

Research Article

Induction of labour at Jos University teaching, hospital, Jos, Nigeria: a four year review

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ABSTRACT

Background: Induction of labour (IOL) is a common procedure that remains a relevant Obstetric procedure. The maternal and perinatal outcomes are paramount hence the need to review the intervention in order to implement needed change.

Objectives: To determine incidence, indications, outcome and complications of induction of labour at the Jos University Teaching Hospital (JUTH), Jos, Nigeria.

Methods: This was a retrospective study reviewing 584 women who had IOL in JUTH from January 2004 to December 2007. Parameters selected for review include parity, gestation age, outcome and cervical state prior to IOL.

Results: Four hundred and eighty women had vaginal deliveries (82.2%). There were fifty two induced on account of antepartum Intra Uterine Foetal Deaths (IUFD), while 1.5% of the deliveries ended up as still births, 10.5% had birth asphyxia and neonatology review and care. Thirty two patients had various complications after IOL. There were no maternal mortalities.

Conclusion: Parity and presence of IUFD were found to influence the outcome of IOL.

Keywords: Cervical assessment, Oxytocin, Induction, Labour, Vaginal delivery, Caesarean section

INTRODUCTION

Induction of labour is one of the important interventions in obstetric practice and remains a therapeutic obstetric challenge.²

It is defined as the initiation of uterine contractions after the 28th week of gestation and before the onset of natural labour by medical and or surgical means for the purpose of achieving normal delivery¹, and can be carried out in the presence or absence of foetal membranes.³ It has also been defined as planned initiation of labour.⁴

It is an operation with a long interesting history, which in previous times was employed almost exclusively for the purpose of ensuring the birth of a small baby in cases of

severe pelvic deformity thus giving the woman a chance to produce a living child.

There are various methods of induction of labour available, out of them all, the synchronous use of fore water amniotomy and oxytocin titration has been found to provide the highest success rate with minimal risk to both mother and child.^{3,5} the synchronous use of fore water rupture and oxytocin infusion was the method of induction in this centre; however in cases of Intrauterine foetal death, aminotomy is withheld because of the risk of infection.¹ The use of misoprostol and other agents had not been commenced at the time of this review.

Induction of labour is performed when prolongation of pregnancy is considered inadvisable for foetal and/or

maternal well being⁷ and Hypertensive disease in pregnancy, IUFD, prolonged Prelabour Rupture of Membranes (PROM), and prolonged pregnancy, Diabetes mellitus and polyhydramnios; are all acceptable indications for IOL.^{1,4,5,7-9} and these were among the main indications at this center. The epidemiology of induction of labour has changed over the years, with increase in the frequency of term induction of labour for various indications.¹¹ Incidence of 3% was obtained at Sokoto,² 5% at Benin,¹⁷ but up to 23% have been documented in developed countries² and these figures are still on the increase.¹² This is due to several reasons according to location.

Post term pregnancy however remains the commonest reason for induction of labour; but the gestational age at delivery for postdate pregnancies has declined generally from 42 to 41 weeks, corresponding with data showing a decreased risk of stillbirth when induction is done at 41 weeks gestation rather than await 42 weeks were adverse outcomes in morbidity and mortality are more.^{7,11,12}

Various protocols for administration of oxytocin for induction obtain. The use of dextrose with 10 units of oxytocin in 1 liter starting with 10 drops per minute (dpm) and escalating by 10 drops every 30 minutes to a maximum of 60 dpm or adequate uterine contractions have been tried. This protocol was found to have limited the duration of labour and the induction delivery interval in primigravidae,^{13,14,15} however, the hyper stimulation and foetal distress rates were found to be 4-5 times higher.¹⁴

The Royal College of Obstetricians and Gynaecologists (RCOG) recommends an interval of at least 30 minutes before increasing the dose rate in use of oxytocin.¹⁴ The rate of oxytocin drops is increased every 30 minutes in the protocol in JUTH.

The use of 60 minutes interval has however been found to be associated with less risk of caesarian section, abnormal FHR patterns and hyper stimulation but no significant difference in length of induction time.¹⁴ The adverse effects of oxytocin are known to be dose related and it is advised that comprehensive assessment of patients prior to induction and close monitoring in labour should be carried out. This should include confirmation of gestational age, foetal presentation, maternal pelvic adequacy, cervical assessment and foetal heart reactivity by non-stress test.¹⁰

Indicators of success in induction of labour according to Bishops cervical scoring system show that the most important predictor of success is cervical dilatation, with cervical effacement/length, consistency as well as station of presenting part having about half the effect.¹¹ It is observed that the more favourable the cervix, the greater the chance of successful induction.¹ The parity and Bishop score have also been found to improve outcome of reduction of labour, with nulliparous women having higher IOL failure and caesarean section rates^{1,10,11} as

well as higher incidence of prolonged and obstructed labour.¹⁵

In the contemplation of induction of labour a qualified nurse with ability to detect complications that obtain during induction of labour should be present throughout the procedure,¹⁰ but if this recommendation is to be met induction of labour may not be practicable in our environment considering the challenges with human resources for health.

Induction of labour is contraindicated in cases of Cephalo Pelvic Disproportion (CPD), placenta previa, foetal malpresentations and cervical carcinoma among others, and should be performed cautiously in grand multiparae and in cases of polyhydramnios.^{1,10} Indeed failure rates obtained in induction of labour are also due to other factors like unsuspected Cephalopelvic Disproportion (CPD) and abnormal lie.⁶

The Jos University Teaching Hospital is a tertiary centre that accepts patients that come directly to the hospital as well as referrals from primary and secondary health centers. Induction of labour is a common procedure in this hospital.

Objective

To determine the incidence, indications, outcomes and complications of induction of labour in this center.

METHODS

This was a retrospective (descriptive) study reviewing patients admitted in JUTH for IOL between January 2004 and December 2007. The records of 584 patients that had IOL were reviewed and analyzed. The records were obtained from the antenatal Care (ANC) wards, the labour wards, Postnatal Wards, Operation theatre, Neonatology Unit and the patient folders that were retrieved. There were a total of 636 cases of IOL during this period of time as documented in the ward records, but 584 patient records were obtained giving a retrieval rate of 91.2%.

All patients were assessed prior to cervical ripening and induction of labour. Ultrasound scanning, cervical al assessments as well as CTG (in the absence of IUFD) were all pre-induction requirements, all in attempting to reduce caesarean section rates.

The method of induction as upheld by the department entails cervical assessment using the Bishops Score and cervical ripening where the cervix is unfavourable. Cervical ripening was effected by extra amniotic application and inflation of the Folley's Catheter balloon, as long as the fetal membranes were unruptured. This is however not done in patients who have had already ruptured membranes. Amniotomy is carried out after cervical ripening, (except in cases of IUFD), and oxytocin infusion commenced.

Those considered to have unfavourable cervix were those that had Bishop score of less than 5, while scores of 5 and above were considered to be favourable in this study.

Amniotomy of fore waters was done at the same time as commencement of oxytocin, when there were no contraindications to amniotomy. It was effected using a pair of Kocher's forceps, and the colour of the liquor observed with each procedure. All the cases of IUFD were confirmed by ultrasound scan and the patients were appropriately counselled.

The hospital protocol for oxytocin administration is gravity fed intravenous infusion using 5% dextrose water at a concentration of 10mU/ml (10IU of oxytocin in 1 litre of Intravenous fluid) for primigravidae, and a concentration of 5mU/ml (5IU of oxytocin in 1 litre of fluid) for multigravidae. It is commenced at the rate of 10 drops per minute and titrated by increasing the rate by 10 drops every 30 minutes, until adequate contractions are established (3 in 10 minutes lasting 45 seconds), or a maximum rate of 60 drops per minute is attained.

The cases were graded into 5 groups based on the circumstances preceding the induction of labour.

- Group 1: Those who had favourable cervix, amniotomy and oxytocin infusion.
- Group 2: Those who had cervical ripening with subsequent spontaneous contractions.
- Group 3: Those who had cervical ripening, amniotomy and oxytocin infusion.
- Group 4: Those who had PROM, and oxytocin infusion when PROM was >24 hours.
- Group 5: IUFD, cervical ripening and oxytocin infusion without amniotomy.

The results were analyzed using the year 2000 version of the EPI – info software.

The limitations of the study include the fact that folders of some patients that had IOL could not be traced because of

the retrospective nature of the study and record keeping challenges. The information used was these documented in all the wards where the patients were managed, the labour ward records and the retrieved folders.

RESULTS

During the period under review, there were a total of 12,948 deliveries in JUTH, and 636 cases of induction of labour, giving an incidence of 4.9%. Ages of the patients ranged from 18 – 43 years, with a mean age of 29.3 years. Some patients ages were estimates, since exact birth dates of some woman are not known. The gestational ages ranged from 28 weeks 3 days to 44 weeks 5 days, and the patients who were not sure of their dates had at least one ultra sound scan estimation of gestational age at different periods in pregnancy.

Looking at the outcome of induction of labour according to parity, the nulliparous women had the highest failure rates with vaginal delivery achieved in 63.5% of them. Multigravidae had higher rates of vaginal delivery. The overall success rate for induction of labour with outcomes of vaginal delivery was 82.2% while 17.8% ended as caesarean sections (Table 1).

Looking at the Indications for induction of labour and obstetric outcome, the most common indication for induction of labour was post-dated pregnancy which contributed 44.5% and this was followed by hypertensive disorders which contributed 26% (Table 2).

While considering the outcomes of induction of labour by group categorization, it was observed that the patients who had cervical ripening and subsequent amniotomy and oxytocin infusion were the largest of the group. The highest vaginal delivery rates were found among those with IUFD. The fact that the contribution of foetal jeopardy to abandoning the IOL process did not feature in this group may have been a factor (Table 3).

Table 1: Outcome of induction of labour according to parity.

Parity	Patient Numbers	Percentage of Study Population (584)	No of Vaginal Births	No of C/S	Percent Success Rate
0	208	35.6	132	76	63.5
1	72	12.3	71	1	98.4
2	64	10.75	60	4	93.8
3	92	15.75	72	20	78.3
4	64	10.95	63	1	98.4
5 or More	84	14.38	180	4	95.3
Total	584	100	460	104	82.2

Table 2: Indications for induction of labour and obstetric outcome.

Indication For IOL	Patient Numbers	Percentage of Study Population (584)	Number of Deliveries	Number of C/S	Success Rate (%)
Hypertensive Disease in Patient	152	26	136	16	89.5
Postdated Pregnancies (> 41 Weeks 3 Days)	260	44.5	188	72	72.3
IUFD	52	8.9	48	4	92.3
PROM	112	19.2	100	12	89.3
*Others	8	1.4	8	0	100
Total	58.4	100	460	104	82.2

*Others – diabetes mellitus and polyhydramnios in pregnancy.

Table 3: The outcome of induction of labour by group categorization.

Group	Number of Patients	% of Study Pop	Vaginal Delivery	Caesarean Section	Success Rate (%)
Group 1 (Favourable Cervix, Amniotomy And Oxytocin Infusion)	56	9.6	40	16	71.4
Group 2 (Cervical Ripening And Contractions)	48	8.2	40	8	83.3
Group 3 (Cervical Ripening Amniotomy And Oxytocin Infusion)	324	55.5	26	64	80.3
Group 4 (Prom + Oxytocin Infusion)	108	18.5	96	12	88.9
Group 5 (IuFD, Cervical Ripening And Oxytocin Infusion)	48	8.2	44	4	91.7
Total	584	100	460	104	82.2

Regarding Gestational age and outcome, those whose gestational ages were equal to or greater than 41 weeks 3 days constituted the highest number who had induction of labour, but vaginal delivery rate was lowest in them. Ten days post Expected Date of Delivery (EDD) was used a cut off for elective induction of labour to avoid patients reaching 42 weeks gestation (Table 4).

Table 4: Gestational age and outcome.

Gestational Age	Total Number	Vaginal Delivery	Caesarean Section	Success Rate (%)
Equal Or > 41 Weeks	284	212	72	74.6
38 Weeks To 41 Weeks	188	160	28	85.1
< 38 Weeks	112	108	4	96.4
Total	584	460	104	82.2

Focusing on the Perinatal outcomes, of 532 women who commenced the process of IOL with live fetuses, 1.5% of them ended as intrapartum IUFDs, 10.5% had varying degrees of birth asphyxia warranting neonatologist review and Special Care Baby Unit (SCBU) admission

while and 88% had good outcomes in view of APGAR scores.

The stillbirths recorded in JUTH during the four years period that reviewed were a 536 and they constituted 4.1% of the 12,948 deliveries. Still births resulting directly from IOL were 8 of 532 (1.5%). However if all the pre induction IUFDs are included as well (52), the total stillbirths obtained in the study was 60 and constituted 10.3% (Table 5).

Table 5: Perinatal Outcomes.

Group	Number	% of Study Population
Antepartum IUFDs (Foetal Demise Before IOL)	52	8.9
Intrapartum IUFDs (Foetal Demise During IOL)	8	1.4
Birth Asphyxia (Moderate To Severe)	56	9.6
Good Outcome (Apgar Scores)	468	80.1
Total	584	100

Considering those who had Caesarean section, the nulliparous women had the highest percentage of failed induction (Table 1). Failure to progress from malpositioning and disproportion were the highest reasons for failure of vaginal delivery.

Table 6: Indications for caesarean section.

Indication	Number	Percentage of Total C/S Cases
Failed Induction	4	3.8
Foetal Distress	28	26.9
Failure To Progress	72	69.2
Total	104	100

The total number of caesarean sections in JUTH during the review period was 1984 (536 elective cases and 1448 emergency cases), and total number of deliveries was 12,948. The caesarean section rate in the hospital was 15.3%. The caesarean section rate obtained in the study on account of IOL was 17.8%.

Complications were documented in 32 cases (5.47%) of induction of labour, with 23 of the patients experiencing varying degrees of postpartum haemorrhage, and of these, 8 of them had blood transfusion while the others were managed without transfusion. One hypertensive woman had a cerebrovascular accident, four women experienced high-grade fever with chills and rigors when induction was commenced and four had retained placenta that were manually removed. These could however not be attributed strictly to the IOL procedure as other risk factors that should have been ruled out were not considered in the study.

DISCUSSION

The rate of induction of labour during the study period was 4.5% and is comparable to the study at Sokoto where 3% was obtained² and in Benin where 5% was reported.¹⁷ However, up to 23% rates been documented in developed countries,² and the rate of induction of labour in these countries is further on the increase especially with the availability of prostaglandin gels to assist cervical ripening, and new evidence to support induction.¹²

The reasons for lower rates of induction of labour include the issues of cost and inconvenience of hospital admission, belief that the pain of induction of labour is more than that of spontaneous contraction as well as aversion to caesarean section. Sweeping of the membranes during an antenatal clinic was more acceptable to the patients than admission for induction of labour, however, patients whose labour followed sweeping of membranes were not included in the study as this method is said to be the most inconsistently documented method¹⁸ Cochrane reviews have found out that routine use of sweeping of membranes from 38 weeks of pregnancy onwards does not seem to produce

clinically important benefits. When used as a means for induction of labour, the reduction in the use of more formal methods of induction needs to be balanced against women's discomfort and other adverse effects.

The overall success rate for induction of labour in this study was 82.2%,² while Orhue and co-workers reported 90.4%, but this was obtainable in only term pregnancies¹⁵ as compared to this study that looked at all the gestational ages. Multiparae were found to have better chances of vaginal delivery with 92.5% of them achieving vaginal delivery while among the nulliparous women only 63.5% achieved vaginal delivery, which is in agreement of what was obtained by Sule-odu and coworkers where nulliparous women were found to have more incidence of prolonged and obstructed labour and greater risk of operative interventions.^{18, 19} However Ekele² and Orhue¹³ did not find any consistent pattern with parity.

The highest success rate in the various groups was obtained in Group 5 whose patients had IUD and subsequent cervical ripening and induction of labour, with vaginal delivery obtained in 91.2% of patients. Those who had prolonged PROM and subsequent oxytocin infusion followed this. This could have been so because in the 2 groups physiological mechanisms of labour were already probably being initiated as IUD and PROM are followed by labour in many cases, and it is known that induction of labour is more likely to be successful if physiological mechanisms are involved.² IUD may be considered a predictive factor in induction of labour as foetal indications for surgery like foetal distress are eliminated and induction duration can be prolonged. In this study it was difficult to analyze age as a predictive factor of outcome, as the birth dates of the patients could not be ascertained, and many are known to be unsure of their actual ages.²

The still birth rate in JUTH for the period of study was 4.1% while the total still birth rate in the study was 10.3%. This was due to the fact that cases of antepartum IUDs for which IOL was carried out were included. However the percentage of intrapartum stillbirth rate occurring during IOL strictly was 1.5%. Studies have shown up to 2.4% total intrapartum deaths in some centres.²⁰

Among the live babies born after induction of labour, 88% had good perinatal outcomes, while 1.5% of those induced with live babies ended as still births, and 9.6% of them had moderate and severe birth asphyxia and were reviewed and cared for by the neonatologist team at the SCBU. It was difficult to obtain data with which to compare this figure. The principal reasons for failure of vaginal delivery were failure to progress due to cephalopelvic disproportion and malposition, as well as foetal distress. Caesarean section was thus the inevitable option in these circumstances.

The use of amniotomy and oxytocin infusion for induction of labour continues in this centre because of

high cost and non-availability of prostaglandins at the time of this review and some studies have shown there is no statistical difference between the two.²¹

The hospital caesarean section rate for the period of study was 15.3%. That obtained in the study was 17.8%, which was comparable to that of 18% obtained by Ekele.² The caesarean section rate was higher at gestational ages above 41 weeks and 3 day, a rate of 25.5% on this group, which is similar to what was obtained in a study at Quebec, where the rates of caesarean section increased at gestational ages greater than 41 weeks, while there was no difference in other studies.¹² Ekele recorded 78% successful vaginal delivery among post term pregnancies.²

However, studies into the issue of caesarean sections during IOL show different results. One showed indicated that while overall caesarean section rates from 1990–1997 remained at or below 20%, elective induction was associated with a doubling of the rate of caesarean section.²³ Another study showed that elective induction in women who were not post-term increased a woman's chance of a C-section by two to three times.²⁴

Another study has indicated that induction may increase the risk of caesarean section if performed before the 40th week of gestation, but it has no effect or actually lowers the risk if performed after the 40th week.^{25,26} while some recent reviews regarding IOL and its effect on Caesarean section rates do indicate that there is no significant increase in IOL rates but on the contrary there can be a reduction in Caesarean section rates with IOL.

CONCLUSION

The rate of induction of labour from this study is 4.5%, and vaginal delivery was obtained in 8.2% of cases. Induction of labour remains relevant obstetrics procedure and its outcome will depend on proper choice of patients and close intrapartum monitoring.

Recommendations include

1. Further studies are recommended, preferably prospective, to look at induction of labour and other possible determinants of outcome.
2. Pre induction evaluation and cervical scoring should be properly done, especially for the nulliparous women before committing them to induction of labour.
3. Close intrapartum foetal monitoring to identify foetal jeopardy and further reduce the foetal morbidities and mortalities associated with IOL.

This study will form a basis for other studies.

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