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TRENDS AND OUTCOMES OF INDUCTION OF LABOUR AMONG PRIMIGRAVIDA AT TERM

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Abstract

Objectives: *To assess the frequency of method used for induction of labour among primigravida and the outcome associated with induction of labour among primigravida at term.*

Study design: *Descriptive longitudinal study*

Study place and period: *Department of Obstetrics and Gynecology, CMH Gujranwala from May 2025 till 15 July 2025.*

Methodology: *Two hundred and forty patients fulfilling the selection criteria were enrolled and method for induction of labor was noted as sweeping of membranes, pharmacological (misoprostol) or Foley's catheter. All females were admitted and followed-up until delivery. During labor, fetal surveillance was done. The time from induction to initiation of labor and delivery and mode of delivery were noted. After delivery, females were examined for 24 hours to assess postpartum hemorrhage. NICU admission were also noted. All this information will be recorded in proforma and analyzed in SPSS 25.*

Results: *The mean age of females was 26.20 ± 5.22 years. The mean gestational age at induction was 39.04 ± 1.46 weeks. Out of 20 females, 26 (10.8%) received sweeping of membranes, 166 (69.2%) females received misoprostol (pharmacological method) while 48 (20%) females received Foley's catheter for induction of labor. The mean time from induction to initiation of labor was observed as 5.61 ± 1.73 hours, while total time from induction to delivery was noted as 12.00 ± 2.96 hours. There were 143 (59.6%) deliveries occurred within 12 hours of induction of labor. Out of 240 females, 170 (70.8%) females had spontaneous vaginal delivery while 70 (29.2%) females underwent cesarean section. NICU admissions were required in 75 (31.3%) cases, who had fetal distress during labor and delivery. Postpartum hemorrhage occurred in 94 (39.2%) females.*

Conclusion: *Misoprostol is found to be more effective for induction of labor at term with least chances of post-delivery complications.*

INTRODUCTION:

The artificial beginning of labour prior to its natural commencement in order to achieve vaginal delivery of the feto-placental unit is known as induction of labour. When the advantages for the mother or foetus surpass the advantages of carrying the pregnancy to term, this common obstetric surgery is recommended. For both moms and clinicians, it might include a complicated set of interventions that defy patterns and offer a multitude of options and challenges. Although it varies by place and organisation, the rate of labour induction seems to be rising.[1-3] Between 1990 and 2018, the percentage of labour inductions in the United States increased from 9.6% to 25.7%, including 31.7% of first-time births. Recent research on inductions has either relied on administrative

data or medical records, or it has been tiny qualitative investigations.[4, 5]

There is a tendency towards higher induction of labour rates with better delivery outcomes, likely due to the higher average age of women.[6, 7] Nulliparous term inductions as a percentage of all births in New Zealand rose from 6.8% to 12.5% between 1990 and 2008. Over 60% of these inductions take place prior to 41 weeks. 30.4% of induced nulliparas were born via caesarean section. At 39–40 weeks, adverse neonatal outcomes and transfer rates were at their lowest (overall 2.1 and 0.5%, respectively).[8] Poor training of mid-level healthcare professionals mixed with uncontrolled access to labor-inducing drugs can put mother and child at serious risk during childbirth in poorer nations like Pakistan.[9, 10]

Aim of this study was to assess the trend and outcomes of Induction of labour among primigravida at term. Literature showed that with induction of labor, the risk of cesarean section has been reduced significantly and number of vaginal deliveries has been increased in recent years in different parts of the world. But in primigravida females, the evidence is limited and only one study found in local literature before. Therefore, to determine the impact of Induction of labour in primigravida females for deliver at term, we want to conduct this study, to get local updated evidence and implement the results in local population. This would help us to improve our knowledge and practice and we would be able to plan whether to apply induction in primigravida without risking the health of female and her neonate.

METHODOLOGY:

After taking approval from ethical review committee, this descriptive longitudinal study was done at Department of Obstetrics and Gynecology, CMH Gujranwala from May 2025 till 15 July 2025 . By using WHO calculator, sample size of 240 cases is calculated with 95% confidence level, 2.5% margin of error and percentage of membrane sweeping i.e. 4% for induction of labor in primigravida females.[11] All the females who fulfilled the following selection criteria were enrolled in the study by setting the Non-probability, consecutive sampling technique.

Inclusion Criteria: Primigravida of age 18-35 years, presenting at term i.e. gestational age during 37-41 weeks, confirmed from dating scan and planned to undergo induction of labor were enrolled in the study.

Exclusion Criteria: Females with abnormal placenta, non-cephalic presentation, Bishop >6, rupture of membranes, or contraindication to prostaglandins were excluded from the study.

Informed consent was obtained and demographics were noted. Then method for induction of labor was noted i.e. sweeping of membranes, induced by using 50 micrograms misoprostol that was inserted into the posterior vaginal fornix every 6 hours with only a maximum of 3 doses or Foley's catheter was inserted. Method of induction was decided by consultant gynecologist after explaining method to the female. All females were admitted and followed-up in gynecology wards. Females were shifted to labor room in case of active labor. During labor, fetal surveillance was done through Cardiotocography. The time from induction to initiation of labor (>3 contractions within 10 minutes) was noted and then time from induction until delivery of fetus and placenta was also noted. Mode of delivery was also noted as cesarean if fetal distress or failure to progress occurred during labor vaginal delivery if female delivered through vagina without assistance or any other indication for operative delivery. After delivery, females were shifted to post-delivery ward and were followed-up there for 24 hours to assess postpartum hemorrhage. Postpartum hemorrhage was assessed as vaginal blood loss >1000 ml after cesarean section or >500 ml blood loss after vaginal delivery noted by using sanitary pads during 24 hours of delivery. Weight of dry pad will be subtracted from weight of wet/soaked pad, considering 1gm=1ml. NICU admission was also noted if required in case of fetal heart rate > 160 bpm or <110 bpm for 10 minutes on Cardiotocography. All this information was recorded in proforma.

Data was entered and analyzed in SPSS 25. Quantitative variables like age, gestational age, BMI, induction to labor and induction to delivery interval were presented as mean and standard deviation. Qualitative variables like

residence, number antenatal follow-ups, induction method and outcome (spontaneous vaginal delivery, NICU admission and postpartum hemorrhage) were presented as frequency and percentage. Outcomes were compared with method of induction by using chi-square test for spontaneous vaginal delivery, NICU admission and postpartum hemorrhage and ANOVA for mean induction to labor and induction to delivery interval. Post-HOC Tukey test was applied for pairwise comparison among three method of induction of labor. P-value ≤0.05 was kept as significant.

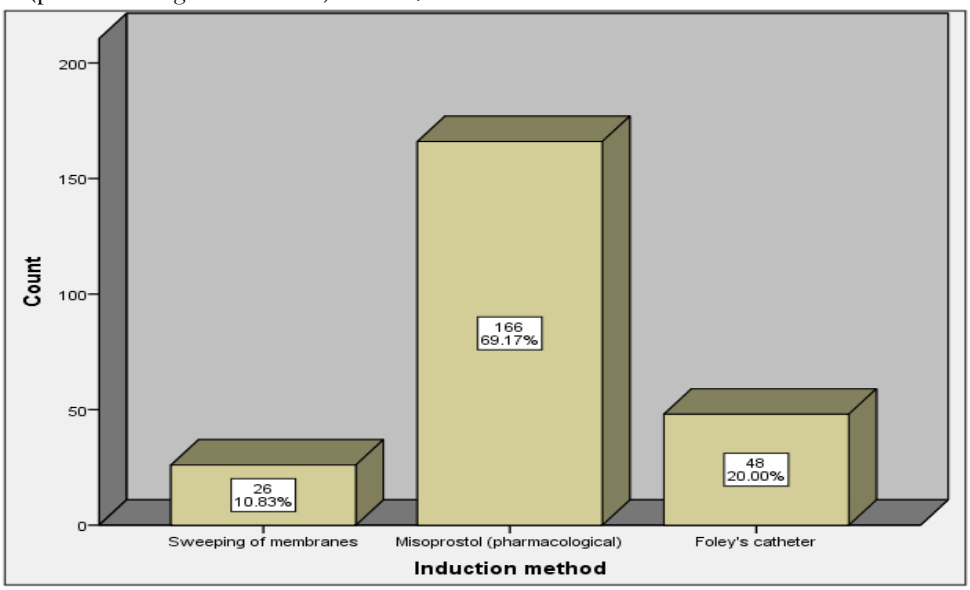
RESULTS

In this study, total 240 primigravida females underwent induction of labor at term. The mean age of females was 26.20 ± 5.22 years. The mean gestational age at induction was 39.04 ± 1.46 weeks. The mean BMI of females was 26.14 ± 3.55 kg/m^2. Out of 240, 159 (66.3%) females were living in urban areas of Gujranwala district. Among all, 168 (70.0%) females had history of visiting antenatal clinic during pregnancy. Among them, 40 (16.7%) females had less than 5 visits, 92 (38.3%) females visited for 6-10 times and 36 (15%) females had more than 10 visits. **Table-I**

Table-I: Basic information of enrolled primigravida planned to undergo induction of labor (n = 240)

	F (%), mean ± SD
Age (years)	26.20 ± 5.22
Gestational age (weeks)	39.04 ± 1.46
BMI (kg/m^2)	26.14 ± 3.55
Residence	
Urban	159 (66.3%)
Rural	81 (33.8%)
Antenatal follow-ups	168 (70.0%)
Number of visits	
Less than 5	40 (16.7%)
6-10	92 (38.3%)
More than 10	36 (15%)

Out of 20 females, 26 (10.8%) received sweeping of membranes, 166 (69.2%) females received misoprostol (pharmacological method) while 48 (20%) females received Foley's catheter for induction of labor. **Figure-1**



Fiigure-1: Method used for induction of labor at term (n = 240)

The mean time from induction to initiation of labor was observed as 5.61 ± 1.73 hours, while total time from induction to delivery was noted as 12.00 ± 2.96 hours. There were 143 (59.6%) deliveries occurred within 12 hours of induction of labor. Out of 240 females, 170 (70.8%) females had spontaneous vaginal delivery while 70 (29.2%) females underwent cesarean section. NICU admissions were required in 75 (31.3%) cases, who had fetal distress during labor and delivery. Postpartum hemorrhage occurred in 94 (39.2%) females. **Table-II**

Table-II: Outcomes observed during study period (n = 240)

	F (%), mean ± SD
Time from induction to initiation of labor	5.61 ± 1.73
Time from induction to delivery	12.00 ± 2.96
Delivery within 12 hours	143 (59.6%)
Mode of delivery	
Spontaneous vaginal delivery	170 (70.8%)
Cesarean section	70 (29.2%)
NICU admission	75 (31.3%)
Postpartum hemorrhage	94 (39.2%)

The mean time from induction to the initiation of labor was observed to be high with sweeping of membranes (6.08 ± 1.60 hours) as compared to Misoprostol (5.54 ± 1.75 hours) and Foley's catheter (5.60 ± 1.72 hours), although the difference in these methods was insignificant ($p>0.05$). The mean time from induction to delivery was observed to be high with sweeping of membranes (13.38 ± 2.80 hours) as compared to Misoprostol (11.43 ± 2.85 hours) and Foley's catheter (13.19 ± 2.84 hours), and the difference in these methods was high significant ($p<0.001$). The number of deliveries achieved within 12 hours was significantly better with misoprostol (112 (57.5%)) than sweeping of membranes (14 (53.8%)) and Foley's catheter (17 (35.4%)). There was significantly ($p<0.05$) more vaginal deliveries with misoprostol (128 (77.1%)) as compared to Foley's catheter (31 (64.6%)) and Sweeping of membranes (11 (42.3%)). Similarly, NICU admissions were significantly less with misoprostol (41 (24.7%)) as compared to Foley's catheter (25 (52.1%)) and Sweeping of membranes (9 (34.6%)). Postpartum hemorrhage was also less with misoprostol (62 (37.3%)) as compared to Foley's catheter (22 (45.8%)) and Sweeping of membranes (10 (38.5%)). Although the difference was insignificant ($p>0.05$). **Table-III**

Table-III: Comparison of outcomes in primigravida given different method of induction for delivery at term (n = 240)

	Method of induction			p-value
	Sweeping of membranes	Misoprostol (pharmacological)	Foley's catheter	
Time from induction to initiation of labor, hours	6.08 ± 1.60	5.54 ± 1.75	5.60 ± 1.72	0.334
Time from induction to delivery, hours	13.38 ± 2.80	11.43 ± 2.85	13.19 ± 2.84	<0.001
Delivery within 12 hours	14 (53.8%)	112 (57.5%)	17 (35.4%)	<0.001
Spontaneous vaginal delivery	11 (42.3%)	128 (77.1%)	31 (64.6%)	0.001
NICU admission	9 (34.6%)	41 (24.7%)	25 (52.1%)	0.001
Postpartum hemorrhage	10 (38.5%)	62 (37.3%)	22 (45.8%)	0.568

For mean time from induction to initiation of labor, the mean difference of sweeping of membranes with misoprostol and Foley's catheter was found to be insignificant ($p>.05$).

While the mean difference between Misoprostol and Foley's catheter was also insignificant (p>0.05). For mean time from induction to delivery, the mean difference of sweeping of membranes with misoprostol was significant (p<0.05) but with Foley's catheter was found to be insignificant (p>.05). While the mean difference between Misoprostol and Foley's catheter was also significant (p<0.05). **Table-IV**

Table-IV: Post-HOC test applied to check pair-wise comparison among three method of induction (n = 240)

Dependent Variable	(I) method	(J) method	Sig.
Time from induction to initiation of labor, hours	Sweeping of membranes	Misoprostol (pharmacological)	0.300
		Foley's catheter	0.500
	Misoprostol (pharmacological)	Foley's catheter	0.969
Time from induction to delivery, hours	Sweeping of membranes	Misoprostol (pharmacological)	0.004
		Foley's catheter	0.956
	Misoprostol (pharmacological)	Foley's catheter	0.001

DISCUSSION

In this study, we observed that out of 20 primigravida females, 26 (10.8%) underwent sweeping of membranes by senior obstetrician, while mostly [166 (69.2%)] females received misoprostol (pharmacological method) and in 48 (20%) females, Foley's catheter was placed for induction of labor. The mean time from induction to initiation of labor was observed as 5.61 ± 1.73 hours, while total time from induction to delivery was noted as 12.00 ± 2.96 hours. There were 143 (59.6%) deliveries occurred within 12 hours of induction of labor. Out of 240 females, 170 (70.8%) females had spontaneous vaginal delivery while 70 (29.2%) females underwent cesarean section. NICU admissions were required in 75 (31.3%) cases, who had fetal distress during labor and delivery. Postpartum hemorrhage occurred in 94 (39.2%) females.

According to a prior study conducted in Nigeria, misoprostol was the most often used way of inducing labour (78.2%), followed by membrane sweeping (4.0%) and Foley's catheter (10.8%). The time between induction and delivery was 12±3.6 hours. Misoprostol (77.7%), Foleys catheter (72.4%), and membrane sweeping (53.3%) all resulted in vaginal deliveries.[11]

In a study, Arif et al. found that misoprostol significantly reduced the induction to delivery period (10.2 ± 0.8 hours). About 60% of women gave birth within 12 hours, and 96% did so within 24. Misoprostol was found to have a mere 6% caesarean section rate.[12] A study by Kamal et al. assessed the safety and effectiveness of vaginal misoprostol and membrane stripping for inducing labour during a term pregnancy. Membrane sweeping is just as effective as vaginal misoprostol; however, misoprostol considerably reduced the induction delivery interval (p>0.05). Neonatal outcomes in terms of NICU hospitalisation, such as 10% with misoprostol and 8% with sweeping of membranes, did not differ significantly between the two groups (P>0.05).[13]

Abdul in Zaria found that the average misoprostol interval was 12 ± 5.2 hours. This was greater than what Owolabi et al. reported (8.7 ± 2.4 hours for misoprostol and 11.9 ± 2.7 hours for Foleys catheter, respectively).[14, 15] On the other hand, Jadai Swamy and Hangaraga found that misoprostol could be administered both vaginally and sublingually, albeit the sublingual route had a shorter induction delivery duration. Compared to the pervaginal group, the sublingual group required fewer dosages, and both groups reported less mild side effects.[16] Misoprostol alone, Foley's catheter alone, misoprostol–cervical Foley's catheter concurrently, and Foley's catheter oxytocin concurrently were the four induction techniques that Levine et al. compared. They discovered that compared to using either drug alone, combined techniques produced a speedier median time (double the chance) to delivery.[17]

In a different study, Esemuede et al. found that the misoprostol group had a higher percentage of women who experienced spontaneous commencement of labour (92.1%) compared to the sweeping of membranes group (85.3%), however this difference was not statistically significant (P=0.21). This study demonstrated that sweeping of membranes and 50 µg misoprostol are both safe and effective outpatient labour induction techniques for post-term pregnancies, with misoprostol providing the advantages of a shorter latency period, less need for oxytocin augmentation during labour, and a shorter total labour duration (P<0.05).[18]

In a study involving primigravida females undergoing sweeping of membranes, Sultan et al., found that 76.5% of patients experienced the effective initiation of spontaneous labour. The majority of patients needed one or two sweeps to induce labour, proving that membrane sweeping is an effective way to shorten pregnancy. Membrane sweeping was found to be an efficient and non-invasive way to start spontaneous labour, shorten the length of pregnancy, reduce the need for medical induction, and avoid post-term pregnancies.[19] In a study, Lella et al., found that 55.6% of primigravidas who had membrane sweep in addition to labour induction had vaginal births. The average interval between the first sublingual misoprostol dose and the start of contractions was 6.9 hours, and the interval between the start of contractions and vaginal birth was 11.2 hours. For primigravidas using misoprostol, the average time between induction and vaginal delivery was 18.8 hours.[20]

CONCLUSION

Misoprostol is found to be more effective for induction of labor at term and more vaginal deliveries can be achieved with this method with least chances of post-delivery complications. Now in future, we will recommend this method for induction of labor in primigravida females to improve number of vaginal delivery without risking the health of female and her neonate.

CONFLICT OF INTEREST

None.

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