressed by other authors.^{2,8,11,23,24}

In this study, IVD was most commonly performed in primigravidae. This is consistent with findings in other studies.¹⁰⁻¹⁴ Primigravidae are more prone to dysfunctional labour leading to prolonged labour and maternal exhaustion in the second stage.¹ Surprisingly, some studies recorded higher rates of IVD in multiparous women compared with primigravidae.^{2,8,26}

The commonest indication for IVD in our study was delayed second stage of labour (76.9%), followed by fetal distress (11.5%). Concerns about possible

adverse fetal outcome in the presence of fetal distress are usually taken more seriously than delays in the second stage of labour due to poor maternal efforts, hence cases of fetal distress are most often treated by EMCS. This might explain the lower rate of fetal distress as an indication in this study. Maternal medical conditions were not a common indication in our study. Again, this is because CS is generally performed for most of our patients with pregnancies complicated by severe maternal medical conditions such as preeclampsia/eclampsia, unless they present in second stage of labour, like the only case recorded in this study. Maternal complications were few. Primary PPH was the commonest maternal complication, occurring in 4(7.7%) of all IVD. Two of the PPH cases were due to genital tract laceration; two resulted from both genital tract laceration and uterine atony.

All four cases of PPH had blood transfusion. Genital tract laceration occurred in 3(5.8%) of IVD. This included two cases of cervical laceration both of which occurred with vacuum delivery. Vacuum delivery, unlike forceps, have often been employed in the late first stage of labour at cervical dilatation of 8cm and above in cases of severe fetal compromise, and this may result in cervical lacerations.^{1,22} However, forceps deliveries are reported to cause more genital tract injuries, including pelvic floor and anal sphincter injury, than vacuum.^{16,23,27} This study recorded one case of a third-degree perineal tear resulting from extension of an episiotomy during forceps delivery for a failed vacuum delivery. There were two cases of failed vacuum delivery; one was completed by forceps delivery and the other by EMCS. This underscores the need to ensure that resources are available for both EMCS and advanced neonatal resuscitation as part of the prerequisites for performing IVD. In our facility, prophylactic antibiotics is routinely given following all IVD.¹⁸ This might explain the lack of any infectious morbidity recorded in the study.

Perinatal outcome was generally good with a live birth rate of 94.2% and good Apgar scores. Nine neonates, however, required SCBU admission on account of persistent low Apgar scores at 5 minutes. Eight of them were discharged in good condition while one neonate who had fetal distress and cephalhaematoma died after 48 hours in the SCBU. It is pertinent to note that the low Apgar scores recorded in most of the cases were as a result of the conditions that necessitated the IVD (severe fetal distress) rather than from the intervention itself.

Perinatal complications recorded included three cases of cephalhaematoma, one case of neonatal jaundice and three perinatal deaths. Two of the perinatal deaths were fresh stillborn babies. One occurred following forceps delivery for a failed vacuum delivery, and the other due to severe birth

asphyxia following vacuum delivery for fetal distress; the third case was an early neonatal death in the SCBU. Two of the perinatal deaths occurred in unbooked patients apparently due to late referral to our facility and the poor condition of the fetuses on arrival. Studies have shown that serious neonatal complications are uncommon with both instruments in well selected cases, although vacuum delivery is generally reported to be safer for the mother while forceps is generally safer for the fetus.^{20,21} When compared with EMCS, maternal and perinatal morbidity and mortality are considerably lower with IVD.²⁷ However, EMCS following failed IVD, is associated with more adverse maternal and perinatal outcome.²³

CONCLUSION

IVD rate is low in our facility with a preponderance of vacuum delivery, and favourable maternal and perinatal outcomes. We recommend periodic training on IVD with facilitative supervision of trainees to improve uptake and outcome of IVD. This will reduce the need for EMCS with its associated complications.

Limitation of the Study

The limitation of the study lies in its retrospective design. In addition, the study did not compare maternal and perinatal outcomes with that of emergency caesarean section which is the immediate alternative to IVD.

REFERENCES

1. Derdre J Murphy. Operative delivery. In: Kenny LC and Myers JP, editors, *Obstetrics by Ten Teachers* 20th Edition. CRC Press, Taylor & Francis Group, Boca Raton FL 2017. P475-671
2. Daru PH, Egbodo C, Suleiman M; Shambe IH, Magaji AF, Ochejele S. A decade of instrumental vaginal deliveries in Jos University Teaching Hospital Northcentral Nigeria (2007-2017). *Trop J Obstet Gynaecol* 2018; 35:113-117
3. ACOG. Operative Vaginal Birth: ACOG Practice Bulletin Number 219. *Obstet Gynecol* 2020; 135: e149-e159
4. Hillier CEM. Worldwide survey of assisted vaginal deliveries. *Int J Gynecol Obstet* 1994; 47:109-114
5. Vannevel V, Swanepoel C, Pattinson RC. Global perspectives on operative vaginal deliveries. *Best Pract Res Clin Obstet Gynaecol*. 2019; 56:107-113.
6. RCOG. Operative Vaginal Delivery. Green-top Guidelines Number 26. London. RCOG Press 2011
7. Bailey PE, Roosmalen JV, Mola G, Evans C, Bernis LD, Dao B. Assisted vaginal delivery in low- and middle- income countries: An overview. *BJOG* 2017; 124: 1335-1344.
8. Aliyu LD, Kadas AS, Hauwa MA. Instrumental Vaginal Delivery in Bauchi, Northeastern Nigeria. *J West Afr Coll Surg* 2011; 1(4):18-27
9. Anozie OB, Lawani OL, Onu F A, Onoh R C, Ogah E O, Eze J N et al. Declining rate of operative vaginal deliveries in Nigeria. *Open J Obstet Gynaecol* 2018; 8:175-184.
10. Garba JA, Burodo AT, Saidu AD, Sulaiman B, Umar AG, Ibrahim R et al. Instrumental vaginal delivery in Usmanu Danfodiyo University Teaching Hospital, Sokoto: A ten-year review. *Trop J Obstet Gynaecol* 2018; 35:123-127
11. Jumbo H C T, Ayogu M, Abdullahi H I. Outcome of instrumental vaginal delivery in University of Abuja Teaching Hospital; a five- year review. *Int J Reprod Contracept Obstet Gynaecol* 2021;10(6):2390-2394
12. Yakassai IA, Abubakar IS, Abdullahi H. An Audit of instrumental Delivery in Aminu Kano Teaching Hospital, Kano. *Trop J Obstet Gynaecol*. 2011; 28(1): 14-17.
13. Adaji SE, Shittu SO, Sule ST. Operative Vaginal Deliveries in Zaria, Nigeria. *Ann Afr Med* 2009; 8(2): 95-99.
14. Bassey EA, Abah GM. A 5-year retrospective review of instrumental vaginal deliveries in Uyo, Akwa Ibom State, Nigeria. *Trop J Obstet Gynaecol* 2018; 35:128-132
15. Keriakos R, Sugumar S, Hilal N. Instrumental Vaginal Delivery – Back to Basics. *J Obstet Gynaecol* 2013; 33: 781–786.
16. Biru S, Addisu D, Kassa S, Animen S. Maternal complication related to instrumental delivery at Felege Hiwot Specialized Hospital, Northwest Ethiopia: a retrospective cross-sectional study. *BMC Res Notes* 2019;12(1):482.
17. Johanson RB, Menon V. Vacuum extraction versus forceps for assisted vaginal delivery. *Cochrane Database Syst Rev* 2000; 2:CD000224.
18. World Health Organization. WHO recommendations on routine antibiotics prophylaxis for women undergoing operative vaginal births. Geneva. WHO, 2021
19. Mahony F, Hofmyer GF, Menon V. Choice of instruments for assisted vaginal delivery: *Cochrane Database Syst Rev* 2010:CD005455
20. Dominico S, Bailey PE, Mwakatundu N, Kasanga M, Roosmalen JV. Reintroducing vacuum extraction in primary healthcare facilities: a case study from Tanzania. *BMC Pregnancy and Childbirth*. 2018; 18: 248.
21. Bailey PE. The disappearing art of instrumental delivery. *Int J Gynecol Obstet* 2005; 91:89-96
22. Marc HT. Operative vaginal delivery. In: Decherney AH, editor, *Current Diagnosis and Treatment*. 11th Ed. McGraw Hill Companies 2013; p 334-48
23. Ghanchi FM, Mansuri MI, Doshi HU, Patel PHK. Maternal and Perinatal Outcome in Instrumental Vaginal Deliveries over 5 years: a retrospective study. *Int J Reprod Contracept Obstet Gynecol* 2023; 12:934-9
24. Dutywa A, Olorunfemi G, Mbodi L. Trends and Determinants of Operative Delivery at 2 Academic Hospitals in Johannesburg, South Africa (2005-2019). *Int J Environ Res Public Health* 2022; 19(23):16182.
25. Shehu CE, Omembelede CJ. Instrumental vaginal delivery- an assessment of use in a tertiary care centre. *Orient J Med* 2016; 28(1-2):22-27
26. Sowemimo OO, Abdur-Rahim ZF, Kolawole OO, Ayegbusi EO, Archibong MS, Igbodike EP et al. Review of instrumental vaginal deliveries at the Obafemi Awolowo University Teaching Hospital Complex Ile-Ife. *Trop J Obstet Gynaecol* 2018; 35:133-136

27. Maharjan A, Kunwar R, Paneru R, Prajapati S, Shrestha T, Bogatee UB. The Feto-Maternal Outcome of Instrumental Vaginal Delivery in Parapokar Maternity and Women Hospital-A Retrospective study. Open J Obstet Gynecol 2022; 12:1289-1295