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■ Original Research Article

Patterns And Obstetric Outcomes of Induction of Labour in a Public District Hospital in Abuja, Northcentral Nigeria: A Five-Year Review

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ABSTRACT

Background: Induction of labour (IOL) is an important intervention in obstetric practice. The decision to induce labour is most often made where continuation of the pregnancy is not beneficial and may pose risks to the foetus or the mother. When successful, IOL obviates the need for emergency caesarean section with its attendant complications. IOL is not without risks and maybe associated with both maternal and perinatal complications. Aim and Objective: The aim of the study was to determine the patterns and obstetric outcomes of induced labours in a public district hospital in Abuja, Nigeria. Method: This was a retrospective study conducted in Maitama District Hospital Abuja, Northcentral Nigeria, over a five-year period from January 1st 2018 to December 31st 2022. Data on parturients who had induction of labour during this period were extracted from the folders in the medical records of the hospital. The data were entered into a computer and analysed using SPSS for windows version 26. Results: There was a total of 4,534 deliveries and 131 induced labours within the study period giving an induction rate of 2.9%. Post-date pregnancy was the commonest indication for induction accounting for 79.4%. Nullipara (Para 0) accounted for the commonest parity (68.7%) but with the lowest vaginal delivery rate (23.3%). Successful induction of labour (IOL) was recorded in 40.5% while 58.8% had failed induction resulting in emergency CS with cephalopelvic disproportion (74.0%) as the commonest reason for the CS. The commonest method of induction was foley catheter with amniotomy and oxytocin titration (86.3%). Foetal outcome was favourable in 79.4% cases. Eight neonates (6.1%) had moderate to severe birth asphyxia that required NICU admission, with three neonatal deaths. Primary PPH was the commonest maternal complications. Conclusion: Higher successful induction rates are associated with higher parity. Careful selection of patients for induction and adequate intrapartum monitoring of induced labours are recommended, taking into consideration available resources.

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INTRODUCTION

Labour induction is the initiation of uterine contractions prior to its spontaneous onset, after the age of viability, by mechanical or pharmacological stimulation of the uterus in order to achieve vaginal delivery.[1] It is an important intervention in obstetric practice and is usually not without risks. The decision to induce labour is most often made where pregnancy continuation is not beneficial and may be harmful to either the foetus or the mother, or both.[1,2] Induction of labour when successful obviates the need for caesarean section with its attendant complications.

Indications for induction of labour may be for obstetric or medical reasons and includes postdate pregnancy, hypertensive disorders of pregnancy including pre-eclampsia and eclampsia, diabetes mellitus, renal disease, chronic pulmonary disease, rhesus isoimmunisation, premature rupture of membranes (PROM), intrauterine fetal death (IUFD), and a host of other medical conditions[1-5] as well as such indications as maternal requests for social reasons, and Obstetricians' preferences.[6,7]

The rates of induction of labour vary from one region to another and even within countries, with higher rates reported in developed Countries compared with developing Countries. The World Health Organization (WHO) estimates that 25% of women in developed countries have their labour induced.[5] An incidence of 22.5% has been reported in the United States[7] and 3-16% in the sub-Saharan Africa.[10,11,12]

The WHO recommends that induction of labour should be performed only when there is a clear medical indication, and the expected benefits outweigh potential risks. Induction of labour when performed for the right indication with adequate monitoring has been shown to reduce perinatal morbidity and mortality drastically, especially after the due date.[5] Induced labour is associated with longer and more painful labour compared with spontaneous labour. Other reported risks of induced labour include failed induction, uterine rupture, increased rates of Caesarean section and instrumental vaginal delivery, primary postpartum haemorrhage (PPH), uterine hyperstimulation with foetal distress, cord prolapse, hyperbilirubinaemia, hyponatraemia, inadvertent preterm delivery with increased perinatal mortality rate, and sometimes maternal mortality.[1-5] However, it has been suggested that some of the observed complications of induced labour and increased risks of Caesarean section maybe due to the initial pathological condition that necessitated the induction of labour rather than the induction process itself.[8,9]

Cervical ripening is an important component of IOL and the Bishop scoring system is often used to determine the 'favourability' of the cervix for induction. Methods of induction include use of prostaglandins and their analogues (PGE2 and misoprostol), oxytocin, balloon foley catheter, amniotomy, and membrane sweeping or stripping. These methods are often used alone or in combinations depending on adopted protocols. Oxytocin titration is usually started either prior to or following amniotomy and often preceded by foley catheter or misoprostol ripening of the "unripe" cervix.

This study aims to retrospectively review the patterns and obstetric outcomes of women who had induction of labour at the maternity unit of Maitama District Hospital Abuja, Northcentral Nigeria, over a five-year period (2018-2022). The findings from the study, which is the first of its kind in any of the FCTA Abuja district hospitals, will not only contribute to existing body of knowledge on the subject but also help in making evidence-based recommendations for the judicious conduct of induction of labour.

MATERIALS AND METHODS

This was a retrospective study of the patterns and outcome of induced labours conducted at the maternity unit of Maitama District Hospital (MDH) Abuja, Northcentral Nigeria, between January 1st 2018 and December 31st 2022. MDH is one of the public secondary healthcare facilities owned by the Federal Capital Territory Administration (FCTA) Abuja and is located in the Abuja Municipal Area Council (AMAC) of the territory. It provides specialized obstetric care for pregnant women with uncomplicated and complicated pregnancies, and serves as a referral centre for patients from both public and private health institutions in the Federal Capital Territory (FCT) Abuja and the neighbouring States of Nasarawa, Niger, Benue, Kaduna, and Kogi. The Hospital runs an electronic medical records system (E-MRS) with a well secured data entry and confidentiality which facilitates data retrieval when required.

Data were collected from the patients' records on the E-Medical Records database and also from the labour ward and theatre records when necessary.

The relevant socio-demographic and obstetric characteristics of the patients obtained included: age, occupation, educational level, parity, gestational age at induction/delivery, booking status, indication for IOL, method of IOL, delivery outcome, as well as maternal and foetal outcomes/complications. The information obtained was transferred into an Excel spreadsheet for analysis using Statistical Package for Social Sciences

(SPSS) version 26.0 (SPSS 26.0, IBM Chicago) with results presented in tables and simple percentages. Frequency distribution was generated for all categorical variables for the descriptive aspect of the analysis. Means, standard deviations and other descriptive measures were determined for quantitative variables. Chi square test was applied for the comparison of proportions and evaluating association of categorical variables where applicable. A confidence interval of 95% and a p-value of < 0.05 was adopted as the level of statistical significance. Ethical approval was sought from the Institution's Ethics Committee.

The main outcome measures were the proportion of successful IOL and failed IOL, while the secondary outcome measures were maternal and foetal outcomes and complications associated with IOL. Failed IOL was defined as failure to achieve spontaneous vaginal delivery without any operative intervention such as instrumental vaginal delivery (Forceps or Vacuum) or emergency Caesarean section.

RESULTS

During the period of study, there were a total of 4,534 deliveries and 131 induced labours giving an induction of labour rate of 2.9%. The majority of the patients was within the 26-30 age group with mean of 29.91±4.251 years.

Most of the women attained tertiary level of education (74.1%), were booked (91.6%) and were civil servants (47.3%). Nulliparity (Para 0) accounted for 68.7% of cases while only three (2.3%) were grandmultipara (Para 5 and above). The mean parity was 0.61±1.247. The mean gestational age at induction was 40.39±1.444 weeks with majority (83.2%) in the 40-42 weeks group (Table 1).

Table 1 shows the sociodemographic characteristics of parturients who had induction of labour within the study period.

Table 2 shows the indications, methods and outcome of labour induction. The commonest indication for IOL was postdate pregnancy accounting for 79.4% of cases followed by hypertensive disorders of pregnancy (chronic hypertension, severe pre-eclampsia/eclampsia) which accounted for 6.9%. Pre-labour premature rupture of membranes (PROM) and intrauterine foetal death (IUFD) accounted for 5.3% each while Rhesus isoimmunization was an indication in 3.1% of cases.

Majority of the patients (86.3%) had intracervical foley catheter ripening of the cervix with amniotomy and oxytocin titration while use of misoprostol alone accounted for only 1.5%. Misoprostol was employed for all the cases of intrauterine foetal death (IUFD) either alone or

Table 1: Sociodemographic characteristics of parturients who had induction of labour.

S/NO	Characteristics	Frequency	(%)
1	**Age group (years)**		
	≤20	1	0.8
	21-25	16	12.2
	26-30	60	45.8
	31-35	42	32.1
	36-40	11	8.4
	≥41	1	0.8
	Total	131	100
	Mean Age ±SD	***=29.91±4.251***	
2	**Booking status**	**Frequency**	**Percentage**
	Booked	120	91.6
	Unbooked	11	8.4
	Total	131	100
3	**Educational level**	**Frequency**	**Percentage (%)**
	No formal education	0	0
	Primary	5	3.8
	Secondary	29	22.1
	Tertiary	97	74
	Total	131	100
4	**Occupation**	**Frequency**	**Percentage**
	Unemployed	33	25.2
	Student	5	3.8
	Civil servant	62	47.3
	Professional	12	9.2
	Business	15	11.5
	Others	4	3.1
	Total	131	100
5	**Parity**	**Frequency**	**Percentage**
	0	90	68.7
	1-4	38	29
	≥5	3	2.3
		131	100
	Mean Parity ± SD	***0.69±1.247***	
6	**Gestational Age**	**Frequency**	**Percentage**
	<37	**7**	5.3
	37-39	12	9.2
	40-42	109	83.2
	>42	3	2.3
	Total	131	100
	Mean GA± SD	***40.39±1.444***	

Table 2: Indication, Method of Induction of labour and Mode of delivery

1	**Indication for IOL**	**Frequency**	**Percentage**	**Chi square**	**p-value**
	Postdated pregnancy	104	79.4		
	Hypertensive disorders of pregnancy	9	6.9		
	Intrauterine foetal death	7	5.3	85.044	0.224
	Premature rupture of membranes (PROM)	7	5.3		
	Rhesus isoimmunisation	4	3.1		
	Total	131	100		
2	**Method of IOL**				
	Foley catheter/Amniotomy/Oxytocin	113	86.3		
	Oxytocin alone	12	9.2	55.495	0.532
	Misoprostol alone	2	1.5		
	Misoprostol/Oxytocin	4	3.1		
	Total	131	100		
3	**Mode of delivery**				
	Vaginal delivery	53	40.5		
	Caesarean section	77	58.8	41.269	0.330
	Vacuum delivery	1	0.8		
	Total	131	100		
4	**Indication for caesarean section**				
	Cephalopelvic disproportion	57	74.0		
	Poor progress	4	5.2	78.477	0.400
	Foetal distress	15	19.5		
	Antepartum haemorrhage	1	1.3		
	Total	77	100		

in combination with oxytocin. Oxytocin titration was used alone in all cases with favourable Bishop score (≥6). Vaginal delivery (successful induction) was achieved in 40.5% of the parturients while 58.8% had failed IOL resulting in emergency CS for various reasons such as cephalopelvic disproportion, foetal distress, and poor progress in labour due to cervical dystocia. Cephalopelvic disproportion was the commonest reason for CS accounting for 74.0% of all the CS followed by foetal distress (19.5%) and poor labour progress (5.2%). There was one case of antepartum haemorrhage constituting 1.3%. Vacuum extraction was performed for one case of foetal distress at full cervical dilatation (Table 2). All cases of induction due to IUFD resulted in successful vaginal delivery.

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Table 3: Outcome of IOL according to parity

Parity	Frequency	Vaginal delivery	Caesarean section	Vacuum delivery	Percentage Success Rate
0	90	21	68	1	23.3
1-4	38	30	8	0	78.9
>5	3	2	1	0	66.7
Total		53	77	1	40.5

Table 3 shows the outcome of IOL according to parity. Successful vaginal delivery was highest among the multiparous group (Para 1-4) accounting for 78.9%. Failed IOL resulting in emergency CS was commonest among the nulliparous group (Para 0) with only 23.3% having successful vaginal delivery.

T able 4 shows the foetal outcome and maternal complications following induction of labour. The mean birthweight of the babies was 3.31±0.471kg with more than 90% weighing between 2.5kg and 4.0 kg and only eight (6.1%) weighing > 4kg. The birthweights of 3 of the IUFD prior to induction were not recorded.

Most of the neonates (79.4%) had good Apgar scores at 1 and 5 minutes (Apgar scores ≥7) with eight neonates (6.1%) having moderate to severe birth asphyxia and all required neonatal intensive care unit (NICU) admission. There were three neonatal deaths (one intrapartum fresh stillbirth following PROM at 35 weeks, one immediate neonatal death from meconium spiration syndrome (MAS) in a postdate pregnancy (41 weeks+5days), and one death in the NICU two days postpartum in a parturient with severe pre-eclampsia at 36 weeks +2days gestational age). There were eight cases of intrauterine foetal death (IUFD) prior to induction.

Maternal complications noted included three cases of primary postpartum haemorrhage (PPH) which accounted for 42.9% of all maternal complications followed by genital tract laceration, and uterine hyperstimulation. Two parturients required intensive care unit (ICU) admission on account of PPH with shock, that required multiple blood transfusion, and maternal severe

hypertension. There was no maternal death from induction of labour during the period of study

Table 4: Foetal Outcome and Maternal Complications of Induced Labour

1	Foetal outcome	Frequency	(%)	Chi square	p-value
	Good outcome/ Apgar scores	104	79.4		
	Birth asphyxia	8	6.1		
	NICU Admission	8	6.1		
	Neonatal death	3	2.3	41.444	1.000
	IUFD prior to IOL	8	6.1		
		131	100		
2	Birth Weight				
	2.5kg-4kg	120	91.6		
	>4kg	8	6.1	16.549	0.620
		128	97.7		
	Mean birthweight ±SD		= 3.31± 0.471 kg		
3	Maternal complications	Frequency	Percentage	Chi square	p-value
	Primary PPH	3	42.8		
	Genital tract laceration	1	14.3		
	Uterine hypersti mulation	1	14.3	93.50	0.083
	ICU admission	2	28.6		
	Maternal death	0	0		
	Total	7	100		

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DISCUSSION

This study shows an induction rate of 2.9% which is comparable with rates reported in other studies.[10,11,13,14,16] It is, however, much lower than rates reported in some other studies in Nigeria and other African countries.[12,15,18,26] The observed differences may be attributed to the various indications and methods of induction employed, the length of the study period and the population studied, and the non-homogenous nature of the sample sizes among other factors. The low induction rate recorded in our study tends to corroborate the fact that induction of labour is generally low in health facilities in Africa and other low-income countries.[2,10,11]

Postdate pregnancy was the main indication for IOL in this study accounting for 79.4%. This is consistent with the findings reported in other studies in Nigeria and other African countries.[13,14,16,22,27] However, postdate pregnancy may be affected by inaccurate determination of gestational age due to unsure of dates of last menstrual period by patients and the lack of early ultrasound scan dating of pregnancy. Other studies in Nigeria and parts of Africa however reported premature rupture of membranes and hypertensive diseases as the commonest indications[11,20,25,26]

The commonest method of induction from our study is the combination of foley catheter ripening of the cervix, amniotomy and oxytocin titration. The use of misoprostol for IOL in pregnant women with live foetuses at term is restricted in all Federal Capital Territory Administration (FCTA) Abuja owned Health facilities including the hospital of study as a matter of policy. This policy arose as a result of previous recorded incidences of maternal and foetal complications (uterine rupture and perinatal mortality) resulting from its use in some of the facilities, coupled with the non-registration of misoprostol for induction of labour by the National Agency for Food and Drug Administration and Control (NAFDAC) in Nigeria. In contrast, other studies in Nigeria and other African countries reported use of misoprostol as the commonest method of induction.[16,17,26,27] The efficacy and safety of misoprostol use in induction of labour in pregnancies with live foetus has been documented in studies in Nigeria and other countries.[27,28] The high cost and non-availability of PGE2, the lower efficacy of other methods of labour induction, the risks associated with misoprostol use in pregnancies with live foetuses, and the lack of facilities for intensive intrapartum monitoring make the use of foley catheter and oxytocin combination a more viable option in low-resource settings.[2] Misoprostol in low doses is only used for induction of labour for IUFD cases in the hospital of study.

The successful induction rate of 40.5% recorded in this study is low compared with some studies while

Caesarean section (CS) due to failed induction which accounted for 58.8% is high compared with those reported in other studies.[13,16,17,21,27] The observed differences may be related to the different indications and methods of induction used in those studies where misoprostol was the main induction agent. The high vaginal delivery rate recorded in our study in those with IUFD may be due to the use of misoprostol and the longer window period allowed for induction due to the elimination of concerns about foetal distress.

The main reason for failed induction in this study is cephalopelvic disproportion (74.0%), similar to the findings in some studies[18] but in contrast with those reported by Ugwuoroko et al[16] and Lawani et al[17] where foetal distress was the main reason.

Majority of the women were nulliparous (Para 0) and this is consistent with findings in other studies. Successful vaginal delivery rate was, however, highest among the multiparous women with lower rates recorded among the nullipara as previously observed in other studies.[13,23,27] This is attributed to the more favourable Bishop scores often registered in this group of parturients prior to induction of labour.

Favourable neonatal outcome as evidenced by good Apgar scores at 1 and 5 minutes was recorded in 79.4%, a finding that is comparable with those of other studies.[13,16,19] There were, however, eight cases of moderate to severe birth asphyxia with three neonatal deaths all related to maternal conditions prior to induction. This finding tends to support the observation that perinatal mortality following IOL may be related to the initial pathological condition that necessitated the induction rather than the induction process itself.[8,9]

The main maternal complication recorded in this study is primary postpartum haemorrhage (PPH) representing 42.9% of all maternal complications, a finding similar to other studies.[16,18,21] Out of the three cases of PPH, one required multiple blood transfusions and intensive care unit (ICU) management. Cases of failed induction are considered as adverse maternal outcome since they ended up in operative interventions with their attendant risks to the mother. There was no cases of uterine rupture and no maternal death.

The main limitation of the study is the fact that specific indications for induction which may on their own affect obstetric outcomes were not excluded in the review. The non-availability and use of infusion pumps for accurate delivery of oxytocin in the facility of study and the restriction on the use of misoprostol for induction may also have affected the obstetric outcomes observed, including the high failed induction rate.

CONCLUSION

The study showed that higher parity is associated with higher rate of successful induction. However, the risk of uterine rupture is increased in this category of parturients. Hence, we recommend careful selection of patients, and adequate intrapartum monitoring for all cases of induced labours, taking into consideration available human and material resources.

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