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Feto-Maternal Outcome In Pregnancy Complicated By Oligohydramnios: A Prospective Observational Study

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ABSTRACT

Introduction: Amniotic fluid plays a critical role in fetal development, providing protection, facilitating movement, and supporting respiratory functions. Oligohydramnios, defined as an amniotic fluid index (AFI) ≤5 cm, is associated with increased perinatal risks, including umbilical cord compression and impaired fetal circulation. This study aims to evaluate maternal and fetal outcomes associated with oligohydramnios in a tertiary care setting.

Materials and Methodology: A prospective, observational hospital-based study was conducted over 1.5 years in the Obstetrics and Gynecology Department at a tertiary care hospital in Gujarat. A total of 163 pregnant women with singleton pregnancies between 28-42 weeks gestation and intact membranes were enrolled. Detailed demographic, clinical, and ultrasonographic assessments were performed. Maternal parameters such as parity, gestational age, and associated conditions were recorded. Neonatal outcomes, including birth weight, APGAR scores, NICU admissions, and perinatal mortality, were analyzed. Statistical analysis was performed using rates, proportions, and percentages.

Results: Most participants (80.98%) were aged 21-30 years, with 50.30% delivering preterm. PIH (22.7%) and idiopathic factors (41.1%) were the most common causes of oligohydramnios. LSCS was performed in 46.62% of cases. NICU admission was required for 69.94% of neonates, primarily due to preterm birth (29.82%) and low birth weight (16.81%). APGAR scores >7 were observed in 92.64% of neonates. Perinatal mortality was 1.59%.

Conclusion: Oligohydramnios is significantly associated with increased rates of preterm birth, LSCS, and NICU admissions. Early diagnosis and fetal surveillance are crucial in optimizing perinatal outcomes and reducing neonatal complications.

Keywords: *Cryotherapy, topical anesthetic, Pain Perception, Visual Analogue Scale and Dibucaine*

1. INTRODUCTION

Amniotic fluid serves as a protective medium for the developing fetus, safeguarding it from mechanical and biological injuries while facilitating movement, swallowing, and respiration. It also possesses bacteriostatic properties and is more accessible than fetal blood for assessing fetal conditions [1,2]. The volume of amniotic fluid varies with gestational age, reaching approximately 250 mL at 16 weeks, 800 mL at 28 weeks, and peaking at 1000 mL at 38 weeks before slightly declining to 800 mL at term [3].

Oligohydramnios is characterized by reduced amniotic fluid volume, defined as less than 200 mL at term or an amniotic fluid index (AFI) of ≤5 cm [4,5]. It poses significant risks, including umbilical cord compression, impaired fetal blood flow, and adverse perinatal outcomes [6]. Contributing factors include maternal conditions such as hypertension, preeclampsia, diabetes, and uteroplacental insufficiency, as well as fetal renal anomalies and premature rupture of membranes [7,8]. The incidence ranges from 2% to 14%, with increased rates of cesarean delivery and perinatal morbidity [9,10]. Premature rupture

of membranes is a common cause of oligohydramnios, with many cases being idiopathic, and the resulting diminished amniotic fluid often leads to an increased rate of cesarean delivery, primarily due to non-reassuring fetal heart rate [11,12].

Timely detection and fetal surveillance are crucial in managing oligohydramnios, emphasizing early intervention to mitigate adverse outcomes. This study aims to identify associated factors and their impact on perinatal outcomes to guide appropriate clinical management.

2. MATERIALS AND METHODOLOGY

This prospective, observational, hospital-based study was conducted over one and a half years in the Department of Obstetrics and Gynecology at tertiary teaching care hospital, Gujarat. As an observational study without comparative analysis, rates, proportions, and percentages were calculated. Previous studies had reported the prevalence of oligohydramnios ranging from 0.5% to 8%. Given this wide range, the median value of 4% was considered for prevalence estimation. Using this proportion, a sample size of 163 was determined at a 95% confidence interval with an absolute precision of 3%, based on the formula: $n=Z^2\times P(100-P)/C^2$

Following ethical committee approval, informed written consent was obtained from all participants. The study included women with singleton pregnancies between 28–42 weeks of gestation with intact membranes, while those with multifetal gestation or premature rupture of membranes were excluded. A structured study proforma was completed for each case, documenting detailed history, clinical examination, and any pregnancy-related complications. Routine antenatal examinations, including symphysial-fundal height measurement, clinical assessment of amniotic fluid volume, fetal movement monitoring, and fetal heart rate assessment, were conducted. Standard investigations and ultrasound evaluation of amniotic fluid index (AFI) were performed in the Gynecology OPD, with Doppler studies for further assessment. Per speculum and per vaginal examinations were carried out in cases with suspected membrane rupture to confirm intact membranes.

Patients diagnosed with oligohydramnios (AFI ≤5 cm) were followed until discharge. Standard management included left lateral positioning, steroid administration for preterm cases, oral and intravenous hydration, and addressing underlying etiological factors. Fetal surveillance was performed using ultrasonography, non-stress tests (NST), and Doppler studies. The timing of delivery was determined based on gestational age, Doppler findings, and further reductions in AFI, following detailed discussions with the patient and relatives. The mode of delivery was individualized based on maternal and fetal well-being, with indications for cesarean section recorded. Maternal outcomes included the mode of delivery (vaginal vs. operative), spontaneous vs. induced labor, and associated maternal conditions such as pregnancy-induced hypertension (PIH), antepartum hemorrhage (APH), diabetes, and intrauterine growth restriction (IUGR). Neonatal outcomes were assessed in terms of birth weight, APGAR score, NICU admission, perinatal mortality, and the presence of meconium-stained amniotic fluid (MSAF) leading to meconium aspiration syndrome (MAS).

Statistical analysis:

The data from the cases under study were systematically organized in an MS Excel sheet. Appropriate statistical analyses, including frequencies, cross-tabulations, ratios, proportions, and percentages, were performed.

3. RESULT

After screening, a total of 163 oligohydramnios participants were enrolled in the study from January 2022 to June 2023 according to inclusion and exclusion criteria. The demographic details of study participants were described as below.

Table 1. Demographic details of study participants

Parameters		Frequency	Percentage
Age group	18-20	20	12.27%
	21-30	132	80.98%
	31-40	11	6.75%
Parity	Primigravida	74	45.40%
	Multipara	89	54.60%
Gestational age	<37 weeks	82	50.30%
	≥ 37 weeks	81	49.70%
AFI	≤5 cm	96	58.90%

	>5 cm	67	41.10%
Betnasol coverage	Yes	130	79.75%
	No	26	15.95%
	Rescue	7	4.30%

Table 1 provides a detailed demographic profile of the study participants. The majority of participants (80.98%) were aged between 21 and 30 years, with a smaller proportion in the 18-20 years (12.27%) and 31-40 years (6.75%) age groups. Regarding parity, 45.40% of participants were primigravida, while 54.60% were multipara. Gestational age distribution was nearly balanced, with 50.30% of participants delivering before 37 weeks and 49.70% at or beyond 37 weeks. Amniotic Fluid Index (AFI) measurements indicated that 58.90% of participants had an AFI of ≤5 cm, while 41.10% had an AFI greater than 5 cm. A large proportion of participants (79.75%) received Betnasol coverage, while 15.95% did not. Additionally, 4.30% of cases received Betnasol as a rescue measure.

Table 2. Maternal factors associated with Oligohydramnios and doppler findings

Parameters		Frequency	Percentage
PIH	Yes	37	22.70%
	No	126	77.30%
Malpresentation	Yes	7	4.29%
	No	156	95.71%
Prolonged Pregnancy	Yes	34	20.86%
	No	129	79.14%
IUGR	Yes	18	11.04%
	No	145	88.96%
Idiopathic	Yes	67	41.10%
	No	96	58.89%
Liquor	Normal	150	92.03%
	MSL	13	7.97%
Doppler findings	Normal	151	92.64%
	Abnormal	12	7.36%
NST reassuring	Yes	137	84.05%
	No	26	15.95%

Table 2 outlines the maternal factors associated with oligohydramnios among the study participants. Pregnancy-induced hypertension (PIH) was present in 22.70% of participants, while the majority (77.30%) did not have PIH. Malpresentation was observed in 4.29% of cases, with 95.71% presenting normally. Prolonged pregnancy was noted in 20.86% of participants, whereas 79.14% had a standard gestational period. Intrauterine growth restriction (IUGR) occurred in 11.04% of cases, with 88.96% not affected. The liquor was normal in 92.03% of participants, with meconium-stained liquor (MSL) present in 7.97%. The majority (92.64%) had normal Doppler results, while 7.36% showed abnormal findings. These results suggest that Doppler abnormalities were relatively uncommon in the study population. A significant majority of 84.05% of the NST results were classified as reassuring, while 15.95% were not. This indicates that most neonates had NST results suggesting normal fetal well-being.

Table 3. Neonate parameters

Neonate parameters		Frequency	Percentage
Birth weight	<2.5 kg	67	41.10%
	≥ 2.5 kg	96	58.90%
APGAR Score (at 1 and 5 min)	≤7	12	7.36%
	>7	151	92.64%

Table 3 presents the distribution of neonate birth weights and APGAR score in the study. A total of 41.10% of neonates had a birth weight of less than 2.5 kg, while the majority (58.90%) had a birth weight of 2.5 kg or greater. This indicates that most neonates fell within the normal birth weight range. The majority of neonates (92.64%) had an APGAR score greater than 7, indicating generally good immediate postnatal condition. A smaller proportion (7.36%) had an APGAR score of 7 or less, suggesting potential need for medical attention at birth.

Table 4. NICU Admission according to indication and mode of delivery

Indication	**NVD**	**LSCS**	**Total**
IUGR	12 (52.17%)	11 (47.83%)	23 (100%)
MASF leading to MAS	1 (25%)	3 (75%)	4 (100%)
Preterm	6 (17.64%)	28 (82.35%)	34 (100%)
RDS	5 (33.33%)	10 (66.67%)	15 (100%)
Low birth weight	3 (15.79%)	16 (84.21%)	19 (100%)
Observation	1 (5.26%)	18 (94.74%)	19 (100%)
Total indication	28 (24.56%)	86 (75.44%)	114 (100%)

Table 4 details the indications for NICU admission according to the mode of delivery, including normal vaginal delivery (NVD) and lower segment cesarean section (LSCS). For neonates with intrauterine growth restriction (IUGR), NICU admissions were more in LSCS (75.44%) compared to NVD (24.56%). Meconium aspiration syndrome following meconium-stained fluid (MASF leading to MAS) was more frequently associated with LSCS (75%) than NVD (25%). Preterm neonates showed a significant skew towards LSCS (82.35%) compared to NVD (17.64%). Respiratory distress syndrome (RDS) and low birth weight were also more commonly associated with LSCS, with 66.67% and 84.21% of cases, respectively, compared to NVD. Observational admissions were predominantly linked to LSCS (94.74%), with only 5.26% admitted following NVD. Overall, 75.44% of NICU admissions were associated with LSCS, while 24.56% followed NVD.

Table 5. NICU Management

Management	**Frequency (N=63)**	**%**
O2 support required	33	52.38%
Ventilation	14	22.22%
Higher antibiotics	15	23.81%
Perinatal mortality	1	1.59%

Table 5 outlines the management interventions for neonates admitted to the NICU. Of the 63 neonates, 52.38% required oxygen support, while 22.22% needed ventilation. Higher antibiotics were administered to 23.81% of the neonates. The perinatal mortality rate was low, with only one case (1.59%) recorded during the study.

Table 6. Septic Screen & length of NICU stay

Parameters		**Frequency**	**%**
Septic Screen	Positive	15	78.95%
	Negative	4	21.05%
Length of stay	<7 days	53	84.13%
	≥ 7 days	10	15.87%

Table 6 presents the results of the septic screen conducted on neonates. Of the cases tested, 78.95% had a positive septic screen, indicating the presence of infection, while 21.05% had a negative result, suggesting no infection. The majority of neonates (84.13%) had a stay of less than 7 days, while 15.87% required a stay of 7 days or more. This indicates that most neonates had a relatively short NICU admission duration.

4. DISCUSSION

The presence of oligohydramnios is associated with a significant increase in perinatal morbidity and mortality. While clinical assessment of amniotic fluid volume remains challenging, modern ultrasound techniques offer a reliable method for its diagnosis [13]. With the widespread availability of ultrasonography, an increasing number of cases are being identified, allowing for enhanced vigilance and improved anticipation of potential complications, particularly during labor [13].

In our study, the majority of participants belonged to the maternal age group of 21–30 years, accounting for 80.98% of the study population. This finding is consistent with the studies conducted by Moses V et al., Modi JY et al., and Chauhan SP et al., which also reported the 21–30 years age group as the most prevalent among their study populations [13–15]. Most common cause of oligohydramnios is idiopathic (41.10%), and second commonest cause is PIH (22.70%). Idiopathic is most common cause of oligohydramnios in, Moses V (32%), Modi JY (52%), Casey BM (60.5%) and Magnan EF (28.5%) like our study (41.10%) [13-17]. The LSCS was done in 46.62% in present study which is compared with the situations in other studies. Study by *Moses V* found that, there was 42% participants were undergone caesarean section similar to Casey B et al in which, there was increased rate of induction of labour (42%) and cesarean section (32%) in oligohydramnios cases [13,18]. Golan A et al. found that, the cesarean section was performed in 35.2% of pregnancies.8 These all are comparable to present study [19].

In this study, 7.36% of neonates had an Apgar score below 7 at both 1 and 5 minutes. This is lower than the 38.8% reported by Syria R et al. at 1 minute [20]. Moses V et al., found 16.3% and Casey B et al. found 6% of neonates had an Apgar score below 3 at 5 minutes [13, 21]. Jun Zhang et al. reported 15 neonates with an Apgar score below 7 at 1 minute and six at 5 minutes [22]. In the present study, 41.10% of neonates born to cases had a birth weight of less than 2.5 kg. This prevalence is higher than the 35% incidence of LBW reported by Casey et al. [21]. In contrast, studies by Chandra P et al. [23] and Sriya R et al. [20] observed a higher prevalence of LBW in cases of oligohydramnios, with 61.53% and 58.38% of neonates, respectively, having a birth weight below 2.5 kg. In the present study, 84 neonates (51.53%) required NICU admission, with 75.44% attributed to LSCS and 24.56% to NVD. Comparatively, Chate P et al. [24] and Chandra P et al. [23] reported NICU admission rates of 42% and 46.5%, respectively, among cases of oligohydramnios. Casey et al. [21] observed a lower incidence, with NICU admissions of 7% and 2% in cases of oligohydramnios.

The perinatal mortality rate in the present study was low, with only one case (1.59%) recorded. In contrast, Moses V et al. reported a perinatal mortality rate of 13% [13], while Chhabra S et al. observed a significantly higher rate of 87.7% [25]. Wolff F et al. and Apel SL et al. documented perinatal mortality rates of 7.2% and 9.9%, respectively [26,27]. The reduced amniotic fluid volume may contribute to fetal abdominal compression, restricting diaphragmatic movement and potentially impacting neonatal outcomes.

5. CONCLUSION

Oligohydramnios, commonly associated with IUGR, PIH, and post-term pregnancies, requires intensive fetal monitoring. Reduced amniotic fluid increases the risk of fetal distress, meconium-stained fluid, and perinatal complications. Rising cesarean rates highlight the need for a balanced approach to delivery to prevent maternal morbidity while ensuring timely intervention. Regular monitoring and risk-based pregnancy termination are essential for optimizing neonatal outcomes.

REFERENCES

[1] Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, et al. Amniotic fluid. Williams Obstetrics. 24th ed. New York: McGraw-Hill Education; 2014. p. 231.

[2] Magann EF, Chauhan SP, Bofill JA, Martin JN. Comparability of the amniotic fluid index and single deepest pocket measurements in clinical practice. Aust New Zeal J Obstet Gynaecol. 2003; 43(1): 75-7.

[3] Kofinas A, Kofinas G. Differences in amniotic fluid patterns and fetal biometric parameters in third trimester pregnancies with and without diabetes. J Matern Neonatal Med. 2006;19(10):633-8.

[4] Entezami M, Albig M, Gasiorek-Wiens A, Becker R. Placenta, cord and amniotic fluid (Chapter 14) In: Ultrasound diagnosis of fetal anomalies. Edition III US: Thieme Medical Pub; 2003: 301.

[5] Konar H. D C Dutta's Textbook of obstetrics.2015;8:250-251.

[6] Manning FA, Hill LM, Platt LD. Qualitative amniotic fluid volume determination by ultrasound: Ante partum detection of intrauterine growth retardation. Am J Obstet Gynecol. 1981;139:254-8.

[7] Manning FA, Harman CR, Morrison I, Menticoglou SM, Lange IR, Johnson JM. Fetal assessment based on fetal biophysical profile scoring. IV. An analysis of perinatal morbidity and mortality. Am J Obstet Gynecol. 1990;162(3):703-9.

[8] Phelan JP, Smith CV, Small M. Amniotic fluid volume assessment with the four-quadrant technique at 36 to 42 weeks gestation. J Reprod Med. 1987;32:540-2.

[9] Brace RA. Physiology of amniotic fluid volume regulation. Clin Obstet Gynecol. 1997;40:280-9.

[10] Locatelli A, Zagarella A, Toso L, Assi F, Ghidini A, Biffi A. Serial assessment of amniotic fluid index in uncomplicated term pregnancies: prognostic value of amniotic fluid reduction. J Matern Neonatal Med. 2004;15:233-6.

[11] Biradar KD, Shamanewadi AN. Maternal and perinatal outcome in oligohydramnios: study from a tertiary care hospital, Bangalore, Karnataka, India. Int J Reprod Contracept Obstet Gynecol, 2016;5(7):2291-9.

[12] Lester Figueroa et al. Oligohydramnios: a prospective study of fetal, neonatal and maternal outcomes in low-middle income countries. Reproductive Health volume. 2020;17:19.

[13] Moses V, Thakre S. A study of maternal and fetal outcome in third trimester diagnose case of oligohydramnios. Int J Reprod Contracept Obstet Gynecol 2016;5:2944-8.

[14] Modi JY, Patel RV, Shah PT, Agrawal AG. Fetomaternal outcome in pregnancy with oligohydramnios. Int J Reprod Contracept Obstet Gynecol 2016;5:4037-40.

[15] Chauhan SP, Hendrix NW: Intrapartum oligohydramnios does not predict adverse peripartum outcome among high risk parturients Am J Obstet Gynecol. 1997;176(6):1130-6.

[16] Magann EF, Mortan ML, Nolan TE Martin JN, Whitworth NS, Morrison JC. Comparative efficacy of sonographic measurements for the detection of aberrations in the amniotic fluid volume on pregnancy outcome. Obstet Gynecol. 1994;83:959-62.

[17] Carroll BC, Bruner JP. Umbilical artery Doppler velocimetry in pregnancies complicated by oligohydramnios. J Repord. Med. 2000;45:562-6.

[18] Casey BM. Pregnancy outcome after antepartum diagnosis of oligohydramnios at or beyond 34 weeks gestation. Am J Obstet Gynaecol. 2000;182:909-12.

[19] Golan G. Oligohydramnios-maternal complication and fetal outcome in 145 cases. Gynecol Obstet Invest. 1994;37(2):91-5.

[20] Sriya R, Singhai S. Perinatal outcome in patients with amniotic fluid index < 5cm. J Obstet Gynaecol India. 2001;51:98-100.

[21] Casey BM, McIntire DD, Bloom SL, Lucas MJ, Santos R, Twickler DM, et al. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks' of gestation. Am J Obstet Gynecol 2000;182(4):909-12.

[22] Jun Z, Troendle J. Isolated oligohydramnios is not associated with adverse perinatal outcome. British J Obst Gynae. 2004;111(3):220-5.

[23] Chandra P, Kaur SP, Hans DK. The impact of amniotic fluid volume assessed intra partum on perinatal outcome. *Obstet and Gynecol Today*. 2000; 5(8); 478-81.

[24] Chate P, Khatri M, Hariharan C. Pregnancy outcome after diagnosis of oligohydramnios at term. Int J Reprod Contracept Obstet Gynecol. 2013; 2: 23-26.

[25] Chhabra S, Dargan R. Oligohydramnios - a potential marker for serious obstetric complications. J Obstet Gynecol. 2007;27(7):680-3.

[26] Wolff F, Schaefer R. Oligohydramnios-perinatal complications and diseases in mother and child. Geburtshilfe Frauenheilkd Mar. 1994;54(3):139-43.

[27] Sarid AL, Levy A. Placental pathologies associated with fetal groth restriction associated with or without oligohydramnios. Arcy Gynecol Obstet. 2009;280(4):549-52.