

A decade of instrumental vaginal deliveries in Jos University Teaching Hospital, North Central Nigeria (2007-2016)

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ABSTRACT

Background: Instrumental vaginal deliveries are witnessing a steady decline despite its usefulness in improving obstetric outcomes in resource-limited settings. This decline in instrumental deliveries is enhanced by dearth of information on good outcomes thereby making its use unpopular among younger generations of obstetricians. The study was aimed at determining the rate of instrumental deliveries and associated outcomes in Jos University Teaching Hospital (JUTH).

Materials and Methods: This study was a 10-year retrospective hospital-based study carried out between January 2007 and December 2016 in JUTH which compared the use of vacuum extractors and forceps to effect vaginal deliveries and the delivery outcomes encountered following such deliveries.

Results: Of the 16,614 deliveries during the study period, 71 were instrumental vaginal deliveries with an incidence of 0.4% for the study period. Vacuum accounted for 97.2% of the deliveries and forceps 2.8%. Prolonged second stage was the indication for instrumental delivery in 85.9% of parturients and there were no significant differences in Apgar scores between babies that had instrumental deliveries and those that did not. Age and parity were not significantly associated with instrumental deliveries. The instrumental delivery rates were, however, significantly lower than earlier reports from this center, and that globally recommended.

Conclusion: Instrumental vaginal deliveries are fast declining in JUTH and the few instrumental deliveries carried out showed a faster decline in forceps deliveries. Efforts have to be made to revive the art of instrumental vaginal delivery in the center to save it from extinction.

Key words: Complications; forceps; instrumental vaginal delivery; North Central Nigeria; outcomes; trends; vacuum delivery.

Introduction

Instrumental vaginal delivery (IVD) refers to the use of active measures to accomplish vaginal delivery through the use of certain instruments mainly the obstetric forceps and the vacuum cups. Instrumental vaginal deliveries are procedures with long and interesting history spanning more than two centuries but which have undergone modifications and refinement to the present stage.^[1]

It is interesting to know that the past several years have witnessed a steady decline in IVD rate with an increase in caesarean section rate.^[2] In addition, vacuum-assisted vaginal delivery has become more common than forceps

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Access this article online	
Website: www.tjogonline.com	Quick Response Code 
DOI: 10.4103/TJOG.TJOG_38_18	

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How to cite this article: Daru PH, Egbodo C, Suleiman M, Shambe IH, Magaji AF, Ochejele S. A decade of instrumental vaginal deliveries in Jos University Teaching Hospital, North Central Nigeria (2007–2016). Trop J Obstet Gynaecol 2018;35:113-7.

with vacuum-to-forceps delivery ratio of 4:1.^[2] Even though forceps-assisted vaginal deliveries were once extremely popular, recent evidence has shown that more vacuum deliveries are done than forceps. This decline is thought to be due to medico-legal implications, over reliance on caesarean section as a solution for most labor disorders.^[1,2]

The incidence of instrumental vaginal deliveries has a wide variation depending on the region, country, and the type of obstetric unit set up with availability of trained personnel to carry out these procedures.^[3] In the United Kingdom, the incidence of IVD varies from 6% to 12%.^[4] While the Royal college of Obstetricians and Gynaecologist consultant conference reported an incidence of 10.5% with a range of 5%–15%.^[5] In the United States, the rate of IVD was reported as 4.5%.^[2,4-6] In developing countries, IVD rate is quite low with incidence of 1%–3% in countries like Niger, Mali, and Burkina Faso.^[2,7,8] In Nigeria, the incidence of IVD reported from Bauchi, North east Nigeria, was 1.8%.^[2] Other studies of IVD reported from Nigeria were mostly on forceps deliveries with incidence of 3.6% in Zaria^[9] and 1.57% in Ibadan.^[10] Incidences of vacuum delivery reported in Nigeria include 1.5% from Enugu, 1.7% from Ilorin, and 0.9% from Kano.^[8] In Jos North Central Nigeria, the incidence of vacuum delivery reported was 0.6%.^[11]

IVD has been listed by World Health Organization and other United Nations agencies as one of the key components of basic emergency obstetric care.^[12] Scaling up its use in resource poor countries through training and availability of the right equipment will likely contribute significantly to reducing maternal and perinatal morbidity and mortality.^[13]

Indeed emergency obstetric operative interventions which include caesarean section and IVD in addition to other life support measures have been found to greatly reduce and even prevent maternal and perinatal mortality.^[14] However, IVD has been noted to be underutilized especially in poor resource settings possibly due to non-availability of the necessary equipment and lack of trained manpower.^[15]

It is for the above reasons that we decided to review the utilization of this basic component of emergency obstetric care in our facility being a training institution. This may help determine its use and the possible complications associated with its use.

Aims and Objectives

The aim of this study was to determine the overall incidence of instrumental vaginal deliveries in Jos University Teaching Hospital (JUTH),

to determine the incidence of use of forceps versus vacuum in JUTH, and to determine the complications and delivery outcomes associated with instrumental vaginal deliveries in JUTH.

Materials and Method

This was a 10-year retrospective cross-sectional study of all instrumental vaginal deliveries carried out in the obstetric unit of JUTH between the periods of January 2007–December 2016. The hospital records of all parturients within this period were reviewed to obtain their sociodemographics (age and parity) and type of instrumental delivery used, the indication for the type of IVD, and Apgar scores of their babies. Data were then analyzed using SPSS software.

Results

During the period under review (2007–2016), there were a total of 16,614 deliveries out of which 71 deliveries were by use of instruments.

The incidence of IVD over the 10 years period (2007–2016) was 0.4% [Table 1].

Table 2 shows the incidence of IVD in each of the years under review. It is interesting to note the inconsistency in the incidence of IVD over the years [Figure 1].

Table 3 shows that the most common type of IVD was vacuum (97.2%), while use of forceps was the least (2.8%).

Table 1: Incidence of instrumental vaginal delivery among parturients

Instrumental vaginal delivery	Frequency	Percent
Yes	71	0.4
No	16,543	99.6
Total	16,614	100.0

Table 2: Trends in instrumental vaginal delivery over the 10-year period

Year	Total no. of delivery for the year	Percentage instrumental delivery for the year
2007	2239	0.4
2008	2818	0.5
2009	2432	0.2
2010	93	0.0
2011	1898	0.7
2012	2148	0.3
2013	2164	0.3
2014	1455	0.7
2015	406	1.0
2016	960	0.4

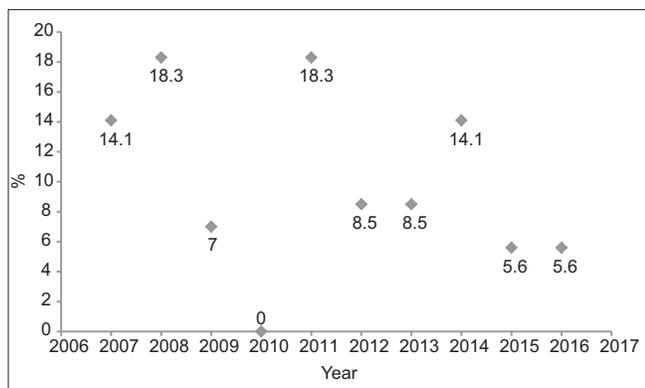


Figure 1: Trends in instrumental vaginal delivery over the years

Prolonged second stage of labor was the major indication for IVD (85.9%), followed by eclampsia and Pregnancy Induced Hypertension (PIH) with 2.8% [Table 4].

Table 5 shows that age, level of education, occupation, and parity were not significantly associated with IVD ($P > 0.05$).

Discussion

There has been a steady decline in IVD worldwide with vacuum delivery replacing forceps especially in the developing countries.^[16] The success and safety of these procedures are based on operator skill, proper timing, and ensuring that all indications are met before carrying out these procedures.^[17,18]

From the results of the study above, the incidence of IVD in JUTH from 2007 to 2016 period was 0.4% with vacuum delivery accounting for 97.2% of all the IVDs while forceps delivery only accounted for 2.8% of all the IVDs. This finding was lower than 1.95% rate reported from the same institution within the period of 1997–2003.^[19] The finding was also lower than 3.6%, 1.06%, and 1.0% reported from Zaria, Sokoto, and Ilorin, respectively.^[1,20,21] This finding was, however, in keeping with similar studies done in Bauchi with an IVD rate of 0.69%^[1] and also from some West African countries like Niger, Mali, and Burkina Faso.^[22]

Looking at the general trend of instrumental vaginal deliveries over the years under review (2007–2016), there seems to be inconsistency in the years as the highest incidence recorded was in 2011 and 2014 (0.7%), while the lowest incidence was in 2010 (0.0%). This inconsistent trend could probably be due to frequent industrial actions by health workers over the years that might have affected training and patient turn out. The lowest incidence of 0.0% recorded in 2010, however, could be as a result of the hospital (JUTH) moving from the temporary site to the present permanent site.

Table 3: Types of instrumental vaginal delivery used for parturients

Types	Frequency	Percent
Vacuum	69	97.2
Forceps	2	2.8
Total	71	100

Table 4: Indications for instrumental vaginal delivery

Indication	Frequency	Percent
Prolonged second stage of labor	61	85.9
Retroviral disease	2	2.8
Eclampsia	2	2.8
Intrauterine fetal death	1	1.4
Two previous CS	1	1.4
Pregnancy-induced hypertension	2	2.8
Antepartum hemorrhage	1	1.4
Severe pre-eclampsia	1	1.4
Total	71	100

CS: Caesarean section

Table 5: Sociodemographic characteristics of parturients who had instrumental vaginal delivery comparing age, parity, and IVD

Characteristic	IVD		Total (n=16,613)	Fisher's P value
	Yes (n=71)	No (n=16,542)		
Age (years)				
<20	7 (10.4)	561 (3.6)	568 (3.6)	
20-29	29 (43.3)	8062 (51.9)	8091 (51.9)	
30-39	30 (44.8)	6407 (41.3)	6437 (41.3)	
40-49	1 (1.4)	488 (3.1)	489 (3.1)	
≥50	0 (0.0)	4 (0.1)	4 (0.1)	0.051
Missing	9 (12.7)	26,187 (15.8)	2626 (16.8)	
Education				
No formal education	0 (0.0)	6 (0.04)	6 (0.04)	
Primary	6 (8.5)	1691 (10.2)	1697 (10.2)	
Secondary	28 (39.4)	6084 (36.8)	6112 (36.8)	
Tertiary	25 (35.2)	5904 (35.7)	5929 (35.7)	0.873
Occupation				
Housewife	45 (63.4)	9387 (56.7)	9432 (56.8)	
Business	7 (9.9)	1823 (11.0)	1830 (11.0)	
Civil servant	3 (4.2)	641 (3.9)	644 (3.9)	
Others	16 (22.5)	4691 (28.3)	4707 (28.4)	0.117
Parity				
Primigravida	0 (0.0)	32 (0.2)	32 (0.2)	
Multigravida	62 (87.3)	13,002 (78.6)	13,064 (78.6)	
Grandmultigravida	9 (12.7)	3508 (2212.2)	3517 (21.2)	0.199

IVD: Instrumental vaginal delivery

In addition, the general low rate of IVD recorded in this study could be attributed to lack or inadequate skill among most resident doctors and the fear of serious materno-fetal injury that has been associated with forceps delivery. There is also the possibility of caesarean section being felt as a safer and easier alternative to labor dystocia. There is also the issue

of solving all labor difficulties with caesarean section, thus increasing the caesarean section rate.^[23]

Vacuum delivery is the most preferred form of IVD from this study as it accounted for 97.2% of all the assisted vaginal deliveries as against the forceps which was only used in 2.8% of all the IVDs over the 10-year period under review. This finding was in keeping with similar studies done in the developing countries.^[1,11,22]

In the United States also, vacuum-assisted vaginal delivery is the most preferred and most common form of IVD.^[24,25] This trend in the United States may be related to medico-legal implication, while in most developing countries the vacuum is preferred over the forceps due to mainly simplicity of its application even by non-doctors. The ease to acquire the skill for vacuum application is also a factor and also the fact that vacuum-assisted vaginal delivery has been shown to have less neonatal and maternal complications especially the long-term effect of pelvic floor injury.^[26,27]

The parity of the parturient from this study did not show any statistically significant relationship with the use of IVD ($P = 0.199$). This finding was in keeping with finding from a similar study done in Bauchi, Nigeria.^[1] This was, however, an incidental finding as it is thought that primigravidas would be more prone to the use of IVD as they are more likely to prolong labor due to uterine inertia and maternal exhaustion.

The most common indication for the application of IVD from this study was prolonged second stage of labor as it was the indication for IVD in 85.9% of all the cases. This finding was in keeping with known indications for IVD from similar studies which include delay in second stage of labor due to maternal exhaustion, fetal distress in second stage of labor, maternal medical conditions where maternal effort is contraindicated like cerebral aneurysm, risk of aortic dissection, proliferative retinopathy, severe hypertension and cardiac failure, myasthenia gravis, spinal cord injury and cerebrospinal cord injury, and cerebrovascular disease.^[2,7,9,17,18,28,29]

Morbidity from IVD is most properly compared with that from caesarean section and not from spontaneous vaginal delivery. And thus postpartum endometritis and pelvic cellulitis are more common and often more severe following caesarean section than instrumental vaginal deliveries.^[14] Maternal complications following IVD include lacerations involving the perineum, vagina, or cervix. Pelvic disorders include urinary and anal incontinence and pelvic organ prolapse. While perinatal morbidities include cephal hematomas, sub-galeal

hemorrhage, retinal hemorrhage, neonatal jaundice, shoulder dystocia, clavicular fractures, and scalp lacerations.^[2,14]

Therefore, to revert this trend of dwindling IVD in JUTH, it is important to put a lot effort by the department on improving training and research of resident doctors on instrumental vaginal deliveries to improve their skills in these procedures and improve benefits to mothers and their babies.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Aliyu LD, Kadas AS, Hauwa MA. Instrumental Vaginal Delivery in Bauchi Northeast Nigeria. *J West Afr Coll Surg* 2011;1:18-27.
2. MarcHT. Operative Vaginal delivery. In Decherney AH, editor. *Current Diagnosis and Treatment*. 11th ed. Mc Graw Hill Companies; 2013. p. 334-48.
3. Hillier CEM. Worldwide survey of assisted vaginal delivery. *Int J Gynecol Obstet* 1994;47:109-14.
4. ArulkumaranS. Malpresentation, Malposition, Cephalopelvic Disproportion and Obstetric Procedures. In Edmonds DK, editor. *Dewhurst's Textbook of Obstetrics and Gynaecology*. Blackwell Publishing Ltd; 2012. p. 311-325.
5. JohnsonR. Recent Advances in Obstetrics and Gynaecology. *Edinburg extraction* 1998;125-39.
6. Ameh CA, Weeks AD. The Role of Instrumental Vaginal Delivery in Low Resource setting. *BJOG* 2009;116:22-5.
7. Shehu CE, Comembelede CJ. Instrumental Vaginal Delivery- an assessment of use in a tertiary care centre. *Orient J Med* 2016;28:1-2.
8. Clark SI, Belfort MA, Hanks GD, Meyers JA, Houser FM. Variation in the rates of Operative delivery in the United States. *Am J Obstet Gynecol* 2007;196:526.
9. Adaji SE, Shittu SO, Sule ST. Operative Vaginal Deliveries in Zaria. *Ann Afr Med* 2009;8:95-9.
10. Aimakhu CO, Olayemi O, Enabor OO, Oluyemi FA, Aimakhu VE. Forceps delivery at the University College Hospital, U.C.H Ibadan. *West Afr J Med* 2003;3:222-4.
11. Mutahir JT, Pam VC. Vacuum Delivery in Jos University Teaching Hospital, Jos Nigeria. *J Med Trop* 2007;9:21-8.
12. Maeve E, Colm O'Herlihy. Guidelines for monitoring the availability and use of Obstetric service. UNICEF, World Health Organization, UNFPA; 1997.
13. SundayEA, Ameen CA. Operative Vaginal deliveries in Contemporary Obstetric practice; from Preconception to Postpartum. In Sifakis S, editor. *Tech* 2016; 255-266. Royal College of Obstetricians and Gynaecologist. Green-top guideline No. 26: Operative Vaginal Delivery. RCOG; 2011.
14. CunninghamFG, Leveno KJ, Bloom SL, Spong CG, Dashe JS, *et al.* Operative Vaginal Delivery. *Williams Obstetrics*. 24th ed. New York, USA: Mc Graw Hill Education; 2014. p. 574-86.
15. Fauveau V. Is vacuum extraction still known, taught and practiced. A worldwide KAP Survey. *Int J Gynecol Obstet* 2006;94:185-9.
16. Okeke TC, Ekwuazi KE. Is there still a place for Vacuum Extraction (ventouse) in modern obstetric practice in Nigeria. *Ann Med Health Sci Res* 2013;3:471-4.
17. Royal College of Obstetricians and Gynaecologist. Green-top guideline

- No. 26: Operative Vaginal Delivery. RCOG; 2011.
18. The Royal Australian and New Zealand College of Obstetricians and Gynaecologist. C-obs 16: Instrumental Vaginal Delivery. RANZCOG; 2012.
 19. Ochejele S, Jonah M, Eka PO, Attah DI, Ameh T, Daru PH, Ujah IAO. Trends and operators of Instrumental vaginal delivery in Jos, Nigeria: A 7-year study (1997-2003) Trop J Obstet Gynaecol 2018;35:79-83.
 20. ChukudebeluWO. In Agboola, editor. Textbook of Obstetrics and Gynaecology for Medical students. 2nd ed. Ibadan: Heinemann Educational Books (Nig) Plc; 2006. p. 41-53.
 21. Anate M. Instrumental (operative) vaginal deliveries vacuum extraction compared with forceps delivery at Ilorin University Teaching Hospital, Nigeria. West Afr J Med 1991;10:127-36.
 22. Bailey PE. The disappearing art of instrumental delivery. Int J Gynaecol Obstet 2005;91:89-96.
 23. Johanson R. Recent advances in obstetrics and gynaecology. Edinburg: Churchill Livingstone; 1998. Advances in assisted vaginal delivery with vacuum extractor. p. 125-39.
 24. Notzon F. International differences in the use of obstetric interventions. JAMA 1990;263:3286-91.
 25. KozakLJ, Weeks JD. U.S. trends in obstetric procedures, 1990-2000. 2002;29:157-61.
 26. Fitzpatrick M, Behan M, O'Connell PR, O'Herlihy C. Randomised clinical trial to assess anal sphincter function following forceps or vacuum assisted vaginal delivery. Br J Obstet Gynaecol 2003;110:424-9.
 27. Bahl R, Patel RR, Swingler R, Ellis M, Murphy DJ. Neuro-developmental outcome at 5 years after operative delivery in the second stage of labour: A cohort study. Am J Obstet Gynecol 2007;197:147.e1-147.e6.
 28. Chukwuemeka A, Hyacinth E. Vacuum deliveries at the University of Nigeria Teaching Hospital, Enugu. Trop J Obstet Gynaecol 2006;23:23-6.
 29. Aliya I, Aisha HK, Javana NM. Vacuum and Forceps Deliveries; Comparison of Maternal and Neonatal Complications. Professional Med J 2008;15:87-90.