Journal of Chitwan Medical College 2020;10(32):29-32
Available online at: www.jcmc.cmc.edu.np

ORIGINAL RESEARCH ARTICLE

FETO-MATERNAL OUTCOMES FOLLOWING LABOR INDUCTION AT A TERTIARY CARE CENTER

Upendra Pandit[1,*], Basant Sharma[1], Rakshya Joshi[1], Julli Chaudhari[1], Prekshya Singh[1], Asmita Sharma[1]
[1]Department of Obstetrics and Gynecology, Chitwan Medical College, Bharatpur-10, Nepal

Received: 8 Feb, 2020
Accepted: 14 May, 2020
Published: 25 Jun, 2020

Key words: Caesarean section; Fetomaternal outcome; Induction of labor.

***Correspondence to:** Upendra Pandit, Department of Obstetrics and Gynecology, Chitwan Medical College, Bharatpur-10, Nepal.
Email: drupandit@gmail.com

*DOI:*https://doi.org/10.3126/jcmc.v10i2.29665

Citation

Pandit U, Sharma B, Joshi R, Chaudhari J, Sing P, Sharma A. Feto-maternal outcomes following labor induction at a tertiary care center.Journal of Chitwan Medical College.2020;10(32):29-32.

Peer Reviewed

ABSTRACT

Background: Labor induction is one of the most common Obstetrics interventions worldwide. It has got significant risks and benefits. Careful selection of cases for induction improves the feto-maternal outcomes. So, the study was designed to assess the fetomaternal outcome and factors associated with mode of delivery following the induction of labor.

Methods: It was a descriptive observational study conducted in the department of Obstetrics and Gynecology from July 17, 2018, to July 16, 2019. The study comprised of 264 mothers admitted in the labor ward subjected to labor induction as clinical management of labor and delivery. Data analyzed with chi-square test and one-way analysis of variance (ANOVA) wherever appropriate.

Results: Of 2950 deliveries, the induction rate was 8.94%. Out of them, 264 mothers undergone labor induction. A caesarean was the highly associated mode of deliveries 168(63.63%) due to induction failure 94(55.97%) followed by fetal distress 37(22%). The mean birth weight of neonates was 3.09±0.41 kg. Apgar score in one minute and hospital stay showed a significant difference (p-value .002), in modes of deliveries. No significant association was observed in maternal and fetal complications like PPH, endometritis, and low Apgar score <7 in five minutes. The majority of neonates admitted for observation at the care unit. The neonatal mortality was two.

Conclusions: Caesarean mode of delivery highly was associated with labor induction due to induction failure and fetal distress. Carefully selected cases improve morbidity and fetomaternal outcomes following labor induction.

INTRODUCTION

Labor induction is one of the most common obstetrics interventions worldwide. But, its rate varies among continents, countries, and institutions.[1,2] Post-dated pregnancy is one of the common indications of labor induction. It has also got significant risks like fetal demise, placental insufficiency which resulted in fetal hypoxia during labor induction. Because the amniotic fluid volume progressively decreases after 38 weeks of gestation, particularly in postdated pregnancy leads to cord compression and fetal distress.

Postdated pregnancy also increases the risk of meconium aspiration syndrome in newborn.[3,4] The outcome of labor induction depends upon maternal and fetoplacental factors like maternal age, parity, gestational age, and bishop score. But the bishop score is a poor predictor of induction success.[5-7] In modern obstetrics the decision of labor induction based on the gestational age, reactive cardiotocography, and sonographic findings like normal fetal weight, cephalic presentation, the location of the placenta and normal amniotic fluid volume.[8]

Now a day, the rate of primary caesarean is increasing worldwide. So that financial burden is increasing in the health care system especially for low-income countries. Maternal death is also increasing due to infection and immediate surgical complications following cesarean delivery.[11] In this scenario, most of the study claimed that the induction of labor parse does not significantly increase the cesarean rate. That is why our study question was "Does labor induction increases caesarean rate? And Do the maternal factors and fetal weight effect on mode of delivery?'' So, the objective of this study was to assess the fetomaternal outcome and factors associated with the mode of delivery following the induction of labor at a tertiary care center.

METHODS

It was a descriptive observational, hospital-based study conducted in the department of Obstetrics and Gynecology from July 17, 2018, to July 16, 2019. During the study period of one year, there were 2950 deliveries. The study comprised of 264 mothers admitted to the labor ward subjected to induction of labor as clinical management of labor and delivery. We took ethical approval from the institutional review committee of Chitwan medical college.

The criteria for case selection was sonographic findings like

normal heart rate, fetal weight within range >2.5kg to 3.5 kg, cephalic presentation, fundal location of the placenta and normal amniotic fluid index, and gestational age at term (37- 42 weeks). All mother fulfilled inclusion criteria admitted for induction of labor with routine induction protocol with Misoprostol. Baseline cardiotocography was performed before vaginal insertion of Misoprostal tablet irrespective of the cervical score (Bishop Score). According to the protocol, Misoprostal 50 mcg doses to primigravida and 25 mcg doses to multigravida was given vaginally at posterior fornix at every 4 to 6 hourly.[11]

We recorded demographic data like age, parity, and gestational age. We also recorded labor-related information like indications of inductions, duration of labor, modes of delivery, and the outcome of labor as Apgar scores at one- and five-minutes following delivery. Data related to birth weight, admission in the neonatal unit, immediate postpartum complications, hospital stay, and re-admission cases for the management of postpartum complications recorded. Secondary data collected from the record books that were available in labor ward and operation room. Statistical package for social science version 20 was used for data entry and analysis. Results presented as percentages, mean, and standard deviation. Data analyzed with chi-square test and one-way analysis of variance (ANOVA) wherever appropriate. The comparison in mean differences expressed between vaginal and caesarean modes of deliveries, p-value <0.05 considered as the level of significance in all statistical tests.

RESULTS

During the study period of one year, there were 2950 deliveries. Two hundred sixty-four (264) women underwent induction of labor yielding an induction rate of 8.9%. Demography results regarding age show the mean age of the mother was 24.08±3.98 during admission. Maternal age range was 15-37 years. Out of them, the predominant age group was 20-24 years of age. Parity related proportion was 59.8% nullipara and 40.2% multipara mothers. The mean gestational age and standard deviation at the time of delivery were 40.1336±1.11 weeks (Table 1).

Table 1: Distribution of demography variables

Demography Variables	Study population (n=264) Number (%)	(χ^2) p-value
Age Group(Years)		
<20	32(12.1)	***<0.001***
20-24	126(47.7)	
25-29	80(30.3)	
≥30	26(9.8)	
Parity		
Nuliparity	158(59.8)	***0.0014***
Multiparity	106(40.2)	
Total	264(100)	
Gestational Age (weeks)		
≤ 40	55(20.8)	***<0.001***
>40	209(79.2)	

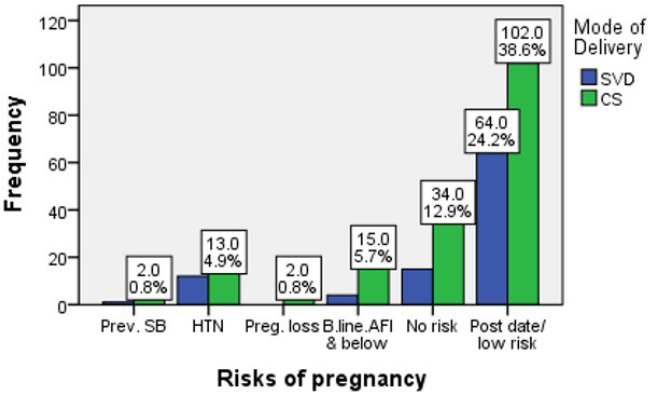

Figure 1: Frequency distribution of cases with risk according to modes of delivery

Regarding risk and co- morbidities, most of the cases that underwent labor induction had postdated with low-risk cases 166(62.8%), no risk 49 (18.56%), Hypertension 25(9.4%) followed by reduced liquor volume 19(7.20%) were the common risk factors associated with the induction of labor. No significant differences observed in the mode of delivery 24.2% vs. 38.6% between vaginal and caesarean birth respectively (Figure 1).

Table 2: Distribution of outcome variables

Outcome variables	Study population N (%)	(χ^2) p-value
Mode of Deliveries		
Vaginal Delivery	96(36.37)	<0.001
Caesarean Section	168(63.63)	
Total	264(100)	
Indications for Caesarean Section		
Induction Failure	94(55.97)	<0.001
Fetal distress	37(22.02)	
Non reassuring CTG	19(11.30)	
Non progress of labor (NPOL) and Ceplalopelvic Disproportion (CPD)	14 (8.33)	
Borderline hydraminous (AFI=5-7cm)	4(2.38)	
Total	168(100)	
Maternal Complications		
No	258(97.8)	<0.001
Yes	6 (2.2)	
PPH	3(1.1)	
Endometritis	3(1.1)	
Genital Tract Injuries	0(0)	
Maternal Mortality	0(0)	
Total	264 (100)	

A significant difference observed in the mode of delivery. The proportion of vaginal delivery and caesarean section was 36.37% and 63.63% respectively. The significant indication (p

value <0.001), for caesarean delivery was induction failure in 55.96%, followed by fetal distress 22.02%. The admission to delivery time in mean hours was 15.65±6.24. The maternal complications like postpartum hemorrhage in 3 mothers and endometritis also in 3 mothers observed which put the maternal complication rate at 2.27% (Table 2). Also the duration of hospital stay was 2.73±1.18 and 3.42±.77, p- value <0.001, in vaginal and caesarean birth respectively (Table 4).

Neonatal outcome observed in all mothers who undergone vaginal and cesarean birth following induction of labor. Twelve and five percent of neonates admitted to the neonatal unit. Among them, the majority admitted for observation (84.85%). Three neonates admitted for the management of sepsis and 2 admitted for the management of birth asphyxia (Table 3). The Apgar score <7 in one minute 6.94±0.93 vs. 7.33±0.97, p-value 0.002 observed in vaginal and caesarean birth respectively. The mean birth weight of neonates was 3.091±.410 kg (Table 4).

Table 3: Distribution of neonatal outcome

Neonatal outcome	Study population(n=264) Number (%)	χ^2 p- value
NICU Admission		
Yes	33(12.5)	<0.001
No	231(87.5)	
Indications for NICU Admission		
Observation	28(84.85)	<0.0001
Sepsis	3(9.09)	
Birth Asphyxia	2(6.06)	
NICU Outcome		
Live	262(99.24)	<0.0001
Mortality	2(0.76)	

Table 4: Group of factors differences between vaginal and CS birth by ANOVA test

Maternal and neonatal factors	Vaginal Birth	Caesarean	ANOVA
	Mean±SD	Mean±SD	Sig.
Age of Mother between and within groups	23.55±4.1	24.82±3.8	0.136
Risks presence in Pregnancy (Harmonic mean)	6.07±1.7	6.13±1.5	0.272
Gestational Age during Delivery between group	40.10±1.09	40.14±1.12	0.328
Admission to delivery time in hours	15.01±5.4	16.01±6.6	0.213
Apgar score in One minute	6.94±0.93	7.33±0.97	0.002
Birth weight in kg	3.097±.405	3.087±.414	0.848
Duration of Hospital Stay	1.53±.75	3.42±.77	<0.001

DISCUSSION

The retrospective study findings showed that induction of labor strongly resulted in a higher incidence of cesarean delivery (63.63 %).[12] About 20% of the more caesarean rate observed in labor induction compared to the general hospital rate of 44%. Various risk factors presented like borderline amniotic fluid index (10.7%), maternal hypertension (7.74%), and others (2.4%) within caesarean deliveries group, which could have resulted in a higher cesarean rate. The most common indication for the caesarean section was induction failure (55.97%), followed by fetal distress (22.2%). A comparative study was done in Kathmandu university teaching hospital in 2007-2008 by Rayamajhi et al[13] found that the low rate of caesarean section (34.6%) compared to our study and predominant (74.07%) was of failed induction in the study group. The study did not mention labor-inducing agents. In our study 36.37% of cases in labor induction undergone vaginal delivery. The primigravida (Nullipara) had 2.8 times the likelihood of caesarean section compared to vaginal delivery. The mean gestational age observed (40.10±1.09 vs. 40.14±1.12 weeks) in vaginal delivery and caesarean group respectively. A recent study done by Alavifared et al [14] observed that lower the gestational age higher the vaginal delivery in the induction group, which contradicts our finding. The mean gestational age of 40.133±1.11 week, observed in both modes of delivery.

The maternal complications rate (2.27%) was low, which is good for quality assurances. Admission to delivery mean time in hours observed (15.01±5.4 vs. 16.01±6.6) in vaginal delivery and caesarean section respectively. Out of 264 live births, 33(12.5%) who had Apgar score ≤6 at 1 minute of birth were admitted in the neonatal Intensive Care Unit. A similar finding observed in different studies.[15,16] Statistical difference in mean Apgar score in 1 minute (6.94±0.93 vs. 7.33±0.97) observed in vaginal delivery and caesarean section group. But, there is no significant association with neonatal intensive care unit admission. The mean fetal the weight associated with mode of delivery was (3097.45±405 vs. 3087.38±414) in vaginal and caesarean delivery respectively. A similar finding noted in a systematic review done by Skeith et al.[17]

The factors like maternal age, gestational age, admission to delivery time, and birth weight were not significantly differed in mean between vaginal and caesarean birth following labor induction. The factors like Apgar <7 in one minute and hospital stay were significantly different in the mean between vaginal and caesarean birth following labor induction.

Following the Cochrane systematic review, the WHO mentioned that there was moderate-certainty evidence suggesting that induction before 41 weeks makes little or no difference to the caesarean section rate, whereas there is also moderate-

certainty evidence suggesting reduced caesarean section rates in cases where labor induction was done at or after 41 weeks.[18]

In this study, the fetomaternal outcome assessed within a time frame of admission to discharge. No outcome assessed after the day of discharge and readmission. The pH level of the umbilical artery not assessed as an outcome variable in neonates.

CONCLUSION

Caesarean delivery was highly associated with labor induction. Apgar score in one minute and hospital stay showed a significant difference in modes of delivery. Maternal and neonatal factors like the age of mother, gestational age, admission to the delivery time, and birth weight were unable to demonstrate the significant difference between the vaginal and caesarean mode of delivery. Carefully selected cases improve surgically related morbidity and fetomaternal outcomes following labor induction.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

REFERENCES:

1. Getahun D. Epidemiologic considerations: scope of problem and disparity concerns. Clin Obstet Gynecol. 2014 Jun;57(2):326-30. [DOI]
2. Lawani OL, Onyebuchi AK, Iyoke CA, Okafo CN, Ajah LO. Obstetric outcome and significance of labor induction in a health resource poor setting. Obstet Gynecol Int. 2014;2014:419621. [DOI]
3. Galal M, Symonds I, Murray H, Petraglia F, Smith R. Post-term pregnancy. Facts Views Vis Obgyn. 2012;4(3):175–87. [PMID]
4. Wennerholm UB, Saltvedt S, Wessberg A, Alkmark M, Bergh C, Wendel SB, Fadl H, et al. Induction of labor at 41 weeks versus expectant management and induction of labor at 42 weeks (Swedish Post-term Induction Study, SWEPIS): multicentre, open-label, randomized, superiority trial BMJ 2019;367:l6131 [DOI]
5. Kolkman, Diny & Verhoeven, Corine & Brinkhorst, Sophie & Van der Post, Joris & Pajkrt, Eva & Opmeer, Brent & Mol, Ben W Mol. (2013). The Bishop Score as a Predictor of Labor Induction Success: A Systematic Review. American journal of perinatology. 30. [DOI]
6. Altin-Traub, Ellen & Boulvain, Michel & Faltin, Daniel & Extermann, Philippe & Irion, Olivier. (2004). Reliability of the Bishop score labor induction at term. European journal of obstetrics, gynecology, and reproductive biology.112. 178-81. [DOI]
7. Ezebialu IU, Eke AC, Eleje GU, Nwachukwu CE. Methods for assessing pre-induction cervical ripening. Cochrane Database Syst Rev. 2015;2015(6):CD010762. Published 2015 Jun 12. [DOI]
8. Kinare A. Fetal environment. Indian J Radiol Imaging. 2008;18(4):326–344. [DOI]
9. Tumblin A. A family-centered cesarean birth story. J Perinat Educ. 2013;22(3):130–132. [DOI]
10. Kokorelias, K.M., Gignac, M.A.M., Naglie, G. et al. Towards a universal model of family-centered care: a scoping review. BMC Health Serv Res 19, 564 (2019). [DOI]
11. Sobhy S, Arroyo-Manzano D, Murugesu N, Karthikeyan G, Kumar V, Kaur I, Fernandez E, Gundabattula SR, Betran AP, Khan K, Zamora J, Thangaratinam S. Maternal and perinatal mortality and complications associated with caesarean section in low-income and middle-income countries: a systematic review and meta-analysis. Lancet. 2019 May 11;393(10184):1973-1982. [DOI]
12. Mishanina E, Rogozinska E, Thatthi T. Khan RU, Khan KS, Meads C. Use of labor induction and risk of cesarean delivery: a systematic review and meta-analysis.CMAJ. 2014 Jun 10; 186(9): 665–673. [DOI]
13. Rayamajhi, R., Karki, C., Shrestha, N., & Padhye, S. (1). Indications for labor induction and predictors for failed induction at KMCTH. Kathmandu University Medical Journal, 7(1), 21-25. [DOI]
14. Alavifard, S., Meier, K., Shulman, Y. et al. Derivation and validation of a model predicting the likelihood of vaginal birth following labor induction. BMC Pregnancy Childbirth 19, 130 (2019). [DOI]
15. Souter V, Painter I, Sitcov K, Caughey AB.Maternal and newborn outcomes with elective induction of labor at term. American Journal of Obstetrics & Gynecology, Volume 220, Issue 3, 273.e1 - 273.e11 [DOI]
16. Keulen JK, Bruinsma A, Kortekaas JC, van Dillen J, Bossuyt PM, Oudijk MA, Duijnhoven RG, van Kaam AH, Vandenbussche FP, van der Post JA, Mol BW, de Miranda E. Induction of labor at 41 weeks versus expectant management until 42 weeks (INDEX): multicentre, randomised non-inferiority trial. BMJ. 2019 Feb 20;364:l344. [DOI]
17. Skeith L, Le Gal G, de Vries JIP, Middeldorp S, Goddijn M, Kaaja R, Gris JC, Martinelli I, Schleußner E, Petroff D, Langlois N, Rodger MA; AFFIRM investigators. The risk of cesarean delivery after labor induction among women with prior pregnancy complications: a subgroup analysis of the AFFIRM study. BMC Pregnancy Childbirth. 2019 Nov 29;19(1):455. [DOI]
18. WHO recommendations: Induction of labor at or beyond term. Geneva: World Health Organization; 2018. Available from: [LINK]