

# Fetal Outcome in Isolated Oligohydramnios: A Prospective Study

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**Abstract** Amniotic Fluid is essential for the growth and development of the growing fetus. It is maximum at around thirty seven weeks of pregnancy and then gradually decreases. Decrease in the amniotic fluid is associated with maternal obstetric complication like PIH, IUGR and increases the risk of fetal morbidity and mortality. This is a prospective study carried out in the department of obstetrics and gynecology at Manipal Teaching Hospital, Pokhara, Nepal. Sixty women with isolated oligohydramnios beyond 34 weeks of gestation were included in the study. In this study, meconium stained liquor, non reassuring heart rate and the rate of cesarean section was observed to be high in isolated oligohydramnios but however, there was no NICU admission and neonatal mortality in this study.

**Keywords:** Isolated Oligohydramnios, Amniotic Fluid Index, Fetal Outcome

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## 1. Introduction

Amniotic Fluid (AF) is essential for the growth and development of fetus. It has a protective effect, protecting the fetus from mechanical and biological injury. Apart from providing nutrients to the fetus it also has excretory functions and prevents infection in utero. In the first half of the pregnancy, the AF volume increases rapidly up to 800 ml by 22 weeks. Then the production becomes slow reaching up to 1000ml at around 37 weeks. The AF volume then decreases by 10% per week until 41 weeks and then by 33% per week [1]. Decrease in the amniotic fluid volume is known as oligohydramnios. Amniotic Fluid Index (AFI) less than 5<sup>th</sup> centile for the gestational age or less than 5 cm or if the maximum vertical pocket is less than 30mm is known as oligohydramnios [2]. It is common obstetric complication and occurs in 3-5% of pregnancies at term. Oligohydramnios is associated with adverse perinatal outcome such as meconium stained liquor, fetal distress, increased rate of operative delivery, NICU admission and increased morbidity and mortality [3,4]. However some studies have not shown the association between oligohydramnios and adverse perinatal outcome [5,6,7,8]. The objective of this study was to evaluate the association of oligohydramnios beyond 34 weeks of gestation to fetal outcome.

## 2. Methodology

### 2.1. Study Site & Design

The prospective study was conducted from 1<sup>st</sup> January 2015 till 30<sup>th</sup> June 2015 in the Obstetrics and Gynecology

### 2.2. Cohort

The study included all women who were pregnant beyond 34 weeks of gestation and had AFI less than 8 without any obstetric complications. The study was conducted

### 2.3. Sample Size Determination

In a pilot study conducted prior to the original study among 10 cases, the percentage of Apgar score more than 6 in 1 minute was 85% with precision 10% and 95% confidence interval. Hence, the required sample size was 49 [9].

### 2.4. Ethical Consideration

Ethical clearance was taken from the Ethical committee of Manipal Teaching Hospital and verbal consent was taken from the participants.

### 2.5. Data Collection

During the study period of six months, 60 patients beyond 34 weeks of pregnancy with oligohydramnios with AFI 8 and less, were taken. The AFI was divided into less than two, two to six and six to eight.

#### 2.5.1. The Inclusion Criteria of the Study Population were:

- i. women with singleton pregnancy,
- ii. confirmed gestational age beyond 34 weeks,
- iii. amniotic fluid volume equals to and less than 8 cm.

**2.5.2. The Exclusion Criteria were:**

- i. gestational age less than 34 weeks,
- ii. multiple pregnancies,
- iii. PIH, PROM, IUGR,
- iv. fetal anomalies.

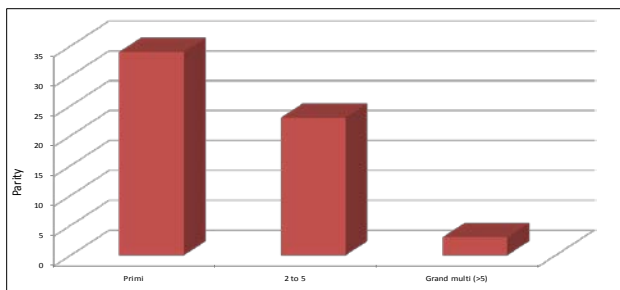
Maternal variables collected were age, parity, gestational age, mode of delivery. Whereas neonatal characteristics collected were Apgar score, birth weight and NICU admission.

**2.6. Data Analysis**

The statistical software package SPSS version 20 and Chi-square test were used for data analysis. And *p* value less than 0.05 was considered to be statistically significant.

**3. Results**

57% (n=34) of the patients were primi, whereas 38% (n=23) were between the parity 2-4 and only 5%(n=3) were grand multipara i.e. parity equals to or more than 5.



**Figure 1.** Parity of The Patient

The study showed that the patients with oligohydraminos were more in the gestational age between 37-40 weeks (n=31). Whereas 27 cases were more than 40 weeks of gestation and only 2 cases were between 34-37 weeks. Only 13% (n=8) cases had AFI less than 2, 40% (n=24) had AFI between 2-5 and 47% (n=28) had AFI between 6-8 (Table 1).

**Table 1. Amniotic Fluid Index in Relation to Gestational Age**

Gestational age	<2	2-5	6-8	P value
34-37 weeks		2		0.05
37-40 weeks	4	12	15	
>40 weeks	4	10	13	

In the study 63% (n=38) patients had cesarean section as compared to 37% (n=22) patients who had vaginal delivery. All the patients with AFI less than 2 underwent cesarean section. Those with AFI between 2-5, 18 had cesarean section and 6 had vaginal delivery. In patients whose AFI was between 6-8, 16 had vaginal delivery as compared to 12 patients who underwent cesarean section (Table 2).

**Table 2. Mode of Delivery in Relation to Amniotic Fluid Index**

AFI	Vaginal delivery	Cesarean section	P value
<2	-	8	0.02
2-5	6	18	
6-8	16	12	

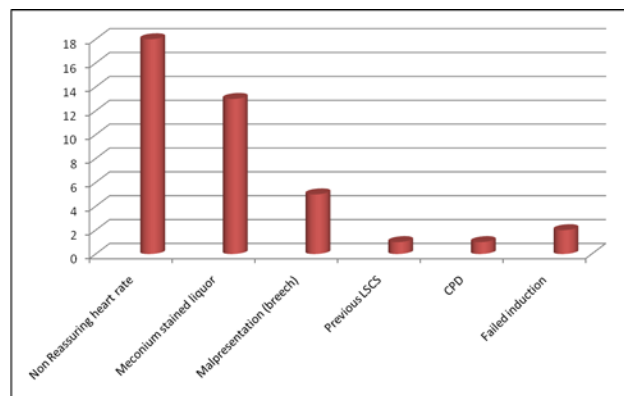
The study showed that meconium stained liquor out of eight patients whose AFI was less than two, six had non reassuring heart rate and two had meconium stained liquor.

Four had APGAR score less than 6 in 1 minutes. Five had birth weight less than 2.5 kg. Majority of the fetus with birth weight more than 2.5 kg had AFI between 6 to 8. The incidence of meconium stained liquor, non reassuring heart rate and APGAR score less than 6 in 1 minute was less in those with AFI between 6 to 8 as compared to those with AFI between 2 to 5 and less than 2.

**Table 3. Neonatal Outcome in Relation to Amniotic Fluid Index**

AFI	<2	2-5	6-8	P value
Meconium stained liquor	2	6	5	0.04
Non reassuring heart rate	6	8	2	
Apgar score < 6 in 1 minute	4	1	2	
Birth weight < 2.5 kg	5	4	4	
Birth weight > 2.5 kg	3	20	24	

In this study, out of thirty eight cases of cesarean section, the majority was for non reassuring heart rate, n=16, followed by meconium stained liquor (n=13), five cases were done for Malpresentation, two for failed induction and one each for previous LSCS and CPD (Figure 2).



**Figure 2.** Indications of Cesarean Section

**4. Discussions**

Oligohydraminos is associated with an increased risk of intrauterine growth retardation, meconium stained liquor, non reassuring fetal heart rate, congenital anomalies of fetus, increase rate of cesarean section and increase perinatal morbidity and mortality [3,4].

The liquor volume decreases as the gestational age increases. In this study most of the patients were between 37-40 weeks, 52% (n=31) followed by patients more than 40 weeks of gestation, 45% (n=27) and only two cases (3%) were between 34-37 weeks of gestation, (p=0.05). Similarly, Brare RA et’ al have also showed in their study that amniotic fluid volume decreases after 37 weeks of gestation [1].

In the present study, meconium stained liquor, non reassuring heart rate, apgar score <6 in 1 minute were identified but however there was no neonatal admission. The result resembles the previous study conducted by Brian M. Casey et’ al [4], where increased rate of labour induction, non reassuring heart rate, meconium aspiration syndrome, neonatal intensive care and still birth were identified. Other studies conducted by Bhat S and Kulkarni V [10] and Umber A [11] have also shown

higher rates of growth retardation and intensive care unit admission in association with oligohydramnios. Several studies [12-19], have also shown increase perinatal morbidity and mortality in relation to oligohydramnios. However, in the studies conducted by Jun Zhang et' al [7], Sowmya K et' al [20], Jillian Coolen et' al [21] have shown no association between oligohydramnios and adverse fetal outcome.

In this study the rate of cesarean section was high (63%, n=38) as compared to vaginal delivery (37%, n= 22) which was statistically significant (p=0.02). The lower the AFI, the higher is the rate of cesarean section. All the patients (n=8) whose AFI was less than 2 had cesarean section. Vaginal delivery was higher (n=16) when the AFI was between 6 to 8. This result is favoured by the study conducted by Sowmya K et' al, [8] who observed that the rate of cesarean section was higher in patients with oligohydramnios. Several studies have also supported that the rate of cesarean section is high among women with oligohydramnios [11-16]. However, in the study conducted by Krishna Jagatia et al [22], the rate of vaginal delivery was more as compared to cesarean section in women with oligohydramnios. Similarly, in studies conducted by Chauhan et' al [23,24], they did not show any increased risk of cesarean section in patients with oligohydramnios.

The study result analysis demonstrate that the most common indication for cesarean section was non reassuring heart rate, 27% (n=16), followed by meconium stained liquor, 22% (n=13). This study is favoured by the study conducted by Brian M. Casey where cesarean section done for non reassuring heart rate was 48% and for meconium stained liquor was 6% in women with AFI less than 5 [10]. However, other studies have shown the incidence of meconium stained liquor was more as compared to non reassuring heart rate [6,8]. The Apgar score less than 1 in 6 min in this study was only 12% (n=7) and it was less among the fetuses whose AFI was less than 2. This study shows that the lesser the AFI, the more risk of having fetus with Apgar score less than 1 in 6 minutes (p=0.04). However, overall there was no increased risk of low Apgar score. This study is supported by the study done by Sowmya K et al [8] Other studies have shown poor Apgar score in relation to AFI [13,14,15]. In this study the incidence of birth weight less than 2.5 kg was more among women with AFI less than 2, (62%,n=5) as compared to those with AFI 2-5 (17%, n=4) and 6-8(14%, n=4). Zun Zhang et' al in their study have shown no changes in fetal weight in relation to oligohydramnios [7]. Other studies have shown decrease in fetal weight in relation to amniotic fluid index.

## 5. Conclusion

In the study it was observed that oligohydramnios is associated with increased rate of cesarean section due to non reassuring heart rate, meconium stained liquor but it was not associated with adverse fetal outcome in the absence of maternal and fetal complicating factors.

## Abbreviations

AFI: Amniotic Fluid Index

AF: Amniotic Fluid

LSCS: Lower segment cesarean section

CPD: Cephalopelvic disproportion

## Declaration of Conflicting Interests

The authors declare that there is no potential conflicts of interest with respect to the research, authorship and /or publication of this article.

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