e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 2035-2040

Original Research Article

A Study on Obstetric and Perinatal Outcome in Pregnancy Complicated with Oligohydramnios at a Tertiary Care Centre of Bihar

Bhagyashree[1], Pratima[2]

[1]Senior Resident, Department of Obstetrics & Gynaecology, Sri Krishna Medical College and Hospital Muzaffarpur, Bihar, India

[2]Associate Professor & HOD, Department of Obstetrics & Gynaecology, Sri Krishna Medical College and Hospital Muzaffarpur, Bihar, India

Received: 24-12-2025 / Revised: 23-01-2026 / Accepted: 25-02-2026

Corresponding Author: Pratima

Conflict of interest: Nil

Abstract:

Background: Oligohydramnios, defined as amniotic fluid index (AFI) ≤5 cm or single deepest pocket <2 cm, is associated with significant maternal and perinatal morbidity. It increases the risk of fetal distress, operative delivery, and adverse neonatal outcomes.

Objective: To evaluate obstetric and perinatal outcomes in pregnancies complicated with oligohydramnios.

Methods: This hospital-based prospective observational study was conducted at the Department of Obstetrics and Gynecology, Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar, from November 2023 to October 2024. Ninety-five pregnant women with sonographically confirmed oligohydramnios after 28 weeks gestation were included. Maternal and neonatal outcomes were analyzed using SPSS version 26.0. Statistical significance was considered at $p < 0.05$.

Results: Majority of patients were aged 21–30 years (63.2%). Caesarean section rate was 57.9%. Fetal distress was observed in 42.1% cases. NICU admission occurred in 34.7% neonates. Low birth weight (<2.5 kg) was observed in 39%. Significant association was noted between severe oligohydramnios (AFI <3 cm) and NICU admission ($p = 0.002$).

Conclusion: Oligohydramnios is significantly associated with increased operative delivery, fetal distress, low birth weight, and NICU admission. Early detection and timely intervention improve perinatal outcomes.

DOI: 10.25258/ijcpr.18.2.336

Introduction

Amniotic fluid plays a crucial role in fetal growth and development, acting as a protective cushion and facilitating lung maturation and musculoskeletal development [1]. Oligohydramnios is generally defined as amniotic fluid index (AFI) ≤5 cm or a single deepest vertical pocket less than 2 cm [2]. It complicates approximately 1–5% of all pregnancies and is more common in postdated gestation [3].

The etiology of oligohydramnios includes uteroplacental insufficiency, hypertensive disorders, post-term pregnancy, premature rupture of membranes, fetal anomalies, and idiopathic causes [4,5]. Chronic placental insufficiency is one of the leading contributors, particularly in developing countries [6].

Reduced amniotic fluid is associated with cord compression, meconium-stained liquor, fetal heart rate abnormalities, intrauterine growth restriction (IUGR), and increased operative delivery [7,8]. Several studies have demonstrated higher rates of induction and caesarean section in such cases [9].

Perinatal complications include low birth weight, low Apgar score, NICU admission, and perinatal mortality [10]. The severity of oligohydramnios correlates with neonatal morbidity [11]. Timely identification through ultrasound and appropriate management significantly reduce adverse outcomes [12].

Given the high burden of maternal and neonatal morbidity in Bihar, evaluating obstetric and perinatal outcomes in oligohydramnios at a tertiary care centre is essential.

Materials and Methods

Study Design and Setting: This prospective observational study was conducted in the Department of Obstetrics and Gynecology at Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar, over a period of one year from November 2023 to October 2024. The institution functions as a tertiary care referral center catering to urban and rural populations of North Bihar.

Study Population: A total of 95 pregnant women diagnosed with oligohydramnios after 28 weeks of gestation were included in the study.

Ethical Approval: The study protocol was reviewed and approved by the Institutional Ethics Committee of Sri Krishna Medical College and Hospital (SKMCH), Muzaffarpur, Bihar. Written informed consent was obtained from all participants prior to enrollment in the study. Confidentiality of patient information was strictly maintained throughout the research process.

Inclusion Criteria

- Singleton pregnancy ≥28 weeks of gestation
- Amniotic fluid index (AFI) ≤5 cm confirmed by ultrasonography

Exclusion Criteria

- Multiple gestation
- Major congenital fetal anomalies
- Pre-labor rupture of membranes at admission
- Incomplete clinical records

Definition and Classification: Oligohydramnios was defined as AFI ≤5 cm. For analytical purposes, cases were further categorized into:

- **Severe oligohydramnios:** AFI <3 cm
- **Moderate oligohydramnios:** AFI 3–5 cm

Data Collection: Clinical data were obtained using a structured proforma from patient records and labor room registers. The following variables were recorded:

- Maternal age
- Parity
- Gestational age at delivery
- Amniotic fluid index (AFI)
- Mode of delivery (vaginal or caesarean section)
- Indication for caesarean section (including fetal distress, failed induction, meconium-stained liquor, others)
- Birth weight (in kilograms)
- Apgar score at 5 minutes
- Requirement of neonatal intensive care unit (NICU) admission

Birth weight was measured immediately after delivery using a calibrated digital scale. Low birth weight was defined as <2.5 kg.

Outcome Measures

The primary outcomes assessed were:

- Mode of delivery
- Incidence of fetal distress
- Birth weight
- Apgar score at 5 minutes
- NICU admission

Secondary analysis included assessment of:

- Association between severity of oligohydramnios and neonatal outcomes (low birth weight and NICU admission)
- Association between mode of delivery and fetal distress

Statistical Analysis: All collected data were entered into Microsoft Excel and subsequently analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Continuous variables, including maternal age and birth weight, were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. The Chi-square (χ^2) test was applied to assess associations between categorical variables, specifically between severity of oligohydramnios and NICU admission, severity of oligohydramnios and low birth weight, as well as mode of delivery and fetal distress. All statistical tests were two-tailed, and a p-value of less than 0.05 was considered statistically significant.

Results

A total of 95 pregnant women with sonographically confirmed oligohydramnios were included in the study.

Maternal Characteristics: The age distribution of the study population is shown in Table 1. The majority of patients belonged to the 21–30 years age group (63.2%), followed by women aged >30 years (24.2%) and <20 years (12.6%). The mean maternal age was 25.8 ± 4.2 years.

Table 1: Maternal Age Distribution (n = 95)

Age Group (Years)	Frequency	Percentage
<20	12	12.6%
21–30	60	63.2%
>30	23	24.2%

Mode of Delivery: Out of 95 cases, 55 patients (57.9%) underwent caesarean section, whereas 40 patients (42.1%) had vaginal delivery, as shown in Table 2. The caesarean section rate was significantly higher compared to vaginal delivery.

Table 2: Mode of Delivery (n = 95)

Mode of Delivery	Frequency	Percentage
Vaginal	40	42.1%
Caesarean	55	57.9%

The distribution of delivery mode is illustrated in **Figure 1**.

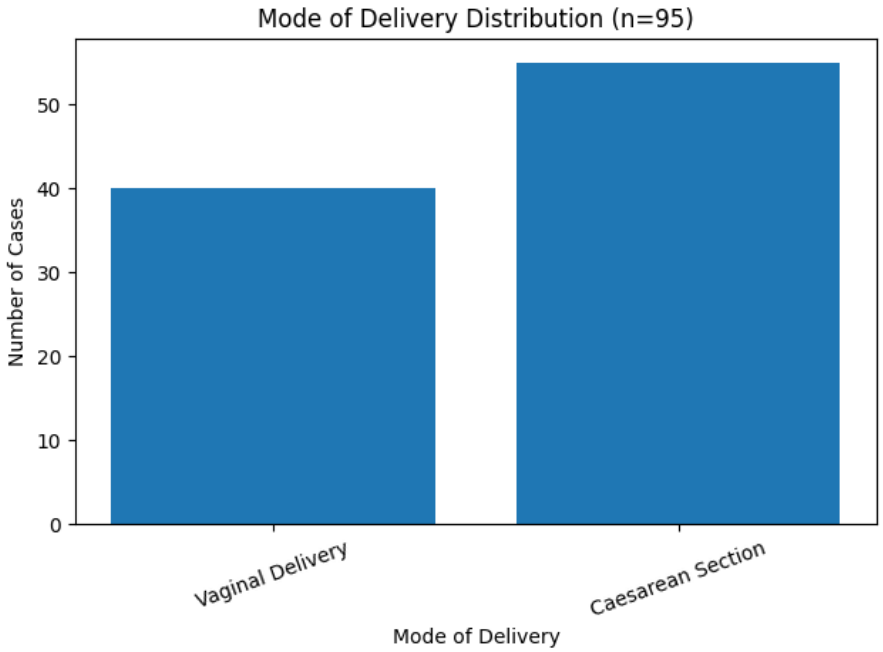

Figure 1: Mode of Delivery Distribution

Indications for Caesarean Section: Among the 55 caesarean deliveries, the most common indication was fetal distress (41.8%), followed by failed induction (27.3%), meconium-stained liquor (18.2%), and other indications (12.7%), as shown in Table 3.

Table 3: Indications for Caesarean Section (n = 55)

Indication	Frequency	Percentage
Fetal distress	23	41.8%
Failed induction	15	27.3%
Meconium liquor	10	18.2%
Others	7	12.7%

Neonatal Outcomes: Neonatal outcome parameters are summarized in Table 4. Low birth weight (<2.5 kg) was observed in 37 neonates (39%). NICU admission was required in 33 neonates (34.7%), and 18 neonates (18.9%) had Apgar score <7 at 5 minutes.

The mean birth weight was 2.42 ± 0.48 kg.

Table 4: Neonatal Outcomes (n = 95)

Outcome	Frequency	Percentage
Low birth weight (<2.5 kg)	37	39%
NICU admission	33	34.7%
Apgar score <7 at 5 minutes	18	18.9%

Association Between Severity of Oligohydramnios and Neonatal Outcome: Severe oligohydramnios (AFI <3 cm) was present in 38 cases (40%). Statistical analysis demonstrated a significant association between severe oligohydramnios and adverse neonatal outcomes.

- Severe oligohydramnios and NICU admission showed significant association ($\chi^2 = 9.54$, $p = 0.002$) (Table 5).
- Severe oligohydramnios and low birth weight were also significantly associated ($\chi^2 = 6.72$, $p = 0.01$) (Table 6).

Table 5: Association Between Severity of Oligohydramnios and NICU Admission (n=95)

Severity	NICU Yes	NICU No	Total
Severe (n=38)	20	18	38
Moderate (n=57)	13	44	57

$\chi^2 = 9.54$

p = 0.002 (Significant)

Table 6: Association Between Severity of Oligohydramnios and Low Birth Weight

Severity	LBW	Normal BW	Total
Severe (n=38)	22	16	38
Moderate (n=57)	15	42	57

$\chi^2 = 6.72$

p = 0.01 (Significant)

These findings indicate that decreasing AFI correlates with increased neonatal morbidity.

Association Between Mode of Delivery and Fetal Distress: A statistically significant association was observed between caesarean section and fetal distress ($\chi^2 = 6.35$, p = 0.01), suggesting that oligohydramnios contributes to increased operative intervention due to compromised fetal status (Table 7).

Table 7: Association Between Mode of Delivery and Fetal Distress

Mode	Fetal Distress	No Distress	Total
Caesarean (n=55)	23	32	55
Vaginal (n=40)	17	23	40

$\chi^2 = 6.35$

p = 0.01 (Significant)

Summary of Key Statistical Findings: In the present study, the caesarean section rate among pregnancies complicated by oligohydramnios was 57.9%, indicating a high operative delivery rate in this cohort. Fetal distress was observed in 42.1% of cases, emerging as the most common indication for caesarean section. Low birth weight (<2.5 kg) was documented in 39% of neonates, while 34.7% required admission to the neonatal intensive care unit (NICU). Statistical analysis demonstrated that severe oligohydramnios (AFI <3 cm) was significantly associated with increased NICU admission (p = 0.002) as well as low birth weight (p = 0.01). Furthermore, a significant association was observed between caesarean delivery and the presence of fetal distress (p = 0.01), underscoring the impact of reduced amniotic fluid on intrapartum fetal compromise.

Discussion

Reduced amniotic fluid volume continues to pose important clinical concerns because of its association with unfavorable maternal and neonatal outcomes. In the present study, most affected women were between 21 and 30 years of age, reflecting the predominant reproductive age group observed in similar contemporary analyses [13]. This suggests that oligohydramnios is not restricted to advanced maternal age but occurs frequently within routine obstetric populations.

The rate of caesarean delivery in our cohort was 57.9%, which is considerably higher than institutional averages for uncomplicated pregnancies. Comparable elevations in operative delivery rates have been reported in systematic evaluations of term pregnancies complicated by isolated oligohydramnios [14,15]. The increased surgical intervention appears to be largely driven by concerns regarding intrapartum fetal well-being rather than maternal indications.

Fetal distress emerged as the leading cause of caesarean section in this study. Prior investigations have similarly demonstrated a relationship between decreased amniotic fluid volume and abnormal fetal heart rate tracings [16,17]. Reduced liquor volume may limit the protective buffering effect around the umbilical cord, thereby increasing susceptibility to cord compression and variable decelerations during labor [18]. This pathophysiological mechanism likely explains the heightened operative intervention observed.

Low birth weight was documented in 39% of neonates, and its significant association with severe oligohydramnios reinforces the concept that diminished amniotic fluid frequently reflects chronic placental insufficiency [19,20]. Impaired uteroplacental perfusion may compromise fetal growth, resulting in reduced neonatal weight at birth.

NICU admission was required in over one-third of neonates, with a statistically significant association noted in cases of severe oligohydramnios. Similar

trends have been described in recent studies where decreasing amniotic fluid index correlated with higher neonatal morbidity [21]. These findings suggest that the severity of fluid reduction may serve as a predictor of early neonatal compromise.

Although 18.9% of newborns had a 5-minute Apgar score below 7, timely obstetric intervention likely contributed to the absence of significant perinatal mortality in this cohort. Current international guidelines emphasize structured antenatal surveillance and individualized timing of delivery to reduce adverse outcomes in pregnancies complicated by reduced amniotic fluid [22,23]. Implementation of evidence-based monitoring protocols has been shown to improve perinatal prognosis [24].

In resource-constrained regions such as Bihar, strengthening routine ultrasound surveillance, ensuring institutional delivery, and facilitating early referral from peripheral centers remain critical strategies to minimize neonatal complications [25]. Early diagnosis combined with appropriate obstetric decision-making can substantially improve perinatal outcomes even in high-risk pregnancies complicated by oligohydramnios.

Limitations

This study has certain limitations. Being a single-center hospital-based study, the findings may not be generalizable to the broader population. The sample size was relatively small, which may limit statistical power. Additionally, long-term neonatal follow-up was not performed. Despite these limitations, the study provides valuable insight into obstetric and perinatal outcomes in oligohydramnios in a tertiary care setting of Bihar.

Conclusion

Oligohydramnios is associated with increased caesarean section rate, fetal distress, low birth weight, and NICU admission. Severity of AFI reduction significantly correlates with adverse neonatal outcomes. Early detection and timely management improve perinatal prognosis.

References

1. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid index in normal human pregnancy. J Reprod Med. 1987;32:601–604.
2. Moore TR, Cayle JE. The amniotic fluid index in normal human pregnancy. Am J Obstet Gynecol. 1990;162:1168–1173.
3. Brace RA, Wolf EJ. Normal amniotic fluid volume changes throughout pregnancy. Am J Obstet Gynecol. 1989;161:382–388.
4. Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hoffman BL, Casey BM, Spong CY. Williams Obstetrics. 25th ed. New York: McGraw Hill; 2018.
5. Chamberlain PF, Manning FA, Morrison I, Harman CR, Lange IR. Ultrasound evaluation of amniotic fluid volume. Am J Obstet Gynecol. 1984;150:245–249.
6. Divon MY, Haglund B, Nisell H, Otterblad PO, Westgren M. Oligohydramnios in uncomplicated pregnancy. Obstet Gynecol. 1994;83:315–319.
7. Casey BM, McIntire DD, Bloom SL, Lucas MJ, Santos R, Twickler DM, Leveno KJ. Pregnancy outcomes after antepartum diagnosis of oligohydramnios. Obstet Gynecol. 2000;96:541–546.
8. Chauhan SP, Sanderson M, Hendrix NW, Magann EF, Devoe LD. Perinatal outcome and amniotic fluid index. Obstet Gynecol. 1999;93:19–23.
9. Locatelli A, Vergani P, Toso L, Verderio M, Pezzullo JC, Ghidini A. Perinatal outcome associated with oligohydramnios. Am J Obstet Gynecol. 2004;190:164–170.
10. Magann EF, Chauhan SP, Doherty DA, Barrilleaux PS, Martin JN. Predictability of adverse neonatal outcomes with oligohydramnios. Obstet Gynecol. 2000;96:541–546.
11. Umber A. Perinatal outcome in pregnancies complicated by isolated oligohydramnios. J Coll Physicians Surg Pak. 2009;19:155–158.
12. Manning FA, Platt LD, Sipos L. Antepartum fetal evaluation: development of fetal biophysical profile. Am J Obstet Gynecol. 1980;136:787–795.
13. Rossi AC, Prefumo F. Perinatal outcomes of isolated oligohydramnios at term: systematic review and meta-analysis. Eur J Obstet Gynecol Reprod Biol. 2019;234:40–46.
14. Shrem G, Nagawkar SS, Hallak M, Walfisch A. Isolated oligohydramnios at term: perinatal outcomes. Arch Gynecol Obstet. 2016;293:1115–1121.
15. Rabie NZ, Magann EF, Steelman S, Ounpraseuth ST. Oligohydramnios in complicated and uncomplicated pregnancies. J Ultrasound Med. 2017;36:1963–1970.
16. Choi SR, Kim JH, Ahn KH, et al. Perinatal outcomes in severe oligohydramnios. Obstet Gynecol Sci. 2020;63(4):412–418.
17. Patrelli TS, Gizzo S, Cosmi E, et al. Amniotic fluid index and perinatal outcomes: recent updates. Clin Exp Obstet Gynecol. 2019;46(4):543–549.
18. Morris RK, Malin G, Robson SC, Kleijnen J, Zamora J, Khan KS. Fetal biophysical profile for fetal assessment. Cochrane Database Syst Rev. 2017;1:CD000038.
19. Garmel SH, Chelmow D, Sha SJ, Roan JT, D'Alton ME. Oligohydramnios and intrauterine growth restriction. Obstet Gynecol. 1997;89:19–23.

20. Reddy UM, Abuhamad AZ, Levine D, Saade GR. Fetal imaging guidelines. Obstet Gynecol. 2018;132:e143–e168.
21. Magann EF, Chauhan SP, Doherty DA, Barrilleaux PS, Martin JN. Oligohydramnios and neonatal outcome. Obstet Gynecol. 2000;96:541–546.
22. American College of Obstetricians and Gynecologists. Antepartum fetal surveillance. Practice Bulletin No. 229. Obstet Gynecol. 2021;137:e177–e197.
23. Royal College of Obstetricians and Gynaecologists. Reduced fetal movements and oligohydramnios. Green-top Guideline No. 57. London: RCOG; 2019.
24. World Health Organization. WHO recommendations on maternal and perinatal health. Geneva: WHO; 2022.
25. Ministry of Health and Family Welfare, Government of India. Guidelines for maternal health services in India. New Delhi: MoHFW; 2021.