

PERINATAL OUTCOME ASSOCIATED WITH OLIGOHYDRAMNIOS IN PREGNANCY.

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Abstract

Background: Oligohydramnios, defined as an amniotic fluid index (AFI) ≤ 5 cm, is associated with increased maternal and perinatal morbidity and mortality. It reflects underlying fetal, placental, or maternal pathology and is an important indicator in antenatal surveillance. **Aim:** To evaluate maternal and perinatal outcomes in pregnancies complicated by oligohydramnios. **Settings and Design:** This prospective hospital-based study was conducted at a tertiary care center over a period of 18 months. **Material and Methods:** A total of 65 pregnant women with singleton pregnancies, gestational age between 28–42 weeks, and AFI < 5 cm were included. Patients with multiple gestation, PROM, antepartum hemorrhage, and intrauterine fetal demise were excluded. Detailed clinical evaluation, ultrasound assessment, Doppler studies, and fetal monitoring were performed. Maternal outcomes included mode of delivery and indications for cesarean section, while perinatal outcomes included birth weight, Apgar scores, NICU admission, and perinatal mortality. **Statistical Analysis:** Data were expressed as frequencies and percentages and analyzed using SPSS version 26.0. **Results:** Most participants were aged 26–35 years, with primigravida constituting 53.8%. Pregnancy-induced hypertension (33.8%) was the most common associated risk factor. Preterm delivery occurred in 55.4% of cases. Cesarean section was the predominant mode of delivery (61.5%), with fetal distress being the leading indication (42.5%). Low birth weight (< 2.5 kg) was observed in all neonates, and 55.4% had Apgar scores < 7 at 1 minute. NICU admission was required in 63.1% of cases, mainly due to prematurity and meconium aspiration. Perinatal mortality was 6.2%. **Conclusion:** Oligohydramnios is associated with adverse maternal and neonatal outcomes, including increased cesarean section rates, fetal distress, low Apgar scores, and higher NICU admissions. Early identification and close antenatal surveillance are essential to improve pregnancy outcomes.

Keywords: Oligohydramnios, AFI, Fetomaternal outcomes.



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INTRODUCTION

Modern obstetrics emphasizes maternal and fetal health, with amniotic fluid (AF) playing a critical role in fetal development and protection. Amniotic fluid cushions the foetus, regulates temperature, supports musculoskeletal and gastrointestinal development, and provides nutrients.

The sonographic diagnosis of oligohydramnios is usually based on an AFI ≤ 5 cm or on a single deepest pocket of amniotic fluid ≤ 2 cm³ [ACOG]. Amniotic Fluid Volume (AFV) is maintained by a balance between fetal urine production (main source after 14–16 weeks) and reabsorption through swallowing and placental intramembranous absorption.

The aetiology of oligohydramnios is multifactorial, encompassing fetal, maternal, and placental factors. Common aetiologies include prelabor rupture of membranes (PROM), post-term pregnancy, congenital renal anomalies, uteroplacental insufficiency, maternal illnesses (hypertension, diabetes), certain medications (NSAIDs, ACE inhibitors, ARBs). Twin pregnancies can exhibit oligohydramnios in donor twins due to twin–twin transfusion syndrome.

Oligohydramnios affects 0.5–5% of singleton pregnancies and 1–5% in the last trimester. Oligohydramnios is linked to adverse perinatal outcomes such as low birth weight, prematurity, meconium-stained AF, non-reassuring fetal heart rates, low Apgar scores, IUGR, birth asphyxia, respiratory distress, NICU admissions, and stillbirth. Increased risk of caesarean

delivery, often due to fetal distress. Severe or prolonged low AF can cause long-term complications like pulmonary hypoplasia and musculoskeletal deformities (Potter's syndrome, clubfoot, hip dislocation).

Regular antenatal fetal assessment includes AFI/DVP, fetal movement counts, biophysical profile, non-stress test (NST), and Doppler studies. Management strategies vary from close monitoring versus early induction of labor depending on severity and gestational age. AFI ≤ 5 cm correlates with higher likelihood of emergency caesarean and poor neonatal outcomes.

MATERIALS AND METHODS

A prospective hospital-based study was conducted at SGRDIMSAR, Sri Amritsar, Punjab from July 2024 to December 2025, screening 200 antenatal women, of whom 65 with satisfying the inclusion and exclusion criteria were included.

INCLUSION CRITERIA

1. Singleton pregnancy
2. Amniotic Fluid Index <5
3. Gestational age between 28-42 weeks
4. Intact membranes at the time of antepartum testing

EXCLUSION CRITERIA

1. Multiple pregnancy
2. Premature rupture of membranes
3. Antepartum hemorrhage
4. Pregnancy with fetal death (IUD)

Data including maternal history, physical and obstetric examination, lab tests, Doppler ultrasound (AFI, fetal well-being, gestational age, placenta, congenital anomalies), and biweekly NST monitoring. Labor was monitored via partogram and CTG, with delivery mode classified as spontaneous/induced vaginal, elective/emergency LSCS, or operative vaginal. Amniotic fluid was noted as clear, thin, or thick meconium-stained. Neonatal outcomes recorded were gestational age, birth weight, Apgar scores, and NICU admissions (IUGR, prematurity, sepsis, respiratory issues, meconium aspiration, hypoglycaemia, neonatal deaths). Data were analysed statistically to evaluate maternal and perinatal outcomes associated with oligohydramnios.

STATISTICAL ANALYSIS

Data were described in terms of frequencies (number of cases) and relative frequencies (percentages). All statistical calculations were done using (Statistical Package for the Social Science) SPSS 26.0 version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

RESULTS

Table 1 summarises age and parity distribution among study participants. A total of 65 cases were studied, most participants were aged 26–30 years and 31–35 years (23 cases each, 35.4%), while 19 participants (29.2%) were over 35 years. Regarding parity, 35 participants (53.8%) were primigravida, and 30 (46.2%) were multigravida.

TABLE 1 AGE PARITY WISE DISTRIBUTION OF PARTICIPANTS

AGE		
AGE GROUP	No. of cases	Percentage
26-30	23	35.4%
31-35	23	35.4%
> 35	19	29.2%
Total	65	100.0%
PARITY		
Parity	No. of cases	Percentage
Primigravida	35	53.8%
Multigravida	30	46.2 %
Total	65	100.0%

Table 2 outlines the risk factors of oligohydramnios, Pregnancy-Induced Hypertension (PIH) being the most common risk factor, observed in 22 cases (33.8%). Fetal Growth Restriction (FGR) was the next most frequent, seen in 12 cases (18.4%), while prolonged pregnancy occurred in 9 cases (13.8%). Anaemia and fever were noted in 6 cases (9.2%) and 4 cases (6.1%), respectively. Ten cases (15.3%) had an idiopathic cause, and 2 cases (3%) were associated with congenital anomalies.

TABLE 2 RISK FACTORS ASSOCIATED WITH OLIGOHYDRAMNIOS

RISK FATORS	No. of cases	Percentage
PREGNANCY INDUCED HYPERTENSION [PIH]	22	33.8%
FETAL GROWTH RESTRICTION [FGR]	12	18.5%
ANEMIA	6	9.2%
FEVER	4	6.2%
CONGENITAL ANOMALIES	2	3.1%
PROLONGED PREGNACY	9	13.8%
IDIOPATHIC	10	15.3%
Total	65	100.0%

Table 3 demonstrates the Maternal outcomes which were assessed in terms of gestational age at delivery and mode of delivery distribution according to labor characteristics, amniotic fluid characteristics. Among 65 cases, most pregnancies (55.4%) were preterm (<37 weeks), 36.9% were at 37–39 weeks, and 7.7% were beyond 40 weeks. Regarding delivery, spontaneous labor resulted in 53.3% vaginal deliveries, 33.3% caesarean sections (LSCS), and 13.3% operative vaginal deliveries, while induced labor had 66.7% LSCS, 31.1% vaginal, and 2.2% operative deliveries. Overall, LSCS was the most common mode of delivery (61.5%), followed by vaginal delivery (33.8%) and operative vaginal delivery (4.6%).

Amniotic fluid assessment showed that most participants had clear liquor (67.7%), while 26.1% had meconium-stained fluid—thin in 16.9% and thick in 9.2%—and 6.2% had absent fluid, indicating that most pregnancies had normal amniotic fluid, but a notable proportion exhibited meconium staining.

TABLE 3 MATERNAL OUTCOMES

GESTATIONAL AGE AT DELIVERY							
WEEKS OF GESTATION		No. of cases		Percentage			
< 37 WEEKS		36		55.4%			
37-39 WEEKS		24		36.9%			
> 40		5		7.7%			
TOTAL		65		100.0%			
MODE OF DELIVERY							
	NVD		LSCS		OPERATIVE VAGINAL DELIVERY		Total
ONSET OF LABOR	No. of cases	Percentage	No. of cases	Percentage	No. of cases	Percentage	
SPONTANEOUS (n=15)	8	53.3%	5	33.3%	2	13.3%	15
INDUCED (n=45)	14	31.1%	30	66.7%	1	2.2%	45
ELECTIVE LSCS(n=5)	0	0.0%	5	100.0%	0	0.0%	5
Total	22	33.8%	40	61.5%	3	4.6%	65
AMNIOTIC FLUID CHARACTERSTICS							
AMNIOTIC FLUID		No. of cases			Percentage		
ABSENT		4			6.2%		
CLEAR		44			67.7%		
THIN MECONIUM		11			16.9%		
THICK MECONIUM		6			9.2%		
Total		65			100.0%		

Table 4 demonstrated that fetal distress was the leading indication (42.5%), followed by failed induction/non-progress of labor (12.5%), IUGR (15%), malpresentation (10%), meconium-stained liquor (10%), elective LSCS (12.5%), and cephalopelvic disproportion (2.5%).

TABLE 4 INDICATION OF LSCS

Indication of LSCS	No. of cases	Percentage
Elective	5	12.5%
Fetal distress	17	42.5%
IUGR	6	15.0%
Malpresentation	4	10.0%
Cephalopelvic disproportion [CPD]	1	2.5%
Failed induction/non progress of labour	5	12.5%
Meconium-stained liquor	2	5.0%
Total	40	100.0%

As demonstrated in Table 5, Perinatal outcomes were assessed among the 65 cases in terms of birth weight, APGAR scores justification and clinical indications of NICU Admission and neonatal morbidity and mortality. most neonates (72.3%) weighed 2–2.5 kg, while 27.7% weighed less than 2 kg. At 1 minute, 55.4% of newborns had APGAR scores below 7, improving to 30.8% at 5 minutes. NICU admission was required for 63.1% of babies, mainly due to prematurity and meconium aspiration syndrome (39% each), followed by IUGR (12.2%), asphyxia (7.3%), and neonatal sepsis (2.4%). Perinatal mortality was 6.2%, with 93.8% of neonates surviving.

TABLE 5 PERINATAL OUTCOMES

BIRTH WEIGHT DISTRIBUTION		
BIRTH WEIGHT	No. of cases	Percentage
< 2	18	27.7%
2-2.5	47	72.3%
2.5-3	0	0.0%
> 3	0	0.0%
TOTAL	65	100%
APGAR SCORE		
AT 1 MIN	No. of cases	Percentage
< 7	36	55.4%
> 7	29	44.6%
TOTAL	65	100%
AT 5 MIN	No. of cases	Percentage
< 7	20	30.8%
> 7	45	69.2%
Total	65	100.0%
NICU ADMISSION AND INDICATION		
NICU ADMISSION (n=41)	No. of cases	Percentage
IUGR	5	12.2%
Sepsis	1	2.4%
Prematurity	16	39.0%
Asphyxia	3	7.3%
MAS	16	39.0%
PERINATAL MORTALITY		
Perinatal mortality (Yes/No):	No. of cases	Percentage
No	61	93.8%
Yes	4	6.2%
Total	65	100.0%

DISCUSSION

Estimation of amniotic fluid volume is an integral part of antenatal surveillance. Reduce amniotic fluid carries an increased risk of an intrapartum notably complication in high-risk pregnancies. Oligohydramnios complicated pregnancies allied with poor maternal and neonatal outcomes.

The majority of participants were aged 26–35 years, with 23 women (35.4%) in both the 26–30 and 31–35 years groups. Women older than 35 years accounted for 29.2%. The mean maternal age was 24.8 years (range 19–37), comparable to previous studies by Ghike et al. (15) (24.65 years) and Biradar et al. (16) (22.4 years). Regarding parity, 35 women (53.8%)

were primigravida, while 30 (46.2%) were multigravida, consistent with trends reported in similar study by Gowda et al. (10)

Preterm deliveries (<37 weeks) were most common, occurring in 36 cases (55.4%). Gestational age of 37–39 weeks was noted in 24 cases (36.9%), and >40 weeks in 5 cases (7.7%). These results are in line with prior studies indicating a physiological decline in AFI with advancing gestation, as demonstrated by multicentre analyses and contemporary prospective studies by Ghosh et al (23), Vidyasagar V et al (17), Kirshenbaum M et al (18).

Caesarean section (LSCS) was the predominant mode, performed in 40 cases (61.5%). Normal vaginal delivery (NVD) occurred in 22 cases (33.8%), and operative vaginal delivery in 3 cases (4.6%). Among spontaneous labor cases, 53.3% delivered vaginally, whereas induction of labor predominantly resulted in LSCS (66.7%). Elective LSCS accounted for 5 cases. A prospective analysis at a tertiary hospital by Gaikwad et al (21) showed that oligohydramnios was allied to a significantly higher overall caesarean section rate when equated with normal AFI

Fetal distress was the most frequent indication for LSCS (42.5%), followed by IUGR (15%), malpresentation (10%), meconium-stained liquor (10%), failed induction or non-progress of labor (12.5%), and cephalopelvic disproportion (2.5%). These patterns are consistent with prior literature, confirming a higher caesarean rate in oligohydramnios, particularly in cases of fetal compromise comparable with study by Sowmya K et al (22), Biradar et al. (16) also reported that fetal distress (42%) was the most common indication, followed by IUGR (18%) and failed induction (13.4%).

Perinatal outcomes were evaluated w.r.t birthweight, APGAR scores. The majority of neonates (72.3%) weighed 2–2.5 kg, while 27.7% weighed <2 kg; none exceeded 2.5 kg similar to the study by Poludasari S et al (12) Similar studies done by Biradar et al (16), Vidyasagar V et al (17) demonstrated that Low AFI was associated with poor APGAR scores analogous to our study with 55.4% of neonates had a 1-minute APGAR <7, and 30.8% had a 5-minute APGAR <7, significantly higher than neonates with normal AFI.

Among 65 high-risk neonates, 41 (63.1%) required NICU admission. The primary indications were prematurity (39%) and meconium aspiration syndrome (MAS) (39%), followed by intrauterine growth restriction (12.2%), birth asphyxia (7.3%), and neonatal sepsis (2.4%). Perinatal mortality was observed in 4 cases (6.2%) while Kahkhaie K et al (3) reported 5.9% perinatal death. These findings align with other studies reporting increased neonatal adversities in pregnancies complicated by oligohydramnios. Bumrah S et al (11) demonstrated that LBW (46.6%), preterm birth (38.3%), NICU admission (26.6%), and stillbirth (6.6%) were notable perinatal outcomes.

CONCLUSION

This hospital-based prospective study highlights that an amniotic fluid index (AFI) of less than 5 cm is significantly associated with adverse maternal and neonatal outcomes. Oligohydramnios was observed more commonly among primigravida women and demonstrated a clear relationship with increasing gestational age, consistent with the natural decline in amniotic fluid volume near term.

Pregnancies complicated by low AFI showed a higher rate of cesarean section, primarily due to fetal distress, underscoring the influence of reduced amniotic fluid on intrapartum management. Additionally, neonates born to mothers with AFI <5 cm had a higher incidence of low APGAR scores at both 1 and 5 minutes, reflecting compromised immediate neonatal status.

Overall, these findings stress the importance of regular antenatal monitoring of amniotic fluid volume, especially during the third trimester, to facilitate early identification of high-risk cases. Timely diagnosis and appropriate obstetric intervention in oligohydramnios can contribute to improved maternal and perinatal outcomes.

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