A Prospective Observational Study of Oligohydramnios and Polyhydramnios on Maternal and Fetal Outcome

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ABSTRACT

A prospective observational study of oligohydramnios and polyhydramnios on maternal and fetal outcome. Objectives of the study was to recognize the maternal risk factors related to prenatal fluid disorders, to evaluate the consequences of prenatal fluid disorders on mother and neonatal outcomes, to observe the relation between abnormal amniotic fluid index (AFI) and perinatal outcome, to notice the source related to abnormal (AFI) and to estimate maternal morbidity associated with abnormal AFI. A Prospective observational study was conducted at Manjula Hospital, in Hanmakonda, Telangana. The patients visiting the inpatient department of gynecology were reviewed, and patients diagnosed with the following conditions, such as oligohydramnios and polyhydramnios, were enrolled in the study. 150 patients with oligohydramnios and polyhydramnios conditions took part. Among 150 patients, 78% (n=117) were diagnosed with oligohydramnios, while 12%(n=18) were diagnosed with polyhydramnios where as 10% (n=15) were diagnosed with polyhydramnios with gestational diabetes. The incidence of oligohydramnios was 6.89% in our hospital, in which moderate oligohydramnios was 4.58% &severe oligohydramnios was 2.31%. Doppler changes were found in 3.2% on USG. The rate of LSCS was 28.5%. SGA was seen in 33%, of which 11% had IUGR. NICU admissions were 28%, and perinatal deaths were 2%. Prevention, early detection, and intervention of antenatal complications can probably reduce the incidence of oligohydramnios and improve maternal and fetal outcome.

Keywords: oligohydramnios, polyhydramnios, Amniotic fluid index

INTRODUCTION

Amniotic fluid is an active, dynamic component of the intrauterine environment that plays a vital role in successful fetal development and the preservation of gestational health. It serves multiple critical functions, including shielding the developing foetus from external physical impacts, maintaining a stable thermal state, preventing umbilical cord compression, and offering systemic space for musculoskeletal growth. Structurally, the fluid possesses bacteriostatic properties that defend the uterine cavity against ascending pathogens. Furthermore, the ingestion and inhalation of amniotic fluid by the foetus are required for the normal maturation of both the fetal gastrointestinal tract and pulmonary tissues. [1, 2]

The volume of amniotic fluid is tightly regulated throughout pregnancy via a delicate homeostatic balance between production and clearance pathways. During early gestation, the fluid originates primarily from the active transport of maternal plasma across the placental and amniochorionic membranes. By the second half of pregnancy, the regulatory mechanisms pivot heavily toward the foetus. Primary production is driven by fetal urination (contributing approximately 500–700 mL daily near term) and the secretion of fetal lung fluid. Conversely, fluid clearance is achieved through fetal swallowing (roughly 200–450 mL daily) alongside intramembranous absorption across the amnion into the fetal vascular network. Disruption of this complex fetomaternal equilibrium causes significant alterations in the total volume, presenting clinically as either an underproduction (oligohydramnios) or an overaccumulation (polyhydramnios). [1, 2, 3, 4, 5]

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In modern obstetrics, real-time transabdominal ultrasound serves as the primary diagnostic window to evaluate amniotic fluid volume. While several qualitative techniques exist, the quantitative calculation of the Amniotic Fluid Index (AFI) using Phelan's four-quadrant technique remains a standard biophysical tool. An AFI between 5.0 cm and 24.0 cm is recognized as normal. [1, 2, 3, 4, 5]

- Oligohydramnios is strictly defined as an AFI < 5.0 cm or a single deepest vertical pocket (SDVP) of less than 2.0 cm.

- Polyhydramnios is characterized by an AFI ≥ 24.0 cm or an SDVP of 8.0 cm or greater. [1]

Abnormal amniotic fluid volumes occur in approximately 5% to 10% of all pregnancies and are strongly associated with higher rates of maternal and perinatal morbidity. Oligohydramnios is frequently linked to maternal vascular pathologies, including preeclampsia, chronic hypertension, post-term gestation, and uteroplacental insufficiency. The lack of adequate fluid leaves the fetus vulnerable to direct physical risks, notably mechanical umbilical cord compression, which triggers severe intrapartum decelerations, fetal distress, and elevated rates of meconium-stained liquor. Consequently, pregnancies complicated by low fluid index show a substantial increase in emergency labor induction and cesarean deliveries. At delivery, neonates from oligohydramnios cohorts exhibit higher rates of intrauterine growth restriction (IUGR), low birth weight (LBW), depressed Apgar scores, and subsequent admissions to the neonatal intensive care unit (NICU). [1, 2, 3, 4, 5, 6]

Conversely, polyhydramnios is driven by a completely distinct set of pathophysiological triggers. It is most frequently associated with maternal gestational diabetes mellitus (GDM), where fetal hyperglycemia induces osmotic diuresis and subsequent polyuria. It is also linked to multiple gestations, isoimmunization, or underlying fetal structural blockages that disrupt regular swallowing mechanisms, such as duodenal atresia or central nervous system anomalies. The massive physical overdistension of the uterine muscle wall in polyhydramnios introduces severe maternal challenges, including preterm labour, premature rupture of membranes (PROM), placental abruption, and severe postpartum haemorrhage due to uterine atony. Perinatal risks are further elevated by mechanical dangers such as cord prolapse or fetal malpresentation, which often require complex surgical delivery. [7, 8, 9]

While numerous retrospective datasets have quantified these complications independently, there remains a critical clinical need to directly compare oligohydramnios and polyhydramnios prospectively within a unified institutional setting. Evaluating both extremes under identical standardized protocols reduces confounding care variables and provides clearer data on their relative impacts on maternal and neonatal health. Therefore, this prospective observational study was designed to systematically evaluate, contrast, and document the specific impacts of oligohydramnios and polyhydramnios on maternal and fetal outcomes. By identifying these distinct risk profiles early, this research aims to help clinicians refine antenatal tracking protocols, improve timing for labour interventions, and reduce avoidable perinatal mortality. [10]

METHODOLOGY

The prospective observational study was carried out for 6 months in Dr. Manjula hospital in the department of gynecology. A total no. of patients 150 case sheets was collected including inclusion and exclusion criteria. The patients demographic details such as age, gravida, mode of delivery, birthweight of child, ICU admission of new born child are collected

Study Criteria:

Inclusion Criteria:

- Pregnant women with more than 20 weeks of gestational age
- The patients with the condition of Polyhydramnios
- The patients with the condition of Oligohyramnios
- The patients with multiple gestation or gravida

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- The patients with Polyhydramnios with gestational diabetes

Exclusion Criteria:

- The patients with Malpresentation
- The patients with antepartum hemorrhage
- Antenatal mother requiring c-section for medical and obstetric conditions

Study Procedure:

Patients visiting primary health care center are reviewed. Patients who meet the study criteria are enrolled in the study. The following information is collected patient demographic details, laboratory reports, medical history, social history, and follow up is conducted for next hospital visit

Source Of Data:

All relevant information is collected required

- Patients
- Patient case sheets
- Laboratory reports

Study Design:

A-Hospital based prospective observational study

Study Period:

The study was carried out to be for 6 months

Study Sample Size:

The study was conducted on 150 patients at single center

RESULTS AND DISCUSSIONS

Table 1: Diagnosis wise distribution

Diagnosis	**No. of patients**	**Percentage (%)**
Oligohydramnios	117	78
Polyhydramnios	18	12
GDM	15	10

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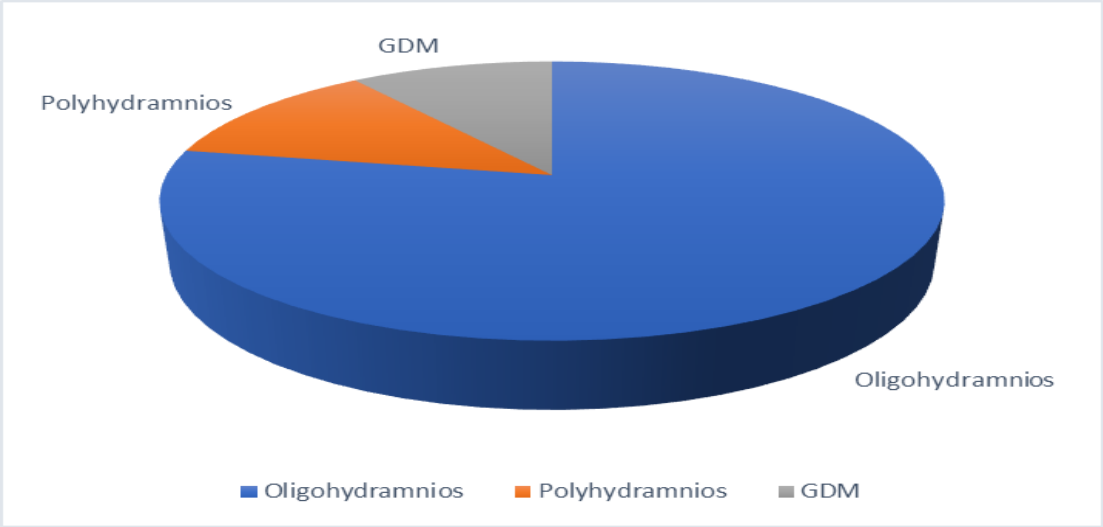

Figure 1: Diagnosis wise distribution

The above Table 1 and Figure 1 represent the diagnosis of pregnant women with oligohydramnios, polyhydramnios, polyhydramnios with gestational diabetes. Among 150 patients were highly reported to be diagnosed with oligohydramnios 78% (n=117) while in the polyhydramnios group is only about 12% (n=18) were diagnosed. 10% (n=15) were diagnosed with polyhydramnios with gestational diabetes.

Table 2: Age wise distribution

Age (yrs)	**No. of patients with oligohydramnios**	**No. of patients with polyhydramnios**
20-25	59	15
26-30	42	11
31-35	12	3
36-40	0	1

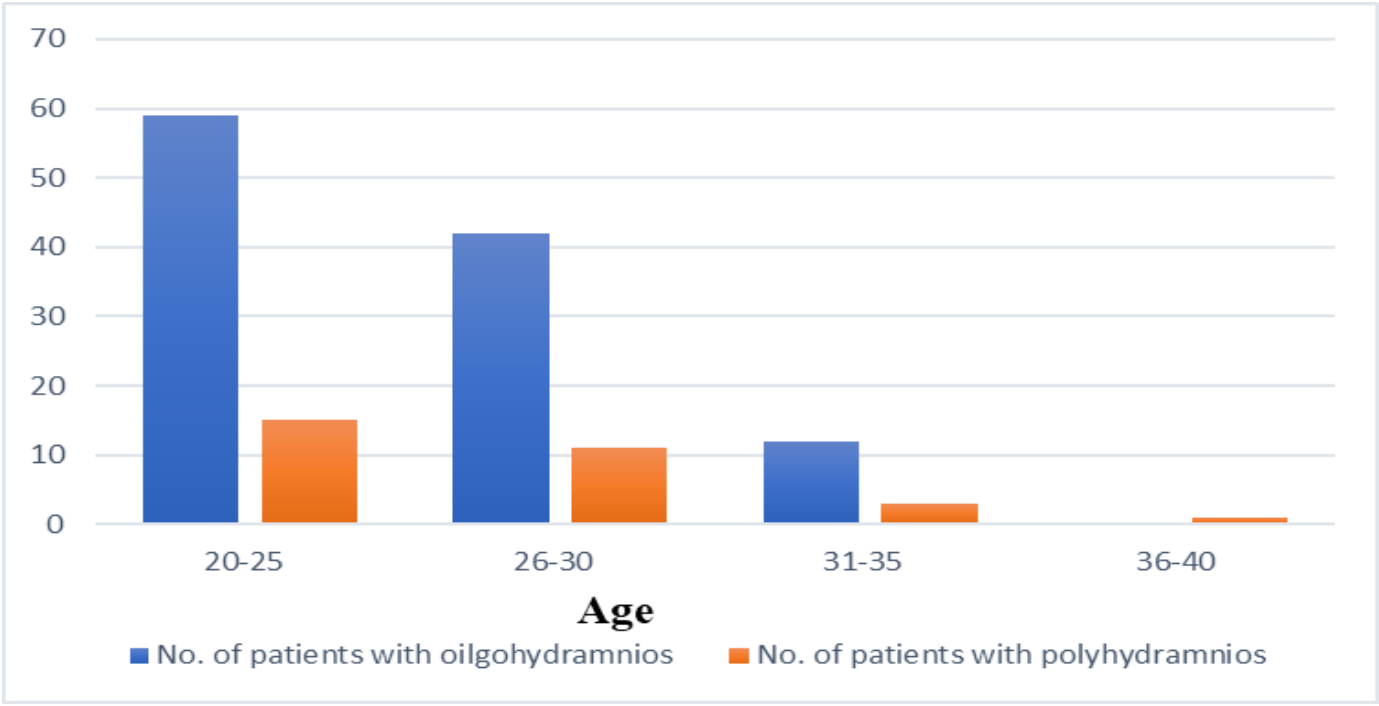

Figure 2: Age wise distribution

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In the above Table 1 and figure 1 showes age wise distribution of oligohydramnios and polyhydramnios. In oligohydramnios group, 39.3% (n=59) patients were in 20-25 years age group followed by 28% (n=42) patients each in 26-30 years group followed by 8% (n=12) patients each in 31-35 years age group and 36-40 years group are to be 0.

Table 3: Gravida wise distribution

GRAVIDA	No of patients with oligohydramnios	Number of patients with polyhydramnios
Primigravida	66	18
P2	12	8
Multigravida	4	12

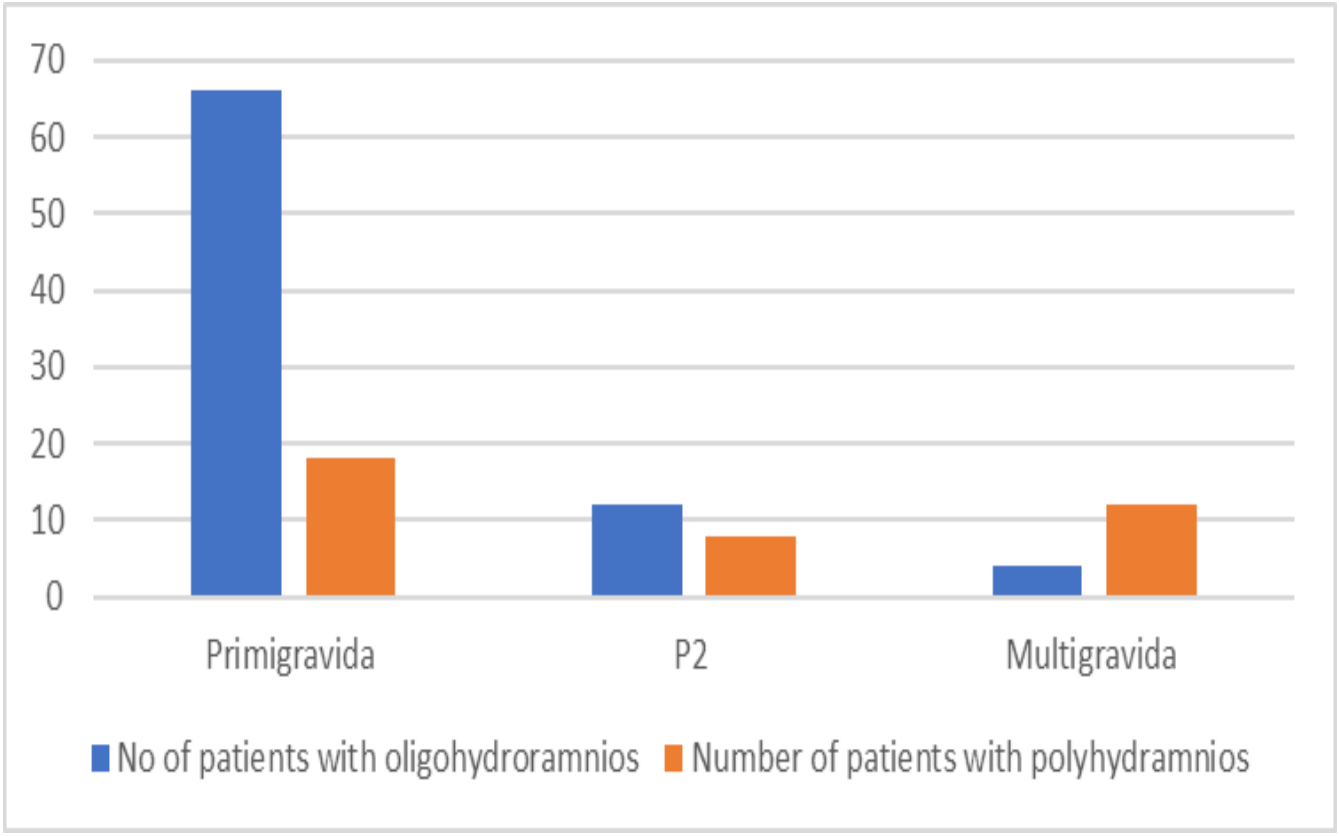

Figure 4: Gravida wise distribution

In oligohydramnios group. 44% (n=66) patients with prim gravida while 8% (n=12) with p2 while multi gravida is 2.6% (n=4), In Polyhyramnios group .12% (n=18) patients with primigravida while 5.3% (n=8) with p2 while multigravida is 8% (n=12)

Table 5: Mode of Delivery Wise Distribution

Mode of delivery	No. of patients with oligohydramnios	No. of patients with polyhydramnios
Normal	17 deliveries	7
cesarean section	67 deliveries	59

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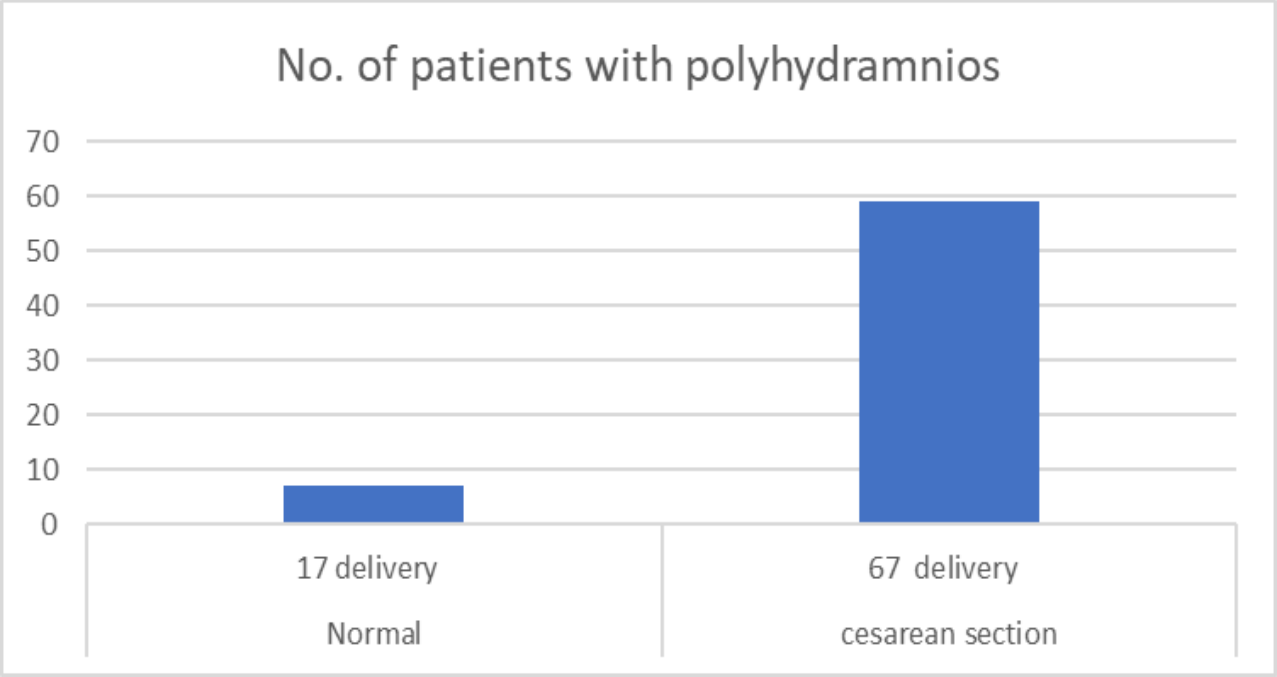

Figure 5: Mode of Delivery Wise Distribution

In oligohydramnios group,17 (11.3%) normal vaginal delivery were done for oligohydramnios. oligohydramnios, group 67 (44.6%) for cesearean section were done for oligohydramnios. In polyhyramnios group 7 (4.6%) normal vaginal delivery were done for polyhyramnios. In polyhydramnios 59 (39.3%) for cesearean section were done for polyhydramnois

Table 6: labor events wise distribution

Labor events	No. of patients with oligohydramnios	No. of patients with polyhydramnios
Term delivery	13	3
Pre-term delivery	106	28

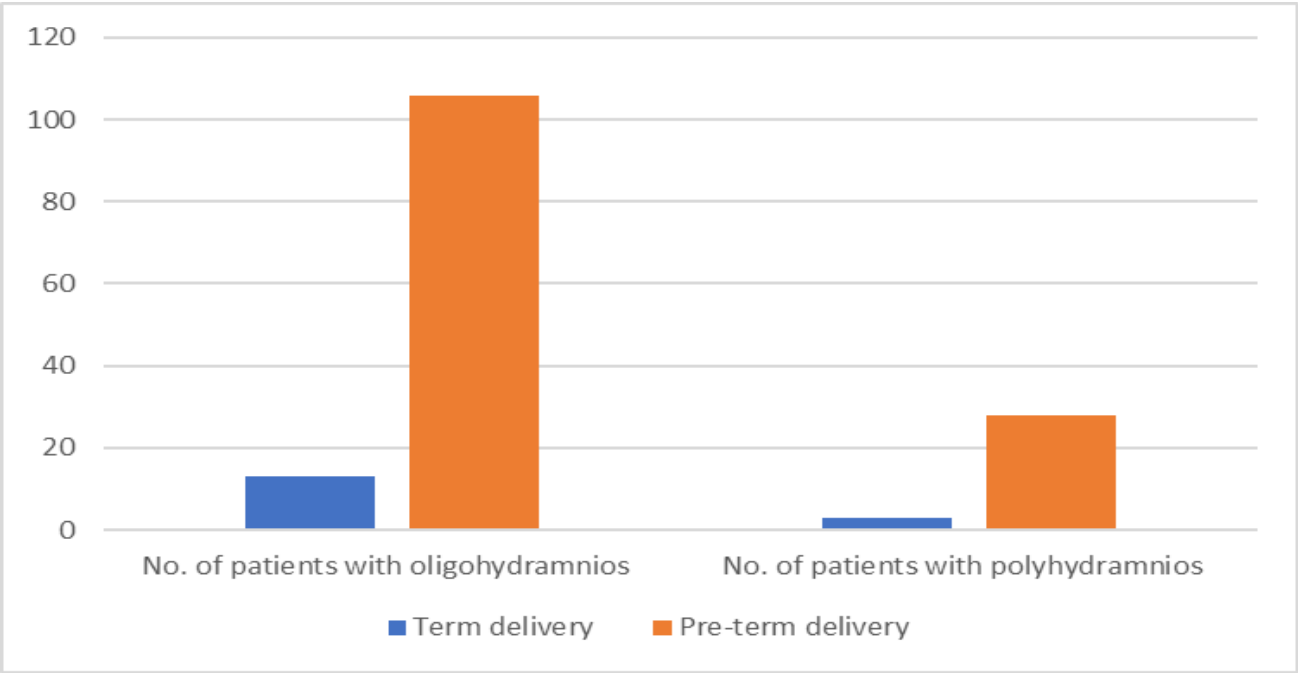

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Figure 6: labor events wise distribution

In oligohydramnios group out 119 patients 8.6% (n=13) are to be term wise delivery where as 70.6% (n=106) are to be preterm deliveries. In polyhydramnios group out of 31 patients 2% (n=3) are to be term wise delivery where as 18.6% (n=28) are to be preterm deliveries

Table 7: Birth weight of child wise distribution

Birth weight	No. of patients with oligohydramnios	No. of patients with polyhydramnios
Normal birth weight	12	51
Low birth weight	52	35

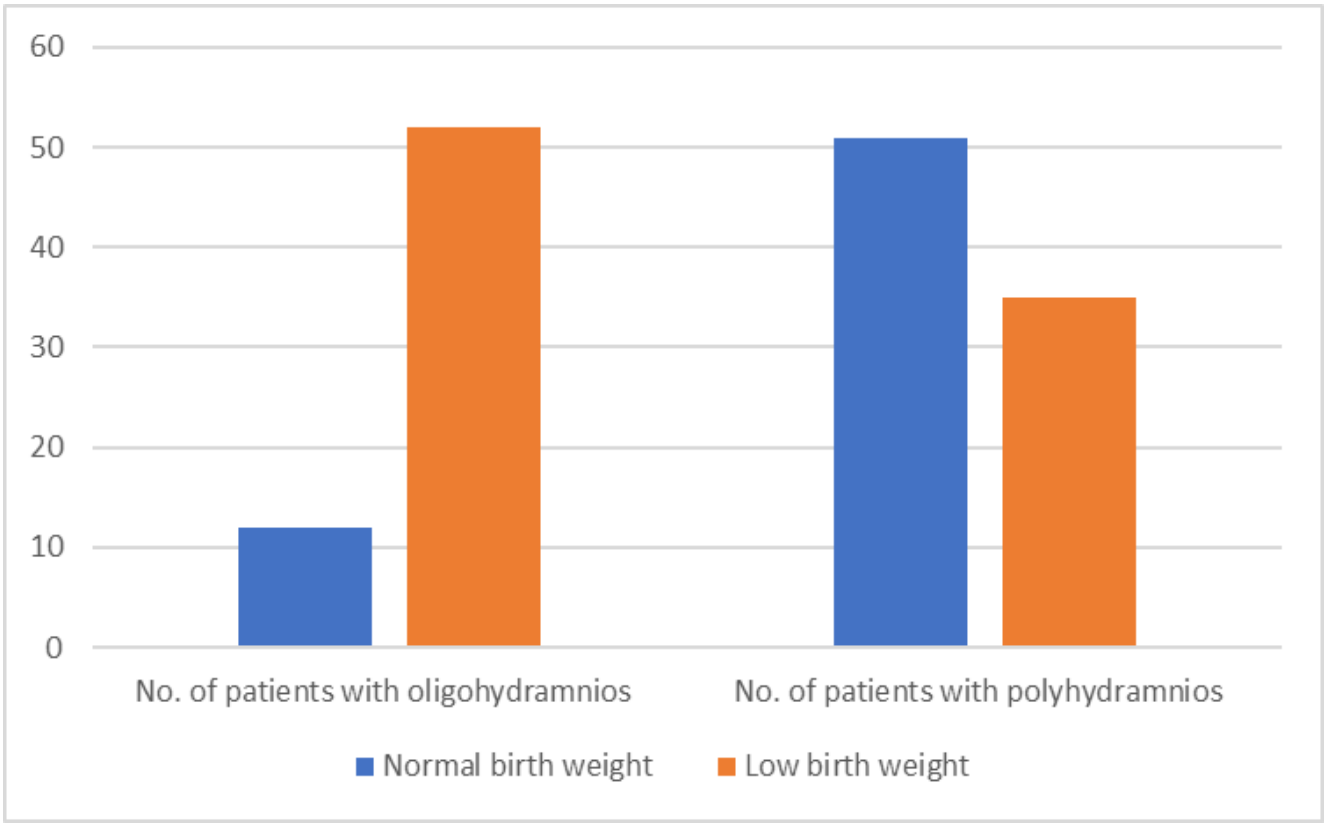

Figure 8: Birth weight of child wise distribution

In oligohydramnios group were reported in 8% (n=12) neonates with normal birth weight

In oligohydramnios group were reported with 34.6 % (n=52) neonates with low birth weight

In polyhydramnios group were reported with 34% (n=51) neonates with normal birth weight

In polyhydramnios group were reported with 23.3%(n=35) neonates with low birth weight

Table 9: NICU admission wise distribution

NICU Admissions	No. of patients with oligohydramnios	No. of patients with polyhydramnios
Yes	34	20
No	77	19

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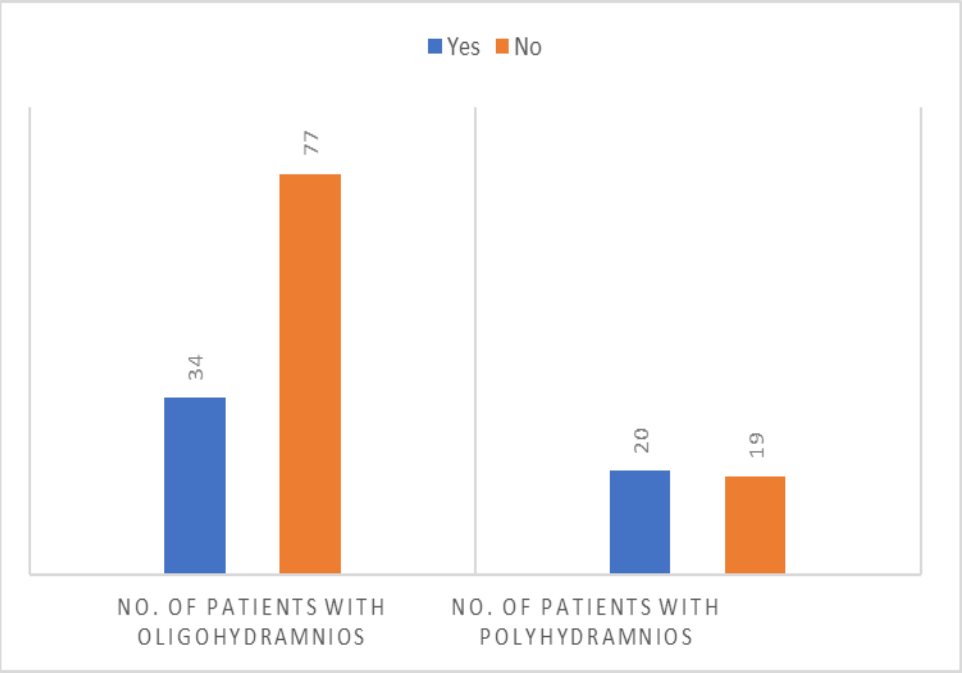

Figure 10: NICU admission wise distribution

In oligohydramnios group 22.6% [n=34], neonates are admitted in NICU

In oligohydramnios group 51.3% [n=77], neonates are reported to be healthy.

In polyhydramnios group 13.3%[n=20], neonates are admitted in NICU. In polyhydramnios group 12.6% [n=19], neonates are admitted in NICU.

Limitations:

- Patients who are not willing to participate in this study due to any reason and patients with incomplete details are not included.
- Our study was limited to a centered study.
- Large-scale studies are required to be conducted to reach a definite conclusion.

DISCUSSION

Among 150 patients with oligohydramnios and polyhydramnios conditions are examined age, gravida, mode of delivery, labor events, birth weight of a child and NICU admissions .Age group 22-25 38.6%[n=59], 26-30 age group 28% [n=42],31-35 age group 8% [n=12]are diagnosed with oligohydramnios.22-25 age group 10% [n=15], 26-30 age group 7.3% [n=11].Age group 31-35 2% [n=3]are diagnosed with polyhydramnios. Among 150 patients with oligohydramnios and polyhydramnios conditions were conducted a study on gravid patients primi gravid 44% [n=66], primi 28% [n= 12], multi gravida 2.6% [n=4], are diagnosed with oligohydramnios. primi gravida 12% [n=18], primi 2 5.3% [n=8], multi gravid 8% [n=12] are diagnosed with polyhydramnios.

Among 150 patients with oligohydramnios and polyhydramnios conditions were conducted a study on birth weight of a child, In this study low birth weight of a child 34.6% [n=52], in oligohydramnios ,23.3%[n=35], in polyhydramnios, where as normal birth weight 8% [n=12], in oligohydramnios ,34% [n=51], in polyhydramnios.

Among 150 patients with oligohydramnios and polyhydramnios conducted a study on NICU admissions in this study 22.6% [n=34], in oligohydramnios admitted in hospital ,51.3% [n=77], are healthy in oligohydramnios .13.3% [n=20], in polyhydramnios are shifted to NICU admission 12.6% [n=19], in polyhydramnios are healthy.

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CONCLUSION

This prospective observational study highlights that deviations in amniotic fluid volume are significant indicators of high-risk pregnancies, carrying a strong correlation with adverse maternal and perinatal outcomes. Abnormal liquor volumes serve as independent risk factors that heavily influence both the mode of delivery and neonatal well-being.

- **Prevalence Dynamics**: Oligohydramnios occurs much more frequently in clinical settings than polyhydramnios. It shows a strong association with primigravid patients, likely due to a higher baseline incidence of pregnancy-induced hypertension and placental insufficiency in first-time pregnancies.

- **Maternal and Delivery Impacts**: Both extremes of amniotic fluid volume significantly increase surgical obstetric interventions. The emergency Lower Segment Cesarean Section (LSCS) rate exceeds 50% in oligohydramnios cases, primarily driven by mechanical umbilical cord compression and acute intrapartum fetal distress. In polyhydramnios, surgical interventions remain high due to fetal malpresentations, maternal metabolic complications (GDM), and the risk of sudden cord prolapse.

- **Neonatal Prognosis**: Variations in amniotic fluid volume directly affect neonatal health. Oligohydramnios is closely tied to low birth weight, fetal growth restriction, and poor APGAR scores. Polyhydramnios, especially when complicated by maternal gestational diabetes, leads to higher rates of fetal macrosomia. Both conditions ultimately increase neonatal intensive care unit (NICU) admissions.

Clinical Recommendation

Regular, systematic ultrasound evaluations of the Amniotic Fluid Index (AFI) are essential during third-trimester antenatal visits. Identifying fluid volume abnormalities early allows clinicians to plan timely interventions, select the optimal mode of delivery, and arrange for immediate neonatal resuscitation. This proactive approach is vital for minimizing preventable perinatal morbidity and mortality.

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