

## Outcome of Induction of Labor: A Prospective Study.

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### ABSTRACT

**Background:** Induction is defined as artificial initiation of uterine contraction with the aim of achieving the normal vaginal delivery. It is most widely accepted obstetrical intervention worldwide. The most common indication for induction is post dated pregnancy. Objective: To assess the outcome of induction in both mother and baby. **Methods:** During our study period, 391 patients were selected for induction due to various indications. Most of them were induced with tablet Misoprostol and only those with higher degree of gravida were induced with Dinoprostone gel intracervically and maternal and fetal outcome was seen. **Results:** Out of 4020 patients, induction rate was 9.72%. Among them 98.2% were induced with Misoprostol. Most of the induced age group was in between 20-30 years of age with primigravida 62%. Among them 48.59% were in between 40-41 weeks of gestation with 93% of having poor bishops score. About 67.7% had normal vaginal delivery with 4.86%, assisted with instrumental delivery. Cesarean section was seen in 32.3% of patients. Most common indications for LSCS were for failed induction (44%). Regarding the fetal outcome 99.7% born alive, 97.92% went to mother side, 2.07% admitted and 0.51% expired. Beside this, 88.7% had birth weight between 2.5 to 3.5 kg and 87.4% had clear liquor and 99.22% had the good apgar score. **Conclusion:** Though the cesarean section rate is higher in this study in comparison of WHO references to be not more than 15% but still the induction is beneficial in high-risk pregnancy where continuing the pregnancy is more hazardous than to termination.

**Keywords:** apgar score, fetal outcome, induction, maternal outcome.

### INTRODUCTION

Induction is defined as an intervention intended to artificially initiate uterine contractions resulting in the progressive effacement and dilatation of the cervix resulting in the vaginal delivery of the baby. Induction is done when benefit to mother and the fetus ought weigh benefits of continuing the pregnancy.<sup>[1,2]</sup> Induction is most frequently practiced obstetric method, its rate has been increasing in US ranges from 9.5% to 33.7%.<sup>[2]</sup> There are various indications of induction of labor. Most common indication is post term pregnancy and induction for this indication has been shown to reduce the chances of perinatal death.<sup>[3,4]</sup>

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Other indications include pregnancy induced hypertension, uncontrolled diabetes, abruptio placentae, coagulopathy, obstetric cholestasis, premature rupture of membranes, chorioamnionitis, intrauterine fetal growth restrictions, intrauterine fetal death, polyhydramnios, oligohydramnios.<sup>[5-7]</sup>

There are various methods of induction including pharmacological and mechanical methods. There are many hazards related to inducing agents like oxytocin, which is amino acid homology, octapeptide similar to arginine vasopressin that has half life of 2-7 min. It binds to the oxytocin receptors and increases the calcium release from endoplasmic reticulum, increases the production of prostaglandins from deciduas to bring about uterine contractions. If it is infused at high doses along with aqueous fluid, water and electrolytes imbalance occur that may lead to convulsions, coma, and even death. Similar derangements can also occur in neonatal biochemistry leading to neonatal seizures.<sup>[8]</sup> It can also lead to uterine rupture if proper monitoring is not done.

Another inducing agent misoprostol, prostaglandin E1 is less expensive, more stable and easier to store than PGE2. Its use may decrease the need for oxytocin induction and reduce the induction-to-delivery intervals (Sanchez-Ramos and colleagues in 1997).<sup>[9]</sup>

Reviewed Cochrane data base support these recommendation, but caution that rates of uterine hyper-stimulation with adverse fetal heart rate changes are increased with its use leading to increased cesarean rates. It can also significantly increase uterine tachysystole, meconium passage,

and meconium aspiration compared with PGE2 gel (Wing and co-workers, 1995a).<sup>[10]</sup>

Next inducing agent is Prostaglandin E2 (dinoprostone) gel that increases the collagenase and hyaluronidase levels in the cervix and increase the submucosal water content that lead to softening of the cervix. It can cause uterine hyper-stimulation so further fetal compromise can occur when used with preexisting labor. Systemic effects include fever, vomiting and diarrhea. Artificial rupture of membrane can lead patient discomfort, trauma to genital tract, abruption of placenta, cord prolapse and sudden IUD.

In this study, we have seen the various indications of induction of labor, its percentage and outcome of induction of labor.

## MATERIALS AND METHODS

This study was conducted from December 2014 to December 2015 with duration of one year in Nobel Medical College Teaching Hospital, Biratnagar, Nepal. This is a prospective observational study. In course of study, 391 patients were induced in our ward. Out of which 6 were induced with Dinoprostone gel and rest all were induced with Misoprostol. Multipara with gravida of greater than or equal to 4 were induced with Dinoprostone gel with the fear of uterine rupture and gravid less than 4 were induced with 50 microgram of Tablet Misoprostol. In this study those who had history of previous cesarean section with intrauterine fetal death in the index pregnancy the Foleys induction was done. Prior to induction Written consent was taken, basic requirements and contraindications for induction was assessed. The passage and passenger were assessed, one night before induction all patients underwent sweeping and stretching of the membranes. After sweeping and stretching if those patients were gone into spontaneous labor they were excluded from the study. The induced patients were monitored in labor room where maternal and fetal monitoring with Non Stress Test (NST) and intermittent auscultation was provided. The Misoprostol was kept in posterior vaginal fornix and dinoprostone gel was put intra-cervically every 6 hourly until the adequate contractions were achieved. In case of live fetus the maximum of 3 doses where as in case of Intrauterine fetal death (IUFD) maximum of 5 doses with 6 hrs apart was introduced. Before doing induction all, the patients were asked to evacuate the bladder and after induction they were asked to lie down on left lateral position. Then after maternal and fetal outcome were observed. Maternal outcomes includes mode of delivery, indications of those delivery, incidence of induction for various indications and Fetal outcomes includes five minutes Apgar score, birth weight of baby, NICU stay, meconium stained liquor, and male: female ratio.

## RESULTS

During our study period, 4020 numbers of obstetrics patients were admitted in our ward. Out of these admitted patients, 391 patients were induced for the various indications thus induction rate of 9.72%. Among these 391 patients, 384(98.2%) patients were induced with tablet misoprostol, 6(1.5%) were induced with dinoprostone gel and 1(0.2%) with previous section with intra uterine fetal death was induced with foley's catheter.

**Table 1: Age and Gravida**

Characteristics		Total Patient	Percentage
Age in years	< 20	57	14.57%
	20-30	308	78%
	> 30	26	6.64%
Gravida	Primi	243	62%
	Multi	148	37.85%

The maximum age group of the patients in our study was 20 - 30 years of age. Among them the youngest age being 17 years and eldest being 36 years of age. Most of the patients enrolled in this study were primi-gravida where as highest gravida being observed was seven [Table 1].

In terms of weeks of gestation, 48.59% of patients were in between 40 to 41 weeks of gestation, 32.9% were of less than 40 weeks of gestation and 18.41% were more than 41 weeks of gestation. The minimum weeks of gestation observed were 32 weeks 3 days and maximum weeks of gestation were 44 weeks.

**Table 2: Various indication of induction.**

Indications of induction	Number of patients	Percentage (%)
Post date	174	44.5%
PROM	77	19.6%
PPROM	7	1.7%
PIH	47	12%
Oligohydraminos	45	11.5%
Decreased FM	15	3.8%
Obstetric cholestasis	8	2.04%
GDM	7	1.79%
Prolonged LSOL	4	1.02%
IUFD	4	1.02%
Polyhydraminos	2	0.51%
Heart disease	1	0.25%

Bishops scoring was introduced by Bishops for cervical ripening and favorability for the vaginal delivery. Total bishop's scoring is 13 and those patient with less than 6 is termed as unfavorable score and those patients with more than or equal to 6 is termed as favorable score. In this study, 93% of the patients had bishops score less than 6 and only 6.6% of the patients had favorable score. Among

these, the minimum bishops scoring observed were 2 and maximum were 7.

**Table 3: Mode of delivery.**

Characteristics		Total number of patients	Percentage
Mode of Delivery	SVD	246	62.91%
	Instrumental	19	4.86%
	LSCS	126	32.23%
Total		391	

Indications for LSCS: In this study a total of 391 patients were enrolled out of which 67.7% were delivered vaginally and 32.3% were delivered by emergency cesarean section. Most common indication for cesarean section was for failed induction, which was 44% (56). The second common indication was fetal distress that was 29% (37). The third common indication was for meconium stained liquor in early stage of labor which was about 17% (22) and least common indication was for arrest of descent and dilatation in active stage of labor that was around 8.7% (11) of patients [Table 2].

Fetal outcome: Regarding the fetal outcome, among 391 numbers of patients who were enrolled in our study 4 was induced for diagnosed intra uterine fetal death. Therefore, these four are excluded as a fetal outcome. Fetal outcome in terms of live and dead birth is being observed only on those patients who have live fetus in uterus, which now accounts in 387 patients. Out of these 387 induced patients, 386 (99.7%) babies born were alive and only 1 (0.25%) was stillbirth during the process of labor. Out of 386 babies born alive, 378 (97.92%) of the babies was sent to mother-side and 8 (2.07%) of the babies were admitted to NICU or pediatric ward after assessing the severity of distress in babies by a pediatrician on duty. Out of 8 babies admitted in NICU or ward, one of them expired while treating in Neonatal Intensive Care Unit (NICU).

Regarding the sex of the baby born, 201(51.41%) were male babies and 190 (48.59%) were female babies. Out of 391 patients induced, 342 (87.47%) patients had clear liquor and 49 (12.53%) had liquor stained with meconium.

Apgar scoring: Apgar score is a system to assess the overall conditions of neonate at birth. Total scoring was 10. It is taken at one minute and five minutes after the birth of a baby. If five minutes apgar score is less than three, it indicates neonate is depressed and they needs continuous resuscitative management. Out of 387 born babies 3 (0.77%) babies had low apgar score i.e. less than 3 where as 384 (99.22%) born babies had good apgar score.

Weight of the babies: Out of 391 born babies, 347 (88.76%) babies, the weight were in between 2.5 kg to 3.5 kg. Among these, the babies born with weight

more than 3.5 kg was 26 (6.64%), where as babies born with less than 2.5 kg were 18 (4.6%).

## DISCUSSION

Labor is induced when delivery is likely to benefit the health of the fetus or mother or both. The induction is justified when the benefits to either mother or fetus outweigh those of continuing the pregnancy. A general concept regarding induction is that, it is more associated with complications in comparison with spontaneous labor. This concept regarding induction was the basis of need for our study. This study comprises 391 pregnant ladies who had various indications for induction of labor. Simultaneously, the maternal and fetal outcome was observed.

### Social demography:

In the present study, maximum numbers of patients were in the age group between 20-30 years. Out of which minimum age of patient was 17 years and maximum age of patient was 36 years.

### Bishops scoring:

In our study, Bishops score in induced patients were un-favorable in 93% of patients where as it was favorable only in 26%. The minimum scoring was two and maximum scoring was seven. Even though most of the patients had poor bishops score, 67.7% of patients had vaginal delivery. It showed that vaginal misoprostol is effective in cervical ripening and vaginal delivery can be anticipated even in patients with poor bishop's score. Similar study was done by Sahin HG et al<sup>[11]</sup> and observed that intra-vaginal misoprostol was effective, cheap and was safe method of induction of labor in toxemia of pregnancy with modified Bishops score less than or equal to four.

### Induction rate:

The total number of obstetric patients admitted during our study period was 4020, out of which 391 patients underwent inductions for various indications. Induction rate was 9.72%, which is similar to recent studies done in United States which ranges from 9.5 to 33.7%.<sup>[2]</sup> Another study done in Nigeria also showed 11.5% induction rate.<sup>(12)</sup> Similar studies was done in Srilanka and Egypt and reported the induction rate of 35.5% and 9.30% respectively..

### Indications for induction:

The most common indications for induction in the present study were Postdated Pregnancy which accounts 44.5% and similar findings were observed i.e. 45.8% in a study "Outcome and significance of labor induction in a health resource poor setting" in Nigeria.<sup>[12]</sup> Another similar study done in Maiduguri reported 46.8% which is also similar to our study.<sup>[13]</sup>

Similarly, study done by Ekele et al also concluded that post date and hypertensive disease of pregnancy were the commonest indication for induction.<sup>[14]</sup> In the present study, premature rupture of membrane (PROM) is the second most common indication of induction followed by hypertensive disorder in pregnancy. But study done by Abdul in Zaria which identified pre-labor rupture of membranes and hypertension in pregnancy as the most common indications.<sup>[15]</sup> Other indications of induction were oligohydraminos, preterm pre-labor rupture of membrane (PPROM), intra uterine fetal death, decreased fetal movement, gestational diabetes mellitus, heart diseases and obstetric cholestasis.<sup>[5-7]</sup> Although misoprostol is currently not approved for induction of labor in United States and United Kingdom, but its use for induction is approved in our country Nepal. Therefore, in the present study the commonest agent for induction was misoprostol, which accounts 98.2% whereas dinoprostone gel was used in 1.5% patients only. Dinoprostone was used in ladies with more than 4 parities with a fear of uterine rupture if misoprostol was being used. We have observed that misoprostol was effective and safe in cervical ripening and therefore induction of labor with rate of vaginal delivery rate were 96%. It should be an essential drug in obstetric practice especially in low resource settings.<sup>[14]</sup> The rate of foley's induction in our study was 0.2% which is similar to the study done in Nigeria reporting 1.7% of patients and the induction with misoprostal in 78.2% of patients.<sup>[12]</sup>

#### Maternal outcome:

Regarding the mode of delivery in our study, 67.7% had vaginal delivery. Out of these 67.7% of vaginal delivery, 4.86% had instrumental vaginal deliveries. Beside these, 32.3% underwent caesarean section. Patterson J et al in Australia did similar study among induced nullipara, and reported 30.4% of deliveries were by caesarean section.<sup>[16]</sup> Similar study done by Throssell M et al showed that among the induced women, the proportions of delivery by emergency caesarean section were 42% for nulliparous and 14% for multiparous.<sup>[17]</sup>

The randomized controlled trial (RCT) done by Augensen K et al<sup>[18]</sup> in 1987 showed that instrumental deliveries were 10.2% in induction group which is much more than in our study. It has been thought that there is more chances of caesarean section for failed induction in case of induced labor. A Cochrane review concluded that rate of caesarean section and assisted vaginal delivery are not increased by induction of labor (IOL) at term when medical indications exist.<sup>[19, 20]</sup>

The most common indication for LSCS in our study was failed induction, which was around 44%. The second common indication was fetal distress, which was around 29%. Similar study done by Park. K. et al reported that the rate of caesarean section for

failed induction was 33%.<sup>[21,22]</sup> Similarly, Yang S<sup>[23]</sup> reported very less rate of caesarean section for failed induction which was around 7.6% and thus contrast to our study, In another study done by Verhoeven C et al reported caesarean section was done in 51% of patients for failed induction, 43% of patients for fetal distress, and (6%) for both.<sup>[24]</sup>

#### Fetal outcome:

Regarding fetal outcome, 99.7% of baby born were born alive in our study. Out of which 97.2% were given to mother side and remaining 2.07% were admitted in ward or NICU for observation or other interventions. Among these admitted babies, 0.51% of babies expired during treatment at ward or NICU. Compared with expectant management, elective induction of labor between 37 to 41 weeks of gestation periods associated with reduced perinatal mortality. Rates of admissions to a neonatal unit were increased in the spontaneous labor group.<sup>[25]</sup>

Heimstad R et al in 2007 reported 5.5% of born babies needed NICU admission among induced labor group.<sup>[26]</sup> Similarly, Gelisen O et al. in 2007 also reported 4.3% of babies were admitted in NICU among induced patient but another study done by Nielsen P et al. in 2005 reported that there was no NICU admission of baby in induced group.<sup>[27, 28]</sup> Peters M in 1995 reported 1% of neonatal death in induction groups.<sup>[29]</sup> Lampe LG also reported 0.05% of neonatal death in contrast to Praysak M who reported that there was no neonatal death in induced patients.<sup>[30,31]</sup>

In the present study meconium stained liquor was seen in only 12.5% of patients. In rest of the patients which was around 87.4% had clear liquor. Similar study done by Hannah M et al showed meconium stained liquor in 25.04% of patients whereas the study done by Cole RA et al found 0.9% induced patients with meconium stained liquor.<sup>[32, 33]</sup>

Regarding the birth weight of babies, 88.76% of babies birth weight was in between 2.5 -3.5kg. In the same way 4.6% of babies weighed less than 2.5 kg and 26% of babies weighed more than 3.5kg, which showed that there is less chances of complications due to fetal macrosomia, as most of the baby delivered were of average size.

Lawani O et al reported that 80.5 % of babies delivered were in between 2.5kg -3.9 kg. Among them 17.5% of babies' weight were less than 2.5 kg where was 2% of babies weighed 4 kg and above.<sup>[12]</sup>

## CONCLUSION

Induction of labour is beneficial and safe in high-risk pregnancy. Though it is thought that induction had lot of hazards but its outcome is beneficial in selected patients where continuing pregnancy is more hazardous than its termination. Although, there is slight increase in rates of caesarean delivery in this study still the fetal complications are less as

compared to other studies. So, induction is beneficial but still more studies are needed to substantiate our study.

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