

## Maternal and Neonatal Outcomes Post-delivery in Spontaneous Rupture of Membrane (SROM) at Term

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### Abstract

**Background:** Spontaneous rupture of membranes (SROM) at term occurs naturally before labour, affecting about 8–10% of pregnancies. Influenced by biochemical, mechanical, and infectious factors, SROM may lead to vaginal or caesarean delivery. Prolonged rupture increases maternal infection risks (chorioamnionitis, endometritis) and neonatal complications (sepsis, respiratory distress), impacting short- and long-term outcomes for both mother and baby.

**Keywords:** Maternal, Neonatal Outcomes, Spontaneous Rupture of Membrane (SROM), Term pregnancy.

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### Introduction

**S**pontaneous rupture of membranes (SROM)

refers to the natural breaking of the amniotic sac, leading to the leakage of amniotic fluid before the onset of labour, typically occurring at or beyond 37 weeks of gestation. (1) SROM at term is a common occurrence in obstetric practice, with studies

estimating that it happens in approximately 8-10% of all pregnancies before the onset of labour. (2)

The amniotic membranes undergo enzymatic remodeling, leading to weakening and eventual rupture. Increased levels of inflammatory cytokines and prostaglandins facilitate this process. Maternal infections, particularly chorioamnionitis or bacterial vaginosis, can lead to premature membrane

weakening due to the release of inflammatory mediators and bacterial enzymes. (3,4,5)

The mode of delivery following SROM at term depends on various factors, including the progression of labour, foetal well-being, and maternal health conditions (6). Prolonged rupture of membranes increases the risk of ascending infections, which can affect both the mother and the newborn. (7,8)

Birth weight and APGAR scores are key indicators of neonatal well-being following SROM at term. (9) Prolonged rupture of membranes (>18-24 hours) increases the risk of ascending infections that can affect the newborn (10). Respiratory complications can arise in neonates born after SROM, particularly in cases of delayed labour progression or associated infections (11).

Two main approaches are considered following SROM at term: expectant (watchful waiting) and active (intervention-based) management. (12). Expectant management is often limited to 12–24 hours post-rupture, after which induction is recommended to reduce infection risk (12, 13). Active Management (Early Induction) involves stimulating labour soon after SROM to reduce infection risk and shorten the time to delivery. (14)

Aim of the study: To determine the maternal and neonatal outcomes post-delivery in spontaneous rupture of membrane at term.

## Patients and Methods

A prospective cross-sectional study was conducted at the Obstetrics & Gynecology Department at Alfayhaa Teaching Hospital, Basrah Governorate, Iraq. During the period from 1<sup>st</sup> of October 2024 to 1<sup>st</sup> of September 2025. Pregnant women who presented with spontaneous ROM at term  $\geq 37$  weeks and singleton pregnancy during the study period were included in the study. Cases were selected by a random sampling technique. The Confirmation of ROM is done by direct visualization or the Fern test.

### 2.2.1. Exclusion criteria

- Preterm ROM (<37 weeks of gestation).
- Multiple pregnancies.
- Presence of significant comorbidities or obstetric complications (e.g., preeclampsia, placental abruption).
- History of previous complications, such as a contracted pelvis or cephalopelvic disproportion.

All participants were interviewed using a structured questionnaire, which covered the following aspects: age, place of residence, occupation, level of education, gravidity, parity, history of abortion, gestational age at presentation, and any complications during the current pregnancy. An assessment of the women's past medical and surgical history, as well as the mode of delivery in previous pregnancies.

All participants underwent a physical examination focusing on the measurement of blood pressure, heart rate, respiratory rate, and body temperature. Determined using the last menstrual period and confirmed through ultrasonography. Weight and height were recorded to calculate the body mass index (BMI). Blood samples were collected and sent for routine blood investigations.

The women were followed up till delivery, and Bishop's score was noted by pelvic examination. The mode of delivery was recorded as normal vaginal delivery, assisted vaginal delivery or cesarean section. The duration between the SROM and the delivery was also recorded, and if women need an induction of labour after SROM.

- The maternal outcome includes the following: duration of labour, Postpartum Hemorrhage, Maternal Infections (like Chorioamnionitis and endometritis), and duration of hospital stay.
- The neonatal outcome includes the following: birth weight in grams, NICU admission, and its indication, neonatal sepsis, respiratory distress, or jaundice and neonatal mortality.

The official agreement was obtained from the ethical committee at the College of Medicine, University of

Basrah. Informed consent will be secured from all participants, ensuring confidentiality and the right to withdraw at any time without repercussions.

Data entry and analysis were conducted using SPSS software, version 26. A p-value of  $\leq 0.05$  was considered statistically significant, and results were displayed in tables and/or graphs.

## Results

The study included 50 women who experienced spontaneous rupture of membranes (SROM) at term. The participants were young, with a mean age of  $24.96 \pm 5.96$  years, mostly between 20 and 29 years (54%), and predominantly housewives (80%). Educational levels were low, with over half having only primary education. A larger proportion (64%) lived in urban areas, which may reflect better access to healthcare services. These data are presented in Table 3.1.

**Table 3.1: Demographic and Socioeconomic Characteristics of Study Participants**

| Variables         |                  | No.              | %    |
|-------------------|------------------|------------------|------|
| Age               | Mean $\pm$ SD    | 24.96 $\pm$ 5.96 |      |
|                   | (range)          | (18-39)          |      |
|                   | <20              | 8                | 16.0 |
|                   | 20-29            | 27               | 34.0 |
|                   | 30-39            | 15               | 30.0 |
| Educational level | Primary          | 26               | 52.0 |
|                   | Secondary        | 14               | 28.0 |
|                   | Higher education | 10               | 20.0 |
| Occupation        | Housewife        | 40               | 80.0 |
|                   | Employed         | 10               | 20.0 |
| Residency         | Peripheries      | 18               | 36.0 |
|                   | City center      | 32               | 64.0 |

In terms of obstetric history, nulliparity was reported in 38%, with a notable proportion (14%) having had five or more previous deliveries. Most women had no history of abortion (68%), and a minority had more than two abortions. Regarding complications during the current pregnancy, anemia was the most common (30%), followed by hypertension (20%), while gestational diabetes was rare (2%). Among the 31

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women with a previous birth, vaginal delivery was most common (67.7%), though nearly one-third had a prior cesarean section. A history of premature rupture of membranes (PROM) was reported in 14% of participants. As shown in Table 3.2.

**Table 3.2: Obstetric History and Current Pregnancy Complications**

| Variables                                         |                           | No. | %     |
|---------------------------------------------------|---------------------------|-----|-------|
| Parity                                            | Nullipara                 | 19  | 38.0  |
|                                                   | 1-4                       | 24  | 48.0  |
|                                                   | >5                        | 7   | 14.0  |
| Abortion                                          | 0                         | 34  | 68.0  |
|                                                   | 1-2                       | 13  | 26.0  |
|                                                   | >3                        | 3   | 6.0   |
| History of current pregnancy complications        | HTN                       | 10  | 20    |
|                                                   | Gestational diabetes      | 1   | 2.0   |
|                                                   | Anemia                    | 15  | 30.0  |
| Mode of delivery in the previous pregnancy (n=31) | Vaginal delivery          | 21  | 67.7  |
|                                                   | Assisted vaginal delivery | 1   | 3.2   |
|                                                   | Cesarean section          | 9   | 29.1  |
| History of PROM                                   |                           | 7   | 14.0  |
| Total                                             |                           | 50  | 100.0 |

Delivery characteristics in women with SROM at term revealed that most delivered at a mean gestational age of  $38.7 \pm 0.99$  weeks. The majority underwent vaginal delivery (62%), while 34% had cesarean sections, and a small proportion required assisted vaginal delivery. Notably, only 20% labored immediately after SROM, while 52% began labor after 6–12 hours, and 28% after more than 12 hours. Induction of labor was required in 68% of cases, indicating that spontaneous labor did not initiate promptly in many women. The average labor duration was  $5.66 \pm 4.21$  hours, with some labors lasting as long as 27 hours. As shown in Table 3.

**Table 3.3: Delivery Characteristics and Labor Outcomes in Women with SROM at Term**

| Variables                             |                           | No.                    | %    |
|---------------------------------------|---------------------------|------------------------|------|
| Gestational age at delivery           | Mean± SD (range)          | 38.7± 0.99 (37.0-40.0) |      |
| Mode of delivery                      | Vaginal delivery          | 31                     | 62.0 |
|                                       | Assisted vaginal delivery | 2                      | 4.0  |
|                                       | Cesarean section          | 17                     | 34.0 |
| Labor After SROM                      | Immediate                 | 10                     | 20.0 |
|                                       | After 6-12 hours          | 26                     | 52.0 |
|                                       | After >12 hours           | 14                     | 28.0 |
| Induction of Labor Required Post-SROM | Yes                       | 34                     | 68.0 |
|                                       | No                        | 16                     | 32.0 |
| Duration of labour                    | Mean± SD (range)          | 5.66± 4.21 (2-27)      |      |

Maternal postpartum outcomes showed that postpartum hemorrhage (PPH) occurred in 16%, while maternal infections were observed in 6% of women. The mean duration of hospitalization was  $24.1 \pm 4.1$  hours, with a wide range of 4 to 48 hours. As shown in Table 3.4.

**Table 3.4: Maternal Postpartum Outcomes Following SROM**

| Maternal outcomes           | No.              | %                     |
|-----------------------------|------------------|-----------------------|
| PPH                         | 8                | 16.0                  |
| Maternal infection          | 3                | 6.0                   |
| Duration of hospitalization | Mean± SD (range) | $24.1 \pm 4.1$ (4-48) |

Neonatal outcomes following SROM showed that the mean birth weight was  $3.59 \pm 0.42$  kg, within the normal range. However, 30% of newborns required NICU admission, with respiratory distress (30%), jaundice (28%), and hypoglycemia (16%) being the

most frequent complications. Neonatal sepsis was relatively rare (4%) but clinically significant. As shown in Table 3.5.

**Table 3.5: Neonatal Outcomes Post-Delivery in SROM Cases**

| Neonatal outcome     | No.              | %                         |
|----------------------|------------------|---------------------------|
| Birth weight         | Mean± SD (range) | $3.59 \pm 0.42$ (3.0-4.2) |
| NICU admission       | 15               | 30.0                      |
| Neonatal sepsis      | 2                | 4.0                       |
| Respiratory distress | 15               | 30.0                      |
| Hypoglycemia         | 8                | 16.0                      |
| Jaundice             | 14               | 28.0                      |

## Discussion

Spontaneous rupture of membranes (SROM) at term is a critical event in obstetrics, with important implications for both maternal and neonatal outcomes (2). This study aimed to evaluate the sociodemographic, obstetric, maternal, and neonatal outcomes of women presenting with SROM at term in a tertiary hospital setting in Basrah, Iraq. Understanding these outcomes is essential for optimizing clinical decision-making, guiding interventions such as induction of labour, and preventing adverse maternal and neonatal complications.

The mean age of participants was  $24.96 \pm 5.96$  years, with the majority (64%) residing in urban areas and 80% identified as housewives. Nearly half of the participants had only primary education (52%). This sociodemographic profile aligns with regional patterns observed in Iraq and other low- to middle-income countries (LMICs) as reported by Saleheen et al. (2021) and Saleh et al. (2022) (15, 16).

The mean gestational age at delivery was  $38.7 \pm 0.99$  weeks, which aligns with the expected term period. The majority of women (62%) had vaginal deliveries, while 34% underwent caesarean sections (CS). Notably, 68% required induction of labour post-SROM. The mean labour duration was  $5.66 \pm 4.21$  hours. In contrast to global trends, as evidenced by a

study from Dayal S et al. (2025) (2), where induction rates post-SROM range from 40–60%, the relatively higher induction rate observed here may reflect local practice patterns or delayed spontaneous labour onset.

A delay in labour onset after SROM was evident, with only 20% experiencing immediate labour. Over half (52%) began labour within 6–12 hours, and 28% after more than 12 hours.

Postpartum haemorrhage (PPH) was noted in 16% of cases, and maternal infection occurred in 6%. The average hospital stay was  $24.1 \pm 4.1$  hours. These findings are within expected ranges but highlight the potential complications of delayed labour or prolonged rupture duration. The incidence of PPH aligns with WHO estimates of 10–20%, particularly in primigravidas and induced labours (17). Although maternal infections were relatively low, the presence of chorioamnionitis and endometritis remains a concern, especially with prolonged rupture of membranes beyond 12 hours.

The mean birth weight was  $3.59 \pm 0.42$  kg, which is within the normal range. However, NICU admission was required in 30% of neonates, primarily due to respiratory distress (30%), jaundice (28%), hypoglycaemia (16%), and neonatal sepsis (4%). A previous study by Zhuang et al. (2022) (18) has shown that SROM can increase the risk of neonatal infection and respiratory complications due to the delayed onset of labour and ascending infections. The NICU admission rate in this study is higher than in some high-income settings but may reflect limitations in immediate neonatal support or a lower threshold for NICU admission in this population (19).

Respiratory distress (30%) and jaundice (28%) were the most frequently reported neonatal complications. Although neonatal sepsis occurred in only 4% of cases, it remains a serious complication warranting early antibiotic administration and close monitoring, especially in those with delayed labour or maternal infection(20).

The observed CS rate (34%) is consistent with WHO-reported rates in middle-income countries (21). The [10.33762/mjbu.2026.170030.1350](https://doi.org/10.33762/mjbu.2026.170030.1350)

relatively high NICU admission and complication rates reinforce the need for protocols targeting timely labour induction and intrapartum monitoring. A study by van der Ham et al. (2012) emphasized that prompt induction following SROM at term reduced infectious morbidity without increasing CS rates—a finding that supports current clinical practices and justifies early intervention in our setting(22).

The findings of this study support the need for active management of labour following SROM at term, particularly among nulliparous women and those with limited access to antenatal care. The presence of maternal anaemia and hypertensive disorders should be closely monitored, and induction of labour should be considered if spontaneous labour does not begin within 6–12 hours to reduce infection risk. Neonatal surveillance should also be intensified in cases with delayed labour onset to minimize complications such as hypoglycaemia, jaundice, or respiratory distress.

## Conclusion

Spontaneous rupture of membranes at term often requires labour induction and leads to higher cesarean rates, maternal morbidity, and neonatal complications. Delayed labour onset and limited maternal education contributed to adverse outcomes. Maternal complications included postpartum haemorrhage (16%) and infection (6%), indicating that SROM at term can contribute to increased maternal morbidity, especially when labour is prolonged. Neonatal complications were notable, with high rates of NICU admission (30%), respiratory distress (30%), jaundice (28%), and hypoglycaemia (16%), suggesting that SROM poses considerable risks to neonatal health. A longer interval between SROM and labour onset was associated with adverse outcomes, highlighting the importance of timely delivery.



## Recommendations

- Implement clear clinical protocols for the management of SROM at term, including timely induction (within 6–12 hours) to reduce maternal and neonatal infection risk.
- Strengthen antenatal care education, especially for young and low-education women, to promote early reporting and monitoring of membrane rupture.
- Conduct further multicentre studies to evaluate long-term outcomes of neonates born after SROM and to identify predictors of poor outcomes for early intervention.

## References

1. Greater Manchester and Eastern Cheshire SCN. Pre-Labour Spontaneous Rupture of Membranes (SROM) at Term (>37 weeks) Guideline . NHS; 2018. Available from: <https://www.england.nhs.uk/north-west/wp-content/uploads/sites/48/2019/03/GMEC-SROM-Term-37-weeks-plus-guidelines.pdf>
2. Dayal S, Jenkins SM, Hong PL. Preterm and Term Prelabor Rupture of Membranes (PPROM and PROM) [Updated 2024 Oct 31]. In: StatPearls . Treasure Island (FL): StatPearls Publishing; 2025. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK532888/>
3. Menon R, Richardson LS, Lappas M. Fetal membrane architecture, aging and inflammation in pregnancy and parturition. *Placenta*. 2019;79:40-45.
4. Lin D, Hu B, Xiu Y, Ji R, Zeng H, Chen H, Wu Y. Risk factors for premature rupture of membranes in pregnant women: a systematic review and meta-analysis. *BMJ Open*. 2024;14(3):e077727.
5. Enjamo M, Deribew A, Semagn S, Mareg M. Determinants of Premature Rupture of Membrane (PROM) Among Pregnant Women in Southern Ethiopia: A Case-Control Study. *Int J Womens Health*. 2022;14:455-466.
6. Neu J, Rushing J. Cesarean versus vaginal delivery: long-term infant outcomes and the hygiene hypothesis. *Clin Perinatol*. 2011;38(2):321-31.
7. Tita AT, Andrews WW. Diagnosis and management of clinical chorioamnionitis. *Clin Perinatol*. 2010;37(2):339-54.
8. Moldenhauer JS. Postpartum Endometritis [Internet]. MSD Manual Professional Edition. [cited 2025 Feb 10]. Available from: <https://www.msdmanuals.com/professional/gynecology-and-obstetrics/postpartum-care-and-associated-disorders/postpartum-endometritis>
9. Junior LCM, Pinto CN, Gerencer CS, Pro ECG, de Carvalho HB. Association of maternal, fetal and labor variables with a low Apgar score in the fifth minute in term pregnancy: a case-control study. *Arch Gynecol Obstet*. 2023;308(5):1473-1483.
10. Al-Lawama M, AlZaatreh A, Elrajabi R, Abdelhamid S, Badran E. Prolonged Rupture of Membranes, Neonatal Outcomes and Management Guidelines. *J Clin Med Res*. 2019;11(5):360-366.
11. Sweet LR, Keech C, Klein NP, Marshall HS, Tagbo BN, Quine D, Kaur P, Tikhonov I, Nisar MI, Kochhar S, Muñoz FM; Brighton Collaboration Respiratory Distress in the

- Neonate Working Group. Respiratory distress in the neonate: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. *Vaccine*. 2017;35(48 Pt A):6506-6517.
12. Ramirez-Montesinos L, Downe S, Ramsden A. Systematic review on the management of term prelabour rupture of membranes. *BMC Pregnancy Childbirth*. 2023;23(1):650.
  13. Hagen ID, Bailey JM, Zielinski RE. Outcomes of Expectant Management of Term Prelabor Rupture of Membranes. *J Obstet Gynecol Neonatal Nurs*. 2021; 50(2):122-132.
  14. Melamed N, Berghella V, Ananth CV, Lipworth H, Yoon EW, Barrett J. Optimal timing of labor induction after prelabor rupture of membranes at term: a secondary analysis of the TERMPROM study. *Am J Obstet Gynecol*. 2023;228(3):326.e1-326.e13.
  15. Saleheen AAS, Afrin S, Kabir S, Habib MJ, Zinnia MA, Hossain MI, Haq I, Talukder A. Sociodemographic factors and early marriage among women in Bangladesh, Ghana and Iraq: An illustration from Multiple Indicator Cluster Survey. *Heliyon*. 2021 May 25;7(5):e07111.
  16. Saleh AM, Othman SM, Ismail KH, Shabila NP. Exploring Iraqi people's perception about early marriage: a qualitative study. *BMC Womens Health*. 2022;22(1):393.
  17. Robertson K, Hardingham I, D'Arcy R, Reddy A, Clacey J. Delay in the induction of labour process: a retrospective cohort study and computer simulation of maternity unit workload. *BMJ Open*. 2021 Sep 7;11(9):e045577.
  18. Zhuang L, Li ZK, Zhu YF, Ju R, Hua SD, Yu CZ, Li X, Zhang YP, Li L, Yu Y, Zeng W, Cui J, Chen XY, Peng JY, Li T, Feng ZC. Latency period of PROM at term and the risk of neonatal infectious diseases. *Sci Rep*. 2022 Jul 18;12(1):12275.
  19. Talisman S, Guedalia J, Farkash R, Avitan T, Srebnik N, Kasirer Y, Schimmel MS, Ghanem D, Unger R, Grisaru Granovsky S. NICU Admission for Term Neonates in a Large Single-Center Population: A Comprehensive Assessment of Risk Factors Using a Tandem Analysis Approach. *J Clin Med*. 2022 Jul 22;11(15):4258.
  20. Attia Hussein Mahmoud H, Parekh R, Dhandibhotla S, Sai T, Pradhan A, Alugula S, Cevallos-Cueva M, Hayes BK, Athanti S, Abdin Z, K B. Insight Into Neonatal Sepsis: An Overview. *Cureus*. 2023 Sep 19;15(9):e45530
  21. Angolile CM, Max BL, Mushemba J, Mashauri HL. Global increased cesarean section rates and public health implications: A call to action. *Health Sci Rep*. 2023 May 18;6(5):e1274.
  22. 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 Med*. 2012;9(4):e1001208.