ATTAHADI MED J. 2026;3(1):59-68
https://doi.org/10.69667/amj.26110

Induction of Labour: A Prospective Study of Drugs, Doses, and Routes

Taweda Khalifa

Department of Obstetrics and Gynecology, College of Medicine, Omar Al-Mukhtar University, AL Bayda, Libya
***Email**: tawidasaeed97@gmail.com*

***Keywords**:*
Induction, Dinoprostone (Propess), Prostaglandin Gel, Misoprostol, APGAR Score.

ABSTRACT

This study sought to determine the safety and effectiveness of various pharmacological labour induction techniques, dosages, and administration routes. Prospective study conducted from January 1 2017, to the end of Jan 2019 at the obstetric and gynaecological department at AL Bayda Medical Center. All women admitted for induction of labour who had a singleton pregnancy and a non-scarred uterus in their third trimester. Before induction, cervical ripening was assessed by Bishop score, induction of labour started by the use of dinoprostone, prostaglandin gel, and misoprostol (vaginal, oral). Data collected directly from patients' files and tabulated on the SPSS software program. The study includes 656 women that admitted for induction of labour during a period of two years. The rate of induction of labour was 5.9%. The mean age of women involved in the study was 29.57±5.89 years, and the mean gestational age was 39.8 ±2.2 weeks. Most of the women induced by vaginal misoprostol (90.7%) had successful vaginal delivery, followed by dinoprostone (85.7%), then oral misoprostol (81.8%) and prostaglandin gel (75%) with p-value =0.05. There were significant association between the method used for induction and for induction and number of doses, time needed to achieve delivery. This study shown significant association between the route of administration of misoprostol and Appearance (color), Pulse, Grimace (reflexes), Activity (muscle tone) (APGAR) score at first 5 minutes. There were significant association between the indication of induction and the mode of delivery. Mode of delivery and maternal and fetal complication not significantly affected by fetal presentation, but the APGAR score was significantly affected by fetal presentation. In conclusion, the most effective and safe pharmacological method of induction of labour was dinoprostone. The safety of vaginal and oral misoprostol was dose-dependent. Bishop's score at the time of induction was a good predictor of successful vaginal delivery. Indication of induction had an impact on the mode of delivery, maternal, fetal, and neonatal complications. Fetal presentation had no impact on mode of delivery, maternal and fetal complications, but fetal presentation had an impact on APGAR score at first 5 minutes.

Introduction

The process of artificially inducing the commencement of labour is known as induction of labour. The prevalence of inducing labour has risen in recent decades, primarily as a result of data showing the dangers to the foetus of pregnancy that lasts longer than 41 full weeks. It has also been proposed that practitioners might have used an induction of labour intervention for a number of reasons. In the absence of treatment, 5–10% of pregnancies last longer than 294 days or 42 full weeks. One of the main causes of the increased rate of induction of labour is these pregnancies. The prevalence of induction of labour varies by nation, with the United Kingdom experiencing an incidence of about 20% and poorer nations like Nigeria experiencing about 6% [1]. Significant differences in clinical standards for induction indications and a rise in elective inductions, which are carried out in low-risk pregnant women without medical grounds, are additional factors contributing to the rise in induction of labour rates [2-4].

One of the most popular obstetric procedures is induction of labour, it is not risk-free and should not be done carelessly [1]. Only when the advantages of induction outweigh the possible risks to the mother and foetus of waiting for spontaneous labour should induction of labour be considered [5]. According to randomised controlled trials, induction of labour is not linked to a higher incidence of caesarean sections when it is done for varied indications like large for gestational age or pre-eclampsia at 37 weeks of gestation. Less than two-thirds of all induced women will give birth naturally, while over 20% will require an emergency caesarean section, and 15% will have an instrumental delivery. In those observational studies, the underlying disease for which the induction was performed had an impact on the final mode of delivery in addition to the induction procedure itself [1]. Several studies demonstrated that a vast majority of women (>70%) would prefer not to have induction of labour. Therefore, women must be counselled appropriately antenatally regarding the risks, benefits, and alternatives to induction of labour [1-4].

Following their decision to have labour induction, the woman and her carer must select an induction technique. The choice of labour induction technique may be influenced by a number of parameters, such as parity, cervical and membrane status, and patient and provider preferences [6]. Despite the abundance of data regarding various labour induction techniques, there is significant uncertainty regarding the advantages and disadvantages of these techniques. To determine the possible risks and advantages of the widely used approach of inducing labour, more research is required [6]. Different methods of labour induction are available, including pharmacological and mechanical methods. This prospective study was

***Received**: 06-12-2025 - **Accepted**: 14-02-2026 - **Published**: 20-02-2026*

designed to assess the efficacy and safety of different pharmacological methods used for the induction of labour, including different doses, regimes, and routes of administration. Compare the induction success rate, side effects, and fetal outcome of different regimens of misoprostol. Study the efficacy and safety of different routes of administration of misoprostol and the relation between Bishop score at time of induction and success of vaginal delivery.

Material and methods

Study design and study area

A prospective study conducted from January 1 2017, to the end of Jan 2019 at the obstetric and gynaecological department at AL Beyda Medical Center.

Inclusion criteria

All women in their third trimester of pregnancy who were admitted to the obstetric department for induction of labour with a clear medical indication of induction (post-term, pre-eclampsia, diabetes, pre-labour rupture of membrane, reduced fetal movement, and others). All women were counselled and verbal consent taken from them after a detailed explanation of the method of induction, the benefits, the risks, and the alternative to induction.

Exclusion criteria

Women excluded from the study are all women who have any contraindication for vaginal delivery, women with a previous uterine scar (previous caesarean deliveries or myomectomy), and women with multiple pregnancy.

Data collection

Demographic and clinical data were collected directly from patients' medical records and analyzed across several key variables. The induction–delivery interval was measured in hours to capture the duration of labor progression. The mode of delivery was documented, distinguishing between vaginal, instrumental, and surgical approaches. The total amount of oxytocin administered during the induction–delivery interval was recorded to assess pharmacological requirements. The duration from the initiation of induction to the achievement of active labor, defined by the onset of regular uterine contractions, was also evaluated. In addition, the incidence of side effects and complications was systematically noted. Fetal outcomes were assessed using the APGAR score at five minutes post-delivery, providing a standardized measure of neonatal well-being. Finally, maternal complications resulting from induction were documented to ensure a comprehensive evaluation of safety and clinical impact.

Procedure

The first assessment of cervical ripening was done by the Bishop Score randomly according to the duty schedule. After proper counselling, selection and evaluation of participants, induction of labour starts by one of the three tested drugs (Misoprostol, Prostaglandin gel, Dinoprostone). Misoprostol is used in vaginal and oral routes, and prostaglandin gel, and dinoprostone are used only by the vaginal route. In general, prostaglandins (PGE1, PGE2) have a major role in cervical ripening, by releasing inflammatory mediators in the cervix and inducing cervical remodelling. PGE1 (misoprostol) and PGE2 (prostaglandin gel, dinoprostone pessary) exert different effects on cervical ripening and myometrial contractility [7].

Statistical analysis

Data was analyzed with SPSS version 26. Continuous variables were summarized with mean and standard deviation (SD), while categorical variables were summarized with frequency and percentages. Chi-square was used for bivariate analysis of associated factors with labour induction; all statistical tests were 2-tailed and considered statistically significant with p-values<0.05.

Ethical consent

The research proposal was submitted to the research committee of the Libyan Board for Health Speciality (LBFHS), and the research concept was approved.

Results

During the study period, there were 11179 deliveries, 656 (5.9%) had undergone pharmacological induction of labour, and 94.1 without. The mean age of the participants was 29.57±5.89 years range from 18- 44 years. The mean gestational age was 39.8 ±2.2 weeks range from 36-42weeks. The mean parity of women involved in the study was 1.44±1.74 range from 0 to 8. The mean of women who had a previous history of abortion was 0.39 ±1.1. The mean of the induction labour interval was 13.05±11.76 hours. The mean of the

***Received**: 06-12-2025 - **Accepted**: 14-02-2026 - **Published**: 20-02-2026*

induction delivery interval was 17.18±13.788 hours. The mean of the Bishop score at the time of induction was 5.38±1.46. The mean birth weight of babies delivered after pharmacological induction of labour, whatever the mode of delivery, was 3.3±0.64. Most of the neonates 605, 92.2%) had a good APGAR score (APGAR score ≥ 7) at first 5 minutes, with a mean 9.33±1.99 (Table 1). The common indications for labour induction were post-dated pregnancy (58.1%), PROM (20.9%), preeclampsia (9.8%), IUFD (3.4%), reduced FM (2.6%), uncontrolled DM (1.2%), fetal cause (0.8%), and medical cause (0.2%). In terms of complications among women undergoing pharmacological induction of labour.

The majority of participants in this study delivered without any other maternal, fetal, and neonatal complications, 578 (88.2%). While about 78(11.89%) of women undergoing labour induction had complication, meconium aspiration was the major complication reported in 34 (43.6%) of them, follow by fetal distress in 15(19.2%), birth canal trauma in 10 (12.8%), postpartum hemorrhage (PPH) in 9(11.5%), abruption placenta in 6 (7.6%), still birth in 2(2.5%) and early neonatal death in 2(2.5%). In another observation, the common indications for caesarean section among women undergoing pharmacological induction of labour was fetal distress in 21(33.8%), follow by failure to progress in18(29.2%), then failed induction in 13(20.9%), abruption placenta in 7(11.3%), mal presentation in 2(3.2%) and eclamptic fit in 1(1.6%) (Table 2).

Table 1. Demographic and clinical characteristics of the population involved in the study

Character	No	(%)	Mean	SD	Range
Age					
<20	23	3.5	29.5	5.5	18-44
21-30	373	56.9			
31-40	239	36.4			
>41	21	3.2			
Abortion					
0	489	74.5	0.39	1.101	0-20
1-3	161	24.5			
>4	6	0.9			
Parity	No.	%	Mean	SD	Range
0	295	45.0	1.44	1.74	0-8
1	105	16.0			
2	99	15.1			
3	61	9.3			
>4	96	14.6			
GA					
<34	19	2.9	39.8	2.2	28-43
34-36	30	4.6			
37-39	159	24.2			
>40	448	68.3			
Induction labour interval (Hours)					
<3	71	10.8	13.05	11.76	0-72
3-12	351	53.5			
>12	234	35.7			
Induction delivery interval (Hours)					
<3	16	2.4	17.18	13.78	0-98
3-12	303	46.2			
>12	337	51.4			
Birth Weight					
<2.5	54	8.2	3.3	0.64	0.5-70
2.5-3.4	337	51.4			
3.5-3.9	189	28.8			
>4	76	11.6			
APGAR score at 5 minutes					
<7	51	7.8	9.33	1.99	0.0-10
≥7	605	92.2			
Bishop score					
Unfavorable (<4)	191	29.1	5.38	1.46	2-9
Favorable (≥4)	465	70.9			

Received*: 06-12-2025 -* ***Accepted****: 14-02-2026 -* ***Published****: 20-02-2026*

Table 2. Indications of Caesarean Section

Indication	No.	%
Fetal distress	21	33.8
Failure to progress	18	29.2
Failed induction	13	20.9
Abruption placenta	7	11.3
Mal presentation	2	3.2
eclamptic fit	1	1.6

In terms of methods used for pharmacological induction of labour. All women induced by dinoprostone and prostaglandin gel did not need the use of oxytocin during labour. Most of the women induced by oral misoprostol 90.9% and those induced with vaginal misoprostol 65.1% did not need the use of oxytocin during labour. While only 0.09% of women induced by oral misoprostol and 34.9% of women induced by vaginal misoprostol needed to use oxytocin during labour (Table 3). Meanwhile, the attending obstetrician place misoprostol 50 mcg every six hours for 533 (87.09%) women, 50mcg every 12hr for 49 (7.52%) of women, 50 mcg every 24hr for 12(1.9%) women, 100mcg every 6hr for 8(1.3%) of women, two women (0.3%) received 100mcg every 12hr, 2(0.3%) women received 100 mcg every 24hr and 6(0.9%) received 25mcg every 12hr (Table 4). More than half of women, 367(55.9%), received three doses of the drug to achieve delivery, 197(30%) received only one dose to achieve delivery, 50(7.6%) received two doses to achieve delivery, 21(3.2%) received 4 doses, and the other 21(3.2%) received >4 doses. The observation about the mode of delivery among women undergoing pharmacological induction of labour was analyzed. Vaginal delivery was achieved in 590(89.9%) parturient while 62 (9.5%) had emergency cesarean section, and 4(0.6%) were delivered via instrumental delivery.

Table 3. Methods used for pharmacological induction of labour

Method of induction	Total No (%)	Oxytocin used No (%)
Vaginal misoprostol	601(91.6)	210(34.9)
Dinoprostone (propess)	28(4.3)	0(0.0)
Prostaglandin E2 gel	16(2.4)	0(0.0)
Oral misoprostol	11(1.7)	1(0.09)

Table 4. The regimen of misoprostol used for the induction of labour

Regime used for induction	No.	%
50mcg /6hr	533	87.09
50mcg /12hr	49	7.52
50mcg /24hr	12	1.9
100mcg /6hr	8	1.3
100mcg /12hr	2	0.3
100mcg /24hr	2	0.3
25mcg /12hr	6	0.9

The following tables describe the association between different variables.

The association between the induction method used and mode of delivery among women undergoing pharmacological induction of labour was illustrated in (Table 5). Use of vaginal misoprostol increases the probability of achieving vaginal delivery followed by Dinoprostone (propess), so women induced with vaginal misoprostol and dinoprostone (propess) were more likely to have successful induction than those induced with prostaglandin gel or Oral misoprostol (p<0.050) (Table 5).

Table 5. Association between the Induction Method used and Mode of delivery among women undergoing pharmacological induction of labour

Induction method	Mode of delivery			X^2	p-value
	Vaginal N (%)	CS N (%)	Instrumental delivery n (%)		
Vaginal misoprostol	545(90.7)	53(8.8)	3(0.5)	12.574	0.050
Dinoprostone propess	24(85.7)	4(14.3)	0(0.0)		

Received: 06-12-2025 - **Accepted**: 14-02-2026 - **Published**: 20-02-2026

Prostaglandin E2 gel	12(75.0)	3(18.8)	1(6.3)		
Oral misoprostol	9(81.8)	2(18.2)	0(0.0)		

All women (100%) induced by prostaglandin gel were prescribed a single dose to achieve delivery. Most of the women induced with dinoprostone 96.4% was prescribed as a single dose and as two doses for only one woman (3.6%). Most of the women induced by vaginal misoprostol 60% need three doses to achieve delivery, 25% need a single dose, 8% need two doses, 3.3% need 4doses and 3.1% need >4 doses. Most women induced by oral misoprostol need three doses to achieve delivery. Those observations were found with significant statistical, clinical, and cost effectiveness (P=0.001) (Table 6). Most of complication was occur among women who received vaginal misoprostol as an induction method. However, there was no statistically significant association between the method of induction used and complication (P=0.211) (Table 7).

Table 6. The association between the induction method and the doses needed to induce labour

Induction method	doses					X^2	p-value
	one dose	2 doses	3 doses	4 doses	>4		
Vaginal misoprostol	152	49	361	20	19	113.281	0.001
Dinoprostone propess	27	1	0	0	0		
Prostaglandin E2 gel	16	0	0	0	0		
Oral misoprostol	2	0	6	1	2		

Table 7. Association between the method used for induction and complications among women undergoing induction of labour

Induction method	Complication							X^2	p-value
	Fetal distress	Meconium Aspiration	Abruption Placenta	Still Birth	PPH	Early Neonatal death	Birth Canal Trauma		
Vaginal misoprostol	13	34	4	2	8	2	8	25.894	0.211
Dinoprostone propess	0	0	1	0	0	0	0		
Prostaglandin E2 gel	1	0	1	0	1	0	1		
Oral misoprostol	1	0	0	0	0	0	1		

Most of the caesarean delivery was associated with vaginal misoprostol and were associated with fetal distress as the cause of caesarean delivery. However, there were no statistically significant differences between the method used for induction and these complications as the main causes of caesarean delivery (p=0.404) (Table 8). Women induced with three doses were more likely to have a successful vaginal delivery (92.4%), followed by those induced by one dose (89.3%), then those induced by two doses (88%). Which had a significant statistical, clinical, and cost-effectiveness association between doses needed and mode of delivery (*p*=0.022) (Table 9).

Table 8. Association between the method used for induction and the cause of caesarean section among women undergoing pharmacological induction of labour

Variables	Drugs				X^2	p-value
	Vaginal misoprostol	Dinoprostone propess	Prostaglandin E2 gel	Oral misoprostol		
Fetal distress	18	2	1	0	18.80	0.404
Failed induction	11	1	0	1		
Abruption placenta	5	0	1	1		
Failure to progress	16	1	1	0		
eclamptic fit	1	0	0	0		

Received*: 06-12-2025 -* ***Accepted****: 14-02-2026 -* ***Published****: 20-02-2026*

Table 9. Association between doses needed to induce labour and Mode of delivery among women undergoing pharmacological induction of labour

Doses	Mode of delivery			X^2	p-value
	Vaginal	CS	Instrumental delivery		
one dose	176	19	2	17.86	0.022
2 doses	44	6	0		
3 doses	339	26	2		
4 doses	16	5	0		
>4	15	6	0		

The total number of women who had vaginal delivery was 590, 82.2% of women who delivered via vaginal had received 50 mcg every 6 hours. The total number of women delivered by caesarean section was 62 women, 74.2% of women who delivered via CS also received 50mcg every 6 hours. However, there was no statistically significant association between the regime of misoprostol used for induction and mode of delivery (P=0.616). Most of the women who had complications were induced with 50 mcg every 6 hours. However, there was no significant statistical association between the regime of misoprostol used for induction and complications among women undergoing induction of labour with misoprostol tablet (p=0.990). Association between route of administration of misoprostol and mode of delivery among women undergoing pharmacological induction of labour with misoprostol analysis data showed that there was no statistically significant association between route of administration of misoprostol and mode of delivery (p=0.548). In addition, there was no statistically significant association between the route of administration of misoprostol and induction delivery interval (p=0.372). As well as, there were no statistically significant association between the route of administration of misoprostol and the most common complications associated with induction (p=0.156). However, there were significant association between the route of administration of misoprostol and APGAR score in the first 5 minutes after delivery of babies, in favour of using vaginal rather than oral misoprostol (p<0.001) (Table 10). There were also statistically significant associations between the method used for induction and induction labour interval, Induction delivery interval, and Bishop score among women undergoing pharmacological induction of labour (P<0.05) (Table 11).

Table 10. Association between the route of administration of misoprostol and the APGAR score at the first 5 minutes

Route of Administration	APGAR Score		X^2	p-value
	<7	≥7		
Vaginal misoprostol	40	561	82.85	0.001
Oral misoprostol	9	2		

Table 11. Association between the induction method used and induction labour interval, Induction delivery interval, and Bishop score among women undergoing pharmacological induction of labour

Variables	Drugs				F	p-value
	Vaginal misoprostol	Dinoprostone	Prostaglandin E2 gel	Oral misoprostol		
Induction labour interval (Hours)	13.4±11.6	15.64±21.9	5.06±1.76	8.57±8.67	4.28	0.005
Induction delivery interval (Hours)	17.34±13.48	27.64±33.2	10.06±4.07	13.89±8.44	4.15	0.006

Most women undergoing pharmacological induction of labour, whatever the method used for induction, need at least 3-12 hours to start active labour (ILI). While the time needed to achieve delivery (IDI) differed according to the method of induction. Current results shown that statistically significant association between the method used for induction and induction labour interval, Induction delivery interval among women undergoing pharmacological induction of labour (P<0.05) (Table 12). In addition, there was a statistically significant association between the method used for induction and APGAR score at the first 5 minutes (P=0.001)

Received: 06-12-2025 - **Accepted**: 14-02-2026 - **Published**: 20-02-2026

ATTAHADI MED J. 2026;3(1):59-68
https://doi.org/10.69667/amj.26110

Table 12. Association between the method used for induction and induction labour interval (ILI), Induction delivery interval (IDI) among women undergoing pharmacological induction of labour

Time in hours	Drugs				X^2	p-value
	Vaginal misoprostol	Dinoprostone propess	Prostaglandin E2 gel	Oral misoprostol		
Induction labour interval (Hours)						
<3	62	4	2	3	19.056	0.004
3-12	312	20	14	5		
>12	227	4	0	3		
Induction delivery interval (Hours)						
<3	15	0	0	1	13.463	0.036
3-12	269	17	13	4		
>12	317	11	3	6		

Discussion

Safety of the method was estimated by maternal, fetal, and neonatal outcomes. Maternal and fetal outcome is estimated by the presence and absence of complications, while neonatal outcome is estimated by APGAR score at first 5 minutes. In the current study, most cases were delivered without maternal and fetal complications, and the most common complication occurred among women who received vaginal misoprostol as a method of induction; there was no statistically significant association between methods used for the induction of labour and maternal and fetal complications. The findings aligned with a non-blinded randomised controlled trial study comparing oral and vaginal misoprostol, which revealed that more caesarean sections were performed for foetal distress in one group and a higher incidence of uterine hyper-stimulation in the vaginal group. Despite this, the two groups' total surgical delivery rates were comparable [9]. According to other earlier research, a higher number of women in the oral group experienced tachysystole as opposed to hyper-tonus and hyper-stimulation. Birth outcomes and intrapartum problem frequencies were comparable between groups [9, 10]. Additionally, another study that compared dinoprostone and vaginal misoprostol discovered that patients receiving misoprostol had a significantly higher incidence of caesarean deliveries due to this indication and non-reassuring foetal heart monitoring patterns linked to hyper-stimulation [11].

According to a different trial that contrasted PGE2 gel with vaginal misoprostol tablets, more women in the misoprostol group gave birth instrumentally, and the maternal outcomes did not differ significantly [12]. Neonatal outcome estimated by APGAR score at first 5 minutes. High APGAR score was noted among women induced by dinoprostone, followed by prostaglandin gel, then vaginal misoprostol, while most of women induced by oral misoprostol was associated with low APGAR score, however there were statistically significant association between methods used for induction of labour and APGAR score at first 5 minutes were comparable to a previous study, study which compare vaginal misoprostol tablet and PGE2 gel found the only significant difference in neonatal outcome was a greater number of babies born with APGAR score < 7 at 1 min in the misoprostol group [12, 13]. In general, in the present study, most of the maternal and fetal complication was associated with vaginal misoprostol as a method of induction of labour, and neonatal complication was associated with oral misoprostol as a method of induction of labour, while dinoprostone and prostaglandin gel appeared to be safer for mothers, fetuses, and neonates. The effectiveness of the method was estimated by achieving vaginal delivery, total time needed to start active labour, total time needed to achieve delivery, number of doses needed to achieve delivery, and need for oxytocin use during labour.

In this study, vaginal misoprostol increased the probability of achieving vaginal delivery, maybe because most of the women induced by vaginal misoprostol were associated with a higher Bishop score at the time of induction, followed by dinoprostone (propess), then oral misoprostol and prostaglandin gel, with a statistically significant association. In all methods used for induction of labour, most women need 3-12 hours to start active labour, while the time needed to achieve delivery in women induced by dinoprostone and prostaglandin gel was 3-12 hour but for women induced by vaginal and oral misoprostol were > 12 hours, with a statistically significant association. All women induced by prostaglandin gel need single dose to achieve delivery despite it was associated with low Bishop score at time of induction, also most of women induced by dinoprostone need single dose to achieve delivery and also was associated with low Bishop score at time of induction, while most of women induced by misoprostol either vaginally or orally need at least three doses to achieve delivery despite it was associated with higher Bishop score at time of induction. In previous studies comparing vaginal and oral misoprostol, the mean induction to vaginal delivery interval was significantly shorter in the vaginal group compared with the oral group. More women were delivered within 24 hours, and fewer women needed oxytocin augmentation in the vaginal group. There was no difference in the mode of delivery, analgesic requirements, or neonatal outcomes in the two groups [8, 9].

Received*: 06-12-2025 -* ***Accepted****: 14-02-2026 -* ***Published****: 20-02-2026*

Another study compared dinoprostone with oral misoprostol, which included 200 women. The proportion of vaginal delivery within 24 hours was 56% in the misoprostol group and 62% in the dinoprostone group. The risk of caesarean section was 18% and 19%, respectively [10].

The induction to onset of significant uterine contractions and delivery intervals were different, with statistically significant [14]. A study by Buser et al. found that misoprostol was more effective than dinoprostone in causing cervical ripening [11, 12]. The findings of this study conclude that the most effective method was dinoprostone, followed by prostaglandin gel, then vaginal misoprostol, and oral misoprostol had the lowest efficacy. The efficacy and safety of oral and vaginal misoprostol is dose dependent. Most cases induced by 50mcg misoprostol/6hr achieved vaginal delivery. However, there was no statistically significant association between the regime of misoprostol used and the mode of delivery. Randomised controlled trials were published as part of a systematic review to compare the effectiveness and safety. Although it is unknown if the 50-mcg dose of intravaginal misoprostol is as safe as the 25 mcg dose, published data show that it is more effective for cervical ripening and labour induction [15]. In another comparison, a randomized clinical trial revealed that, although there were no significant differences between treatment groups, the percentage of patients who gave birth vaginally in less than 12 and 24 hours was significantly higher in the 100 mcg group than in the 50 mcg group [16]. There was no statistically significant correlation seen in this study between the misoprostol regimen and complications in mothers, foetuses, or newborns. Contrary to our findings, the meta-analysis suggests that women who took 25 mcg of misoprostol were less likely than those who received 50 mcg to experience tachysystole and hyperstimulation syndrome. Nonetheless, neonatal results seem to be similar for the two dosages [15].

This study calculated the effectiveness of the misoprostol administration route based on the delivery method and delivery time. The manner of delivery and the misoprostol administration route did not statistically significantly correlate. Additionally, there was no statistically significant correlation seen between the time required to achieve delivery and the misoprostol administration route. Current findings contrast with those of a previous study [8]. The rate of maternal, foetal, and neonatal complications was used to determine the safety of the misoprostol administration route. In our investigation, there was no statistically significant correlation between the misoprostol administration route and maternal or foetal complications. There was no statistically significant difference between the sublingual and vaginal misoprostol groups in a systematic review that was equivalent to our findings. There was no discernible difference between the sublingual and vaginal groups when the studies were categorised based on the initial misoprostol dosage [7]. In this study, there were significant statistical association between the route of administration of misoprostol and neonatal complication which presented by an APGAR score<7. In contrast to our results, a randomized controlled trial comparing 50mcg sublingual and 25mcg vaginal misoprostol found there were no significant differences in neonatal outcomes between the two groups [8].

This study did not include the sublingual route of administration for the induction of labour because, at the time of the study, the sublingual route was still not recommended for the induction of labour by this labour ward protocol. In this study higher Bishop score at the time of induction was associated with an increased probability of achieving vaginal delivery, with a statistically significant association between Bishop score at the time of induction and successful vaginal delivery. Similar to these results, a systematic review to evaluate the Bishop score at the time of induction as a determinant of success of induction found that women with higher versus lower Bishop Score seem to be a determinant of achieving vaginal delivery and is associated with induction to-vaginal delivery time interval [17]. In this study, there were no statistically significant associations between the indication of induction and the number of doses needed to achieve delivery and the time needed to achieve delivery, which is similar to a prospective observational study that evaluates induction of labour in cases of severe preeclampsia and eclampsia [18]. Also, a retrospective cohort study evaluates the indication for induction of labour impacts the risk of caesarean delivery, and found a significant increase in the risk of caesarean delivery in nulliparous women with fetal indications for induction [19].

In this study, there were statistically significant association between the indication of induction and maternal and fetal complications. In contrast to our results, a prospective observational study which evaluate induction of labour in cases of severe preeclampsia and eclampsia found that the only maternal complications were hyper-stimulation, which occurred in 6.8 and 5.1% of cases, respectively [18]. Every woman in this research who presented breech had a successful vaginal birth. Nevertheless, no statistically significant correlation was found between the technique of delivery and foetal presentation. Analogous to the retrospective comparison of labour induction in breech and cephalic presentations, which included 101 breech inductions and matched them with 202 cephalic presentations. Following Bishop score correction, the two groups' rates of caesarean sections did not differ significantly [20].

Received*: 06-12-2025 -* ***Accepted****: 14-02-2026 -* ***Published****: 20-02-2026*

Conclusion

The study concludes that the most effective and safe pharmacological method of induction was dinoprostone (propess), followed by prostaglandin gel, then vaginal misoprostol and oral misoprostol, while the safety of vaginal and oral misoprostol was dose dependent. The efficacy and safety of misoprostol were not affected by regime of misoprostol used for induction. Also, the efficacy of misoprostol is not affected by route of administration, maternal and fetal complication not affected by the route of administration, but rout of administration has an impact on the APGAR score. The oral route of misoprostol is associated with a low APGAR score. Bishop's score at the time of induction was a good predictor of successful vaginal delivery. Indication of induction had an impact on the mode of delivery, maternal, fetal, and neonatal complications. Fetal presentation did not have an impact on mode of delivery, maternal or fetal complication, but had an impact on APGAR score.

Acknowledgments

Heartily thankful to the Al-Beyda Medical Center Director for his encouragement and support. My thanks are conveyed to the patients who accept in participate in this research, also all staff and nurses of Al-Beyda Medical center in Al-Jabal Al-Akhdar in Al-Beyda City (Libya) for their great assistance.

Conflict of interest. no conflict of interest.

References

1. McCarthy FP, Kenny LC. Induction of labour. Obstet Gynaecol Reprod Med. 2014 Jan;24(1):9-15.
2. Na ED, Chang SW, Ahn EH, Jung SH, Kim YR, Jung I, Cho HY. Pregnancy outcomes of elective induction in low-risk term pregnancies: A propensity-score analysis. Medicine (Baltimore). 2019 Feb;98(8):e14284.
3. Coulm B, Blondel B, Alexander S, Boulvain M, Le Ray C. Elective induction of labour and maternal request: a national population-based study. BJOG. 2016 Dec;123(13):2191-7.
4. Dublin S, Johnson KE, Walker RL, Avalos LA, Andrade SE, Beaton SJ, Davis RL, Herrinton LJ, Pawloski PA, Raebel MA, Smith DH. Trends in elective labor induction for six United States health plans, 2001-2007. J Womens Health (Larchmt). 2014 Nov;23(11):904-11.
5. Deehan G, Townsend R. Induction of Labour. In: Obstetrics & Gynaecology. Boca Raton (FL): CRC Press; 2025. p. 312-9.
6. Alfirevic Z, Keeney E, Dowswell T, Welton NJ, Medley N, Dias S, Jones LV, Gyte G, Caldwell DM. Which method is best for the induction of labour?: A systematic review, network meta-analysis and cost-effectiveness analysis. Health Technol Assess. 2016 Aug;20(65):1-584.
7. Bakker R, Pierce S, Myers D. The role of prostaglandins E1 and E2, dinoprostone, and misoprostol in cervical ripening and the induction of labor: a mechanistic approach. Arch Gynecol Obstet. 2017 Aug;296(2):167-79.
8. Shetty A, Danielian P, Templeton A. A comparison of oral and vaginal misoprostol tablets in induction of labour at term. BJOG. 2001 Mar;108(3):238-43.
9. Wing DA, Park MR, Paul RH. A randomized comparison of oral and intravaginal misoprostol for labor induction. Obstet Gynecol. 2000 Jun;95(6 Pt 1):905-8.
10. Tan SY, Au N, Peel MD, Dodd JM, Deussen A, Le Roux PA, Young DC, Tessier F, Dallenbäch P, Croll DM, Patabendige M. Oral misoprostol (PGE1) vs vaginal dinoprostone (PGE2) for labor induction: individual participant data meta-analysis of randomized controlled trials. Ultrasound Obstet Gynecol. 2025 Nov 8. Epub ahead of print.
11. D'souza AS, Samuel CJ, Katumalla FS, Garg G, Goyal S. A randomized comparison between misoprostol and dinoprostone for cervical ripening and labor induction in patients with unfavorable cervices. Int J Reprod Contracept Obstet Gynecol. 2017 Sep;4(5):1522-8.
12. Chaudhuri S, Mitra SN, Banerjee PK, Biswas PK, Bhattacharyya S. Comparison of vaginal misoprostol tablets and prostaglandin E2 gel for the induction of labor in premature rupture of membranes at term: a randomized comparative trial. J Obstet Gynaecol Res. 2011 Nov;37(11):1564-71.
13. Tarimo CS, Bhuyan SS, Zhao Y, Ren W, Mohammed A, Li Q, Gardner M, Mahande MJ, Wang Y, Wu J. Prediction of low Apgar score at five minutes following labor induction intervention in vaginal deliveries: machine learning approach for imbalanced data at a tertiary hospital in North Tanzania. BMC Pregnancy Childbirth. 2022 Apr;22(1):275.
14. Ayaz A, Shaukat S, Farooq MU, Mehmood K, Ahmad I, Bahoo ML. Induction of labor: a comparative study of intravaginal misoprostol and dinoprostone. Taiwan J Obstet Gynecol. 2010 Jun;49(2):151-5.
15. Sanchez-Ramos L, Kaunitz AM, Delke I. Labor induction with 25 microg versus 50 microg intravaginal misoprostol: a systematic review. Obstet Gynecol. 2002 Jan;99(1):145-51.
16. Herabutya Y, Chanrachakul B, Ayuthaya NI, Pratak O, Prasertsawat MD. A comparison of the efficacy of sublingual and oral misoprostol 400 microgram in the management of early pregnancy failure: a randomized controlled trial. J Med Assoc Thai. 2006;89 Suppl 4:S5-10.
17. Teixeira C, Lunet N, Rodrigues T, Barros H. The Bishop Score as a determinant of labour induction success: a systematic review and meta-analysis. Arch Gynecol Obstet. 2012 Sep;286(3):739-53.
18. Nahar S, Rasul CH, Sayed A, Azim AK. Utility of misoprostol for labor induction in severe pre-eclampsia and eclampsia. J Obstet Gynaecol Res. 2004 Oct;30(5):349-53.

Received*: 06-12-2025 -* ***Accepted****: 14-02-2026 -* ***Published****: 20-02-2026*

19. Parkes I, Kabiri D, Hants Y, Ezra Y. The indication for induction of labor impacts the risk of cesarean delivery. J Matern Fetal Neonatal Med. 2016 Jan;29(2):224-8.
20. Leblanc F, Khobzaoui M, Cailliau E, Subtil D, Houfflin-Debarge V, Garabedian C, Ghesquière L. Breech presentation induction compared to cephalic presentation: Effectiveness and characteristics. Eur J Obstet Gynecol Reprod Biol. 2023 Mar;282:155-60.

Received*: 06-12-2025 -* ***Accepted****: 14-02-2026 -* ***Published****: 20-02-2026*