ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

SUCCESS RATE, MATERNAL AND PERINATAL OUTCOME, AND ASSOCIATED FACTORS OF INDUCTION FOR PRELABOUR RUPTURE OF MEMBRANE IN THREE TEACHING HOSPITALS, ADDIS ABABA: A CROSS-SECTIONAL STUDY.

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCES, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY AS PARTIAL FULFILLMENT OF SPECIALITY IN OBSTETRIC AND GYNECOLOGY

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Success rate, Maternal and Perinatal outcome, and Associated factors of induction for Prelabour rupture of membrane in three teaching hospitals, Addis Ababa: A cross-sectional study.

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Declaration

DRPC FORM III: RESEARCH PROPOSAL APPROVAL BY ADVISORS[1]

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, POSTGRADUATE PROGRAM

I, Dr. Samson Kehali, hereby declare that this research thesis entitled " Success rate, Maternal and Perinatal outcome, and Associated factors of induction for Prelabour rupture of membrane in three teaching hospitals, Addis Ababa: A cross-sectional study, 2025" in line with the requirement of graduate studies was fully undertaken by me under the guidance of my advisors and that I have, to the best of my knowledge and effort, avoided plagiarism or duplication of materials unless and otherwise cited and/or acknowledged and that it has not been so far submitted for any form of thesis application or consideration.

Investigator Dr. Samson Kehali _____ _____

We hereby certify that we have read and evaluated this research thesis relating to" Success rate, Maternal and Perinatal outcome, and Associated factors of induction for Prelabour rupture of membrane in three teaching hospitals, Addis Ababa: A cross-sectional study, 2025 **"** under our guidance from its inception up to in its current format including ethical issues and that it can be submitted to the DRPC for further administrative processing & documentation of the thesis by the Department as part of the resident's research undertaking for his/ her partial fulfillment to the Degree of Specialty in Obstetrics and Gynaecology.

Advisors Dr. Ahmed Abdella _____ _____

Dr. Salih Hassen _____ _____

[1] NOTE: THIS IS ADVISORS APPROVAL OF THE PROPOSAL FOR METHODOLOGICAL & ETHICAL ISSUES APPROPRIATENESS INCLUDING THE DATA COLLECTION PROCESS AND PARTICIPANTS PROTECTION &RIGHT.

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Acronym and Abbreviation

ACOG	American College of Obstetricians and Gynecologists
BPP	Biophysical Profile
CD	Cesarean Delivery
CI	Confidence Interval
CS	Cesarean Section
GA	Gestational Age
GMH	Gandhi Memorial Hospital
IOL	Induction of Labour
LUSTCS	Lower Uterine Segment Transverse Cesarean Section
LW	Labour Ward
NICU	Neonatal Intensive Care Unit
OB-GYN	Obstetrics and Gynecology
OR	Odds Ratio
OVD	Operative Vaginal Delivery
PPH	Post-Partum Hemorrhage
PPH	Postpartum Hemorrhage
PROM	Prelabour Rupture of Membranes
ROM	Rupture of Membranes
RR	Relative Risk
SSI	Surgical site infection
SVD	Spontaneous Vaginal Delivery
TASH	Tikur Anbessa Specialized Hospital
ZMH	Zewuditu Memorial Hospital

Summary

Background: Prelabour rupture of membranes refers to the loss of integrity of fetal membranes prior to the onset of clinically apparent labour contractions. The major issue in managing a woman with PROM at term is whether to follow her expectantly or proceed for delivery. Among the factors to consider are possibility of failed induction, caesarean delivery, length of labour, cost, length of hospitalization and risk of maternal and neonatal complications.

Objective: the objective of the study is to assess the success rate, maternal and perinatal outcomes, and factors affecting of induction for prelabour rupture of membrane in the three teaching Hospitals of Addis Ababa University.

Methods: Facility based cross-sectional study was employed in the three affiliate teaching hospitals of Addis Ababa University. The study subjects were recruited sequentially until the calculated sample size of 374 is achieved. The data were collected by interview & reviewing participants' clinical records. The data were entered, clearing and analysis by SPSS version 25. Logistic regression analyses were employed to identify factors associated with the outcome variable. Using 95% CI, variables with a p-value <0.05 were identified as statistically significant factors.

Result: Sixty seven percent (n= 250) of 374 participants with PROM had a successful induction of labor. Multiparity (Odd's ratio= 14.0, 95% CI: 3.78, 52.16), term PROM (Odd's ratio= 4.9, 95% CI: 1.04, 23.29), and absence of intrapartum complications (Odd's ratio= 15.0, 95% CI: 13.37, 65.13) were significantly associated with higher odds of successful induction. Maternal complications occurred in 6.4% (n= 24) of participants, mainly postpartum hemorrhage (n= 21, 5.6%) and surgical site infection (n= 3, 0.8%).

Poor perinatal outcomes were observed in 18% (n= 67) of neonates, with 16% (n= 59) requiring NICU admission and a neonatal mortality of 2.7% (n= 10). Multiparous women had a better perinatal outcomes (Odd's ratio= 0.39, 95% CI: 0.17, 0.92), while hypertensive disorders (Odd's ratio= 13.4, 95% CI: 1.03, 44.92) and non-spontaneous deliveries, OVD (Odd's ratio= 28.2, 95% CI: 2.73, 91.31) and CS (Odd's ratio= 6.2, 95% CI: 2.58, 14.96) significantly increased the risk.

Conclusion and recommendation: The success of induction was good, and is comparable to the findings of studies done in other centers. Multiparity, term PROM, and absence of intrapartum complications were associated with successful induction. Strengthen antenatal risk assessment to identify women at higher risk for poor outcomes; those with hypertensive disorders and primigravidity is important to improve the outcome.

Keywords: induction, prelabour rupture of membranes, AAU

1. Introduction

1.1 Background

Prelabour rupture of membranes (PROM) is defined as the rupture of the fetal membranes before the beginning of uterine contractions (1). PROM is an established entity in obstetric practice. It refers to the loss of integrity of fetal membranes prior to the onset of clinically apparent labour contractions (2). It has a multifactorial etiology (3). It happens in approximately 5–10% of pregnancies, of which 80% are at term (4). Approximately 60–70 % of term PROM cases are followed by the onset of labour within 24 hours (5,6). It has been linked to various maternal complications, including neonatal septicemia. Common maternal complications include intra-amniotic infection, pelvic abscess, sepsis and post-partum hemorrhage (PPH) (7).

In order to avoid such complications, recent clinical trials support immediate induction of labour (IOL) once PROM is confirmed, after due consideration of gestational age and obstetric status (8).

Vaginal prostaglandin helps to shorten total duration of labour time by reducing latency period in women with unfavorable cervix without increasing the rate of caesarean section and/ or fetomaternal morbidity. However, this pharmacological ripening method carries the risk of uterine hyperstimulation, which can adversely affect fetal heart rate (32).

Most experts recommend early induction of labour in term PROM cases with an eye towards avoiding increased morbidity and mortality (15). Induction of labour can be classified as either emergency or elective depending on fetal, maternal, social, or a combination of these factors. Elective induction is conducted with prior planning by the health care provider and the mother when continuing the pregnancy beyond a certain number of weeks is going to bring a risk to the fetus or the mother. PROM is one of the indications for elective induction. On the other hand, emergency induction is undertaken when there is an emergency maternal and fetal condition that necessitates immediate delivery, which includes intra-amniotic infection (IAI), a scenario which occurs commonly after the occurrence of prolonged PROM (16).

A Cochrane review assessed maternal, fetal and neonatal effects of planned early birth when compared with expectant management for women with term PROM. Data from 23 randomized controlled trials found that there is a significant reduction in maternal infectious morbidity

(clinical chorioamnionitis and endometritis) in women who were induced with oxytocin versus expectant management, with no difference in neonatal infection or CD rate between the groups (17). As a result of that study, The Cochrane review was in favor of planned intervention following PROM at term (18). According to the American College of Obstetricians and Gynecologists (ACOG, 2020), it is recommended to initiate delivery in case of term PROM, even when maternal and fetal status are reassuring (14).

The evidence related to induction of labour in women with prelabour rupture of membranes was obtained from a systematic review (12) of 16 randomized controlled trials. The induction of labour performed for the indication of prelabour rupture of membranes was not associated with increased caesarean section rates or other adverse outcomes. The risk related to the critical outcome of perinatal mortality was not significant, but there were only 10 perinatal deaths in five trials included in the review (5870 participants, RR 0.46, 95% CI 0.13–1.66). There was a reduction in admissions to a neonatal intensive care unit with induction of labour (five trials, 5679 participants, RR 0.73, 95% CI 0.58–0.91) (1.4.1). This effect was more evident when induction of labour was carried out with oxytocin (three trials, 2883 participants, RR 0.58; 95% CI 0.39–0.85) (19).

1.2 Statement of the problem

Prelabour rupture of membranes is a matter of major concern for all obstetricians as it is associated with high fetal morbidity and mortality and maternal morbidity and mortality

sometimes. The majority (90%) of prelabour rupture of membranes (PROM) occurs in women who are at term and PROM at term occurs in 8 per cent of all births (21).

PROM has been associated with significant maternal and perinatal complications which include a high rate of Cesarean section (C/S), chorioamnionitis, abruptio-placenta, cord prolapse, respiratory distress syndrome (RDS), birth asphyxia, low APGAR score (e (<7/10), preterm labor, low birth weight, admission to neonatal intensive care unit (NICU) and perinatal death (16). PROM is responsible for 44% of perinatal morbidity and 7% of perinatal mortality (22). About one-third of preterm births, which are the main cause of newborn death, and 13–60% of intra-amniotic infections or chorioamnionitis in pregnant women are attributed to PROM (23). Moreover, PROM has a wide range of negative effects, including maternal and neonatal mortality and morbidity, as well as national economic loss from prescription expenses, hospital stays, lost productivity, and healthcare expenditures (22,23).

The incidence of spontaneous prelabour rupture of membranes is reportedly between 6 to 10%. Over 60% of these women at term go into spontaneous labor within 24 hours and over 95% deliver spontaneously within 72 hours of PROM. The major issue in managing a woman with PROM at term is whether to follow her expectantly or proceed for delivery (19). Among the factors to consider are possibility of failed induction, caesarean delivery, length of labour, cost, length of hospitalization and risk of maternal and neonatal infection. Induction of labour results in shorter time to delivery and decreased risk of maternal and neonatal infection but can result in failed induction and operative delivery (24,25). Therefore, this study will assess the prevalence of induction of labor for term PROM, its success rate and perinatal and maternal outcome.

1.3 Significance of the study

Assessing the success rate of induction of labor among patients with prelabour rupture of membranes (PROM) will be important for obstetricians make informed decisions regarding the management of patients with this condition. It provides insight into whether induction is a viable

option or if alternative strategies such as expectant management or immediate delivery via cesarean section are more appropriate.

The finding of the study will also be useful to detect the associated factors for successful induction and those with an increased risk of maternal and fetal complications, including chorioamnionitis, postpartum hemorrhage, and maternal sepsis. Assessing the success rate of induction of labor in PROM cases allows for the optimization of maternal health outcomes by potentially reducing the duration of ruptured membranes and minimizing maternal morbidity. Evaluating the success rate of induction of labor in PROM can impact neonatal health outcomes by facilitating timely delivery, reducing exposure to intrauterine infection, and improving neonatal morbidity and mortality rates.

Successful induction of labor in PROM cases may lead to shorter hospital stays and fewer interventions, thereby optimizing resource utilization within obstetric units. Conversely, understanding factors associated with failed inductions can help allocate resources more effectively to manage cases that require prolonged monitoring or alternate delivery strategies. This study will also be an insight for further study with larger sample size. Finally, the findings from this study will contribute to the development or refinement of clinical guidelines and protocols. These guidelines can assist healthcare providers in standardizing practices for managing PROM, ensuring consistency and quality of care across different healthcare settings.

Therefor the finding of this study builds the knowledge of efficacy and Predictors of Induction Success, Timing and Mode of Induction for better success, Maternal and Neonatal Outcomes, Factors Affecting Induction Success, Evidence-based practices derived from studying PROM induction can guide protocols to reduce risks of infection, labor complications, and neonatal morbidity, improving both immediate and long-term outcomes for families.

2. Literature Review

Study done on optimal induction timing in prelabor rupture of membranes revealed that from 3,140 women with PROM, 1,676 patients received oxytocin infusion: 1,127 within 12 hours of PROM; 285 between 12 to 24 hours of PROM and 264 more than 24 hours of PROM initiation. Early (within 12 hours of PROM) administration induction resulted in a shorter interval from membrane rupture to delivery, compared with intermediate (within 12-24 hours of PROM) and delayed oxytocin induction (>24 hours of PROM) administration (23.2 hours vs. 28.2 hours vs. 45 hours, respectively, p<0.001). There were no differences in CS rates among groups, nor episiotomy and PPH. Intrapartum fever rate was similar between early, intermediate, and delayed groups (5.68% vs. 7.37% vs. 4.92%, respectively, p>0.05). Other infectious variables (chorioamnionitis and endometritis) were also similar between all three groups (p>0.05). When mothers received early oxytocin induction, less number of newborns needed additional antibiotic treatment, compared with intermediate and delayed induction groups (26.8% vs. 38.6% vs. 33.33%). Neonatal composite adverse outcome was less common in early oxytocin induction group, compared with intermediate and delayed groups (27.42% vs. 38.95% vs. 34.47%, respectively, p<0.001), a significant reduction in neonatal composite adverse outcome with early oxytocin induction compared to intermediate oxytocin induction (RR 1.27, p=0.0307) (26)

The rate of CS differed significantly only between the women with term-PROM (18.6%) and women with spontaneous labor (9%) (OR, 2.08; 95% CI, 1.4 to 3.0). The rate of low 5-minute Apgar score (< 7) was similar in all groups, but the incidence of non-reassuring fetal heart rate pattern leading to CS was significantly lower in the study groups. A logistic regression model was used to control for maternal and gestational age, gravidity, parity, nulliparity rate, number of used PGE2 tablets, oligohydramnios, birth weight, and time from admission to delivery, as possible predictor factors for mode of delivery in the study groups (PROM and P-PROM) (R2 ¼ 0.349; p < 0.001). On forward likelihood analysis, parity (OR, 0.44; 95% CI, 0.21 to 0.94; p ¼ 0.03), greater number of PGE2 tablets used (OR, 2.03; 95% CI, 1.16 to 3.57; p ¼ 0.01), and higher birth weight (OR, 1.002; 95% CI, 1.00 to 1.003; p ¼ 0.009) were independently and significantly associated with increased risk of CS. When the model was used on the whole sample of those who had labor induction (groups 1 to 3) (R2 ¼ 0.083; p < 0.001), controlling for the same variables and for the indication for labor induction (PROM versus elective), nulliparity (OR, 2.99; 95% CI, 1.83 to 4.89; p < 0.001), and higher birth weight (OR, 1.001; 95% CI, 1.00

to 1.003; $p < 0.001$), in addition to PROM at or before term (OR, 2.31; 95% CI, 1.43 to 3.74; $p < 0.001$), were independently and significantly associated with increased risk of CS (27).

The cesarean section rate for the PROM group was significantly lower (21.9% vs. 26.3%, $p = 0.029$). The induction-to-delivery interval was shorter (mean: 972 [854–6734] min vs. 1741 [97–10 834] min, $p < 0.0001$) and the rates of vaginal birth within 24 hours (80.9 vs. 52.0%, $p = 0.0001$) and 48 hours (98.4 vs. 85.3%, $p = 0.0001$) were higher in the PROM group. The impact of PROM on the cesarean section rate was not significant in multivariate analysis; however, PROM was found to have the greatest effect on the induction-to-delivery interval ($p < 0.0001$) (28).

A study done on comparison of Induction and Expectant Management of Prelabour Rupture of Membranes at Term for Maternal Outcome of mode of delivery of patients revealed that there were 187(67%) patients who delivered vaginally after induction. 63(22%) patients had fetal distress. Similarly failed induction observed in 15(5%) patients. Ninety-three (33%) patients were delivered via LUSTCS. There were only 15(5%) patients having chorioamnionitis (29).

The study done in Outcomes and Associated Factors of Induction revealed that the prevalence of successful induction of labor was 70.3% (65.6, 74.7). The favorable Bishop score ((CI 3.90, 1.63–9.29); p value = 0.002), the intermediate Bishop score ((CI 3.53, 2.15–5.82); p value = 0.001), labor induction using oxytocin with cervical ripening ((CI 2.60, 1.21–5.63); p value = 0.015), and urban residence ((CI 0.48, 0.30–0.78); p value = 0.003) were associated with successful induction of labor (30).

2.1. Conceptual framework

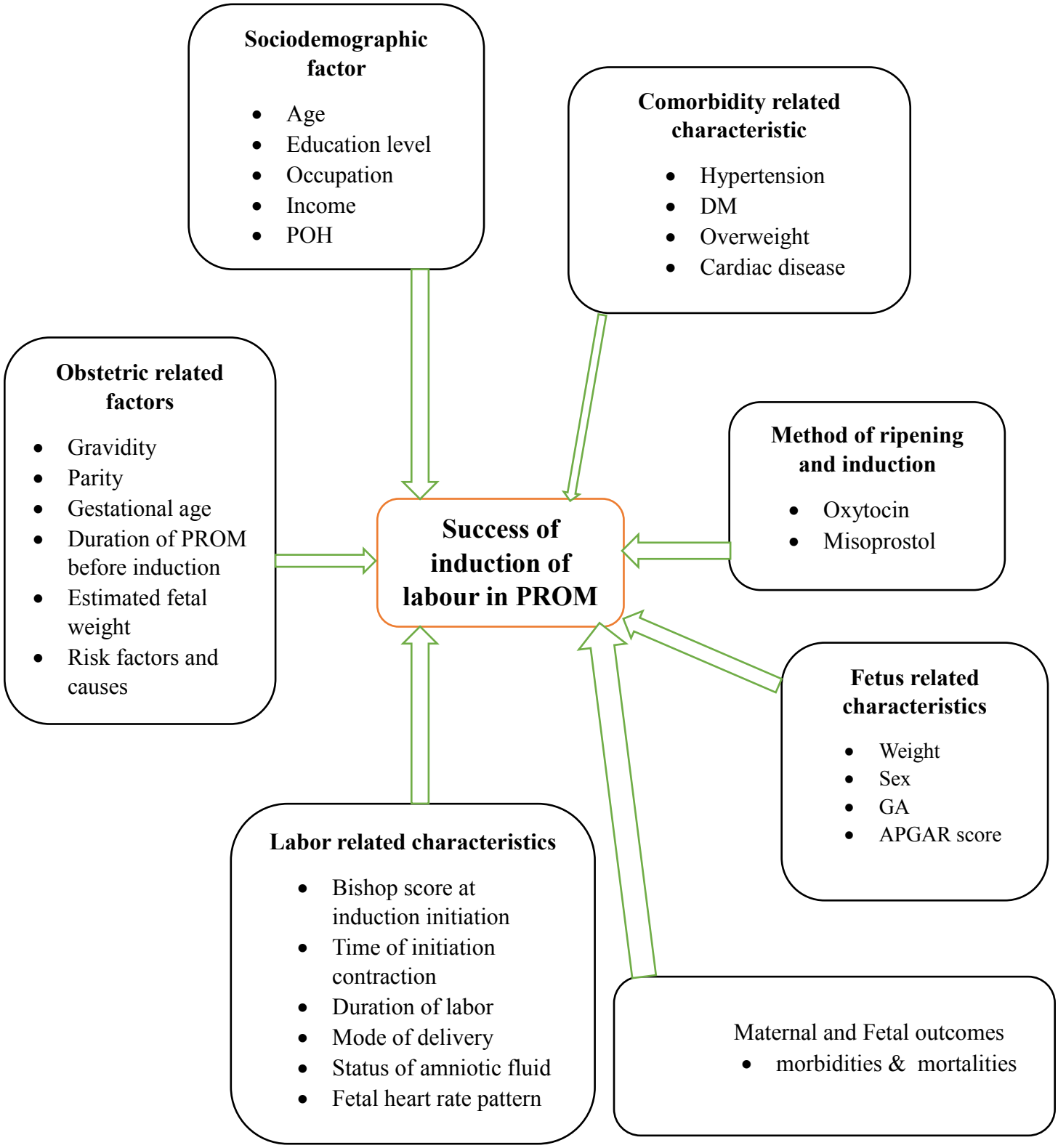

Figure 1: Conceptual framework

3. Objective

3.1. General objective

Assessment of the success rate, the maternal and perinatal outcome and its determinants among pregnancies with PROM induction at the three teaching hospitals of Addis Ababa university, 2025.

3.2. Specific objectives

- Determine the rate of failure and/or success of induction in pregnancies with PROM
- Assess the determinants of success and failure of induction of labor for PROM
- Assess the maternal outcome of pregnancies complicated with PROM
- Assess the perinatal outcome of pregnancies complicated with PROM
- Assess the determinants of adverse maternal outcome in pregnancies with PROM
- Assess the determinants of adverse perinatal outcomes in pregnancies complicated with PROM

4. Methods and Materials

4.1. Study area and period

The study was carried out in the three teaching hospitals of Addis Ababa University College of Health Sciences (TASH, ZMH, and GMH) between the start of December 2024, and April 1, 2025. The calculated sample size was attained.

TASH is one of the largest referral and teaching institutions in the country located at Addis Ababa, the capital city of the nation. It receives patients from all over the country. It has more than 700 beds. The department of obstetrics and gynecology has one emergency gynecologic OPD, one labor ward, two inpatient wards, one ANC and one regular gynecologic referral clinic.

ZMH and GMH are prominent public hospitals located in Addis Ababa having affiliation with TASH. Both are having teaching OB-GYN department serving for the community in the city and the surrounding area from Oromiya regional state.

4.2. Study Design

Facility Based Cross-Sectional Study design was used.

4.3. Population

4.3.1. Source Population

All pregnant women who delivered in the study area

4.3.2. Study Population

Pregnant women who have PROM and subsequently deliver in the study

4.4. Eligibility Criteria

4.4.1. Inclusion Criteria

Pregnant women whose labor is induced for PROM with singleton pregnancy and cephalic presentation

4.4.2. Exclusion Criteria

- Women who have uterine contraction (spontaneous labor) at time of arrival to the hospital
- Women who are having PROM but with fetal malformation
- Women who are unwilling to participate in the study or unable to undergo the interview

4.5. Sample Size Determination

In this study, sample size was determined by using the single population proportion formula taking 67% successful induction of delivery (29), with 5% marginal error, 95% CI.

Therefore $n = \frac{Z(_{1/2})^2 P(1-P)}{d^2}$

Sample size by good maternal outcome (n1) = $(1.96)^2$*0.67(1-0.67)/$0.05)^2$=340

Then after adding 10% none response rate the final sample size will be 374.

- Adverse perinatal outcome of induction of PROM 27.4% (26)

Sample size by adverse perinatal outcome (n2) = (1.96)2*0.274(1-0.274)/0.05)2=306

Then after adding 10% none response rate the final sample size will be 337.

- Successful of induction of PROM 70% (30)

Sample size by successful induction (n3) = (1.96)2*0.70(1-0.70)/0.05)2=323

Then after adding 10% none response rate the final sample size will be 355.

Thus, the sample size was taken from the maternal outcome of prom induction of lab our. So, the final sample size will be 374.

4.6. Sampling Techniques and Procedures

There was small occurrence of induction in prelabour rupture of membrane. So, census method was used until the maximum sample size achieved during the study period. Participants who have a confirmed diagnosis of PROM at the time of delivery were recruited at the emergency unit and obstetrical/maternity wards

4.7. Variables

4.7.1. Dependent variables

Success (outcome) of induction in prelabour rupture of membrane

4.7.2. Independent variables:

Sociodemographic And Past Obstetrics Factors

Age

Education Level

Marital Status

Occupation

Income

POH

Comorbidity Related Characteristic, And Current Obstetric & Other Medical Complications

Hypertension

DM

Overweight

Cardiac Disease

Obstetric Related Factor: Reproductive Characteristics

Gravidity

Parity

Gestational Age

Method Of Induction

Oxytocin

Misoprostol

Current Pregnancy & Labor Factors

Duration of PROM before induction

Estimated fetal weight

Clinical infection

BISHOP score at induction initiation

Time of initiation contraction

The provider who follows induction

Fetus Or Newborn Related Characteristics

Weight

Sex

GA

Liquor status

Resuscitation needs on outcome

4.8. Operational Definition

PROM: Participants with PROM as diagnosed & treated by the treating physician are included.

Term PROM: PROM at or after 37+0 weeks of gestation.

Preterm PROM (PPROM): PROM before 37 weeks of gestation but after 27+6 weeks as determined from LNMP or early ultrasound or clinical assessment.

Priming with misoprostol: administration of misoprostol 25 mcg orally every 3 hours for the intent of making favorable bishop score. Sometimes women given this drug may have adequate uterine contraction and might not require induction with oxytocin.

Induction of labor: use of uterine stimulants including prostaglandins and oxytocin with the intension of initiating uterine contractions and subsequent delivery of the fetus.

Failed induction: Failure of induction as per the diagnosis of the managing physician.

CD for failed induction: CD done for failed induction as per the diagnosis of the treating physician.

CD without failed induction: CD done for other obstetrical indications other than failed induction. It may occur during cervical priming and or labor induction processes as in cases of NRFHRP or CPD.

Successful induction: Achievement of successful vaginal delivery after induction

Maternal morbidity/adverse maternal outcome: The presence of one or more of the following → PPH, ICU admission, maternal sepsis, surgical site infection or maternal death before discharge

Adverse perinatal outcome: the presence of either or more of the following → 5^{th} minute APGAR score (<7), diagnosis of PNA, MAS, Neonatal sepsis, NICU admission for more than 24 hours, Early neonatal death until the mother is discharged.

4.9. Data Collection & Instrument

Structured questionnaire was adopted from the result of different researches studied on PROM. Midwives working in the labour ward was conduct face-to-face interview of study participants after given one-day training, whereas residents were supervising the data collection process. A pre-tested structured questionnaire initially prepared in English and translated into local language was used to collect data on success of induction in PROM, and potential predictors including

demographic characteristics, pregnancy related characteristics, morbidity, Obstetric characteristics were documented. By explaining the objective of the study using the information sheet, consent is taken from the participants. After consent for the interview & data extraction from participants' clinical record is secured, participants are interviewed privately every day in the morning and afternoon at a time when they are comfortable, before potential participants are discharged from the hospital.

To ensure data consistency, the questionnaire was first created in English, translated into the local language, and then translated back into English by several certified individuals. Prior to the actual data collecting time, data collectors received a one-day training on how to complete the questionnaire and the entire data gathering process. A pretest was administered to 5% of the sample size in a comparable population outside the study area that would not be included in the research. And correction was done as necessary.

4.10. Data Collection Procedure

The data collectors and supervisors were given training on the scheduled date. The instruments were pre-tested after the data collecting formats were prepared for usage, and then actual information was collected on the planned date.

Following informed consent and screening for exclusion criteria, each individual participant was requested to give answers for the questionnaire. Mothers who had given birth in the study health institutions were interviewed in order to gather primary data. Three midwives were tasked for gathering the data for each facility. The corresponding residents who worked there provided oversight during the data gathering process, and the investigator checked the data every day.

4.11. Data Quality Control

Data collectors were supervised by the principal investigator, and the questionnaire was checked daily for accuracy and completeness to determine its validity. For any issue that might have been arising during the data collection process, appropriate intervention was made by the principal investigator.

4.12. Data Analysis and Interpretation

Data were cleaned, entered and analysis using SPSS version 25. Summary statistics of mean and percentages were used to describe the study. The fitted bivariate logistic regression model is used

to assess the association between the study outcomes and the different potential risk-factors. Then, multivariable logistic models were fitted to identify independent determinants. For the multivariable regression modeling, the covariates were included in a model which was selected based on their bivariate association with the outcome where variables with P-value < 0.25 was included. Adequacy of the models to predict the outcome variables were checked using the Hosmer–Lem show test. The strength of association between the different factors and the study outcomes were reported using crude and adjusted odds ratio, and the presence of statistically significant association was considered at p-value less than 0.05.

4.13. Ethical Consideration

Ethical clearance was obtained from the Institutional Research Review Board of Addis Ababa University College of health science department of obstetrics and gynecology. Prior to the start of data collection, verbal consent was requested from each of the study participants after information is provided about the nature and objective of the study. During data collection, the study participants were told that the data collected was kept anonymous, confidential, and that the data collected was used only for the purpose of this study. Participants were also informed that they have the right not to participate in the study or can withdraw at any time point with no repercussion on the quality of any service they receive using the information sheet.

4.14. Dissemination of the Results

The final research paper will be submitted to the obstetrics and gynecology department of Addis Ababa University Health Sciences College for partial fulfillment of specialty in OB-GYN. Based on the work plan, after data is collected and analyzed, conclusion and discussion will be made and public defense is to be done at AAU department of obstetrics and gynecology. Information will be shared for the concerned body and the public after taking notes of the opinions of the internal and external examiners and obtaining approval from the appropriate authority. Publication of the results will also be taken into consideration.

5. Result

5.1 Sociodemographic characteristics of study participants

This study included 374 participants who fulfill the inclusion criteria, making the response rate 100%. Of which, 108 were recruited from TASH, 206 clients from GMH and 60 were from ZMH.

The majority (91.4%) of the participants were in the age group of 18–34 years, with a mean age of 26.0 ± 4.59 years. Ninety-two percent (n = 345) of the participants resided in urban areas. More than ninety percent (n = 339) were married, and 45.5% (n = 170) had an educational level of college and above. Two-thirds of the participants' partners also had an educational level of college and above, and 38.5% of them had a monthly income of 10,000–15,000 ETB.

Table 1. The sociodemographic characteristics of the study participants who were induced for prelabour rupture of membrane in three teaching hospitals of Addis Ababa university, 2025

Variable	frequency	Percent
Age in years		
18-34	342	91.4
≥35	32	8.6
Residency		
Urban	345	92.2
Rural	29	7.8
Marital status		
Married	339	90.6
Single	28	7.5
Divorce	7	1.9
Education level		
No formal education	14	3.7
Primary	42	11.2
Secondary	148	39.6
College and above	170	45.5
Occupation		
Housewife	61	16.3
Student	22	5.9
Employee	226	60.4
Business women	22	5.9
Daily laborer	43	11.5
Partner education level		
No formal education	10	2.9
Primary education	16	4.6
Secondary education	83	23.7
College and above	241	68.9
Household monthly income		
<5000	68	18.2
5000-10000	68	18.2
10000-15000	144	38.5
>15000	94	25.1

5.2 Reproductive related characteristics of the study participants

Almost Sixty-two percent of the study participants were multiparous, and 35.3% had a history of abortion. Among those with a history of abortion, 74.2% had one abortion. Additionally, 1.3% had a history of stillbirth, and 2.4% had a history of early neonatal death (END).

Table 2. Reproductive related characteristics of the study participants

Variable	Frequency	Percent
Gravidity		
One	143	38.2
Two-four	213	57
Five and above	18	4.8
Parity		
Primiparous	143	38.2
Multiparous	219	58.6
grand multiparous	12	3.2
Abortion		
Yes	132	35.3
No	242	64.7
Number of abortions n=132		
One	98	74.2
Two or more	34	25.8
History of Still birth		
Yes	5	1.3
No	369	98.7
History of END		
Yes	9	2.4
No	365	97.6

5.3 Health status related characteristics of the study participants

Three percent of the participants had pre-pregnancy medical illness, and 11.8% were having hypertension. Among those with hypertensive disorders, 86.4% had gestational hypertension, and 9.1% had preeclampsia. Additionally, 2.4%, 1.1%, and 0.5% of the participants were sero-reactive for HIV, HBsAg, and VDRL, respectively. Almost 45% (n = 167) of the participants had blood type O, 4% were Rh-negative, and only one patient was sensitized.

Table 3. Health status related characteristics of the study participants

Variable	Frequency	Percent
Pre-pregnancy chronic medical illness		
Yes	11	2.9
No	363	97.1
HTN		
Yes	44	11.8
No	330	88.2

Types of HTN (n=44)		
Chronic hypertension	2	4.5
Gestational hypertension	38	86.4
Preeclampsia	4	9.1
Antihypertensive medication		
Yes	2	4.5
No	42	95.5
VDRL result		
Non-reactive	372	99.5
Reactive	2	0.5
HbSAg		
Negative	370	98.9
Positive	4	1.1
HIV/AIDS		
Non-reactive	365	97.6
Reactive	9	2.4
Blood group		
O	167	44.7
A	139	37.2
B	139	2.9
AB	57	15.2
Rh status		
Negative	15	4
Positive	359	96
Rh Sensitization status(n=15)		
Not sensitized	14	93.3
Sensitized	1	6.7

5.4 Current pregnancy related characteristics of the study participants

Ninety-five percent of the participants had antenatal care (ANC) follow-up, and 87.1% of them had fewer than eight visits. Additionally, 92.8% underwent an optimally timed early ultrasound, and 2.7% experienced early pregnancy complications. Five percent of the participants developed pregnancy-induced hypertension (PIH), and among them, 68.4% had mild gestational hypertension. Forty percent of the participants gave birth at a gestational age between 39 and 40^{+6} weeks. Twelve percent experienced preterm premature rupture of membranes (PROM), and 15.6% developed chorioamnionitis. Eighty percent received steroid treatment, and all of them were given dexamethasone.

Table 4. Current pregnancy related characteristics of the study participants

Variable	Category	Frequency	Percent
ANC in the current pregnancy	Yes	356	95.2
	No	18	4.8
Place of ANC (n=356)	Government hospital	14	3.9

	Health center and government hospital	8	2.3
	Health center	326	91.6
	Private medium clinic	8	2.3
Number of ANC (n=356)	<8	310	87.1
	≥8	46	12.9
Measurement of gestational age	Reliable LNMP	76	20.3
	Early ultrasound	298	79.7
Date of the earliest ultrasound (n=298)	optimal dated	282	94.6
	suboptimal dated	16	5.4
Early pregnancy complication	Yes	23	6.1
	No	351	93.9
Types of early pregnancy complication (n=23)	HEG	19	82.6
	Early pregnancy bleeding	4	17.4
PIH	Yes	19	5.1
	No	355	94.9
Severity level (no =19)	Mild	13	68.4
	Severe	6	31.6
GDM	Yes	8	2.1
	No	366	97.9
Controlling at delivery GDM (N=8)	Good	6	75
	poor	2	25
Gestational age at delivery	$\leq 36^{+6}$	45	12.0
	$37\text{-}38^{+6}$	123	32.9
	$39\text{-}40^{+6}$	150	40.1
	$41\text{-}41^{+6}$	50	13.4
	≥42	6	1.6
Preterm PROM	Yes	45	12
	No	329	87.7
Risk factor for preterm PROM(n=45)	UTI and history of PROM	3	6.7
	History of PROM	1	2.2
	Smoke	3	6.7
	UTI	29	64.4
	None identified	10	22.2
Gestational age in weeks at preterm PROM diagnosis	<34	9	20
	$34\text{-}36^{+6}$	36	80
Preterm PROM related complication(n=45)	Chorioamnionitis	7	15.6
	None	38	84.4
Antenatal steroid treatment (n=45)	Yes	36	80
	No	9	20
Types of steroids (n=36)	dexamethasone	36	100
Dose of dexamethasone(n=36)	2dose	2	5.6
	4dose	34	94.4
Prophylactic antibiotics	Yes	374	100

5.5 Labour and delivery related characteristics of the study participants

All the study participants underwent induction for PROM, and 93.3% were having GA of near-term and above. Cervical ripening was performed in 98.9% of the participants, with 99.5% of them receiving misoprostol. Ninety-eight percent were induced with oxytocin. Among the participants, 79.4% had a duration of PROM between 8 and 18 hours before induction whereas 20.6% of cases were having PROM lasting more than 18 hrs. 64.5% delivered within 24 hours of PROM. In 95% of cases, the amniotic fluid was clear, and 19.8% experienced intrapartum complications. Among those with complications, non-reassuring fetal heart rate patterns (NRFHBP) accounted for 74.3%, followed by meconium-stained amniotic fluid (MSAF) at 17.6%. More than two-thirds of the participants delivered via vaginal delivery (VD), and 33.2% delivered by cesarean section (CS).

Table 5. Labour and delivery related characteristics of the study participants

Variable	Response	Frequency	Percent
Reason for induction	APH with preterm PROM	15	4
	Near term, term and post term with prolonged PROM	349	93.3
	Preterm PROM with Pre-eclampsia	3	0.8
	Chorioamnionitis	7	1.9
Cervical ripening	Yes	370	98.9
	No	4	1.1
Method of ripening(n=370)	Misoprostol	368	99.5
	Folly catheter	2	0.5
Method of induction (n=370)	Oxytocin	366	97.9
	Misoprostol	8	2.1
Duration of ROM before labor in hours	8-18	297	79.4
	18-24	54	14.4
	>24	23	6.1
Duration of ROM before delivery in hrs	<24	241	64.4
	≥24	133	35.6
Status of liquor at delivery	Clear	355	94.9
	GIMSAF	4	1.1
	Bloody	15	4
Intrapartum complication	Yes	74	19.8
	No	300	80.2
Types of intrapartum complication (n =74)	NRFHBP	55	74.3
	IUFD	4	5.4
	MSAF	13	17.6
	Abruption	2	2.7

Liquor status at delivery	Clear	304	81.3
	GIMS	16	4.3
	G2MS	32	8.6
	G3MS	7	1.9
	Bloody	14	3.7
Mode of delivery	VD	246	65.8
	OVD	4	1.1
	CS	124	33.2
Urgency	Emergency	124	100
Types of uterine incision	Low transverse	124	100

5.6 The indication of cesarean section after induced prelabour rupture of membrane

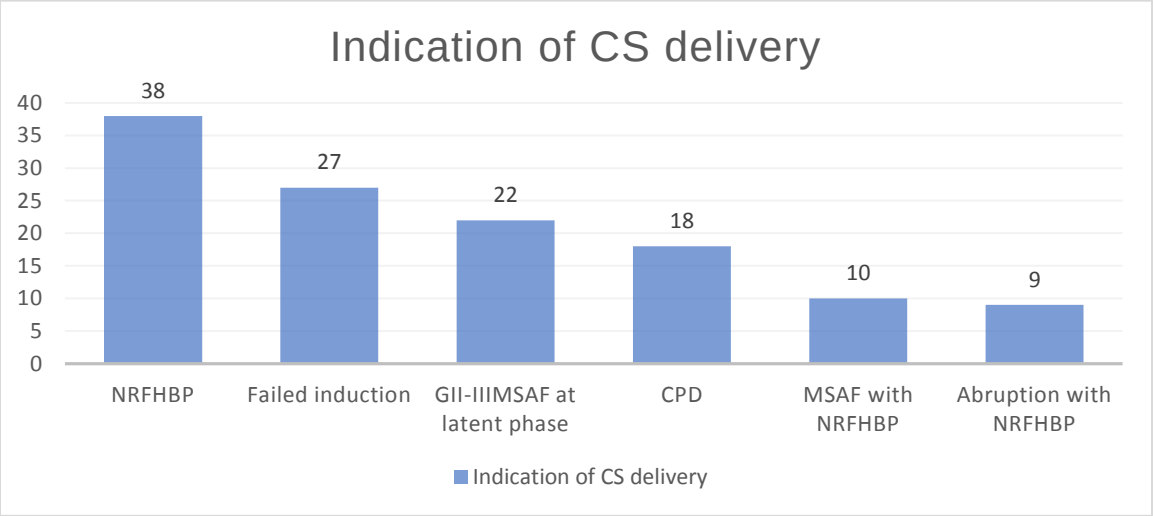

Figure 2. The indication of cesarean section after induced prelabour rupture of membrane

5.7 The success rate of induction of labour among women with prelabour rupture of membrane

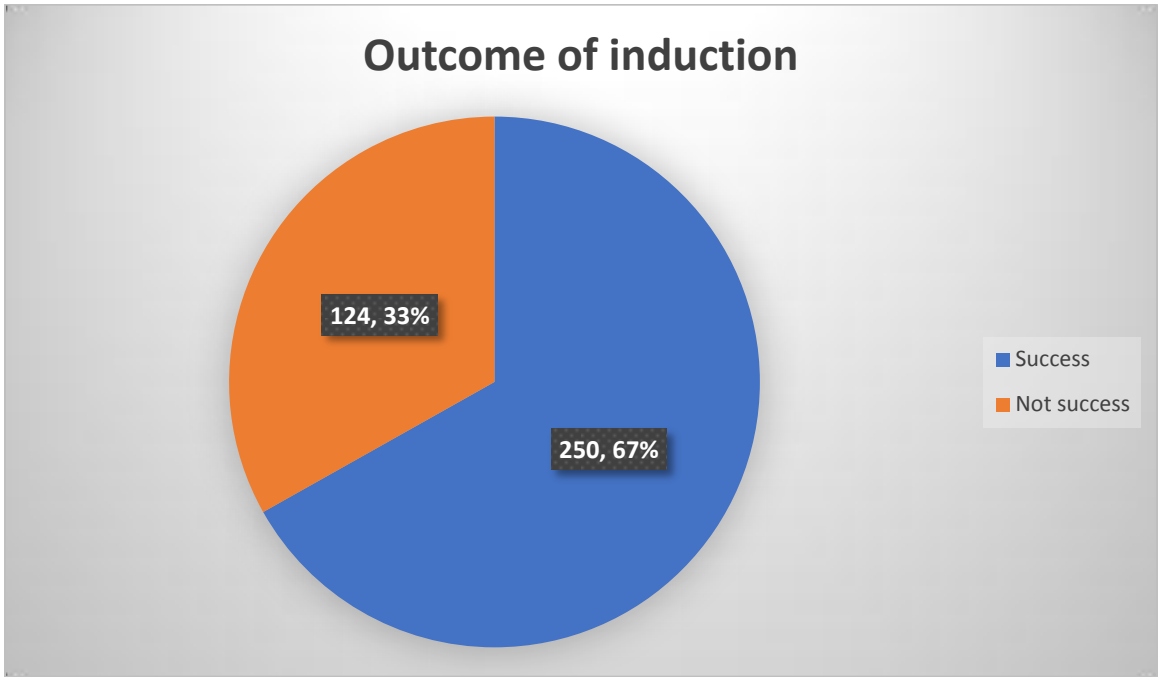

Figure 3. The success rate of induction of labour among prelabour rupture of membrane

5.8 The determinant factors of successful induction for PROM

Maternal occupation, parity, GA at time of induction, and intrapartum complications were associated with the success of PROM induction. The odds of successful PROM induction were 4.7 times higher in employed women compared to housewife (AOR = 4.7, 95%, 1.46, 15.41). Multiparous and primiparous women had 14 times (AOR = 14, 95% CI: 3.78, 52.16)), and 11.05 times (AOR = 11.1, 95% 3.58, 34.17)) higher odds of successful PROM induction, respectively, compared to nulliparous women. Participants with term GA had 4.9 times higher odds of successful induction compared to those with preterm (AOR = 4.9, 95% 1.04, 23.29)). Additionally, participants without intrapartum complications had 15 times higher odds of successful induction compared to those who experienced complications (AOR = 15, 95% CI: 13.37, 65.13)).

Table 6. The bivariate and multivariate logistic regression of association between success of induction of labour among prelabour rupture of membrane in three teaching hospitals of Addis Ababa university, 2025.

Variable	**Success of induction**		**p-value**	**COR with 95%CI**	**P-value**	**AOR with 95%CI**
	yes	no				

Occupation						
housewife	44	17	1		1	
student	10	12	0.028	0.32(0.12, 0.88)	0.142	6.2(0.54, 71.01)
employee	161	65	0.891	0.96(0.51, 1.79)	0.010	**4.7(1.46, 15.41)**
business women	16	6	0.957	1.1(0.35, 3.07)	0.207	4.9(0.41, 58.62)
daily laborer	19	24	0.005	0.31(0.13, 0.69)	0.941	1.1(0.17, 6.72)
Monthly income in birr						
<5000	37	31	1		1	
5000-10000	46	22	0.115	1.8(0.87, 3.52)	0.115	3.5(0.74, 16.99)
10000-15000	104	40	0.011	2.2(1.19, 3.97)	0.253	2.1(0.59, 7.00)
>15000	63	31	0.104	1.7(0.89, 3.24)	0.164	0.38(0.09, 1.49)
Parity						
Primiparous	63	80	1		1	
Multiparous	119	100	0.041	3.6(2.19, 26.34)	0.000	**14.0(3.78, 52.16)**
grand multiparous	7	5	0.003	6.1(2.36, 19.32)	0.000	**11.05(3.58, 34.17)**
number of ANC						
<8	201	109	1		1	
≥8	35	11	0.136	1.7(0.84, 3.53)	0.939	0.95(0.24, 3.75)
PROM before term						
Yes	20	26	1		1	
No	230	98	0.001	3.1(1.63, 5.72)	0.044	**4.9(1.04, 23.29)**
Duration of ROM before labour in hours						
8-16	206	91	1		1	
16-24	32	22	0.146	0.64(0.35, 1.17)	0.958	0.97(0.27, 3.45)
>24	12	11	0.094	0.48(0.21, 1.13)	0.111	5.7(0.67, 48.71_
Intrapartum complication						
Yes	10	64	1		1	
No	240	60	0.000	25.6(12.41, 52.61)	0.000	**15(13.37, 65.13)**

5.9 Maternal outcome related characteristics of induction for prelabour rupture of membrane

Five-point six percent (5.6%) of the cases developed postpartum hemorrhage (PPH), and 0.8% developed surgical site infection (SSI). Among those who developed PPH, 71.4% were caused by uterine atony, and 28.6% were due to retained placental tissue. The overall rate of maternal complications was 6.4% (n = 24).

Table 7. Maternal outcome related characteristics of induction for prelabour rupture of membrane

Variable	frequency	Percent
Postoperative complication (n=374)		
PPH	21	5.6
SSI	3	0.8
Cause of PPH (n=21)		
Uterine atony	15	71.4
Retained placenta tissue	6	28.6

Overall maternal outcome		
Good	350	93.6
Poor	24	6.4

5.10 The determinant factors of maternal outcome of induction for PROM

In the bivariate analysis, the significant variables associated with poor maternal outcome were multiparous (COR = 0.27, 95% CI: 0.08–0.91), hypertension (COR = 6.6, 95% CI: 2.74–16.09), preterm PROM (COR = 6.2, 95% CI: 2.58–15.05), and intrapartum complication (COR = 8.2, 95% CI: 3.43–19.67). In the multivariate logistic regression, the odds of poor maternal outcome among those with gravidity of 2-4 were 97% lower compared to the primigravid women (AOR = 0.03, 95% CI: 0.01–0.61, p = 0.021), and among women with gravidity 5 and above, the odds were 95% lower (AOR = 0.05, 95% CI: 0.01–0.53, p = 0.014).

The odds of poor maternal outcome among hypertensive women were 18.6 times higher compared to non-hypertensive women (AOR = 18.6, 95% CI: 1.66–58.28, p = 0.018). Similarly, the odds of poor outcome among women with preterm PROM were 5.9 times higher compared to those with term PROM (AOR = 5.9, 95% CI: 1.21–28.53, p = 0.028). Strong association was also observed in women who experienced intrapartum complications, with the odds of poor maternal outcome being 13 times higher compared to those without complications (AOR = 13.3, 95% CI: 4.84–28.70, p < 0.001).

Table 8. The bivariate and multivariate logistic regression of association between maternal outcome among women who delivered after induced for prelabour rupture of membrane in three teaching hospitals of Addis Ababa university, 2025.

Variable	Maternal outcome		p-value	COR with 95%CI	P-value	AOR with 95%CI
	poor	good				
Age in years						
18-34	20	322	1		1	
≥35	4	28	0.152	1.5(0.74, 7.19)	0.122	1.3(0.21, 16.70)
Gravidity						
One	8	135	1		1	
Two- Four	13	200	0.061	0.23(0.05, 1.07)	0.021	**0.03(0.01, 0.61)**
Five and above	3	15	0.034	0.27(0.08, 0.91)	0.014	**0.05(0.01, 0.53)**
Hypertension						
Yes	10	34	0.000	6.6(2.74, 16.09)	0.018	**18.6(1.66, 58.28)**
No	14	316	1		1	
Preterm PROM						
Yes	10	36	0.000	6.2(2.58, 15.05)	0.028	**5.9(1.21, 28.53)**

No	14	314	1		1	
Intrapartum complication						
Yes	15	59	0.000	8.2(3.43, 19.67)	0.000	**13.3(4.84, 28.70)**
No	9	291	1		1	

5.11 Perinatal outcome related characteristics of the study participants

In this study, 63.4% of the neonates were female, and 88.8% had a normal birth weight. Eighty-eight percent of the neonates were born at a gestational age of ≥37 weeks, and 97.1% of them were alive. Ninety-six percent of the neonates had an APGAR score of ≥7 at the fifth minute, and 12.1% required resuscitation. All the neonates were referred to the NICU, with 83.9% referred for septic workup. Sixteen percent of the neonates were admitted to the NICU, and among those admitted, 83.1% were discharged while 16.9% died.

Table 9. Perinatal outcome related characteristics of the study participants

Variable	Response	frequency	Percent
Sex of the neonate	Male	137	36.6
	female	237	63.4
Birth weight	<2500	42	11.2
	2500-3999	332	88.8
Gestational age at delivery	<37	45	12
	≥37	329	88
Outcome of neonate at delivery	Alive	363	97.1
	IUFD	8	2.1
	EOND	3	0.8
Timing of still birth (n=8)	Intrapartum	3	37.5
	antepartum	5	62.5
First APGAR score(n=366)	<7	27	7.4
	≥7	339	92.6
Fifth minute APGAR score (n=366)	<7	14	3.8
	≥7	352	96.2
Tenth minute APGAR score (n=366)	<7	3	0.8
	≥7	363	99.2
Resuscitation required (n=366)	None	321	87.8
	Intra nasal oxygen support	44	12.1
	Bag and mask ventilation	1	0.2
NICU referral (n=366)	yes	366	100
Reason for referral (n=366)	Preterm and septic workup	11	3
	Preterm+ RDS +PROM baby	5	1.4
	Preterm and RDS	7	1.9
	RDS and septic workup	32	8.7
	Septic work up and IUGR work up	4	1.1
	Septic workup	307	83.9

NICU admission(n=366)	Yes	59	16.1
	No	307	83.9
Outcome of NICU admission (n=59)	Discharged	49	83.1
	died	10	16.9
Cause of death in NICU (n=10)	Respiratory arrest 2^{ry} to RDS	7	70
	Sepsis/septic shock	2	20
	Septic shock	1	10

5.12 NICU admission diagnosis of the neonate

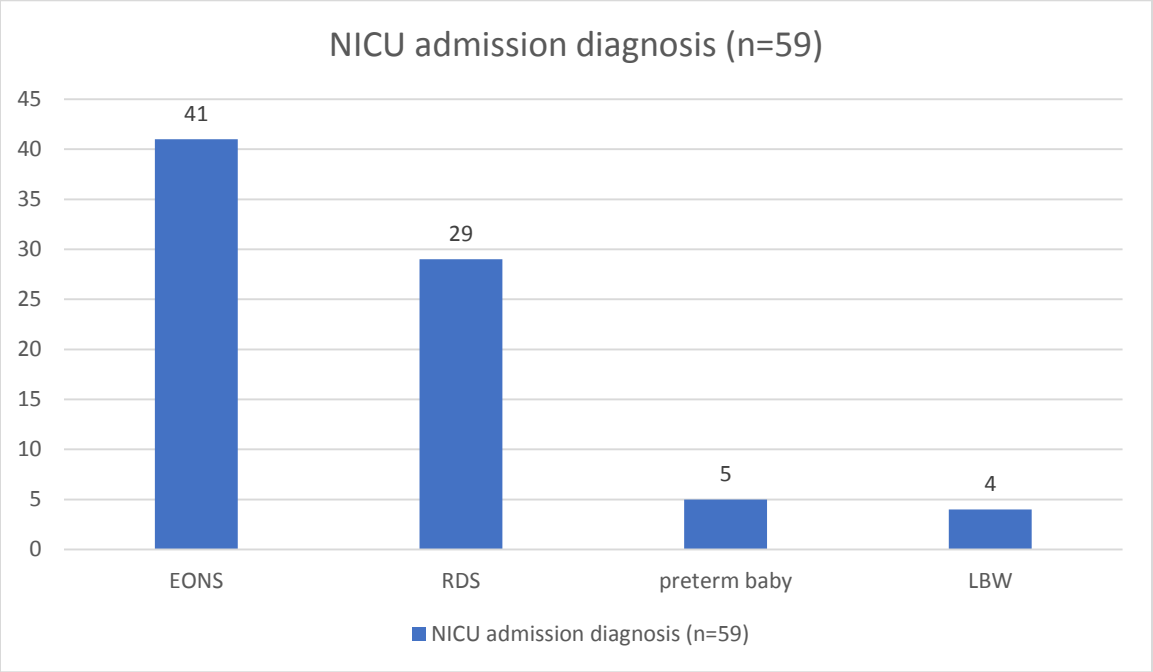

Figure 4.NICU admission diagnosis of the neonate

5.13 Overall composite perinatal outcome

In this study 18% of the study participants had poor composite outcome, while 82% had good composite outcome as shown in the figure below.

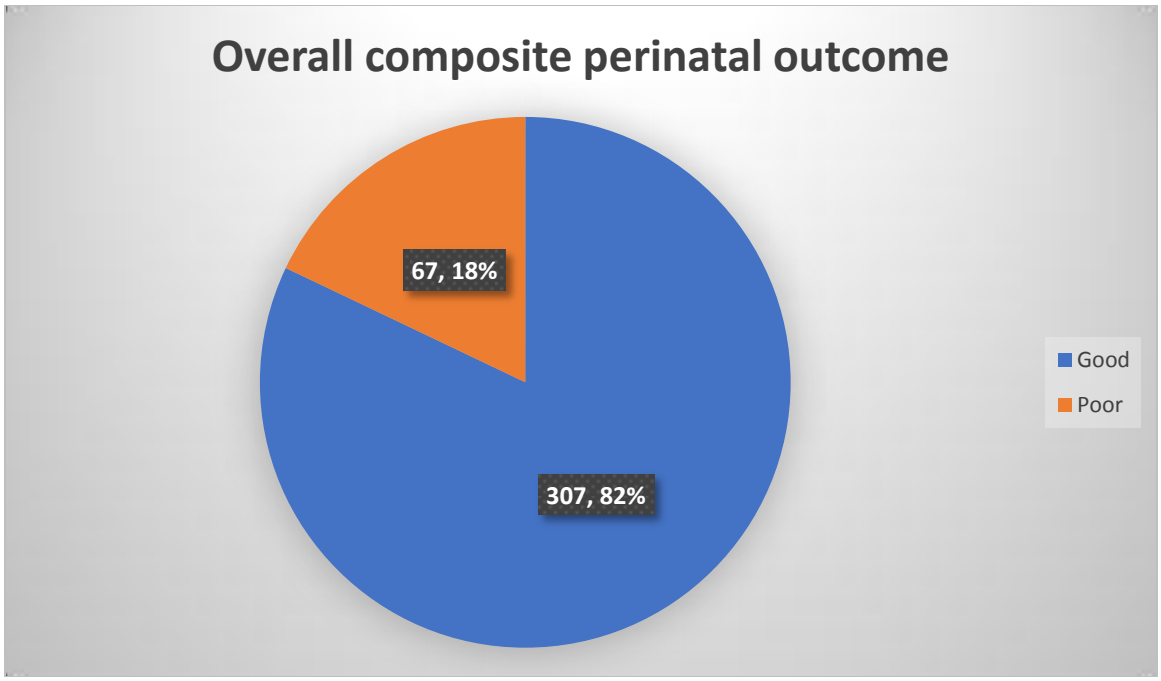

Figure 5. Overall composite perinatal outcome

5.14 The determinant factors of perinatal outcome of induction for PROM

Residency, gravidity, hypertension, preterm PROM, duration of ROM before labor, duration of ROM at delivery, mode of delivery, and maternal outcome were associated with composite perinatal outcome in the bivariate logistic regression analysis. Multivariate logistic regression revealed that multiparous women were 61% less likely to have a poor composite perinatal outcome compared to primigravida women (AOR = 0.39, 95% CI: 0.17–0.92). The odds of poor composite perinatal outcome were 13.2 times higher in participants with hypertensive disorders compared to those without (AOR = 13.2, 95% CI: 1.03–44.92). Participants whose mode of delivery was operative vaginal delivery (OVD) and cesarean section (CS) had 28.2 times (AOR = 28.2, 95% CI: 2.73–91.31) and 6.2 times (AOR = 6.2, 95% CI: 2.58–14.96) higher odds, respectively, of poor composite perinatal outcomes compared to those delivered by vaginal delivery (VD).

Table 10. The bivariate and multivariate logistic regression of association between perinatal outcome among neonate delivered after induction of prelabour rupture of membrane in three teaching hospitals of Addis Ababa university, 2025.

Variable	perinatal outcome		p-value	COR with 95%CI	P-value	AOR with 95%CI
	poor	good				
residency						
Urban	56	289	1		1	

rural	11	18	0.005	3.2(1.41, 7.04)	0.556	1.5(0.40, 5.44)
Gravidity						
One	33	110	1		1	
Two-four	27	186	0.011	0.48(0.28, 0.85)	0.032	**0.39(0.17, 0.92)**
Five and above	7	11	0.150	2.1(0.76, 5.91)	0.321	0.43(0.08, 2.29)
Hypertension						
Yes	18	26	0.000	3.9(2.02, 7.78)	0.000	**13.4(1.03, 44.92)**
no	49	281	1		1	
Preterm PROM						
Yes	33	13	0.000	21.9(10.54, 45.71)	0.000	**13.6(3.57, 90.10)**
No	34	294	1		1	
Duration of ROM before induction (hours)						
8-16	46	251	1		1	
16-24	10	44	0.576	1.2(0.58, 2.64)	0.817	0.89(0.29, 2.67)
>24	11	12	0.000	5.0(2.08, 12.02)	0.194	2.4(0.64, 9.36)
Duration of ROM at delivery (hours)						
<24	26	215	1		1	
≥24	41	92	0.000	3.7(2.13, 6.37)	0.020	**3.1(1.19, 7.87)**
Mode of delivery						
SVD	19	227	1		1	
OVD	2	2	0.016	11.9(1.59, 89.62)	0.005	**28.2(2.73, 91.31)**
CS	46	78	0.000	7.1(3.89, 12.75)	0.000	**6.2(2.58, 14.96)**
Maternal outcome						
Good	50	300	1		1	
Poor	17	7	0.000	14.6(5.75, 36.92)	0.207	2.3(0.62, 8.86)

6. Discussion

In this study, out of 374 pregnant women with PROM who underwent induction, 67% (n=250) had a successful induction of labor. This finding is consistent with studies conducted at Sir Ganga Ram Hospital in Lahore and Debre Markos University, which reported comparable outcomes(29), (30). The similarity suggests that with appropriate selection criteria and timely intervention, successful induction in PROM cases is achievable across different healthcare settings. The consistency across these studies reinforces the importance of optimizing induction protocols.

The study found that primiparous and multiparous women had significantly higher odds of successful PROM induction compared to nulliparous women 14 times and 11.05 times, respectively. This suggests that previous childbirth experience, whether one or more, contributes

positively to the likelihood of induction success. These results are consistent with findings from a study conducted in Israel (27). The increased success among primiparous and multiparous women may be attributed to improved cervical readiness and a more responsive uterus due to prior labor experience.

This study revealed that participants with term PROM had 4.9 times higher rates of successful induction compared to those with preterm PROM. This finding is supported by a similar study done in Israel (27). The higher success rate in term PROM cases may be due to several physiological and clinical factors. At term, the cervix is more likely to be favorable, and the uterus more responsive to induction agents, facilitating a smoother labor process. In contrast, preterm PROM often presents with an unripened cervix and increased risk of complications, such as infection or fetal intolerance to labor, which may lead to failed induction and increased likelihood of cesarean delivery.

The study found that participants without intrapartum complications had 15 times higher odds of successful induction compared to those who experienced complications. This strong association indicates that the absence of intrapartum complications significantly contributes to the success of labor induction in PROM cases. This finding emphasizes the critical role of close monitoring and timely management during labor to prevent complications and improve induction success.

The study showed a maternal complication rate of 6.4%, with PPH in 5.6% and SSI in 0.8% of cases. Among PPH cases, uterine atony was the leading cause (71.4%), followed by retained placental tissue (28.6%). These findings highlight the need for effective third-stage labor management and preparedness for managing PPH, particularly in PROM cases where risk may be elevated.

In this study, 18% of neonates experienced poor perinatal outcomes, with 16% requiring NICU admission. Among those admitted, 83.1% were successfully discharged, while 16.9% died. This finding is consistent with results from Sir Ganga Ram Hospital in Lahore (29). The elevated rate of NICU admissions and neonatal deaths may reflect complications commonly associated with PROM, such as prematurity, infection, or birth asphyxia. These outcomes highlight the importance of timely and appropriate obstetric and neonatal care in managing PROM to reduce perinatal risk.

The study showed that multiparous women were 61% less likely to experience a poor composite perinatal outcome compared to primigravida women (AOR = 0.39, 95% CI: 0.17–0.92). This suggests that previous childbirth experience may contribute to more favorable neonatal outcomes in PROM cases. Multiparous women often have more efficient labor progress, a lower likelihood of prolonged labor, and reduced need for interventions, all of which can positively impact neonatal well-being. In contrast, primigravida women may face longer labor durations and higher rates of complications, contributing to increased perinatal risk.

The study revealed that participants with hypertensive disorders had 13.2 times higher odds of experiencing poor composite perinatal outcomes compared to those without such conditions (AOR = 13.2, 95% CI: 1.03–44.92). This may be due to the fact that hypertensive disorders in pregnancy are known to compromise placental function, leading to issues like fetal growth restriction, preterm birth, and increased risk of fetal distress.

Participants whose mode of delivery was OVD and CS had 28.2 times (AOR = 28.2, 95% CI: 2.73–91.31) and 6.2 times (AOR = 6.2, 95% CI: 2.58–14.96) higher odds, respectively, of poor composite perinatal outcomes compared to those delivered vaginally. These findings may be explained by the fact that OVD and CS are often performed in response to labor complications such as fetal distress or failure to progress, which themselves are risk factors for adverse perinatal outcomes.

7. Strength and limitation of the study

7.1 Strength of the study

The study doesn't just examine induction success rate but also looks into, maternal and perinatal outcomes. This multidimensional analysis provides a balanced view of the effectiveness and safety of induction in PROM cases, useful for both clinicians and policymakers.

7.2 Limitation of the study

Timing of PROM (exact time when membrane ruptured) may rely on patient's recall. That could lead to misclassification of duration of rupture.

The study likely focuses on outcomes during labour, delivery, and immediate postpartum/perinatal period, but longer-term outcomes (in neonates' neurodevelopment, infections; in mothers: reproductive health, postpartum morbidity) are not assessed.

8. Conclusion

In this study, majority of women with PROM had successful induction of labor. Multiparity, term PROM, and absence of intrapartum complications were significantly associated with higher odds of successful induction. As compared to the general population of women in labour and delivery, there was no significant difference in the rate of maternal complications. Poor perinatal outcomes were observed in 18% of neonates, with 16% requiring NICU admission and a neonatal mortality rate of 2.7%. Multiparous women had better perinatal outcomes. Hypertensive disorders, OVD and CS had association with poor perinatal outcomes.

9. Recommendation

Based on findings of this study, induction of labour following premature rupture of membranes demonstrated a high success rate in achieving vaginal delivery without significant maternal or neonatal complications. Therefore, induction should be considered a safe and effective management strategy for PROM, particularly when appropriate patient selection and a standardized protocol is applied. Future larger, multicenter studies are recommended to validate these results and to identify additional predictors of successful induction with the aim of further optimizing outcomes.

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ANNEXES

Annex I: Participants information sheet

Hi there, I'm _____. As a member of the research team led by Dr Samson Kehali, who is pursuing his obstetrics and gynecology specialty at Addis Ababa University's College of Health Science, we are assessing Prevalence of successful induction, factors affecting & perinatal outcomes of induction for prelabour rupture of membrane in 3 teaching hospitals of AAU. I respectfully ask that you consider participating in the study by providing your attention.

The primary goal of this research is to contribute to the development of appropriate policies and programs that will enhance the quality of care provided by enhancing the better outcome management of PROM.

Study procedure: If you consent to take part, you will be questioned about your birth outcome of your baby and yours and some variables on sociodemographic and reproductive history, which may support the outcome variable. It should take about 50 minutes to complete the survey. You must comprehend and sign the consent form found in Annex II if you are willing to take part in this data.

Confidentiality: The data gathered will be kept private and utilized exclusively for study. The information gathered will only be accessible to the members of the research team, and participant personal information—such as name and phone number and card number—was not disclosed. The primary investigator alone will be able to view the password-protected soft copy of the data, while the hard copy will be stored in a locked cabinet. Nothing unique to any one participant will be reflected in the study's conclusions.

Benefits of the study: Your participation in the study has no any special privilege to you or no additional/ special service offered, and no payment will be granted. However, participating in the study and giving your factual information will be a great input to bring change in quality PROM induction and it’s outcome.

Risks of the study: In the procedure, you may feel some discomfort for wasting your time (a maximum of 50 minutes), but does not bear any risk. Furthermore, you will not be forced to respond to information you do not know.

Rights: Participation in this study is fully voluntary. You have the right to declare to participate

or not in this study. If you decide to participate, you are given the right to with draw from the Study at any time and also, you have the right not to answer that you do not want to answer.

Having stated information above, would you like to participate in this study?

1. Yes _____
2. No _____

Thank you for your collaboration!

If you have any questions regarding the study or would like to be informed of the result after its completion you can contact the principal investigator.

Address of the principal investigator:

Dr Samson Kehali

Mobile phone: +251 911040310

Annex II. Consent Form

Good morning/afternoon, I am Dr Samson Kehali an OB-GYN resident from AAU College of medicine and Health Sciences, department of obstetrics and gynecology, studying the prevalence of successful induction, factors affecting & perinatal outcomes of induction for prelabour rupture of membrane (PROM). Based on the information what you give me and other relevant information, the result of this study will help to develop a better service. I assure you that there are no risks of being involved in this study. Your trustworthy answers have paramount importance for the quality of the service. Your answers will be secured confidential.

Thank you very much for your commitment!

I understand that my participation is completely voluntary. I would like to take part in this study.

I would like to take part in this study.

- No (if so, thank her and continue her postpartum care)
- Yes

Institution name?

- TASH
- GMH
- ZMH

Annex III. Questionnaire

Please fill, encircle or tick your responses in front of the questions presented below.

Questionnaire Code: _____

Participant MRN: _____

Part 1: Socio-demographics

S. No.	Question	Response	Remark
101	Age in completed Years	_____ years	
102	Current Residence	1. Urban (specify town: _____) 2. Rural (specify region: _____)	
103	Marital Status	1. Married 2. Single 3. Widowed 4. Divorced 5. Other; specify: _____	
104	Highest Educational Level	1. No formal Education 2. Can read and write 3. Completed Primary education 4. Completed Secondary education 5. Completed TVT/ Preparatory 6. Completed 1st degree in College 7. Completed 2nd degree in college 8. Completed PhD 9. Postdoctoral	
105	Occupation (current)	1. Housewife 2. Student 3. Employee (specify Profession): _____ 4. Business woman (specify Business): _____ 5. Daily laborer 6. Other (specify) _____	
105	Partner's Highest Educational Level	1. No formal Education 2. Can read and write 3. Completed Primary education 4. Completed Secondary education 5. Completed TVT/ Preparatory 6. Completed 1st degree in College 7. Completed 2nd degree in college 8. Completed PhD 9. Completed Postdoctoral	
107	Partner's Occupation (current)	1. Not working 2. Employee (specify Profession): _____ 3. Business woman (specify Business): _____ 4. Daily laborer 5. Other (specify) _____	
108	Household Income per month	_____ Et Birr	

Part 2: Reproductive and Past Medical, Gynecologic and Surgical, and obstetric characteristics

S. No.	Question	Response	Remark
201	Gravidity	_____	
	Parity (multiple pregnancy as multiple deliveries)	_____	
202	Abortions	_____	
203	Ectopic	_____	
204	Stillbirths	0. No 1. Yes; specify number: _____	
205	Early Neonatal Deaths	0. No 1. Yes; specify number: _____	
206	Alive Children (number)	0. No 1. Yes; specify number: _____	
207	Previous Cesarean deliveries	0. No 1. Yes; specify number: _____	
208	Previous Breech vaginal deliveries	0. No 1. Yes; specify number: _____	
209	Prepregnancy Chronic Medical Illness	0. No 1. Yes	If 'No", skip to Part 3
210	Pregestational DM	0. No 1. Yes	If 'No', skip to 213
211	Duration of Pregestational DM	_____ years	
212	Current Treatment of Pregestational DM (multiple response possible)	1. Insulin; NPH ___IU, R ____IU 2. Oral Agent; specify _____ Dose: _____ Dose: _____	The recent dose before delivery
213	Hypertension	1. No _____ 2. Yes_____ (Specify)	If 'no', skip to 216
214	Type of hypertension	1. Chronic Hypertension _____ 2. Gestational hypertension _____ 3. Preeclampsia _____ 4. Superimposed PE _____ 5. Others (specify) _____ _____ _____	
215	Antihypertensive Medications	0. No 1. Yes; specify: _____ Dose: _____ Dose: _____	
216	Other Chronic medical illnesses present or within the past 3 months before the current pregnancy (multiple response is possible)	0. No 1. Yes; specify _____	
217	Other medications present or within the past 3 months before the current pregnancy	0. No 1. Yes; specify: _____Dose: _____ _____Dose: _____	

Part 3: Antepartal Characteristics

S. No.	Question	Response	Remark
301	LMP (dd/mm/yyyy)	_____	
302	Early Mile stone used (Like 1st fetal kick or positive hcG test result…)	_____ Date ____/____/_____	
303	Earliest US (Date and GA)	____/____/_____GA=___W___D	
304	Gestational Age (at delivery)	____Weeks____ Days	
305	ANC	0. No;	If 'Yes', skip to 307

		1. Yes	
306	Reason if 'No' ANC	_____	
307	Place of ANC (multiple response is possible)	1. Health Centre 2. Private Medium Clinic 3. Gov't Hospital 4. Private Hospital/Centre 5. Other (specify): _____	
308	Number of ANC Visits	_____	
309	Hemoglobin at delivery	____ g/dl	
310	VDRL result	0. Non-reactive 1. Reactive : a. Rx provided b. Rx not provided	
311	HBSAg result	0. Negative 2. Positive: a. Rx provided b. Rx not provided	
312	HIV/AIDS Screening	0. Non-reactive 1. Reactive: a. Rx provided b. Rx not provided	
313	Blood Group and Rh status	_____	If Rh is "+ve", skip to 316
314	Rh sensitization status	0. Not sensitized 1. Sensitized; specify titer: _____	
315	If Rh sensitized, specify complication (multiple response is possible)		
316	Early Pregnancy Complications	0. No 1. Yes	If 'No', skip to 320
317	Excessive Nausea and Vomiting (Hyperemesis gravidarum)	0. No 1. Yes; Admitted: 0. No, 1. Yes	
318	Early Pregnancy Bleeding (at GA <28 weeks)	0. No 1. Yes; GA at onset: ___W___D	
319	Other early pregnancy complications		
320	Obstetric Complications (Late pregnancy at GA >28 weeks)	0. No 1. Yes	If 'No', skip to Part 4
321	Pregnancy induced Hypertension	0. No 1. Yes: GA at Dx: ___W ____D	If 'No', skip to 325
322	Type of Hypertensive Disease	1. Preeclampsia syndrome 2. Gestational Hypertension 3. Superimposed Preeclampsia	
323	Severity of PIH	1. Mild/without severity features 2. Sever/with severity features	
324	PIH related Complications (multiple response is possible)	0. None 1. Eclampsia 2. Organ failure; specify: _____ 3. Pulmonary edema 4. APH 5. Fetal Death 6. Others (specify): _____	
325	Gestational Diabetes	1. No 2. Yes	If 'No', skip to 332
326	GA at Diagnosis of GDM	____W ___D	
327	Mode of Diagnosis	1. FBS only 2. OGTT 75gm	If 'FBS only', skip to 329

		3. OGTT 100gm	
328	OGTT Values	1. FBS= _____ mg/dl 2. 1 Hour=_____ mg/dl 3. 2 Hour=_____ mg/dl 4. 3 Hour=_____ mg/dl	
329	Treatment of GDM (multiple response is possible)	1. Non-medical (Diet and Exercise) 2. Insulin; NPH: ___ IU, R: ___ IU 3. Oral agent; Specify: _____ Dose: _____ _____ Dose: _____	Doses are the recent one before delivery
330	Glycemic Control (over the last 2-4 weeks before delivery)	1. FBS: _____ - ____ mg/dl 2. 2 hours post breakfast: ___ - ___ mg/dl 3. 2 hours post lunch: _____ - ____ mg/dl 4. 2 hours post dinner: ____ - ____ mg/dl	
331	GDM related Complications (multiple response is possible)	0. None 1. Macrosomia; EFW: _____g 2. Polyhydramnios 3. Others (specify): _____	
332	Antepartum Bleeding (at GA ≥ 28 weeks)	0. No 1. Yes; specify GA= ___weeks __Days	If 'No', skip to 335
333	If there is APH, specify Cause	_____	
334	APH related Complications (multiple response is possible)	0. None 1. Hemorrhagic Shock 2. Anemia 3. DIC 4. Fetal Death 5. Other (specify: _____)	
335	Preterm PROM	0. No 1. Yes; GA at Dx: ___ W____ D	If 'No', skip to 337
336	Risk factor for PROM (multiple response is possible)	1. Fall down accident 2. Urinary tract infection 3. Vaginitis/ Cervicitis 4. History of PROM in previous pregnancy 5. Smoking 6. Any drug (if yes, specify_____) 7. History of cervical procedures like cerclage 8. Other (if yes, specify_____)	
337	PROM related complications (multiple response is possible)	0. None 1. Chorioamnionitis (IAI) 2. Cord prolapse 3. Others (specify: _____)	If IAI is diagnosed: - Abdominal pain? - Foul smelling discharge? - Fetal tachycardia? - PR= - T'= - WBC=
338	Other late trimester complications	_____	
339	Antenatal steroid Treatment	0. No 1. Yes; specify the drug given: _____	
340	If 'Yes' to 339, specify number of courses	_____	
341	Is prophylactic antibiotics given?	0. No 1. Yes; specify _____	

Part 4: Labor and Delivery

S. No.	Question	Response	Remark
401	Onset of Labor	1. Spontaneous 2. Induced	If 'spontaneous', skip to 407
402	Reason for Induction (multiple indication possible	_____ _____	
403	Bishop's score	_____/ _____	
404	Cervical ripening used	0. No _____ 1. Yes _____	If 'no', skip to 406
405	Method of ripening used (multiple response possible)	1. Misoprostol _____ 2. Catheter _____ 3. ARM _____ 4. Others (specify) _____ _____	
406	Method of Induction (multiple response possible)	1. Oxytocin 2. Misoprostol 3. Other (specify: _____)	
407	Duration of ROM before labor	____ Days ____Hours ____Mins	(IF PROM, enter latency period but if ROM during labor enter 0)
408	DURATION OF LABOR before delivery (be it CS or VD) (with labor contraction)	_____	If no contraction & delivered by CS, enter 0
409	Duration of ROM before delivery	___ Days ____Hours ____Mins (It's the sum of the above two)	Latency period + labour duration if PROM
410	Status of Liquor at ROM	0. Clear 1. G1MS 2. G2MS 3. G3MS 4. Bloody	
411	Intrapartum Complications (Multiple response is possible)	0. None 1. NRFHR Pattern; specify: _____ 2. Spontaneous Uterine Rupture 3. Rupture/ dehiscence of previous scar 4. Intrapartum Fetal Death 5. MSAF 6. Uterine Hyperstimulation 7. Other (specify: _____)	
412	Liquor Status at Delivery	0. Clear 1. G1MS 2. G2MS 3. G3MS 4. Bloody	
413	Mode of Delivery	1. SVD 2. Breech Vaginal Delivery; specify type: 1. Spontaneous VBD, 2. Assisted VBD, 3. Total breech extraction 3. CD (Cesarean Delivery) 4. Vacuum Delivery; specify application: _____ 5. Forceps Delivery; specify application:	If '1 or 2', skip to part 5

		_____ 6. Destructive Vaginal Delivery: specify: 7. Laparotomy	
414	Indication for CD/Instrument/Lap/ DVD	_____	
415	If CD, specify Urgency	1. Elective/Planned 2. Emergency	
416	If CD, Type of Uterine Incision	0. Low transverse 1. Classical 2. Inverted T 3. Other (specify: _____)	
417	Intraoperative complications (multiple response is possible)	0. None 1. Excessive Bleeding 2. Visceral injury; (specify organ: _____) 3. Uterine/vaginal Extension 4. Difficult extraction 5. Other (specify: _____)	
418	Other intraoperative Procedures (multiple response is possible)	0. None 1. Adhesion release 2. Tubal Ligation 3. Repair of extension 4. Uterine/ovarian artery ligation 5. Internal iliac artery ligation 6. Uterine Compression suture 7. Hysterectomy 8. Bladder repair 9. Bowel repair 10. Blood transfusion 11. Other (specify): _____	
419	Duration of surgery	_____ hours_____ minutes	
420	Estimated Blood loss	_____ ml	
421	Postoperative/delivery Hgb	_____ gm/dl	
422	Postoperative complications (multiple response is possible)	0. None 1. PPH 2. Puerperal Fever; specify cause: _____ 3. Surgical Site infection; 1. Superficial SSI, 2. Deep SSI, 3. Organ Space 4. Anemia; specify Hgb: ____ gm/dl 5. Others (specify: _____)	
423	If 'PPH', specify the cause	1. Uterine atony 2. Retained Placental tissue 3. Uterine rupture/dehiscence 4. Vaginal tear 5. Cervical tear 6. Perineal tear; specify grade: _____ 7. Episiotomy extension 8. Uterine Inversion	

		9. Pelvic Hematoma; specify: _____ 10. Other (specify: _____)	

Part 5: Neonatal Outcome

S. No.	Question	Response	Remark
501	Sex	1. Male 2. Female 3. Ambiguous genitalia	
502	Birthweight in grams	_____ gms	
503	Gestational age at delivery	_____ weeks	
504	Neonatal Outcome	1. STILBIRTH 2. Early neonatal death (if END, age at death =_____ days 3. Alive	If 'Alive/early ND', skip to 507
505	If stillborn, specify timing	1. Intrapartum 2. Antepartum	
506	If stillborn, specify GA at death	___Weeks ___Days	If died in labor, GA is the same as GA at delivery, if before labor, it is < GA at delivery
507	1st min. APGAR score	____	(0 for SB)
508	5th min. APGAR score	____	(0 if death <5 min
509	10th min. APGAR score	____	(0 if death <10 min
510	Resuscitation required (Circle all that are applied)	0. None (only basic support) 1. Intra nasal Oxygen support 2. Bag and Mask ventilation 3. Endotracheal Intubation 4. Cardiac compression 5. Other (specify: _____)	
511	NICU referral	0. No 1. Yes	If 'No', skip to 516
512	Reason for Referral (diagnosis @ referral) (Multiple reasons are possible)		
513	NICU Admission (>24 hrs)	0. No 1. Yes; Duration: ____Days ____ Hrs	If 'No', skip to 516
514	Duration of NICU Stay (be it alive if dead at discharge)	_____ Days and _____ Hours	
515	NICU Admission Diagnosis (problem list as treated in the NICU)	_____	
516	Overall Outcome	1. Alive 2. Stillbirth 3. ENND (within 7 days of delivery)	If 'Alive', you are done. *(If discharged alive it is alive even if discharged before 7 days)*
517	If it's 'ENND', specify place of Death	1. Labor ward 2. NICU	
518	Identified Cause of Death (Multiple response is possible)	0. None 1. Yes; (specify) _____ _____ _____	