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# **Original Article**



Comparison of Fetomaternal Outcome between Early Planned Labor Induction and Expectant Management in Late Preterm Pre-Labor Rupture of Membrane (PPROM)

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### ABSTRACT

Late preterm pre-labor rupture of membranes (PPROM) remains a clinical dilemma, with conflicting evidence regarding early induction versus expectant management. Objectives: To compare maternal and neonatal outcomes between early planned labor induction and expectant management in women with late preterm PPROM. Methods: This prospective comparative observational cohort study was conducted at the Department of Obstetrics and Gynecology, Kharadar General Hospital. A total of 134 women with late preterm PPROM (34+0 to 36+6 weeks) were enrolled and managed with either early planned induction (Group A, n=67) or expectant management (Group B, n=67). Outcomes were analyzed using Chi-square and Mann-Whitney U tests, and multivariate logistic regression was applied to adjust for maternal risk factors, including BMI, diabetes, and hypertension. **Results:** Maternal infection [40.3% vs. 23.9%, p=0.042], cesarean delivery [55.2% vs. 37.3%, p=0.038], neonatal infection [53.7% vs. 35.8%, p=0.037], and neonatal intervention [41.8% vs. 23.9%, p=0.027] were significantly higher in the induction group. Multivariate analysis showed hypertension as a strong predictor of maternal infection (aOR 11.45, 95% CI: 1.5-85.6, p=0.018) and neonatal intervention (aOR 3.22, 95% CI: 2.1-17.1, p=0.017), while obesity and diabetes significantly predicted cesarean delivery and neonatal infection. Conclusions: Early induction in late preterm PPROM was associated with increased maternal and neonatal complications, particularly among women with comorbidities. Expectant management with close surveillance may be safer in stable patients, especially in populations with high rates of hypertension, diabetes, and obesity.

# INTRODUCTION

Preterm pre-labor rupture of membranes (PPROM) is defined as rupture of the fetal membranes before the onset of labor in pregnancies less than 37 weeks of gestation [1]. It complicates approximately 2-3% of all pregnancies and accounts for nearly one-third (approximately 25 to 30%) of preterm births worldwide [2, 3]. PPROM is associated with significant maternal and neonatal morbidity due to risks of infection, preterm delivery, and neonatal respiratory distress[2]. The management of PPROM, particularly in the late preterm period (34+0 to 36+6 weeks), remains

controversial [4]. Early planned labor induction may reduce the risk of ascending infection but can increase neonatal respiratory morbidity due to earlier delivery [4]. Conversely, expectant management allows for greater fetal maturity but carries an increased risk of chorioamnionitis, i.e. up to 50% have histological evidence despite clinical signs and symptoms, maternal sepsis, i.e. 3.47 times odd of morbidity, and adverse perinatal outcomes. i.e., more often diagnosed with respiratory distress syndrome (RDS)[5-8]. Previous international studies have reported conflicting

results, and no universal consensus exists regarding the optimal strategy [1]. In low- and middle-income countries such as Pakistan, the challenge is further compounded by variable availability of neonatal intensive care facilities, inconsistent application of antibiotic and steroid protocols, and a higher baseline burden of maternal comorbidities[9].

Evidence from local populations is limited, and guidance for clinical practice is often extrapolated from studies conducted in high-income settings, which may not be directly applicable. We hypothesized that early planned labor induction in late preterm PPROM would result in lower rates of maternal and neonatal infection without significantly increasing neonatal morbidity compared with expectant management. So, the objective of this study was to compare fetomaternal outcomes between early planned labor induction and expectant management in women with late preterm PPROM.

### METHODS

This prospective comparative observational cohort study was conducted in the Department of Obstetrics and Gynecology, Kharadar General Hospital, from June 2024 to December 2024, after approval from the College of Physicians and Surgeons and the Institutional Review Board of Kharadar General Hospital, Karachi (Ref. No. CPSP/REU/OBG-2023-207-12962. Women presenting with late preterm pre-labor rupture of membranes (PPROM) between 34 and 37 weeks of gestation were consecutively enrolled. Inclusion criteria were singleton pregnancies with confirmed PPROM, while exclusions were multiple gestations, major fetal anomalies, previous classical cesarean section, placenta previa, and contraindications to vaginal delivery. Diagnosis of PPROM was established on sterile speculum examination with visualization of liquor pooling, supplemented by pH testing when required. The informed consent was taken on admission; Grouping was not randomized. Patients were assigned based on clinical evaluation at presentation and departmental protocol. Those with maternal fever ≥38°C, elevated CRP, foulsmelling discharge, or non-reassuring fetal status was managed with early planned induction, whereas clinically stable women with no signs of infection and normal fetal surveillance were managed expectantly. Induction was undertaken using Prostaglandin E2 per vaginally, repeated after 6 hours in case of no uterine contraction under continuous maternal and fetal monitoring, while expectant management consisted of inpatient observation, serial maternal vital signs, fetal surveillance with cardiotocography or biophysical profile, prophylactic antibiotics, and corticosteroids as per departmental policy. The delivery was indicated at 37 weeks or earlier if complications arose, like chorioamnionitis, nonreassuring fetal heart rate, or completion of 37 weeks of gestation. In such situations, labor was either induced or a cesarean section was performed, depending on the clinical scenario. The primary outcomes of interest included mode of delivery, maternal infection, and neonatal infection. Secondary outcomes included cesarean section rate, hospital stay, NICU admission, respiratory support requirement, and composite neonatal intervention. Maternal infection was defined as clinical suspicion of chorioamnionitis with fever ≥38°C and elevated C-reactive protein, which was assessed by sending venous blood samples to the institutional diagnostic laboratory. Maternal C-reactive protein levels were determined via quantitative immunoturbidimetric assay on the Roche Cobas c311 automated analyzer (Roche Diagnostics, Germany). A venous sample (3 mL) was obtained under aseptic technique at admission, and results were expressed in mg/L; values > 10 mg/L were considered elevated. Neonatal infection, referred to as early-onset sepsis, is confirmed by clinical signs, laboratory markers, or culture positivity. Data were analyzed using SPSS version 22.0; categorical variables were compared with Chi-square or Fisher's exact test, continuous variables were summarized as mean ± SD or median (IQR) depending on normality tested by Shapiro-Wilk, and between-group differences were assessed with t-test or Mann-Whitney U test. Multivariable logistic regression adjusting for maternal age, body mass index, and comorbidities (hypertension, diabetes) was performed, with results expressed as adjusted odds ratios and 95% confidence intervals; p < 0.05 was considered statistically significant.

#### RESULTS

An overall of 134 pregnant women between 34 to 37 weeks of gestation with confirmed cases of pre-labor rupture of membranes were involved in the study. The baseline characteristics of 134 women with late preterm PPROM, divided into early planned labor induction (Group A, n=67) and expectant management (Group B, n=67). Most participants in both groups were 20-30 years old [Group A: 38 (56.7%), Group B: 33 (49.3%), p=0.19], with comparable median ages (30 vs. 31 years, p=0.314). Body mass index showed significant differences: obesity was more common in Group A [39 (58.2%) vs. 25 (37.3%)], with higher median BMI (30.8 vs.  $28.9 \text{ kg/m}^2$ , p=0.02). Residential status, socioeconomic class, and employment did not differ significantly between groups (p>0.05). Gestational age at presentation was also similar, with roughly half of the women in each group presenting at 34-35 weeks and the remainder at 36-37 weeks (p=0.3). Diabetes prevalence was higher in Group A (50.7% vs. 38.8%), though not statistically significant (p=0.165). Hypertension, however, was significantly more frequent in Group A [40 (59.7%) vs.

28(41.8%), p=0.038](Table 1).

Table 1: Initial Clinical Profile of Females with Final-Phase Preterm Pre-Labor Rupture of Membranes (n=134)

Characteristics	Categories	Group A (Induced) N=67	Group B (Expected) N=67	p- value*	
Age (years)	20 - 30	38 (56.7%)	33 (49.3%)		
	31 – 40	24 (35.8%)	22 (32.8%)	0.19	
	>40	5 (7.5%)	12 (17.9%)		
	Median (IQR)	30 (25-36)	31(25-39)	0.314**	
BMI (Kg/m²)	Normal weight	3 (4.5%)	12 (17.9%)		
	Overweight	25 (37.3%)	30 (44.8%)	0.012	
	Obese	39 (58.2%)	25 (37.3%)		
	Median (IQR)	30.8 (28.7- 31.2)	28.9 (26.2- 31.2)	0.02**	
Residency	Rural	18 (26.9%)	25 (37.3%)	0.195	
	Urban	49 (73.1%)	42 (62.7%)		
Monthly Family Income (Rs)	<50,000	18 (26.9%)	25 (37.3%)	0.38	
	50,000-100,000	34 (50.7%)	27(40.3%)		
	>100,000	15 (22.4%)	15 (22.4%)		
Employment	Employed	19 (28.4%)	16 (23.9%)	0.55	
	Unemployed	48 (71.6%)	51(76.1%)		
Gestational Age (weeks)	34-35	37(55.2%)	31(46.3%)	0.3	
	36-37	30 (44.8%)	36 (53.7%)		
Comorbidities	Diabetes Mellitus	34 (50.7%)	26(38.8%)	0.165	
	Hypertension	40 (59.7%)	28 (41.8%)	0.038	

Normal Weight = BMI 18.5 - 24.9, Over Weight = 25 - 29.9, Obese = BMI≥30,\*Chi-Square test, \*\*Mann-Whitney U test

The perinatal outcomes in women with late preterm PPROM show maternal infection occurred more frequently in the induction group [Group A: 27 (40.3%) vs. Group B: 16 (23.9%), p=0.042]. Cesarean delivery was also higher in Group A [37 (55.2%) vs. 25 (37.3%), p=0.038]. Neonatal infection rates were significantly greater in Group A [36 (53.7%) vs. 24 (35.8%), p=0.037], and neonatal interventions were more common [28 (41.8%) vs. 16 (23.9%), p=0.027](Table 2).

Table 2: Maternal and Neonatal Outcomes between Two Groups (n=134)

Outcomes	Categories	Group A (Induced) n=67	Group B (Expected) n=67	p- value*
Maternal Outcomes	Maternal Infection	27(40.3%)	16 (23.9%)	0.042
	Cesarean Section	37(55.2%)	25 (37.3%)	0.038
Neonatal Outcomes	Neonatal Infection	36 (53.7%)	24 (35.8%)	0.037
	Neonatal Intervention	28 (41.8%)	16 (23.9%)	0.027

<sup>\*</sup>Chi-Square test

The multivariate analysis of predictors for maternal outcomes in late preterm PPROM shows that for maternal infection, age, gestational age, and diabetes mellitus were not significant predictors [aOR 0.95 (95% CI: 0.9-1.1, p=0.38); aOR 0.95(95% CI: 0.5-2.0, p=0.897); aOR 0.14(95% CI: 0.0-2.1, p=0.151), respectively]. Higher BMI also showed no significant association [aOR 1.36, 95% CI: 0.9-2.0, p=0.104]. In contrast, hypertension was a strong and significant predictor of maternal infection [aOR 11.45, 95%] CI: 1.5-85.6, p=0.018]. For cesarean delivery, age and gestational age were not significant predictors [aOR 0.96, 95% CI: 0.9–1.0, p=0.3; aOR 0.83, 95% CI: 0.5–1.3, p=0.441]. However, higher BMI [aOR 1.2, 95% CI: 1.1-1.5, p=0.046], diabetes mellitus [aOR 2.77, 95% CI: 1.2-7.9, p=0.047], and hypertension [aOR 1.46, 95% CI: 1.1-4.5, p=0.048] were all significant predictors of cesarean section (Table 3).

Table 3: Predictors of maternal outcomes between two groups (Multivariate Analysis)n=134

Predictors	Maternal Infection RR (95% CI)	p- value	Cesarean Section RR (95% CI)	p- value
Age	0.95 (0.9 – 1.1)	0.38	0.96 (0.9 - 1.0)	0.30
BMI	1.36 (0.9 - 2.0)	0.104	1.20 (1.1 – 1.5)	0.046
Gestational Age	0.95 (0.5 - 2.0)	0.897	0.83 (0.5 - 1.3)	0.441
Diabetes Mellitus	0.14 (0 - 2.1)	0.151	2.77 (1.2 - 7.9)	0.047
Hypertension	11.45 (1.5 – 85.6)	0.018	1.46 (1.1 – 4.5)	0.048

RR=relative Risk, CI Confidence Interval

The multivariate analysis of predictors for neonatal outcomes in late preterm PPROM shows that for neonatal infection, higher BMI [aOR 1.3, 95% CI: 1.0-1.6, p=0.028], diabetes mellitus [aOR 1.53, 95% CI: 1.1-5.3, p=0.050], and hypertension [aOR 1.24, 95% CI: 1.1-3.9, p=0.042] were significant predictors, while maternal age and gestational age were not associated. For neonatal intervention, hypertension emerged as the only significant predictor [aOR 3.22, 95% CI: 2.1-17.1], whereas all other factors were non-significant (Table 4).

Table 4: Predictors of Neonatal Outcomes Between Two Groups (Multivariate Analysis) n=134

Predictors	Neonatal Infection RR (95% CI)	p- value	Neonatal Intervention RR (95% CI)	p- value
Age	0.96 (0.9 - 1.0)	0.376	0.95 (0.9 – 1.1)	0.325
BMI	1.30 (1.0 – 1.6)	0.028	1.22 (0.9 - 1.6)	0.207
Gestational Age	0.99 (0.6 - 1.7)	0.980	0.94 (0.5 – 1.7)	0.835
Diabetes Mellitus	1.53 (1.1 – 5.3)	0.050	1.08 (0.3 – 3.9)	0.906
Hypertension	1.24 (1.1 – 3.9)	0.042	3.22 (2.1 – 17.1)	0.017

RR=relative Risk, CI Confidence Interval

Hypertension, diabetes, and elevated BMI were important predictors of adverse fetomaternal outcomes in late preterm PPROM. Hypertension strongly increased the risk of both maternal infection and neonatal intervention, while diabetes and obesity contributed to higher rates of cesarean section and neonatal infection. These findings highlight the need to individualize management decisions in late preterm PPROM, especially in women with maternal comorbidities.

# DISCUSSIONS

In our cohort of 134 women with late preterm PPROM, baseline profiles were largely comparable between the induction and expectant groups, except for higher rates of obesity (58.2% vs. 37.3%, p=0.02) and hypertension (59.7% vs. 41.8%, p=0.038) in the induction arm. These comorbidities are well-recognized contributors to adverse outcomes and may partly explain the higher maternal and neonatal complications observed. However, in Pakistan, where obesity and hypertension frequently complicate pregnancy, its association of PPROM with strongly predicts cesarean delivery and neonatal morbidity is not reported [10, 11]. European trials, such as PPROMEXIL/PROMEXIL-2 studies, didn't provide a detailed breakdown; however, literature pointed out a 38% prevalence of hypertension, and obese women have 1.98 times higher chances of PPROM morbidity, but in contrast, higher rates were seen in LMICs [12-14]. The differences in maternal health status between South Asian and Western populations play a decisive role, highlighting the need to interpret global evidence cautiously and tailor management decisions in Pakistan to account for the higher prevalence of maternal risk factors. Our study demonstrated significantly higher adverse outcomes in the induction group compared to expectant management, with maternal infection (40.3% vs. 23.9%, p=0.042), cesarean delivery (55.2% vs. 37.3%, p=0.038), neonatal infection (53.7% vs. 35.8%, p=0.037), and neonatal intervention (41.8% vs. 23.9%, p=0.027)occurring more frequently after induction. These findings contrast with the Dutch PPROMEXIL trial, where induction reduced maternal chorioamnionitis without significantly increasing neonatal morbidity Van Der Ham et al. and with a recent analysis by Simons et al. which found no long-term disadvantage with expectant management [12, 15]. However, our results are consistent with regional data that reported infection rates of nearly 30% and higher cesarean delivery rates among women with comorbidities, especially hypertension, undergoing induction, which emphasized hypertension and obesity as strong predictors of neonatal morbidity in South Asian cohorts [16, 17]. Differences in baseline risk factors, gestational age at delivery, induction protocols, and NICU resources may explain why induction in our setting was associated with greater maternal and neonatal complications compared with international studies. These results suggest that in Pakistan, where maternal comorbidities and limited neonatal care capacity are common, expectant management may provide safer outcomes when close monitoring is feasible. Our analysis showed that hypertension, diabetes, and elevated BMI were significant predictors of adverse maternal and neonatal outcomes in late preterm PPROM, with hypertension strongly

associated with maternal infection (aOR 11.45) and neonatal intervention (aOR 3.22). Similar associations have been reported where obesity and hypertension to markedly increase cesarean delivery and neonatal morbidity; some authors highlighted that antepartum hemorrhage is the leading factor that is indirectly associated with hypertension [13, 14, 18], International data show mixed patterns: Bitar et al. (2025) reported that maternal comorbidities, particularly hypertension, and infection doubled the risk of complications in late PPROM, consistent with our findings, whereas Simons et al. (2023) in a Dutch cohort found no significant effect of BMI or hypertension, reflecting the lower prevalence of these risk factors in European populations [15, 19]. A recent metaanalysis by Lee et al. (2025) concluded that baseline maternal health, particularly obesity and diabetes, remains the primary determinant of outcomes in low- and middleincome settings [4, 20]. Taken together, our results reinforce that in Pakistan, where metabolic risk factors are highly prevalent, these comorbidities magnify adverse outcomes and may explain the divergence from Western studies, underscoring the need for tailored management strategies. This study has several limitations. First, it was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. Second, allocation to induction or expectant management was not randomized but based on clinical judgment and departmental protocol, introducing the possibility of selection bias. Third, baseline imbalances, particularly higher rates of obesity, diabetes, and hypertension in the induction group, may have confounded the outcomes despite statistical adjustment. Fourth, neonatal outcomes were assessed only during the immediate hospital stay, and long-term follow-up on neurodevelopment and respiratory health was not available. Finally, variations in induction regimens, antibiotic use, and monitoring protocols could not be fully standardized, which may have influenced maternal and neonatal outcomes.

### CONCLUSIONS

Early planned induction in late preterm PPROM was associated with higher rates of maternal infection, cesarean delivery, and neonatal complications, particularly among women with obesity, diabetes, and hypertension. Careful patient selection and close monitoring are essential, and in resource-limited settings like Pakistan, expectant management may be safer for stable women without high-risk comorbidities.

# Authors Contribution

Conceptualization: MA Methodology: SI Formal analysis: MF

Writing review and editing: SI, MA, MF

All authors have read and agreed to the published version of the manuscript

## Conflicts of Interest

All the authors declare no conflict of interest.

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#### REFERENCES

- [1] Battarbee AN, Osmundson SS, McCarthy AM, Louis JM. Society for Maternal-Fetal Medicine, SMFM Publications Committee. Society for Maternal-Fetal Medicine Consult Series# 71: Management of Previable and Periviable Preterm Prelabor Rupture of Membranes. American Journal of Obstetrics and Gynecology. 2024 Oct; 231(4): B2-15. doi: 10.1016/j. ajog.2024.07.016.
- [2] Ağaoğlu RT, Öztürk Ö, Ulusoy CO, Günday F, Sarikaya Kurt D, Aksu M, et al. Perinatal Outcomes and Predictors of Neonatal Mortality in Preterm Premature Rupture of Membranes: A Tertiary Center Experience. BMC Pregnancy and Childbirth. 2025 May; 25(1): 585. doi: 10.1186/s12884-025-07688-9.
- [3] Lorthe E, Kayem G. Tocolysis in the Management of Preterm Prelabor Rupture of Membranes at 22-33 Weeks of Gestation: Study Protocol for a Multicenter, Double-Blind, Randomized Controlled Trial Comparing Nifedipine with Placebo (TOCOPROM). BMC Pregnancy and Childbirth. 2021 Sep; 21(1): 614. doi: 10.1186/s12884-021-04047-2.
- [4] Lee D, Lynch TA. PPROM in the Late Preterm Period: An Argument for Expectant Management. American Journal of Obstetrics and Gynecology Maternal-Fetal Medicine. 2025 Mar; 7(1): 101563. doi: 10.1016/j.ajo gmf.2024.101563.
- [5] Bond DM, Middleton P, Levett KM, Van der Ham DP, Crowther CA, Buchanan SL, et al. Planned Early Birth Versus Expectant Management for Women with Preterm Prelabour Rupture of Membranes Before 37 Weeks' Gestation for Improving Pregnancy Outcome. Cochrane Database of Systematic Reviews. 2017(3). doi: 10.1002/14651858.CD004735.pub4.
- [6] Ghosh D, Jena P, Sahu PS, Pradhan DD, Panda J, Panda B. Safety and Efficacy of Extended Expectant Management in Preterm Premature Rupture of Membrane Between 32 and 34 Weeks of Pregnancy -

- A Randomized Controlled Trial. European Journal of Obstetrics and Gynecology and Reproductive Biology. 2025 Jun; 310:113971. doi: 10.1016/j.ejogrb. 2025.113971.
- [7] Sklar A, Sheeder J, Davis AR, Wilson C, Teal SB. Maternal Morbidity After Preterm Premature Rupture of Membranes at < 24 Weeks' Gestation. American Journal of Obstetrics and Gynecology. 2022 Apr; 226(4): 558-e1. doi: 10.1016/j.ajog.2021.10.036.
- Choi EK, Kim SY, Heo JM, Park KH, Kim HY, Choi BM, et al. Perinatal Outcomes Associated with Latency in Late Preterm Premature Rupture of Membranes. International Journal of Environmental Research and Public Health. 2021 Jan; 18(2): 672. doi: 10.3390/ ijerph18020672.
- [9] Aziz A, Saleem S, Nolen TL, Pradhan NA, McClure EM, Jessani S, et al. Why Are the Pakistani Maternal, Fetal, and Newborn Outcomes so Poor Compared to Other Low and Middle-Income Countries? Reproductive Health. 2020 Dec; 17(Suppl 3): 190. doi: 10.1186/s12978-020-01023-5.
- [10] Saleem M, Jabin M. Fetomaternal Outcome in Obese Pregnant Women with Pregnancy-Induced Hypertension Visiting Liagat Memorial Hospital, Kohat. Pakistan Journal of Intensive Care Medicine. 2025 Jul; 5(02): 111-. doi: 10.54112/pjicm.v5i02.111.
- [11] Sattar A, Ramzan S, Sahito RM, Ali R, Ghumro RA, Shahriyar A. Analyzing the Fetal Complications Associated with Preterm Premature Rupture of Membranes. Journal of The Society of Obstetricians and Gynaecologists of Pakistan. 2025 Jan; 15(1): 12-6. doi: 10.71104/jsogp.v15i1.874.
- [12] Van Der Ham DP, Vijgen SM, Nijhuis JG, Van Beek JJ, Opmeer BC, Mulder AL, et al. Induction of Labor Versus Expectant Management in Women with Preterm Prelabor Rupture of Membranes Between 34 and 37 Weeks: A Randomized Controlled Trial. PLoS Medicine. 2012 Apr; 9(4): e1001208. doi: 10.1371/ journal.pmed.1001208.
- [13] Wenas AF, Al-Massawi HY. Association Between Gestational Hypertension and Preeclampsia with Spontaneous Prelabor Rupture of Membrane. Medical Journal of Babylon. 2022 Apr; 19(2): 281-7. doi: 10.4103/MJBL.MJBL\_36\_22.
- [14] Robinson L, Reiss K, Seybold D, Younis L, Calhoun B. A Comparison of Neonatal Outcomes Between Obese and Nonobese Women with Preterm Prelabor Rupture of Membranes. Cureus. 2024 Jun; 16(6). doi: 10.7759/cureus.61754.
- [15] Simons NE, de Ruigh AA, van't Hooft J, Aarnoudse-Moens CS, van Wely M, van der Ham DP, et al. Childhood Outcomes After Induction of Labor or

- Expectant Management for Preterm Prelabor Rupture of Membranes: A 10-Year Follow-Up of the PPROMEXIL Trials. American Journal of Obstetrics and Gynecology. 2023 May; 228(5): 588-e1. doi: 10.1016/j.ajoq.2023.02.007.
- [16] Dhakal-Rai S, van Teijlingen E, Regmi P, Wood J, Dangal G, Dhakal KB, et al. Factors Contributing to Rising Cesarean Section Rates in South Asian Countries: A Systematic Review. Asian Journal of Medical Sciences. 2022 Feb; 13(2): 143-74. doi: 10.3126/ajms.v13i2.40904.
- [17] Wolde M, Mulatu T, Alemayehu G, Alemayehu A, Assefa N. Predictors and Perinatal Outcomes of Pre-Labor Rupture of Membrane Among Pregnant Women Admitted to Hiwot Fana Comprehensive Specialized University Hospital, Eastern Ethiopia: A Retrospective Study. Frontiers in Medicine. 2024 Jan; 10: 1269024. doi: 10.3389/fmed.2023.1269024.
- [18] Tikmani SS, Saleem S, Sadia A, Bann CM, Bozdar MH, Raza J, et al. Predictors of Preterm Neonatal Mortality in India and Pakistan: A Secondary Analysis of Data from Purpose Study. Global Pediatric Health. 2024 Mar; 11: 2333794X241236617. doi: 10.1177/233379 4X241236617.
- [19] Bitar G and Sibai BM. Preterm Premature Rupture of Membranes in the Late Preterm Period: An Argument Against Expectant Management. American Journal of Obstetrics and Gynecology Maternal-Fetal Medicine. 2025 Mar; 7(1): 101619. doi: 10.1016/j.ajogmf. 2025.101619.
- [20] Sun H, Su X, Mao J, Du Q. Impact of Pre-Pregnancy Weight on the Risk of Premature Rupture of Membranes in Chinese Women. Heliyon. 2023 Nov; 9(11). doi: 10.1016/j.heliyon.2023.e21971.