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Original Research Article

Maternal and perinatal outcome in induction of labour: A comparative study

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Abstract: Labour induction should be performed where benefit out weights potential harm. However, it is not always without risk. The objective of our study was comparative analysis of fetomaternal outcome associated with labour induction. This was a prospective longitudinal study including 966 pregnant women at or beyond term subjected to induction of labour (IOL).Another 966 pregnant women in spontaneous labour was taken as control. The incidence of labour induction was 13.6%.Majority were in the age group of 21-30 years(73.1%) and nullipara (59.6%).Most of the patients were term (83.6%) followed by post-term (16.4%).Majority were induced with favourable Bishop score(BS) ≥ 5(70.7%).71.4% were induced with oxytocin only and 28.6% with artificial rupture of membranes (ARM) + oxytocin .The most frequent indication was prelabour rupture of membranes (PROM) (39.8%). 69.7% had vaginal delivery with induction delivery interval (IDI) of <18 hours in 61.3%. Caesarean section rate was 30.3%, failed induction (31.3%) being most common indication. Maternal outcome in terms of postpartum haemorrhage (PPH) (20.3%), hysterectomy(2.28%), ICU admission(3.52%),hospital stay of > 7 days (15.8%), puerperial pyrexia(4.35%) were observed more in induced group. The adverse perinatal outcome included birth asphyxia(15.4%),low 5 minute Apgar score (15.8%),neonatal jaundice(19.6%),low birth weight(LBW) (5.18%),admission to NICU(26.2%) and perinatal mortality(6.00%). Although the duration of labour was less, IOL in our setting in order to get vaginal delivery is affected by a high rate of adverse fetomaternal outcome, associated maternal morbidities being contributing factors.
Keywords: Induction of labour, Bishop score, Indications, Maternal and Perinatal outcomes, Failure of Induction, Mode of Delivery

INTRODUCTION

Induction of labour (IOL) implies stimulation of uterine contractions before spontaneous onset of labour, with or without amniotomy. The World Health Organisation (WHO) recommends induction is performed with a clear medical indication and when expected benefits outweigh potential harms [1]. State of cervix is the most important predictor of success; an unripe cervix conveys a lower likelihood of vaginal delivery [2]. As perinatal mortality and fetal compromise increase progressively with gestation beyond 37 weeks, induction of labour between 37 and 41 weeks has the potential to improve neonatal outcomes [3]. Induction following premature rupture of membranes (PROM) has been shown to reduce chorioamnionitis, endometritis and neonatal ICU (NICU) admissions [4]. One Recent systematic review showed that a policy of labour induction for women with post term pregnancy compared with expected management is associated with fewer perinatal deaths and fewer caesarean sections [5].Other stabilised indications include hypertensive disorders in pregnancy (HDP), chorioamnionitis, maternal medical complications, IUGR, IUD, vaginal bleeding, multiple pregnancy and isoimmunisation [1-3]. Elective induction (induction of labour in the absence of medical indications) rates are increasing disproportionally accounting for 10-30% of inductions in some countries [6].Some studies have suggested that elective induction of labour after 37 weeks gestation is associated with increased obstetric intervention, particularly caesarean delivery [7].Conversely, when induction of labour is carried out after 37 weeks gestation in the presence of medical indications such as gestational hypertension, it reduces the risk of adverse maternal outcomes [8].

Keywords: To evaluate the methods, indications and maternal and perinatal outcome of induced labour.

MATERIAL AND METHODS

The present study was carried out in the Department of Obstetrics and Gynaecology MKCG Medical College, Berhampur, Odisha, India during a

period of two years from August 2014 to July 2016. After institutional ethical approval, a total of 966 pregnant women admitted at or beyond term(between 37 to 42 weeks) were selected randomly according to inclusion and exclusion criteria and subjected to IOL .Another 966 cases at or beyond term admitted in spontaneous labour were taken as control. Demographic profiles of the patients in both groups were comparable in relation to age, parity, gestational age & BMI. The proposed study was a prospective and comparative study.

Inclusion criteria

- Prelabour rupture of membranes (PROM)
- Post term pregnancy
- Polyhydramnios,Oligohydramnios
- Uncomplicated twin pregnancy
- Bad obstetrics history (BOH)
- IUGR in uncompromised foetus
- Chorioamnionitis
- Associated obstetric complications-Hypertensive disorders of pregnancy (HDP), Antepartum haemorrhage in stable condition (minor degree of placenta preavia and abruptio placentae), gestational diabetes mellitus,Rh Isoimmunisation.
- Pregnancy with medical complications-Diabetes mellitus, hypertension, renal pathology, cardiac disease, hypothyroidism.

Exclusion Criteria

Not given valid consent, Preterm pregnancy, recognised contraindications for vaginal delivery like malpresentations, major degree of placenta preavia, previous caesarean section, myomectomy, hysterotomy or any other uterine scar, pelvic structural deformities.

During the study period pregnant women reporting to the outpatient department/labour room were screened and recruited in the study after taking informed consent if they satisfy inclusion-exclusion criteria. Detailed history, physical examination and baseline investigations, pelvic examination and Bishop scoring were carried out. Decision to induce was taken after a reassuring CTG and oxytocin or oxytocin and ARM was used for labour induction depending upon BS .In women with poor BS pre-induction cervical ripening was done with PGE2 gel prior to formal induction. Those cases who had premature rupture of membranes or in whom cervix was not sufficiently open to facilitate artificial rupture of membranes or in those cases where fetal head was not engaged were subjected to induction by oxytocin infusion alone as per the above schedule and those with favourable cervical score and engaged head were subjected to ARM. Thereafter oxytocin drip of 2.5 U in 500 cc of lactated Ringers solution was started @10 drops/minute, increased by 10 drop per minute every 30 minutes until an adequate pattern of uterine contractions (≥ 3 contraction in 10 minute lasting for > 40 seconds has been obtained) .Whenever second pint was needed, 5 U of oxytocin was added to it and infused at half of the rate of running drip and increased upto 40 drops per minute. After delivery the infusion was continued for one hour as prophylaxis against PPH.Progress of labour was plotted on partograph and labour was suspended in favour of caesarean section on early sign of fetal distress, failed induction, non progress of labour. Apgar score of the newborn was recorded at 1 minute and 5 minutes after the birth of the baby. Subsequent follow up of the neonates and mother was done in the postnatal ward till 7 days. Data were analysed using simple tabulations.

RESULTS

A total of 966 pregnant women at or beyond term were included and subjected to induction of labour. Another 966 cases at or beyond term admitted in spontaneous labour were taken as control. Total number of deliveries during the study period was 7101; total inductions were 966, so induction rate at our center was 13.6%. Out of the 966 women in study & control group, majority were in the age group of 21-30 years 706 (73.1%) & 700 (72.5%). Nullipara constituted majority in both study 576(59.6%) and control 582(60.2%) group. Most of the women were term in both studies 808(83.6%) & control 816(84.5%) group. Post term constituted 158(16.4%) in study and 150(15.5%) cases in control group. Majority in study 534(55.3%) and control group 513(53.1%) had BMI between 21-25 kgandm2. Majority were booked in both study 656 (67.9%) and control 635 (65.7%) group. Gestational age at booking shows that majority 389 (59.3%)of parturient in study and 327(51.5%) in control group had booking at more than 28 weeks gestation, indicating that most women in the environment still have the attitude of late booking (Table1).

Table-1: Demographic characteristics of study & control group (n=966)

	Study Group	Control Group
Age group (years)	No. (%)	No.(%)
≤ 20	50 (5.18)	56 (5.79)
21-25	432 (44.7)	428 (44.3)
26-30	274 (28.4)	272 (28.2)
31-35	153 (15.8)	156 (16.1)
>35	57 (5.90)	54 (5.59)
Parity	No.(%)	No.(%)
Nullipara	576 (59.6)	582 (60.2)
Para 1	182 (18.8)	178 (18.4)
Para 2	139 (14.4)	135 (13.9)
≥Para 3	69 (7.14)	71 (7.35)
Gestational age(weeks)	No.(%)	No.(%)
37-40	808(83.6)	816 (84.5)
41-42	158(16.4)	150 (15.5)
BMI(kg/m2)	No.(%)	No.(%)
≤20	243 (25.2)	254 (26.3)
21-25	534 (55.3)	513 (53.1)
26-30	149 (15.4)	152 (15.7)
>30	40 (4.14)	47 (4.87)
Booking status	No.(%)	No.(%)
Booked	656 (67.9)	635 (65.7)
Unbooked	310 (32.1)	331 (34.3)
Gestational age at booking(in weeks)	No.(%)	No.(%)
<13	86(13.1)	102(16.1)
13-28	181(27.6)	206(32.4)
>28	389(59.3)	327(51.5)

Out of 966 cases, 683(70.7%) in the study group were induced with favourable BS of ≥5 whereas 283(29.3%) had unfavourable BS ≤4. 690 (71.4%) were induced with oxytocin only and 276(28.6%) cases were induced with ARM followed by oxytocin.The most frequent indication was PROM comprising of 384 (39.8%) women followed by HPD 149(15.4%) and post-term 104(10.8%). Elective induction (done only for logistical problems like history of rapid labour, distance to hospital) was done in 104 (10.8%) of cases (Table 2).

Among 966 women, 673 (69.7%) cases in the study and 862(89.2%) in the control group had vaginal delivery 293(30.3%) cases had caesarean section in study vs 104 (10.8%) in control group. In the study group, IDI was 6-12 hours in 104 (15.5%),12-18 hours in 308(45.8%),18-24 hours in 206 (30.6%) and more than 24 hours in 55(8.17%). 412 (61.3%) of vaginal deliveries in the study group occurred within 18 hours whereas only 240 (27.9%) women in control group delivered within 18 hours. Thus duration of labour was less than that of control group.Out of 293 cases of caesarean section in the study group, failed induction 91(31.1%) and fetal distress 80 (27.3%) were responsible for major percentage. In contrast the control group had an incidence of 104(10.8%) of which fetal distress was indication in 48(46.2%), failure to progress in 40(38.5%) cases (Table3).

Maternal complications were seen more among study cases 403(41.7%) than control group 187(19.4%). Among intranatal complications, PPH was found in 196 (20.3%) of cases subjected to induction, the incidence being three times of control 62(6.42%), Hysterectomy in 22(2.28%) vs 5(0.52%), ICU admission in 34(3.52%) vs 10(1.04%) cases. Out of 22 cases of hysterectomy, there were 5 cases of peripartum hysterectomy for intractable PPH (3 atonic & 2 both atonic plus traumatic) not controlled by medical or conservative surgical procedures, 4 for rupture uterus (one in primipara and 3 in multipara), 13 cases of caesarean hysterectomy for uncontrolled PPH with low general condition out of which 8 were complicated by various obstetric conditions like preeclampsia, placenta preavia, multiple gestation). Among puerperal complications, episiotomy wound infection was found more in control 53(5.49%) than induced group 28(2.89%) (Table4).

Table-2: Bishop Score, method of induction& indications for induction (n=966)

Bishop score	No. (%)
≤ 4 (unfavourable)	283(29.3)
≥5(favourable)	683(70.7)
Method of induction	No. (%)
ARM+Oxytocin	276 (28.6)
Oxytocin	690 (71.4)
Indications	No. (%)
PROM	384 (39.8)
HDP	149(15.4)
Post term	104 (10.8)
IUGR	83 (8.59)
Antepartum haemorrhage	37 (3.83)
Placenta preavia	16 (1.66)
Abruptio Placentae	21 (2.17)
Gestational Diabetes mellitus	13 (1.35)
Twin pregnancy	11 (1.14)
Chorioamnionitis	19 (1.97)
Polyhydramnios	19 (1.97)
Oligohydramnios	15 (1.56)
Rh isoimmunisation	07 (0.72)
Bad Obstetric History(BOH)	14 (1.45)
Unstable lie	06 (0.62)
Borderline CPD	28 (2.89)
Any other obstetric &medical complications	13 (1.97)
Elective indication	104 (10.8)

* Total % age exceeded 100 as single case may have multiple indications

Table-3: Mode of delivery, duration of labour & indications of caesarean section

Mode of delivery	Study group	Control group
	No. (%)	No. (%)
Vaginal delivery	673 (69.7)	862 (89.2)
Spontaneous vaginal delivery	502 (74.6)	706 (81.9)
Low forceps	108 (16.05)	108 (12.5)
Ventuose	63 (9.36)	48 (5.57)
Duration of labour(hours)	No. (%) ***(IDI)**	No.(%)
6-12	104 (15.5)	99(11.5)
12-18	308 (45.8)	141(16.4)
18-24	206 (30.6)	245(28.4)
>24	55 (8.17)	377(43.7)
Caesarean section	293 (30.3)	104 (10.8)
Indications	No. (%)	No. (%)
Failed induction	91 (31.1)	-
Fetal distress	80 (27.3)	48 (46.2)
Non progress of labour	69 (23.5)	40 (38.5)
Undiagnosed CPD	34(11.6)	16 (15.4)
Malposition	32(10.9)	12 (11.5)

(* Induction- delivery interval)

Total % age exceeded 100 as single case may have multiple indications

Table-4: Maternal outcome among study and control group (n=966)

Maternal complications	Study group	Control group
Intranatal	No. (%)	No.(%)
Postpartum haemorrhage	196 (20.3)	62 (6.42)
Perineal tear	38 (3.93)	14 (1.45)
MROP	19 (1.97)	12 (1.24)
Hysterectomy	22 (2.28)	05 (0.52)
ICU admission	34 (3.52)	10 (1.04)
Maternal distress	45 (4.66)	19 (1.97)
Intranatal pyrexia	23 (2.38)	08 (0.83)
Hospital stay > 7 days	153 (15.8)	103 (10.7)
Puerperal	No.(%)	No.(%)
Puerperal pyrexia	42 (4.35)	29 (3.00)
Episiotomy wound infection	28 (2.89)	53 (5.49)
C/S wound section	26 (2.69)	13 (1.35)
Total	*403 (41.7)	187 (19.4)

(*Total no. of complications are exceeding no. of cases as single women may have multiple complications)

Table-5: Perinatal outcome among study and control group (n=966)

Neonatal outcome	Study group	Controlgroup
	No. (%)	No. (%)
Birth asphyxia	149 (15.4)	114 (11.8)
RDS gest age < 37 wks	59 (6.11)	46 (4.76)
Apgar score <7 at 5 min	153 (15.8)	84 (8.69)
Birth trauma	20 (2.07)	04 (0.41)
Congenital anomaly	14 (1.45)	06 (0.62)
Neonatal jaundice	189 (19.6)	47(4.87)
Hypoglycaemia	38 (3.93)	41(4.24)
Neonatal sepsis	103(10.7)	71(7.35)
Low birth weight	50(5.18)	36(3.73)
Premature	36(3.73)	24(2.48)
SGA	14(1.45)	12(1.14)
Perinatal mortality	58(6.00)	29(3.00)
Stillbirth	32(3.31)	10(1.04)
Neonatal death	26(2.69)	19(1.97)
NICU admission	253(26.2)	96 (9.94)
Total	*414 (42.9)	156 (15.7)

(*Total no. of complications are exceeding no. of neonates as one baby may have multiple complications)

The neonatal morbidity was also found higher in induced 414(42.9%) than control 156(15.7%) group. Birth asphyxia is found in 149(15.4%) vs 114(11.8%) babies, Respiratory distress syndrome in 59(6.11%) vs 46(4.76%) ,Apgar score < 7 at 5 minute in 153(15.8%) vs 84(8.69%),neonatal infection in 103(10.7%) vs 71(7.35%) mainly cases of umbilical sepsis, respiratory infection, skin infection and few case of conjunctivitis, low birth weight in 51(5.23%) vs 36(3.73%),perinatal mortality in 58(6.00%) vs 29(3.00%),NICU admission in 253(26.2%) vs 96(9.94%).Out of 26(2.69%) neonatal deaths in study group,12 babies had undiagnosed congenital anomalies out of which nine expired within 24 hours. Four cases were induced for preeclampsia at gestational period of 37 weeks with oxytocin drip alone. Premature SGA babies were delivered with low Apgar score at 1 min and 5min; two of them developed RDS and died within 24 hours, another two developed severe jaundice, died within 48 hours. 5 cases were induced electively at term delivered and developed RDS and expired two days after birth.Other 5 neonatal death was due to severe birth asphyxia with Apgar score of 2 at 1 min and 4 at 5 min were induced with oxytocin 5 units among which two had difficult forceps . Both first and second stage was prolonged. Babies send to NICU and expired within one hour of birth. Low birth weight was found in 51(5.23%), out of which 36(3.73%) were premature and SGA in 15(1.55%) in study group (Table 5).

DISCUSSION

In the present study, we aim to describe the incidence, indications, methods, success and fetomaternal outcome of induction of labour and its comparison with those in spontaneous labour. The incidence of labour induction in our study was 13.6% which is lower than that reported in developing countries which are around 20% [6, 9]. Similarly in an Indian study, the induction rate was 11.4% [10]. This low prevalence may be because the study was carried out in a tertiary care hospital where facilities for intensive monitoring of labour and supervision of trained staff are available for 24 hours and obstetrician reluctance of induction unless there is a valid indication. Out of 966 women in the study group, majority were in the age group of 21-30 years (73.1%).Only around 5-6 % of the women in both groups belonged to age group of ≤20 years and >35 years. Younger and older group showed a higher incidence of caesarean section (12.0% & 20.7% resp.) in comparison those within the age of 26-35 yrs (5.3%) [11]. Nullipara constituted about 50.8% of the series presented by smith *et al*. [3]. Incidentally 59.6 % of the cases in the present study were found to be nullipara. There is statistically significant relationship between the parity and success of induction [12]. Failure rate was lowest (6.3%) in case with para 1 to para 4 group whereas the rate of failure was highest in primigravidas (14.2%). Only term and postterm pregnancies were included in this study. Maternal and neonatal complication varied with gestational age and were lowest at 39 week and highest postterm, caesarean section (12.3% vs 21.6%), operative vaginal delivery (10.7% vs 15.4%), maternal haemorrhage (9.7% vs 14.6%), poor neonatal outcome measured were low apgar score at 5 min<7(1.0% vs 2.3%) [13]. Most of the women in study group had BMI between 21-25 kg/m2(55.3%). Elevated BMI (>40kg/m2) have been shown to increase CS rate when labour is induced [14].

Out of the 966 cases selected for induction of labour 29.3% had unfavourable Bishop score ≤4. The percentage of cases with unfavourable score was 29 in the series of Orhue *et al*. [13]. In studies of women with a favourable cervix, the CS rate of induced pregnancies was equivalent to those managed expectantly [15]. Rozenburg *et al*. reported that the BS was a better predictor of time interval from induction to delivery [16]. In the present study the ideal combined method of amniotomy followed by oxytocin could be used for only 28.6 % of cases. Because major portion of the induced cases had their membranes ruptured prematurely and 42.00 % of the cases had floating head.

As per the indication of induction of labour, prelabour rupture of membranes (PROM) constituted the major group (39.8%), next in order of frequency were HPD (15.4%) and postterm pregnancy (10.8%). Samina Asghar *et al*. in their study also reported PROM as major indication (58%), followed by preeclampsia (10%), IUGR (5%) [17]. Bukola *et al*. and also Abdul in Zaria identified PROM and hypertension in pregnancy as the commonest indications [18, 19]. In our study, elective induction was done in 10.8% of cases. Guerre *et al*. reported an elective induction rate of 16.7% in Latin American facilities [20]. Elective induction was associated with increased adjusted odds of NICU and ICU admissions, but not increased odds of fetal or neonatal mortality [21].

The success rate for vaginal delivery was 69.7% which is comparable to international standards [22]. Caesarean section was done in 30.3% of cases and the rate was quite high in comparison to the control group (10.8%). Similarly in a study by Yogesh Raj Amartya *et al*., showed caesarean section rate of 25.6% and normal delivery rate of 74.4% among induced women and 11.6% and 88.4% among women with spontaneous labour [23]. The incidence of low forceps was higher (16.1%) in study cases than controls (12.5%).Delayed second stage and fetal distress were the chief indications of forceps application. Pant *et al*. in a study showed that the rate of vaginal delivery was 60%, and 20% had instrumental delivery in induced group [24]. In the present study 61.3% of patients in the study group had IDI within 18 hours. Pant and her colleagues found that the BS was directly related to the mean IDI. In their study, the women with a low BS(0-4) had a mean IDI of 12.30 hrs and those with a score of 5-8, had a mean IDI of 9.5hrs[24].The overall IDI of <12 hours was reported in the study by Abdul in Zaria[19].

Failure of induction was the commonest indication in the present study (31.1%), mostly in cases with unfavourable BS. The incidence of fetal distress was 27.3%, mostly associated with high dose high dose of oxytocin. Higher failure rate in present study may be because of higher no. of nulliparas included in the study, delayed amniotomy only in the active stage of labour. In a collaboration study by Hendricks *et al*., failure of induction exceeded 20% among patients with a low BS, and a BS of 8 being associated with only 3% failure [25]. Osaheni Lucky Lawani *et al*. in their study had 24.1% cases of failed induction resulting in emergency caesarean section [26].

Maternal complications were seen more among study (41.7%) than control group (19.4%). The increased incidence of PPH is attributed to precipitate delivery followed by a period of uterine atony [27]. Incidence of PPH, perineal tear, MROP, Hysterectomy, ICU and intranatal pyrexia was lower in control group

than in the induced group [12]. Samina Asghar *et al*. in their study among 5727 induced women had PPH (26%),ICU admission 83%, hospital stay > 7 days in 20%, hysterectomy in 2.5% [17], whereas Tan *et al*. reported PPH and maternal pyrexia in 13.3% and 21%respectively [28]. There are evidences from various other studies that induction is associated with increased uterotonic use, perineal lacerations, hysterectomy, ICU & NICU admission, longer hospital stay, greater anaesthesia/analgesia requirement during labour, lower Apgar scores and delayed commencement of breast feeding when compared to women with spontaneous onset of labour [29]. These risks remained even after adjustment for a number of factors associated with the underlying condition that resulted in the need for IOL.

Neonatal complications were found in 42.9% of induced group, whereas only 15.7% of neonates in control group had various complications. There were (3.31%) stillbirths in the study vs (1.04%) stillbirth in the control group. These were mostly due to abruptio placentae, difficult forceps and IUGR & associated obstetric & medical conditions. While the Cochrane review established that induction reduces perinatal mortality, only one stillbirth was reported in the seven trails included for this outcome. Given that labour induction without medical indications was not associated with a change in the odds of fresh stillbirth. It is more likely that underlying increased fetal risk due to maternal morbidities was responsible [4]. There were (2.69%) neonatal deaths in the study & (1.97%) neonatal death in control group. Except nine neonatal deaths due to congenital anomalies, rest of the neonatal deaths were somehow or otherwise related with IOL. In the present study 3.73% neonates were premature and 1.55% was SGA in study group. Wrong dates and error of assessment could be responsible for such unexplained prematurity. Prematurity rate of 3.3% [12] and 0.5% [27] has been reported in two other studies. In the present study the incidence of low Apgar score was 15.8% compared to 5.6% [20] &16.6 % [24] in another study. 26.2% of baby's required NICU admission in study group whereas only 9.94 % of babies in the control group were admitted in NICU. Macer JA *et al*. in their study reported only 0.8% of babies' required neonatal intensive care unit [30]. Incidence of neonatal jaundice in induced group was more than three times to that of control group (19.6% vs4.87%). The increased incidence of jaundice could be result of higher incidence of forceps delivery [31]. This postulation regarding the cause of the hyperbilirubinaemia was an inherent fetal haemorrhage in induced labour. Neonatal hyperbilirubinaemia more pronounced when the total amount of oxytocin given to the mother is high, such as happens in prolonged inductions [32]. The higher incidence of forceps and caesarean births could have contributed to the higher sepsis rate in present study (10.7% vs 7.35%). In a few other studies also, neonatal hyperbilirubiremia and neonatal sepsis were found in cases of induced labour [25, 33]. Bahn *et al*. in their study reported neonatal jaundice in 38.5%, hypoglycaemia in 1.5 % & RDS in 1.5% & birth asphyxia in 1% [27]. Orhue *et al*. reported birth trauma in 0.2%, neonatal sepsis in 0.4% of induced cases [12]. Guerra *et al*. also found an increased risk of Apgar <7 at 5 minutes, very low birth weight, NICU admission and delayed breast feeding associated with labour induction [20].

CONCLUSION

IOL is beneficial and safe in high risk pregnancies when the benefits of early delivery outweigh the risk of continuation, but this is not without attendant complications and failures which can be significantly reduced with proper patient selection and adequate fetomaternal monitoring to ensure a favourable obstetric outcome of a healthy mother and baby which are the targets of the safe motherhood initiative. Despite the safety of induction, a liberal induction policy leads to an increase in operative deliveries creating potential risks for the mother and the baby and greater expense. Perinatal outcome strictly depends on standard of care available but majority of studies report poor perinatal outcome for induced labour. While medically indicated inductions increase the odds of several adverse neonatal outcome, this was likely influenced by higher baseline maternal risk.

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REFERENCES

1. Mudde C. Radical right parties in Europe: what, who, why? Participation. 2011; 34(3).
2. Sanchez-Ramos L. Induction of labor. Obstetrics and gynecology clinics of North America. 2005 Jun 30; 32(2):181-200.
3. Smith GC. Life-table analysis of the risk of perinatal death at term and post term in singleton pregnancies. American journal of obstetrics and gynecology. 2001 Feb 28; 184(3):489-96.
4. Mozurkewich E, Chilimigras J, Koepke E, Keeton K, King VJ. Indications for induction of labour: a best-evidence review. BJOG: An

International Journal of Obstetrics & Gynaecology. 2009 Apr 1; 116(5):626-36.
5. Gülmezoglu AM, Crowther CA, Middleton P, Heatley E. Induction of labour for improving birth outcomes for women at or beyond term. The Cochrane library. 2012 Jun 13.
6. Lydon-Rochelle MT, Cárdenas V, Nelson JC, Holt VL, Gardella C, Easterling TR. Induction of labor in the absence of standard medical indications: incidence and correlates. Medical care. 2007 Jun 1; 45(6):505-12.
7. Vahratian A, Zhang J, Troendle JF, Sciscione AC, Hoffman MK. Labor progression and risk of cesarean delivery in electively induced nulliparas. Obstetrics & Gynecology. 2005 Apr 1; 105(4):698-704.
8. Koopmans CM, Bijlenga D, Groen H, Vijgen SM, Aarnoudse JG, Bekedam DJ, van den Berg PP, de Boer K, Burggraaff JM, Bloemenkamp KW, Drogtrop AP. Induction of labour versus expectant monitoring for gestational hypertension or mild pre-eclampsia after 36 weeks' gestation (HYPITAT): a multicentre, open-label randomised controlled trial. The Lancet. 2009 Sep 25; 374(9694):979-88.
9. Cookson RA. Royal College of Obstetricians and Gynaecologists. Induction of Labour full guidance published by the RCOG. RCOG Clinical Effectiveness Support Unit, London.
10. Misra M, Vavre S. Labour induction with intra-cervical prostaglandin gel and intravenous oxytocin in women with a very uinfavourable cervix. *Austr NZ J Obstet Gynaecol 1994*; 34(5): 511-515.
11. Yeast JD, Jones A, Poskin M. Induction of labor and the relationship to cesarean delivery: a review of 7001 consecutive inductions. American journal of obstetrics and gynecology. 1999 Mar 31; 180(3):628-33.
12. Orhue AA. Induction of labour at term in primigravidae with low Bishop's score: a comparison of three methods. European Journal of Obstetrics & Gynecology and Reproductive Biology. 1995 Feb 1; 58(2):119-25.
13. Heimstad R, Skogvoll E, Mattsson LÅ, Johansen OJ, Eik-Nes SH, Salvesen KÅ. Induction of labor or serial antenatal fetal monitoring in postterm pregnancy: a randomized controlled trial. Obstetrics & Gynecology. 2007 Mar 1; 109(3):609-17.
14. Ennen CS, Bofill JA, Magann EF, Bass JD, Chauhan SP, Morrison JC. Risk factors for cesarean delivery in preterm, term and post-term patients undergoing induction of labor with an unfavorable cervix. Gynecologic and obstetric investigation. 2008 Oct 30; 67(2):113-7.
15. Osmundson SS, Ou-Yang RJ, Grobman WA. Elective induction compared with expectant management in nulliparous women with a favorable cervix. Obstetrics & Gynecology. 2010 Sep 1; 116(3):601-5.
16. Rozenberg P, Chevret S, Chastang C, Ville Y. Comparison of digital and ultrasonographic examination of the cervix in predicting time interval from induction to delivery in women with a low Bishop score. BJOG: An International Journal of Obstetrics & Gynaecology. 2005 Feb 1; 112(2):192-6.
17. ASGHAR S, AWAN A, YASIN S. Perinatal and Maternal Outcome Associated With Induction of Labour. Hospital. 4753:83.
18. Bukola F, Idi N, M'Mimunya M, Jean-Jose WM, Kidza M, Isilda N, Faouzi A, Archana S, Paulo SJ, Matthews M, Metin G. Unmet need for induction of labor in Africa: secondary analysis from the 2004-2005 WHO Global Maternal and Perinatal Health Survey (A cross-sectional survey). BMC public health. 2012 Aug 31; 12(1):722.
19. Secondary analysis from the 2004-2005 WHO Global Maternal and Perinatal Health Survey (A cross-sectional survey). BMC public health. 2012 Aug 31; 12(1):722.
20. Abdul MA, Ibrahim UN, Yusuf MD, Musa'r H. Efficacy and Safety of Misoprostol in Induction of Labour in a Nigerian Tertiary Hospital.
21. Guerra GV, Cecatti JG, Souza JP, Faúndes A, Morais SS, Gülmezoglu AM, Passini Jr R, Parpinelli MA, Carroli G. Elective induction versus spontaneous labour in Latin America. Bulletin of the World Health Organization. 2011 Sep; 89(9):657-65.
22. Vogel JP, Souza JP, Gülmezoglu AM. Patterns and outcomes of induction of labour in Africa and Asia: a secondary analysis of the WHO Global Survey on Maternal and Neonatal Health. PloS one. 2013 Jun 3; 8(6):e65612.
23. Rayburn WF. Preinduction cervical ripening: basis and methods of current practice. Obstetrical & gynecological survey. 2002 Oct 1; 57(10):683-92.
24. Amatya YR. Patterns of Delivery and Perinatal Outcomes Among Women Delivered at District Hospital of Rural Nepal. Online Journal of Health and Allied Sciences. 2014 Oct 30; 13(3).
25. Pant L, Mansukhani GN, Garud M. Fetal outcome following induction and augmention

of labour by oxytocic agents. J Obstet Gynaecol Ind.1991; 41(4):472-475.
26. Tuck SM, Cardozo LD, Studd JW, Gibb DM, Cooper DJ. Obstetric characteristics in different racial groups. BJOG: An International Journal of Obstetrics & Gynaecology. 1983 Oct 1; 90(10):892-7.
27. Osaheni Lucky Lawani ,Azubuike Kanario Onyebuchi,Chukwuemeka Anthohy Iyoke et al.Obstetrics and Gynaecology International Volume 2014(2014),Article ID 419621,5.
28. Bahn SA, Jacobson J, Petersen F. Maternal and neonatal outcome following prolonged labor induction. Obstetrics & Gynecology. 1998 Sep 1; 92(3):403-7.
29. Tan PC, Valiapan SD, Tay PY, Omar SZ. Concurrent oxytocin with dinoprostone pessary versus dinoprostone pessary in labour induction of nulliparas with an unfavourable cervix: a randomised placebo-controlled trial. BJOG: An International Journal of Obstetrics & Gynaecology. 2007 Jul 1; 114(7):824-32.
30. Hofmeyr GJ. Induction of labour with an unfavourable cervix. Best Practice & Research Clinical Obstetrics & Gynaecology. 2003 Oct 31; 17(5):777-94.
31. Macer JA, Macer CL, Chan LS. Elective induction versus spontaneous labor: a retrospective study of complications and outcome. American journal of obstetrics and gynecology. 1992 Jun 1; 166(6):1690-7.
32. Sivasuriya M, Tan KL, Salmon YM, Karim SM. Neonatal serum bilirubin levels in spontaneous and induced labour. BJOG: An International Journal of Obstetrics & Gynaecology. 1978 Aug 1; 85(8):619-23.
33. Arias F, Bhide AG, Arulkumaran S, Damania K, Daftary SN, editors. Practical guide to high risk pregnancy and delivery. Elsevier health sciences; 2012 May 14.
34. Mercer B, Pilgrim P, Sibai B. Labor induction with continuous low-dose oxytocin infusion: a randomized trial. Obstetrics & Gynecology. 1991 May 1; 77(5):659-63.