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Original Research Article

Maternal and fetal outcome in oligohydramnios diagnosed at or after 34 weeks of gestational age: a case-control study

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ABSTRACT

Background: Oligohydramnios, a deficiency in amniotic fluid volume diagnosed at or after 34 weeks of gestation, is a common obstetric dilemma. While historically linked to adverse outcomes, optimal management remains controversial particularly in isolated cases, balancing the risks of prematurity against intrauterine compromise. Aim was to compare the maternal and fetal outcomes in pregnancy with oligohydramnios diagnosed at or after 34 weeks of gestation with those of normal amniotic fluid index (AFI).
Methods: A prospective case-control study was conducted in the Department of Obstetrics and Gynaecology at Al-Ameen Medical College and Hospital, Vijayapura, from February 2024 to January 2026. A total of 102 pregnant women were included, with 51 cases of oligohydramnios and 51 matched controls with normal AFI. All participants underwent detailed clinical evaluation, ultrasonography including AFI, Doppler and fetal biometry, and non-stress tests (NST).
Results: Baseline characteristics were comparable between groups, but hypertensive disorders were significantly higher in the oligohydramnios group (37.3% vs. 9.8%). Non-reactive NST patterns, abnormal fetal heart rate patterns, labour induction (60.8% vs. 17.6%), and caesarean section rates (58.8% vs. 17.6%) were more frequent among cases. Neonates in the oligohydramnios group had lower mean birth weight (2670 g vs. 2850 g) and higher NICU admissions (43.1% vs. 13.7%)
Conclusions: Oligohydramnios in late pregnancy may indicate placental pathology and is linked to increased maternal and perinatal complications, requiring careful evaluation, close fetal surveillance, and individualized multidisciplinary management rather than purely conservative care

Keywords: Oligohydramnios, Pregnancy-induced hypertension, Nonreactive non-stress test, Uteroplacental insufficiency, Caesarean section, NICU admission

INTRODUCTION

Pregnancy is a complex physiological state characterized by a dynamic interplay between the maternal body and the developing fetus. This symbiosis is facilitated and protected by the intrauterine environment, a critical component of which is the amniotic fluid.

Amniotic fluid is not merely a passive pool of water; it is a vital, dynamic milieu essential for normal fetal growth and development. It serves multiple indispensable functions, it cushions the fetus against trauma, allows for free movement which is crucial for musculoskeletal development, maintains a constant temperature, possesses antimicrobial properties, and is fundamental for the development of the fetal pulmonary and gastrointestinal systems.[1]

The volume of this fluid is a carefully regulated balance between production (primarily fetal urine and lung fluid) and removal (primarily fetal swallowing and absorption), and its adequacy is a key indicator of fetal well-being.

Oligohydramnios is the medical term denoting a deficiency in the volume of amniotic fluid. It is one of the

most commonly encountered conditions in obstetric practice and a significant cause of perinatal morbidity and mortality. The diagnosis, traditionally based on ultrasound assessment, is most frequently defined as an AFI of less than 5 cm or a single deepest vertical pocket (SDP) of less than 2 cm.[2]

Amniotic fluid volume it maintains amniotic fluid pressure and reduces the loss of lung fluid which is essential component to pulmonary development. It also prevents compression of the umbilical cord.[3]

A reduction in amniotic fluid volume is often among the earliest indicators of an underlying fetal abnormality or a maternal disease condition. Marked decreases in amniotic fluid are associated with higher rates of perinatal morbidity and mortality.[4]

Congenital oligohydramnios is associated with fetal abnormalities, uteroplacental insufficiency, premature rupture of membranes, intrauterine growth restriction (IUGR), post-term pregnancy, and chronic placental abruption.[5]

The gestational age at which oligohydramnios is diagnosed is a critical determinant of its management and implications. The time at or after 34 weeks of gestation marks an important point in obstetric decision-making. While a fetus delivered at this stage is considered late-preterm and has a significantly higher chance of survival without major long-term sequelae compared to earlier gestations, it is not without risks.

Late-preterm infants are still at an increased risk for respiratory distress syndrome (RDS), transient tachypnoea of the newborn (TTN), hyperbilirubinemia, hypoglycemia, and feeding difficulties compared to their term counterparts.[6]

Therefore, the obstetrician is faced with a complex dilemma: on one hand, there is the iatrogenic risk of prematurity associated with active intervention and delivery; on the other hand, there is the potential risk of continuing a pregnancy in a potentially hostile intrauterine environment characterized by reduced amniotic fluid, which may lead to umbilical cord compression, fetal distress, and meconium aspiration.

Oligohydramnios can be an idiopathic finding in women who have low risk pregnancies and no medical or fetal complication.[7]

Objectives

The objcetives were to assess and compare the rates of adverse maternal outcomes (mode of delivery, indications for cesarean section) and fetal outcomes (Apgar scores, birth weight, NICU admission, meconium staining) between the study group (oligohydramnios, AFI ≤5 cm) and the control group (normal AFI, 10-25 cm).

METHODS

Study design

This was prospective case control study aimed to compare maternal and fetal outcomes in pregnancies complicated by oligohydramnios diagnosed at or after 34 weeks of gestation with those of pregnancies having a normal AFI.

Study setting

The study was done at Department of Obstetrics and Gynaecology, Al-Ameen Medical College and Hospital, Vijayapura, Karnataka a tertiary care teaching hospital.

Study duration

The study was carried out over 23 months from February 2024 to January 2026. This duration allowed adequate patients enrolment.

Study sample size

Total sample size 102 out of which 51 cases are antenatal patients with USG diagnosis of oligohydramnios (AFI≤5) at or beyond 34 weeks of gestation and they are compared with 51 antenatal patients with normal liquor (AFI≥5 and ≤25) at/beyond 34 weeks of gestation and both the groups are matched for age, parity and gestational age. Informed consent was obtained from study subjects. Data entered in MS excel and analysed using appropriate statistical tests. $P<0.05$ was considered statistically significant.

Study procedure

All the pregnant women in the study who ended up with spontaneous labour were allowed to deliver irrespective of gestational age with continuous FHR monitoring. Caesarean section or instrumental vaginal delivery were performed in these women for non-reassuring fetal heart pattern during labour.

Women not in labour with the gestational age between 34-37 weeks were closely monitored with biweekly NST and biophysical profile (BPP), until they went into spontaneous labor. If they fail to go into spontaneous labor, they were induced at term with Dinoprostone gel (0.5 mL) or oxytocin drip depending on the Bishop's score.

Women with continuous non reassuring FHR persisted in spite of corrective measures like change in maternal position, hydration, O_2 inhalation and significant Doppler change are taken for caesarean delivery irrespective of gestational age. Women with mal-presentation and other obstetric indications directly taken for cesarean delivery.

Study parameters

The recorded outcome measures included labor status, gestational age at delivery, AFI, fetal heart rate (FHR)

tracing, mode of delivery, indications for cesarean section, instrumental delivery, APGAR scores at 1 and 5 minutes, birth weight, and admission to the neonatal intensive care unit (NICU)

Inclusion criteria

Pregnant women aged 18 years or older, Singleton pregnancy with a gestational age of 34 weeks or more, for the case group-ultrasonographically confirmed AFI ≤5 cm and for the control group-ultrasonographically confirmed AFI between 10 cm and 25 cm and patients with intact amniotic membranes were included in the study.

Exclusion criteria

Patients with known foetal congenital anomalies, pre-labour rupture of membranes (PROM), post-term pregnancy (≥42 weeks of gestation), multiple gestation (twins, triplets, etc.), clinical evidence of cephalopelvic disproportion and placenta previa were excluded from the study.

Ethical consideration

The study was approved by the institutional ethics committee of Al Ameen medical college. Informed consent was obtained.

RESULTS

Demographic data of subjects

In the total 102 pregnant women, 51 were cases of oligohydramnios (AFI≤5) and 51 were normal liquor (AFI≥5 and ≤25) and they are matched for age, parity and gestational age. Age and gestational ages were not significant between cases and controls. AFI was significantly decreased in cases (3.9±1.04) compared (10.56±1.53) with controls, with p<0.001 which is highly significant as illustrated in Table 1.

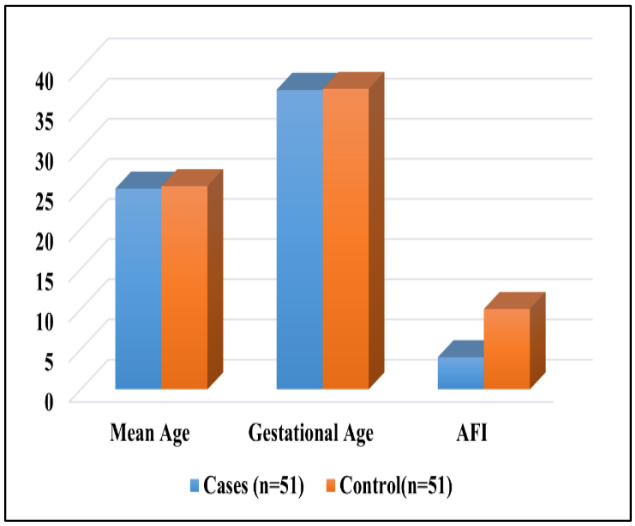

Figure 1: Demographics data of the subjects.

Labour characteristics and mode of delivery in oligohydramnios and control groups

Details the occurrence FHR and outcome of labour and delivery for both groups. Late deceleration significantly more common in cases with 14 patients (27.5%) compared to only 3 (5.8%) in the control (p=0.021). Regarding the onset of labor, the case group showed a much higher rate of induction (49%) compared to the control group (15.7%), whereas spontaneous labor was predominantly seen in controls (76.5% vs. 29.4%), representing a highly significant trend (p<0.001).

The mode of delivery followed a similar pattern of high significance (p<0.001). In the control group, the vast majority of women (78.4%) achieved a full-term normal vaginal delivery, while only 17.6% required an LSCS. In contrast, the case group had a substantially higher surgical intervention rate, with 30 women (58.8%) undergoing an LSCS and only 18 (35.3%) delivering vaginally. Instrumental vaginal deliveries remained low and statistically comparable between both groups (5.9% in cases vs. 3.9% in controls) (Table 2).

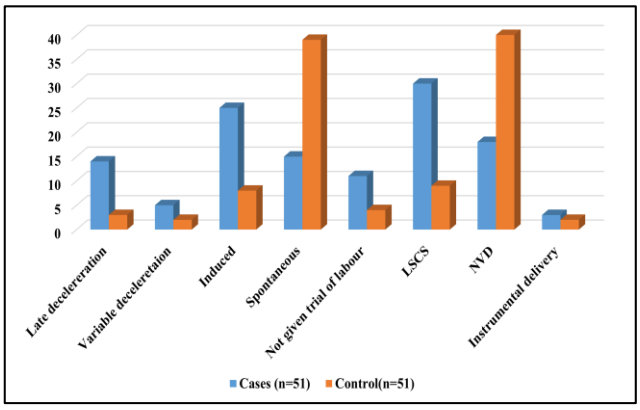

Figure 2: Labour characteristics and mode of delivery in oligohydramnios and control groups.

Maternal risk factors associated with oligohydramnios at admission

Beyond demographic matching it reveals the distinct pathologies linked to low amniotic fluid. The data demonstrates a strong, significant association between oligohydramnios and hypertensive disorders of pregnancy; this was observed in 19 cases (37.3%) compared to 5 controls (9.8%), yielding a p=0.001. This finding is clinically vital, as hypertension serves as a primary driver of uteroplacental insufficiency (Table 3).

Assessment of fetal growth and wellbeing

Assessment of fetal growth and well-being showed significant differences between the oligohydramnios and control groups. Abnormal Doppler findings were observed in 11 cases (21.6%) compared to 2 controls (3.9%), and

abdominal circumference <10th percentile was noted in 9 cases (17.6%) versus 3 controls (5.9%) (Table 4).

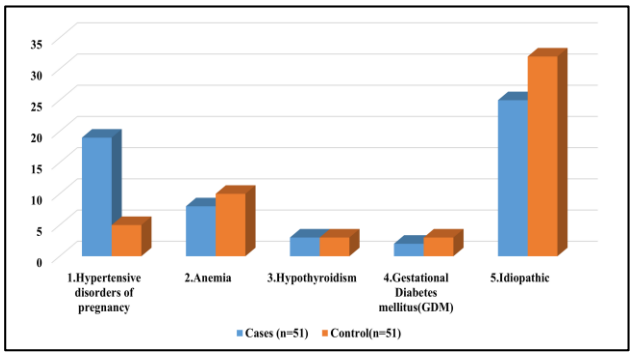

Figure 3: Maternal risk factors associated with oligohydramnios at admission.

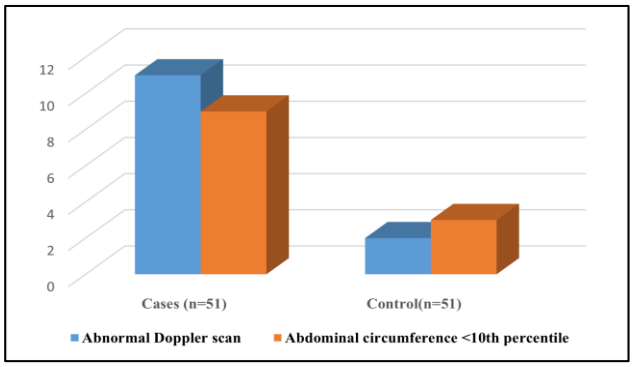

Figure 4: Assessment of fetal growth and well-being.

These abnormalities were more frequent in pregnancies with associated risk factors such as hypertension but were also present in a few idiopathic cases. Abnormal Doppler patterns indicate uteroplacental insufficiency and placental dysfunction, while reduced abdominal circumference reflects asymmetric IUGR due to reduced fetal perfusion.

The presence of these findings even in idiopathic oligohydramnios suggests underlying subclinical placental pathology affecting fetal growth and well-being.

Neonatal outcome

Demonstrates the significant neonatal impact of oligohydramnios. Infants in the case group showed poorer early adaptation, with 31.4% recording a 1-minute APGAR score <7 compared to only 3.9% of controls (p<0.001). This necessitated resuscitation in 29.4% of cases versus 5.9% in the control group (p=0.002).

While low birth weight was more frequent in cases (19.6% vs 9.8%), the difference was not statistically significant (p=0.161). However, clinical morbidity remained high; 43.1% of the case group required NICU admission, significantly exceeding the 13.7% required by controls (p=0.001) (Table 5).

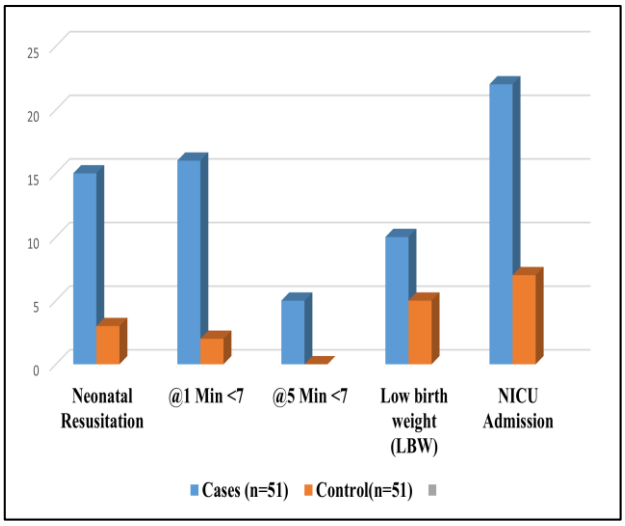

Figure 5: Neonatal outcome.

Table 1: Demographics data of the subjects.

Demographic data	Cases, (n=51)	Control, (n=51)	P value	Significance
Mean age (in years)	25±3.6	25.3±4.3	0.70	Not significant
Gestational age (in weeks)	37.3±1.3	37.4±1.2	0.69	Not significant
AFI (in cm)	3.9±1.04	10.56±1.53	<0.001	Highly significant

Table 2: Labour characteristics and mode of delivery in oligohydramnios and control groups.

Labour variables	Cases, (n=51)	Control, (n=51)	P value	Significance
Late deceleration	14 (27.5%)	3 (5.8%)	0.021	Significant
Variable deceleration	5 (9.8%)	2 (3.9%)	0.437	Not significant
Induced	25 (49%)	8 (15.7%)	<0.001	Highly significant
Spontaneous	15 (29.4%)	39 (76.5%)	<0.001	Highly significant
Not given trial of labour	11 (29.4%)	4 (7.8%)	0.051	Borderline
LSCS	30 (58.8%)	9 (17.6%)	<0.001	Highly significant
Normal vaginal delivery	18 (35.3%)	40 (78.4%)	<0.001	Highly significant
Instrumental delivery	3 (5.9%)	2 (3.9%)	1.000	Not significant

Table 3: Maternal risk factors associated with oligohydramnios at admission.

Risk factors	Cases, (n=51)	Control, (n=51)	P value	Significance
Hypertensive disorders of pregnancy	19 (37.3%)	5 (9.8%)	0.001	Highly significant
Anemia	8 (15.7%)	10 (19.6%)	0.602	Not significant
Hypothyroidism	3 (5.9%)	3 (5.9%)	1.000	Not significant
Gestational diabetes mellitus	2 (3.9%)	3 (5.9%)	1.000	Not significant
Idiopathic	25 (49%)	32 (62%)	0.161	Not significant

Table 4: Assessment of fetal growth and well-being.

Parameters	Cases, (n=51)	Control, (n=51)	P value	Significance
Abnormal Doppler scan	11	2	0.0163	Significant
Abdominal circumference <10th percentile	9	3	0.123	Not significant

Table 5: Neonatal outcome.

Outcomes	Cases, (n=51)	Control, (n=51)	P value	Significance
Neonatal resuscitation	15 (29.4%)	3 (5.9%)	0.002	Highly significant
APGAR score				
@1 Min <7	16 (31.4%)	2 (3.9%)	<0.001	Highly significant
@5 Min <7	5 (9.8%)	0	0.056	Borderline
Low birth weight	10 (19.6%)	5 (9.8%)	0.161	Not significant
NICU admission	22 (43.1%)	7 (13.7%)	0.001	Highly significant

DISCUSSION

Amniotic fluid volume is now recognized as an important marker of fetal wellbeing. Our findings align with a substantial body of global and regional literature, consistently painting oligohydramnios as a significant marker of perinatal risk rather than an incidental finding.

In the present study, the mean age of both the study group and the control group was 25 years. This close matching reduces the potential confounding effect of advanced maternal age, which is independently linked to increased risks of hypertensive disorders, gestational diabetes, and fetal chromosomal abnormalities or adolescent pregnancy, which carries risks of preeclampsia and low birth weight. By neutralizing age as a variable, we isolate the impact of oligohydramnios itself.[2]

The mean gestational age in the present study between two groups were virtually identical in their gestational age distribution at the time of diagnosis/enrolment (37.3±1.3 week), It definitively rules out prematurity as the primary explanation for the adverse neonatal outcomes witnessed in the oligohydramnios cohort. The mean AFI in the present study was 3.9±1 cm comparable with a study by Elizabeth et al of 3.2 cm.[8]

The significantly higher incidence of meconium-stained liquor (MSL) (37.3% vs. 11.8%) and is a classic sign of fetal hypoxic stress in the present study unlike the findings of Locatelli et al.[9]

The diagnosis of oligohydramnios radically altered the natural course of pregnancy, with 49% of cases undergoing induction of labour versus only 15.7% of controls. This proactive management is driven by the desire to deliver the fetus from a potentially hostile environment. Notably, the induction rate was high even in the idiopathic subgroup, reflecting a clinical consensus that low fluid itself is an indication for delivery, a practice supported by many studies from similar settings but questioned by others like Trudell et al.[10] Where as some studies shows lesser incidence of induction in oligohydramnios Kreiser et al reported that 7%.[11]

There is increased incidence of caesarean delivery in Oligohydramnios. The overwhelmingly dominant indication for caesarean section in the oligohydramnios group was fetal distress (35.3% of the group, accounting for 60% of their caesareans), a rate six times higher than in controls. This aligns precisely with a multitude of studies. Ghosh et al reported a 66% caesarean rate with non-reassuring FHR as a key driver.[12]

Table 3 is arguably the most illuminating table in etiological terms. The most striking finding is the near four-fold higher prevalence of hypertensive disorders of pregnancy (PIH) in the oligohydramnios group (37.3% vs. 9.8%). Hypertensive disorders, particularly preeclampsia, are classic causes of uteroplacental insufficiency, our data strongly supports the conceptual model presented by Chiniwar et al and Saxena et al who identified PIH as a leading associated factor in their oligohydramnios cohorts.[13,14]

Table 4 demonstrates significant ultrasonographic evidence of fetal compromise in pregnancies with oligohydramnios. Higher rates of abnormal Doppler scans (21.6% vs. 3.9%) and abdominal circumference <10th percentile (17.6% vs. 5.9%) indicate uteroplacental insufficiency and asymmetric IUGR. Abnormal Doppler findings reflect increased umbilical artery resistance and fetal adaptation to hypoxia, while reduced abdominal circumference suggests impaired nutrient supply and compromised liver growth. These findings link maternal conditions such as PIH with placental dysfunction and fetal sequelae, explaining the higher rates of non-reactive NSTs and fetal distress. The presence of abnormalities even in idiopathic cases suggests underlying subclinical placental pathology. This supports studies by Rahman et al, Ghimire et al and RCOG guidelines emphasizing close fetal surveillance in oligohydramnios.[15-17]

The need for neonatal resuscitation was five times higher in the oligohydramnios group (29.4% vs. 5.9%). This reflects neonates born in a depressed physiological state due to the cumulative effects of chronic hypoxia and acute intrapartum stressors. A low Apgar score at 1 minute (<7) was eight times more common in the oligohydramnios group (31.4% vs. 3.9%), indicating immediate postnatal depression, a low 5-minute Apgar score persisted in 9.8% of the oligohydramnios infants, while no control infant had a low score at this interval. The 5-minute Apgar score is a robust predictor of medium-term outcomes; persistence of depression suggests a failure to respond adequately to initial resuscitation and is strongly associated with higher risks of hypoxic-ischemic encephalopathy (HIE) and long-term neurological morbidity. Patel and Bhatiya and Ghosh et al both reported significantly lower Apgar scores in their oligohydramnios cohorts.[18]

Increase in NICU admissions for the oligohydramnios group (43.1% vs. 13.7%). The most common indications RDS and TTN. Shah et al reported a 41% NICU admission rate, with tachypnoea as the main cause.

The higher rate of LBW reinforces the findings of impaired fetal growth 10 cases (19.6%) vs. 5 controls (9.8%). This complication predisposes the neonate to hypoglycemia, hypothermia, and difficulty with feeding transition.

The incidence of IUGR is significantly increased in patient with oligohydramnios. LBW is rarely an isolated finding but is typically a manifestation of asymmetric IUGR due to placental insufficiency.

CONCLUSION

Oligohydramnios diagnosed at or after 34 weeks of gestation is a significant high-risk obstetric condition frequently associated with underlying placental dysfunction, most notably pregnancy-induced hypertension. It leads to a substantial increase in obstetric interventions, including induction of labour and caesarean delivery, primarily due to fetal distress. Neonates from such pregnancies face significantly higher risks of low birth weight, low Apgar scores, resuscitation needs, and NICU admission. This study underscores that oligohydramnios in this gestational period should be managed as a high-risk pregnancy with intensive fetal surveillance and preparedness for multidisciplinary care to mitigate adverse maternal and perinatal outcomes.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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