

Original Article

Trends and outcomes of instrumental vaginal deliveries at Lagos University Teaching Hospital: a 10-year review

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ABSTRACT

Background: Instrumental vaginal delivery (IVD) is an essential component of basic emergency obstetric care, and the instruments are cheap. However, its use is declining due to medico-legal reasons and over reliance on caesarean section. **Objectives:** To determine prevalence, trend and feto-maternal outcomes of instrumental deliveries performed at Lagos University Teaching Hospital (LUTH). **Methodology:** A cross-sectional study of 97 cases of IVD conducted at LUTH from 1st January 2010 to 31st December 2019. Data was obtained from delivery registers and case files for scrutiny. Data analysis was done with SPSS, version 23.0. **Results:** Prevalence of instrumental delivery during study period was 0.71% with no significant change in trend in the last 10 years ($p=0.099$). Mean age of parturient was 29.1 ± 5.1 years; most were booked (63/97, 64.9%). Delivery was performed by vacuum extraction in 63.9% and forceps in 36.1%. Perineal laceration occurred significantly more with vacuum extraction (16.1%) compared to forceps delivery (2.9%), $p = 0.043$. Neonatal unit admission rate for all IVD was 30/97 (30.9%). Birth asphyxia was significantly higher in babies of women who had forceps delivery compared to vacuum ($p < 0.05$). **Conclusion:** The low prevalence of IVD and high prevalence of birth asphyxia especially with forceps delivery might suggest loss of skills among maternal health workers. There is a need to explore the reasons for the dwindling rates in instrumental deliveries especially in tertiary institutions where specialist Obstetricians are being trained.

Keywords: Instrumental Delivery, Forceps, Vacuum Extraction, Maternal Mortality, Perinatal Outcome, Complications.

INTRODUCTION

Instrumental vaginal delivery (IVD) is an age-long obstetric practice used to expedite vaginal delivery or avert recourse to caesarean delivery. The first set

of obstetric forceps which were precursors of those currently in use in modern obstetrics were invented by Peter Chamberlain in 1600s and this was initially kept as a family secret for many years until his death.^[1] Instrumental vaginal delivery, which involves the use of a vacuum device or forceps, is an important management option in clinical situations where delivery needs to be expedited. When indicated for reasons such as maternal

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exhaustion, a non-reassuring fetal heart rate tracing, or maternal medical benefit from a short second stage (cardiac disease, respiratory, or intracranial pathology, where bearing down may increase the preload), instrumental vaginal delivery presents an alternative to caesarean delivery.^[2] However, the indications are not absolute, and decision is individualized based on the clinical presentation and patients wish.^[3]

Instrumental vaginal delivery is one of the six critical functions of basic emergency obstetric and neonatal care, but currently under-utilized.^[4] The rates have been between 10% and 13% in the United Kingdom and 5% in United States.^[5,6] In Nigeria, instrumental vaginal delivery rate was found to be 4.9% in Lagos, 0.69% in Bauchi, 3.6% in Zaria, and as high as 28.7% in Kano.^[7-10] The study in Lagos was conducted 16 years ago, hence there is a need for us to review and determine the current trend and prevalence of IVD as well as assess the utilization and outcome of instrumental vaginal delivery procedures to ascertain its safety or otherwise. This study aimed to determine the current prevalence of instrumental delivery at Lagos University Teaching Hospital (LUTH), to assess the trend and pattern of instrumental delivery in the last 10 years, to assess the success rate of instrumental delivery in LUTH, and to determine the maternal and fetal outcomes in women who had instrumental vaginal delivery.

SUBJECTS AND METHODS

This was a retrospective cross-sectional study conducted at the Department of Obstetrics and Gynecology, Lagos University Teaching Hospital, Idi-Araba, Lagos after obtaining ethical clearance from the hospital's Health Research and Ethics Committee (HREC No ADM/DCST/HREC/APP/3985).

Included were all mothers who had instrumental vaginal deliveries at LUTH from 1st January 2010 to 31st December 2019. Data was collected from the labor ward registers. Relevant information on age, parity, booking status, indications and type of procedure performed, the APGAR scores of the babies and complications in the parturient and baby were obtained using a structured proforma designed for this study. Primary outcome measure was incidence of instrumental deliveries. Secondary outcome measures were incidence of perineal tears, postpartum hemorrhage, APGAR scores at 1 and 5

minutes, incidence of birth trauma, and incidence of neonatal unit admission. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0, IBM Corp., Armonk, NY, USA.

RESULTS

During the study period (2010 – 2019) a total of 13,717 deliveries were conducted at LUTH, out of which 97 were instrumental deliveries. This put the overall prevalence of instrumental deliveries as 0.71%. The mean age of parturient who had instrumental delivery was 29.1 ± 5.1 years, with a median parity of 0 (range 0 – 6). There was a rapid decline in IVD in the last 3 years The near zero prevalence of instrumental deliveries in 2014 was partly because of health workers’ strike (Figure 1).

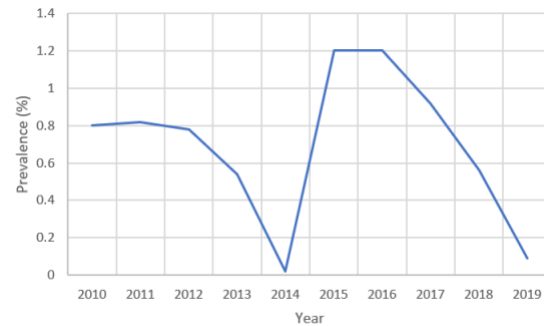


Figure 1: Trend in instrumental delivery at LUTH 2010 - 2019

Table I: Clinical profile in women who had instrumental deliveries in LUTH 2010 – 2019

Clinical characteristic	Frequency (%) n = 97
Mode of delivery	
Forceps	35 (36.1)
Vacuum	62 (63.9)
Booking status	
Booked	63 (64.9)
Unbooked	34 (35.1)
Gestational age at delivery	
Preterm (36 weeks and below)	19 (19.6)
Term (37 - 39 weeks)	48 (49.5)
Postdate (40 weeks and above)	30 (30.9)
Number of fetuses	
Singleton pregnancy	93 (95.9)
Twin pregnancy	4 (4.1)
Type of anesthesia	
Epidural	3 (3.1)
Local infiltration	76 (78.4)
None	18 (18.6)

Of the women who had instrumental delivery, almost two-thirds were booked (had antenatal care). Of the instrumental deliveries conducted 35 (36.1%) were forceps delivery and 62 (63.9%) were vacuum deliveries. Local infiltration with Lidocaine was the commonest form of anaesthesia offered (Table 1).

Table 2: Comparative outcome of forceps versus vacuum delivery

Parameter	Forceps (n = 35)	Vacuum (n = 62)	All instrumental deliveries (n = 97)	OR (95% CI)	p-value
Postpartum haemorrhage incidence ^a	9 (25.7%)	10 (16.1%)	19 (19.6%)		0.460
Mean blood loss (ml) ^c	346 ± 282	291 ± 160			0.304
Incidence of perineal tear ^b	1 (2.9%)	10 (16.1%)		6.54 (0.80 – 53.43)	0.043*
Incidence of episiotomy ^d	24 (68.6%)	44 (71%)		1.12 (0.46 – 2.76)	0.804
	Forceps (n = 23)	Vacuum (n = 52)	All live births (n = 75)		
Incidence of perinatal asphyxia ^a (APGAR score <7) based on:					
APGAR at 1 minute	12 (52.2%)	12 (23.1%)	24 (32.0%)		0.006*
APGAR at 5 minutes	6 (26.1%)	5 (9.6%)	11 (14.7%)		0.014*
Neonatal unit admission rate ^a	8 (34.8%)	22 (42.3%)	30 (40.0%)		0.059

^aChi square and ^bFishers Exact used in testing association between forceps and vacuum delivery

^ctudent t-test used in testing for association between forceps and vacuum; ^dStatistically significant

The incidence of perineal tear was significantly higher with vacuum extraction compared to forceps delivery, p = 0.043. On the other hand, the incidence of birth asphyxia was significantly higher with the use of forceps compared to vacuum, p < 0.05 (Table 2).

Table 3: Indications for neonatal unit (NNU) admission for babies of mothers who had instrumental delivery

Indication for admission	Frequency (%) n = 30
Neonatal jaundice	10 (33.3)
Perinatal asphyxia	7 (23.3)
Respiratory distress syndrome	5 (16.7)
Prematurity	3 (10.0)
Sepsis	2 (6.7)
Congenital pneumonia	1(3.3)
Hypoglycemia	1(3.3)
Caput succedaneum	1 (3.3)

Neonatal unit admission rate was 30.9% and the indications were mostly for neonatal jaundice, respiratory distress syndrome and prematurity (Tables 2 and 3), which are not related to IVD.

Of the babies delivered by instrumental deliveries, 72 (74.2%) were successfully discharged home, 3 (3.1%) had early neonatal death, 6 (6.2%) were fresh still births and 16 (16.5%) were macerated still births. None of the deaths were affirmatively attributable to instrumental delivery. There was no maternal death.

DISCUSSION

The overall prevalence of instrumental delivery of 0.71% in this study is low and indicates an aversion for the use of instrumental deliveries in modern day obstetrics. Similar low prevalence has been reported in earlier studies done in Bauchi and Port Harcourt; 0.69% and 0.67% respectively [8,11] but lower than 1.06%, 1.57%, 1.5%, 3.6%, and 3.7% reported from Sokoto, Ibadan, Enugu, Zaria, and Abakaliki respectively. [12,13] These are however much lower than the usage rate of 8.5% recommended by the Royal College of Obstetricians and Gynecologist (RCOG). [14] A marked reduction in prevalence in Lagos from 4.9% in 2004 to 0.71% in the last decade is similar to the trend in incidence patterns observed in other centres where similar studies have been conducted indicating that the use of instrumental vagina deliveries is gradually becoming a lost art.[7] This calls for concern, as instrumental deliveries can serve as a cost effective and a less invasive option of delivery especially in a low resource setting such as Nigeria, with patients’ aversion to caesarean deliveries due to sociocultural and religious beliefs.

Aside reducing cost of care, instrumental deliveries help reduce morbidities associated with vaginal deliveries especially in high-risk parturient, such as pregnant women with cardiac diseases and sickle cell diseases, in whom it is important to shorten second stage of labour to minimize maternal exhaustion and undue prolongation in second stage of labour. These low and declining prevalence rates could be because of inexperience of skilled birth attendants in conducting instrumental delivery or increase in medical litigation in recent times which puts fear in the mind of an average accoucheur while conducting deliveries. There will be a need to explore the

domains contributing to the declining prevalence of instrumental deliveries in our society to understand ways to combat these to prevent extinction of the art of using vacuum and forceps for delivery. The decline with the use of instrumental delivery might also partly be a reason for the increase in caesarean section rates in Nigeria in recent years. Caesarean section rates will continue to soar higher if we do not promptly identify reasons for the decline in the use of forceps and vacuum for delivery and address them before these procedures go into extinction like destructive operations.

The low parity of women who had forceps delivery in this study is in keeping with the previous study by Prapas et al who observed that 85% of women who had vacuum delivery and 82% of women who had forceps delivery were primigravidae.^[15] This might be because these women are inexperienced and are more likely to suffer maternal exhaustion or make poor efforts in bearing down during delivery. Another observation highlighted by this study is the differences in the complication patterns associated with the two types of instrumental delivery. The incidence of perineal tears was significantly higher in women who had vacuum delivery compared to women who had forceps delivery. This is contrary to the findings in a study by Aliyu et al in which they observed more perineal tears with the use of forceps delivery, but like the observation made by Garba et al of a higher incidence of perineal tears with the use of vacuum extraction.^[8,16] This could be attributable to failure to anticipate perineal tears in women undergoing vacuum compared to forceps. It is generally assumed that the vagina will be roomy, as the vacuum cups do not occupy space compared to forceps which does, and hence prophylactic episiotomy not being promptly given to pregnant women undergoing vacuum compared to forceps delivery.

The statistically significant difference in the incidence of perinatal asphyxia evaluated by APGAR scores with usage of vacuum and forceps delivery is also worthy of note. The higher percentage of perinatal asphyxia observed with forceps delivery is similar to what was observed by Aliyu et al and Garba et al.^[8,16] This may be one of the reasons why forceps delivery usage is declining faster than vacuum delivery.

This is evident from the findings in this study that almost two-thirds of instrumental

deliveries were conducted using ventouse. Aside having lower incidence of complications, vacuum is often preferred because it is easier to apply, requires less skill, and does not occupy space within the maternal pelvis. Of the indications identified for neonatal unit admissions, only caput succedaneum was related to instrumental delivery in 3.3% of women who were delivered by these methods.

Considering the relative safety of instrumental delivery as found in this study and its benefits, there is no reason the skill of using ventouse and forceps to facilitate delivery should be allowed to go into extinction. There is a need to explore factors responsible for its non-usage in many obstetric units and try to modify these, to encourage the use, and train and retrain of maternal healthcare workers on the use of instrumental deliveries in our country.

CONCLUSION

The use of instrumental vaginal delivery, despite its relative safety, is fast declining in our centre. The associated high prevalence of birth asphyxia especially with forceps delivery might suggest loss of skills among maternal health workers. Availability of instrumental vaginal delivery is a component of basic obstetric care. There is need to train and retrain skilled birth attendants and to equip our training centres to boost basic obstetric skills especially in the use of instrumental vaginal delivery.

Competing interests

The authors declare that there are no competing interests in conducting this study.

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Conference presentation

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