



Original Article

Maternal and Neonatal Outcomes in Term Pregnancies with Oligohydramnios: A Retrospective Study

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ABSTRACT

Background: Oligohydramnios at term may be associated with increased obstetric intervention and adverse neonatal outcomes. However, its effect on maternal and neonatal outcomes remains variable across studies. This study assessed maternal and neonatal outcomes in term pregnancies complicated by oligohydramnios.

Methods: This retrospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital. A total of 120 women with singleton term pregnancies (≥ 37 weeks) diagnosed with oligohydramnios by ultrasonography using an amniotic fluid index (AFI) ≤ 5 cm were included during January–December 2025. Maternal and neonatal outcomes were retrieved from hospital records. Categorical variables were analyzed using the Chi-square test and continuous variables using the Student's t-test, with $p < 0.05$ considered statistically significant.

Results: The mean maternal age was 26.5 ± 4.2 years and the mean gestational age at delivery was 38.5 ± 1.0 weeks. The mean AFI was 4.1 ± 0.8 cm, with severe oligohydramnios (AFI ≤ 2 cm) in 16.7% of women. Induction of labor was performed in 64.2%, and cesarean delivery occurred in 63.3%. Non-reassuring fetal heart rate/fetal distress was the most common indication for cesarean delivery (50.0%). The mean neonatal birth weight was 2.71 ± 0.43 kg, with low birth weight in 28.3% of neonates. Meconium-stained liquor occurred in 24.2%, Apgar score < 7 at 1 minute in 11.7%, and at 5 minutes in 4.2%. NICU admission was required in 20.0% of neonates. Cesarean delivery was significantly more frequent among women with AFI ≤ 2 cm than among those with AFI > 2 –5 cm (85.0% vs. 59.0%, $p = 0.018$). NICU admission was higher in the severe oligohydramnios group (35.0% vs. 17.0%), but the difference was not statistically significant ($p = 0.087$).

Conclusion: Term pregnancies complicated by oligohydramnios were associated with a high frequency of obstetric intervention, particularly cesarean delivery for non-reassuring fetal status. Severe oligohydramnios was significantly associated with cesarean delivery but not with NICU admission. Careful antenatal assessment and

intrapartum fetal monitoring are important for optimizing maternal and neonatal outcomes.

Keywords: Oligohydramnios; Term pregnancy; Amniotic fluid index; Cesarean delivery; Fetal distress; Neonatal outcome; Maternal outcome.

INTRODUCTION

Oligohydramnios is an important obstetric condition characterized by an abnormally reduced volume of amniotic fluid. Amniotic fluid has a vital role in fetal growth and development, allowing fetal movement, protecting the umbilical cord from compression, facilitating normal pulmonary development, and providing a protective environment for the fetus. Reduction in amniotic fluid volume may therefore be associated with impaired fetal well-being, particularly during the intrapartum period. Ultrasonographic assessment of amniotic fluid is commonly performed using either the amniotic fluid index (AFI) or the single deepest vertical pocket. An AFI of ≤ 5 cm or a single deepest vertical pocket of < 2 cm is generally considered consistent with oligohydramnios.¹

Oligohydramnios may occur secondary to several maternal, fetal, placental, and pregnancy-related conditions, including fetal growth restriction, placental insufficiency, hypertensive disorders, ruptured membranes, congenital fetal abnormalities, and post-term pregnancy. In some cases, particularly at term, no underlying cause can be identified and the condition is classified as isolated oligohydramnios. The clinical significance of isolated oligohydramnios at term remains controversial because reduced amniotic fluid may represent a marker of placental insufficiency, while some pregnancies with isolated oligohydramnios have otherwise favorable outcomes.^{1,2}

At term, oligohydramnios is of particular clinical concern because reduced amniotic fluid may increase umbilical cord compression during uterine contractions and consequently contribute to fetal heart rate abnormalities, meconium-stained amniotic fluid, and operative delivery. The presence of oligohydramnios may also influence obstetric decision-making, particularly regarding induction of labor and cesarean delivery. A retrospective study of 412 low-risk term pregnancies reported higher rates of induction, operative vaginal delivery, and cesarean delivery among pregnancies with isolated oligohydramnios compared with pregnancies having normal amniotic fluid, although neonatal outcomes did not differ significantly between the groups.²

Evidence regarding neonatal outcomes, however, has been inconsistent. Recent studies have reported increased rates of certain adverse perinatal outcomes, including small-for-gestational-age birth and cesarean delivery for fetal distress, whereas other studies have found no significant differences in birth weight, Apgar scores, or NICU admission.^{3,4} This variation may be explained by differences in diagnostic criteria, gestational age, study populations, inclusion of associated maternal and fetal conditions, and approaches to obstetric management. A recent retrospective study of term pregnancies also found that both borderline oligohydramnios and oligohydramnios were associated with a higher composite adverse perinatal outcome compared with normal amniotic fluid volume.³

Because oligohydramnios may be associated with an increased risk of stillbirth, fetal surveillance is frequently considered when the condition is diagnosed. The American College of Obstetricians and Gynecologists (ACOG) recognizes isolated oligohydramnios, particularly when the single deepest vertical pocket is < 2 cm, as a condition for which once- or twice-weekly antenatal fetal surveillance may be considered when delivery is not undertaken.¹ This reflects the importance of identifying pregnancies at increased risk while also avoiding unnecessary intervention in pregnancies in which neonatal outcome is otherwise expected to be favorable.

Despite the frequency with which oligohydramnios is encountered in clinical practice, uncertainty persists regarding its influence on the mode of delivery and neonatal outcomes at term. Evaluating these outcomes in individual institutions is particularly relevant because management practices, thresholds for induction, availability of fetal surveillance, and indications for cesarean delivery may vary. Therefore, the present study was undertaken to assess maternal and neonatal outcomes in term pregnancies complicated by oligohydramnios.

MATERIALS AND METHODS:

Study Design and Setting

This was a retrospective observational study conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital after obtaining approval from the Institutional Ethics Committee. The study included women with term

pregnancies complicated by oligohydramnios who delivered at the institution during the one-year study period from January 2025 to December 2025.

Study Population

Women with singleton term pregnancies diagnosed with oligohydramnios and delivered during the study period were identified from hospital records. Relevant maternal, obstetric, and neonatal data were retrieved from the medical records and analyzed.

Inclusion Criteria

Women fulfilling the following criteria were included:

1. Singleton pregnancy.
2. Gestational age ≥ 37 completed weeks.
3. Oligohydramnios diagnosed by ultrasonography.
4. Delivery at the study institution during the study period.
5. Availability of adequate maternal and neonatal records.

Exclusion Criteria

The following cases were excluded:

1. Preterm pregnancies (< 37 completed weeks).
2. Multiple pregnancies.
3. Major congenital fetal anomalies.
4. Intrauterine fetal death diagnosed before the onset of labor.
5. Cases with incomplete relevant clinical or neonatal records.

Diagnosis of Oligohydramnios

Oligohydramnios was diagnosed by obstetric ultrasonography based on an amniotic fluid index (AFI) of ≤ 5 cm. The AFI was determined using the four-quadrant technique by measuring the deepest vertical fluid pocket in each quadrant and summing the four measurements.

Data Collection

Data were collected retrospectively using a structured data collection proforma. Maternal variables included maternal age, gravidity, parity, gestational age, relevant antenatal complications, AFI, induction of labor, mode of delivery, indication for cesarean delivery, and maternal complications.

Neonatal variables included birth weight, Apgar scores at 1 and 5 minutes, meconium-stained liquor, requirement for neonatal resuscitation, NICU admission, neonatal complications, and perinatal outcome.

Statistical Analysis

Data were entered into SPSS version 23.0 and analyzed. Continuous variables were expressed as mean $\pm$ standard deviation, while categorical variables were expressed as frequencies and percentages. The association between categorical variables was assessed using the Chi-square test. Continuous variables were compared using the Student's t-test. A p-value < 0.05 was considered statistically significant.

RESULTS:

During the one-year study period from January 2025 to December 2025, a total of 120 women with singleton term pregnancies complicated by oligohydramnios were included in the study. The mean maternal age was 26.5 ± 4.2 years, and the mean gestational age at delivery was 38.5 ± 1.0 weeks.

The majority of women belonged to the 21–30 years age group (72.5%). Primigravida women constituted 55.8% of the study population, while 44.2% were multigravida. The distribution of maternal age, parity, and gestational age is presented in Table 1.

Table 1. Maternal Characteristics of the Study Population

Characteristic	Number (n)	Percentage (%)
Total	120	100
Age group		
≤ 20 years	5	4.2
21–30 years	87	72.5

31–35 years	23	19.2
>35 years	5	4.2
Parity		
Primigravida	67	55.8
Multigravida	53	44.2
Gestational age		
37–37+6 weeks	22	18.3
38–38+6 weeks	43	35.8
39–39+6 weeks	42	35.0
≥40 weeks	13	10.8

The mean amniotic fluid index (AFI) was 4.1 ± 0.8 cm. Most women had an AFI between >2 and 5 cm (83.3%), while 16.7% had severe oligohydramnios with an AFI ≤ 2 cm. The distribution of women according to AFI is shown in Table 2.

Table 2. Distribution of Study Participants According to AFI

AFI (cm)	Number (n)	Percentage (%)
≤ 2	20	16.7
>2–3	31	25.8
>3–4	36	30.0
>4–5	33	27.5
Total	120	100

Mode of Delivery

Induction of labor was performed in 77 (64.2%) women. Vaginal delivery occurred in 44 (36.7%) women, whereas 76 (63.3%) underwent cesarean delivery. Thus, cesarean delivery was the predominant mode of delivery in the study population (Table 3).

Table 3. Distribution According to Mode of Delivery

Mode of delivery	Number (n)	Percentage (%)
Vaginal delivery	44	36.7
Cesarean delivery	76	63.3
Total	120	100

Indications for Cesarean Delivery

Among the 76 women who underwent cesarean delivery, the most common indication was non-reassuring fetal heart rate/fetal distress (50.0%). Failed induction accounted for 21.1%, followed by meconium-stained liquor with fetal compromise (11.8%) and previous cesarean section (9.2%). The distribution of indications is shown in Table 4.

Table 4. Indications for Cesarean Delivery

Indication	Number (n)	Percentage (%)
Non-reassuring fetal heart rate/fetal distress	38	50.0
Failed induction	16	21.1
Meconium-stained liquor with fetal compromise	9	11.8
Previous cesarean section	7	9.2
Failure to progress	4	5.3
Other indications	2	2.6
Total	76	100

Maternal Outcomes

Induction of labor was the most frequent intervention, occurring in 64.2% of women. Prolonged labor was observed in 7.5%, while postpartum hemorrhage occurred in 4.2%. Operative vaginal delivery was required in 3.3% of women. No maternal mortality was observed during the study period as shown in Table 5.

Table 5. Maternal Outcomes

Maternal outcome	Number (n)	Percentage (%)
Induction of labor	77	64.2
Prolonged labor	9	7.5

Postpartum hemorrhage	5	4.2
Operative vaginal delivery	4	3.3
Maternal infection	3	2.5
Maternal mortality	0	0

Low birth weight (<2.5 kg) was observed in 34 (28.3%) neonates. Meconium-stained liquor was noted in 29 (24.2%) deliveries. An Apgar score <7 at 1 minute was observed in 14 (11.7%) neonates, while 5 (4.2%) had an Apgar score <7 at 5 minutes. NICU admission was required in 24 (20.0%) neonates. The neonatal outcomes are summarized in Table 6.

Table 6. Neonatal Outcomes

Neonatal outcome	Number (n)	Percentage (%)
Birth weight <2.5 kg	34	28.3
Meconium-stained liquor	29	24.2
Apgar <7 at 1 minute	14	11.7
Apgar <7 at 5 minutes	5	4.2
NICU admission	24	20.0
Respiratory distress	10	8.3
Birth asphyxia	7	5.8
Meconium aspiration	5	4.2
Neonatal mortality	1	0.8

Women with severe oligohydramnios (AFI ≤ 2 cm) had a higher proportion of cesarean delivery than those with AFI >2–5 cm. Cesarean delivery was performed in **85.0%** of women with AFI ≤ 2 cm compared with **59.0%** of those with AFI >2–5 cm. This association was statistically significant (**p = 0.018**) (Table 7).

Table 7. Association Between AFI and Mode of Delivery

AFI	Vaginal delivery n (%)	Cesarean delivery n (%)	p-value
≤ 2 cm (n=20)	3 (15.0)	17 (85.0)	
>2–5 cm (n=100)	41 (41.0)	59 (59.0)	0.018

NICU admission was more frequent among neonates born to women with severe oligohydramnios. NICU admission occurred in **35.0%** of neonates in the AFI ≤ 2 cm group compared with **17.0%** in the AFI >2–5 cm group. The difference was statistically significant (**p = 0.087**) (Table 8).

Table 8. Association Between AFI and NICU Admission

AFI	NICU admission n (%)	No NICU admission n (%)	p-value
≤ 2 cm (n=20)	7 (35.0)	13 (65.0)	
>2–5 cm (n=100)	17 (17.0)	83 (83.0)	0.087

DISCUSSION:

Oligohydramnios at term is a common obstetric condition that may influence the course of labor and neonatal outcome. The present retrospective study evaluated maternal and neonatal outcomes among 120 women with singleton term pregnancies complicated by oligohydramnios. The major findings were a relatively high rate of cesarean delivery, with non-reassuring fetal heart rate being the most common indication, and a higher frequency of NICU admission among neonates born to women with severe oligohydramnios.

In the present study, the mean maternal age was 26.5 ± 4.2 years, and the majority of women belonged to the 21–30-year age group. Primigravida women constituted 55.8% of the study population. Similar demographic patterns have been reported in previous studies of term pregnancies complicated by oligohydramnios.^{6,7} The predominance of younger women may reflect the obstetric population served by the study institution rather than a specific association between maternal age and oligohydramnios.

The mean AFI in our study was 4.1 ± 0.8 cm, with severe oligohydramnios (AFI ≤ 2 cm) observed in 16.7% of women. Although AFI is widely used for assessment of amniotic fluid, the method of assessment may influence the diagnosis and subsequent management. Studies have suggested that use of the single deepest pocket may result in fewer diagnoses of oligohydramnios and fewer obstetric interventions compared with AFI.^{8,9} Nevertheless, AFI remains commonly used in clinical practice.

Induction of labor was performed in 64.2% of women, while cesarean delivery occurred in 63.3%. The relatively high rate of induction reflects the common practice of considering delivery when oligohydramnios is diagnosed at term. Shrem et al. reported increased induction and operative delivery among women with isolated oligohydramnios at term.⁶ Similar findings have been reported in other observational studies.^{7,10}

Non-reassuring fetal heart rate/fetal distress was the most common indication for cesarean delivery in our study, accounting for 50% of cesarean deliveries. Reduced amniotic fluid may decrease the cushioning effect around the umbilical cord, increasing the risk of cord compression during contractions and resulting in fetal heart rate abnormalities. Previous studies have similarly identified fetal distress as an important indication for cesarean delivery in pregnancies complicated by oligohydramnios.^{7,10}

Severe oligohydramnios (AFI ≤ 2 cm) was associated with a higher rate of cesarean delivery than AFI $>2-5$ cm (85.0% versus 59.0%, $p=0.018$). This suggests that greater reduction in amniotic fluid may be associated with increased intrapartum intervention. However, this association should be interpreted cautiously because other factors, including parity, fetal growth restriction, previous cesarean section, and clinician decision-making, may influence the mode of delivery.

Meconium-stained liquor was observed in 24.2% of deliveries. Reduced amniotic fluid may increase the concentration of meconium and may be associated with fetal stress during labor. Previous studies have also reported an increased frequency of meconium-stained liquor in pregnancies complicated by oligohydramnios.^{7,11}

The mean neonatal birth weight was 2.71 ± 0.43 kg, and 28.3% of neonates had a birth weight <2.5 kg. Oligohydramnios may occur in association with placental insufficiency and fetal growth restriction. Therefore, the observed proportion of low-birth-weight neonates may partly reflect associated placental or fetal factors rather than a direct effect of oligohydramnios alone.^{1,12}

An Apgar score <7 at 1 minute was observed in 11.7% of neonates, while only 4.2% had an Apgar score <7 at 5 minutes. These findings indicate that most neonates had satisfactory adaptation by 5 minutes. Previous studies have reported variable associations between oligohydramnios and low Apgar scores.^{7,10}

NICU admission was required in 20% of neonates. Although NICU admission was more frequent in the severe oligohydramnios group than in the AFI $>2-5$ cm group (35.0% versus 17.0%), the difference was not statistically significant ($p=0.087$). The higher numerical frequency may indicate greater neonatal vulnerability with severe oligohydramnios, although the present sample does not provide sufficient evidence to establish a significant association.

CONCLUSION

Term pregnancies complicated by oligohydramnios were associated with a high frequency of obstetric intervention, particularly cesarean delivery for non-reassuring fetal status. Severe oligohydramnios was significantly associated with cesarean delivery, whereas the association with NICU admission was not statistically significant. Careful antenatal assessment and intrapartum fetal monitoring are important for optimizing outcomes in these pregnancies. Larger prospective studies with appropriate control groups are required to determine the independent effect of oligohydramnios on maternal and neonatal outcomes.

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