

Maternal and Perinatal Outcome in Pregnant Women with Oligohydramnios in a Tertiary Care Centre

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Abstract

Background and Objectives: Amniotic fluid is clear slightly yellowish liquid which surrounds the foetus, it is alkaline and its volume is related to gestational age. It protects the fetus by functioning like a shock absorber, maintains even temperature, allows for the growth and free movements of foetus and prevents adhesions between fetal parts and amniotic sac.

Polyhydramnios, severe oligohydramnios are around 1.25% and 1- 5% of the pregnancies. Oligohydramnios is more associated with fetal anomalies, morbidities and maternal hypertension. We noticed there was a drastic change in the patterns of the levels of amniotic fluid among the labour class women. The present study was designed to evaluate the effects of decreased amniotic fluid levels on the mother and the baby.

Materials and Method: A cross sectional study was conducted in the Department of Obstetrics and Gynaecology , ESIC-PGIMSR Bangalore between January 2019 to June 2020. 254 pregnant women with normal and oligohyframnios were included in the study. The maternal and fetal outcomes were observed in pregnant women with normal AFI and decreased AFI.

Results: Among 254 women 151 had normal AFI and 103 had oligohydramnios. Age ranged from 26-28 years. In oligohydramnios group, higher induction of labor 61(59.2%) vs 40(26.5%), cesarean section rate 59(57.3%) vs 46(30.5%), APGAR <7 at 5 minutes 17(16.5%) vs 3(2%), low birth weight babies 42(40.7%) vs 27(17.9%) and NICU admission 36(35%) vs 25(16.6%) with a $p \leq 0.001$ when compared to normal AFI group.

Conclusion: Amniotic fluid index is an important part of antepartum fetal surveillance. Abnormalities of AFI are associated with higher maternal cesarean sections and NICU admissions.

Keywords: Amniotic Fluid Index; oligohydramnios; cesarean section; Neonatal Intensive Care Unit; APGAR score; Induction of labour

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Introduction

Amniotic fluid is a clear liquid which surrounds the foetus in pregnancy. The fluid is alkaline and its volume is related to gestational age. Amniotic fluid volume increases from approximately 30 mL at 10

weeks to 200 mL by 16 weeks and reaches 800 mL by the mid-third trimester. [1,2] The fluid is approximately 98-percent water. A full-term fetus contains roughly 2800 mL of water and the placenta another

400 mL, such that the term uterus holds nearly 4 liters of water [3].

Measurement of amniotic fluid volume is a routine procedure for regular antenatal screening of fetus. Over the time the methods of measurement of amniotic fluid volume has been continuously evolving from interventional technique like dilutional dye techniques to non-invasive methods like ultrasound measurement techniques like single vertical pocket, amniotic fluid index technique.

The main function of amniotic fluid is to protect the foetus. During pregnancy, it acts as shock absorber, maintains even temperature, allows for the growth and free movements of foetus and prevents adhesions between foetal parts and amniotic sac. During labour, amnion and chorion combine to form a hydrostatic wedge which helps in dilatation of cervix, it guards against umbilical cord compression [4].

Oligohydramnios is a condition where the liquor amnii is decreased in amount which is measured in ultrasonography as Amniotic fluid index (AFI) less than 5cm. Oligohydramnios is a severe and common complication of pregnancy and the incidence is about 1-5% of total pregnancies. The common clinical features are fetal malpresentation, smaller symphysio fundal height and undue prominence of fetal parts. Maternal complications are prolonged labour, increased operative rates due to malpresentation and increased maternal morbidity. Fetal complications like Intrauterine growth restriction (IUGR), fetal distress, cord compression

Our pregnant women belong to the labour class and are involved in different job profiles. In day to day clinical practice we noticed there was a drastic change in the patterns of the levels of amniotic fluid. Since we are unable to understand the cause for and outcome of reduced amniotic fluid values in these group of women, the

present study was designed to evaluate the different values of amniotic fluid levels and their effect on the mother and the baby.

Materials and Methods

Source of the Data

The present study was carried out among pregnant women with gestational age ≥ 36 - ≤ 40 weeks attending the Department of Obstetrics and Gynaecology, ESIC-PGIMS Bangalore between January 2019 and June 2020.

Inclusion Criteria:

1. All pregnant women between ≥ 36 to ≤ 40 weeks of gestation.
2. Pregnant women who are willing to participate in the study.

Exclusion Criteria:

1. Pregnant women with surgical complications like ovarian tumor, acute fatty liver, cervical incompetence, Preterm premature rupture of membranes (PPROM), Premature rupture of membranes (PROM).
2. Pregnant women who are not willing to participate in the study.

Method of Collection

All the pregnant women who fulfill the inclusion criteria had undergone AFI measurement by Phelan technique² every 14 days from 36 weeks onwards up to 40 weeks. AFI was performed along with the regular Obstetric scan by using ultrasound machine, PHILIP or TOSHIBA Company of model by using a curvilinear probe of 3.5 to 5 Hz.

The last AFI measurement was considered for evaluation.

Normal AFI ranges from 8-20 centimeters.

AFI of < 8 CM was considered as oligohydramnios.

In the above groups maternal outcome was measured as,

- A. Onset of labour - Spontaneous labour or Induced labour

- B. Labour complication-Prolonged labour
- C. Mode of delivery-Vaginal delivery or Instrumental delivery or Caesarean delivery

Foetal outcome was measured as,

- A. APGAR score at 1 and 5 minutes
- B. Birthweight
- C. NICU admissions

Duration of the study: Eighteen months (January 2019 to June 2020)

Study design: Cross sectional study

Statistical Analysis

Sample Size: A total of 254 pregnant women were enrolled for the study. Sampling was done by simple random sampling. 151 women in the normal AFI group, and 103 in oligohydramnios group. The two groups were matched for their age.

With prevalence of abnormal amniotic fluid volumes in our hospital, P = 25%, with power = 80% and confident interval, CI= 95% and precision =5%, Design effect value, DE=1 Sample size was calculated using following formula

$$n = \frac{[DE Np(1 - p)]}{\left[\frac{d^2}{Z^2 (1 - \alpha/2)} (N - 1) + p(1 - p) \right]}$$

Statistical Analysis:

Data were entered into Microsoft Excel and statistical analysis was carried out in SPSS software version 17.0. Qualitative variables were presented as frequency and percentages. Quantitative variables were presented as mean (standard deviation) or median (range) depending upon the distribution of data. Bar diagram and pie charts were used for graphical representation of data.

Based on AFI values, the participants were divided into two groups normal AFI and oligo. Categorical variables like (onset of labour, Birth weight categories, NICU admission, obstructed labour, PPH) between the AFI groups were compared using chi square tests. A p value of less than 0.05 was considered as statistically significant.

Observations and Results

Table 1: Distribution of women with Oligohydramnios

| Groups | Number | Percentage |
|-------------|--------|------------|
| Severe (<5) | 34 | 33 |
| Mild (5-8) | 69 | 67 |
| Total | 103 | 100 |

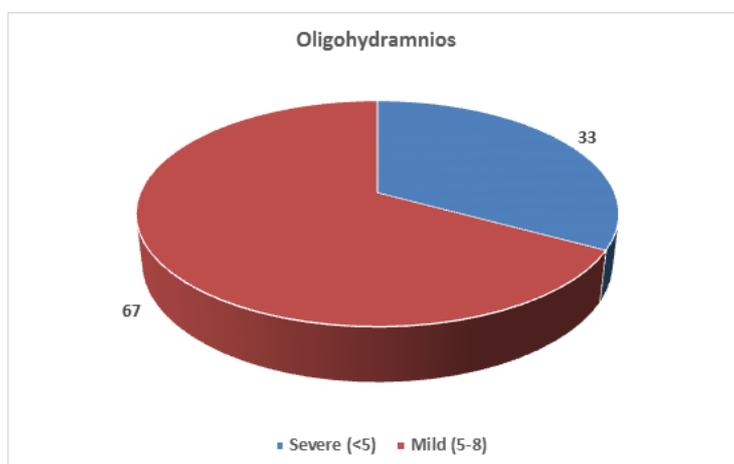


Figure 1: Distribution of Amniotic Fluid Index in the oligohydramnios group.

Table 2 : Distribution Age in two group

| Age groups | Groups | | | |
|------------|------------|------|-----------------|------|
| | Normal AFI | | Oligohydramnios | |
| | n | % | N | % |
| ≤20 | 14 | 9.3 | 5 | 4.9 |
| 21-25 | 64 | 42.4 | 43 | 41.7 |
| 26-30 | 55 | 36.4 | 41 | 39.8 |
| >30 | 18 | 11.9 | 14 | 13.6 |
| Total | 151 | | 103 | |

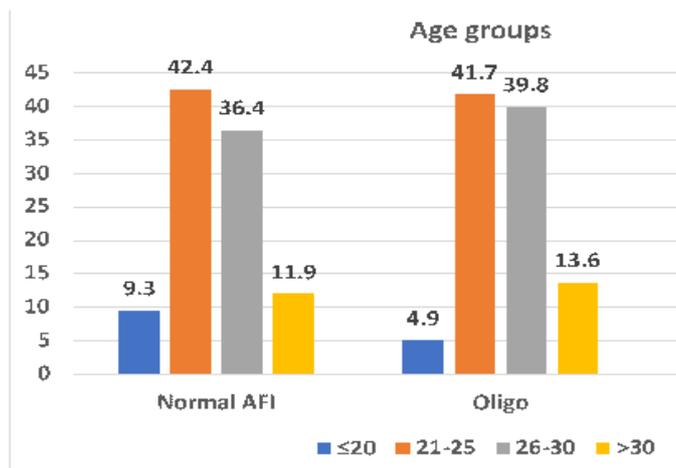


Figure 2: Distribution of age in the two groups.

Table 3: Distribution of Parity in two groups

| Parity | Groups | | | |
|-----------|------------|------|-----------------|------|
| | Normal AFI | | Oligohydramnios | |
| | n | % | n | % |
| Primipara | 74 | 49.0 | 54 | 52.4 |
| Multipara | 77 | 51.0 | 49 | 47.6 |
| Total | 151 | | 103 | |

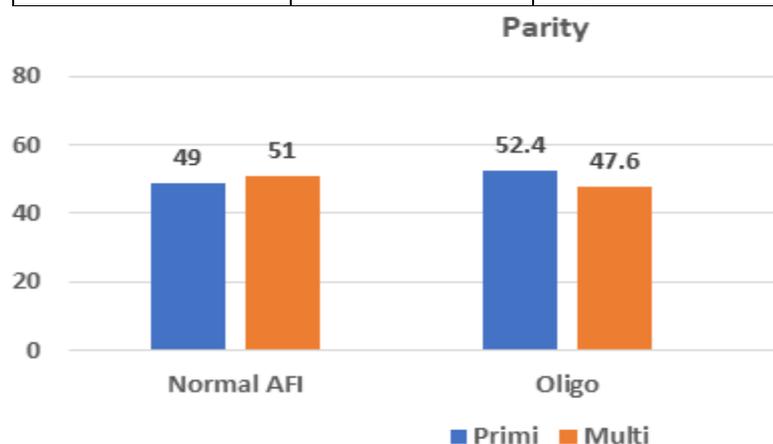


Figure 3: Distribution of Parity in two groups

Table 4 : Comparison of comorbidities in women between the normal AFI and Oligohydramnios

| Comorbidities | Normal | | Oligohydramnios | |
|--|--------|------|-----------------|------|
| | n | % | N | % |
| Yes | 87 | 57.6 | 54 | 52.4 |
| No | 64 | 42.4 | 49 | 47.6 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=0.414 (Not significant) | | | | |

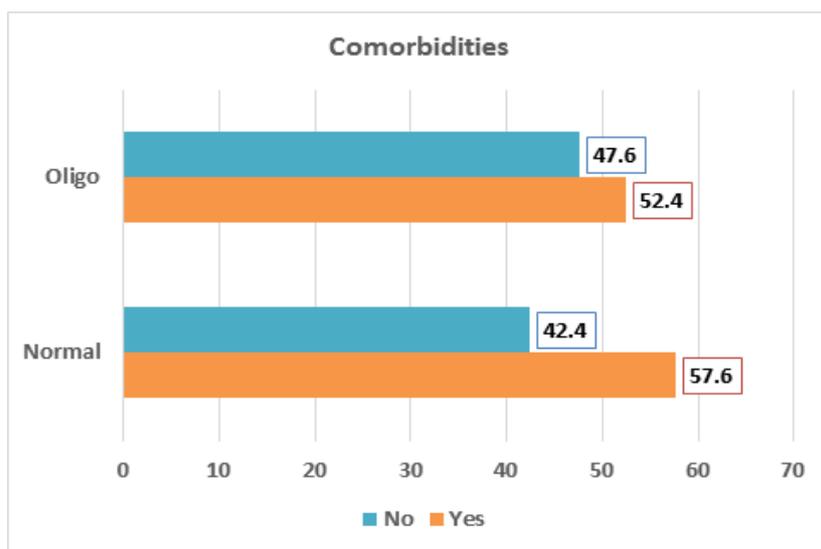


Figure 4: Comparison of comorbidities in women between the normal AFI and Oligohydramnios

Table 5: Comparison of onset of labor between normal AFI and Oligohydramnios.

| Onset of labour | Normal | | Oligohydramnios | |
|---|--------|------|-----------------|------|
| | N | % | n | % |
| Spontaneous | 111 | 73.5 | 42 | 40.8 |
| Induced | 40 | 26.5 | 61 | 59.2 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=<0.001 (Significant) | | | | |

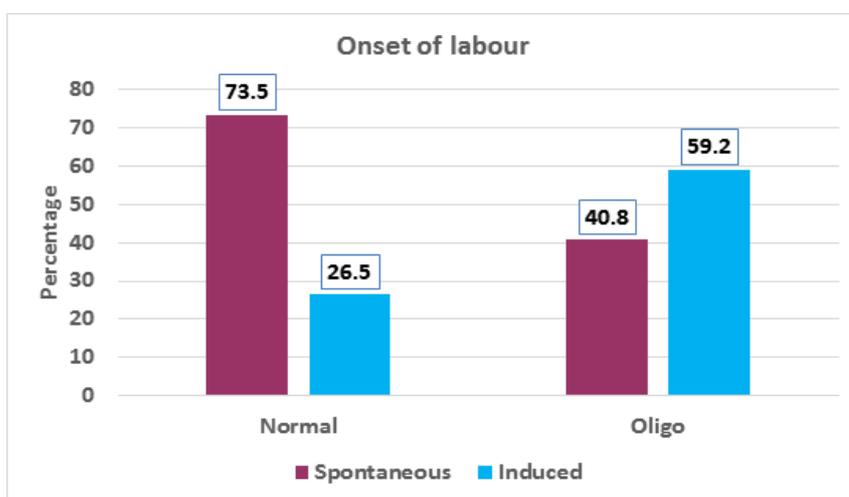


Figure 5: Comparison of onset of labor between normal AFI and Oligohydramnios

Table 6: Comparison of Prolonged labor between normal AFI and Oligohydramnios.

| Prolonged labour | Normal | | Oligohydramnios | |
|--|--------|-----|-----------------|------|
| | N | % | n | % |
| No | 148 | 98 | 100 | 97.1 |
| Yes | 3 | 2 | 3 | 2.9 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=0.633 (Not Significant) | | | | |

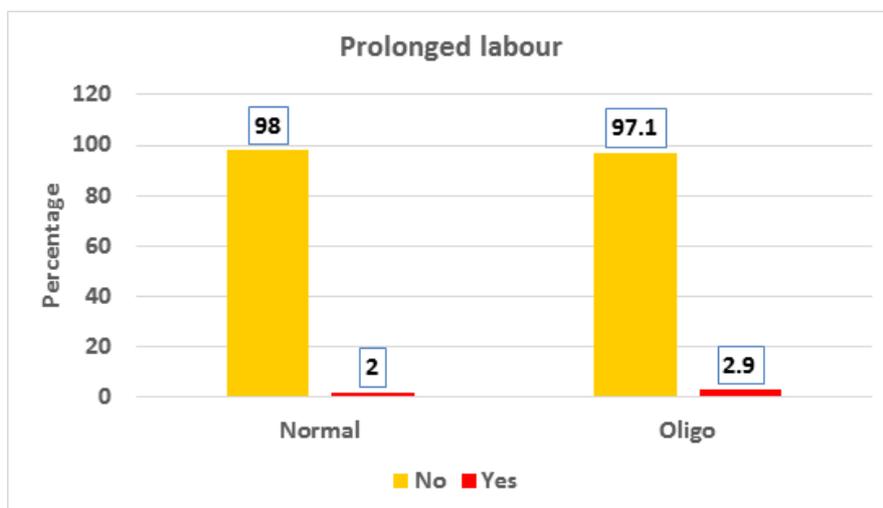


Figure 6: Comparison of Prolonged labor between normal AFI and Oligohydramnios

Table 7: Comparison of Mode of delivery between the Normal AFI and Oligohydramnios

| Mode of delivery | Normal | | Oligohydramnios | |
|---|--------|------|-----------------|------|
| | n | % | n | % |
| Vaginal | 101 | 66.9 | 38 | 36.9 |
| Instrumental | 4 | 2.6 | 6 | 5.8 |
| Cesarean | 46 | 30.5 | 59 | 57.3 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=<0.001 (Significant) | | | | |

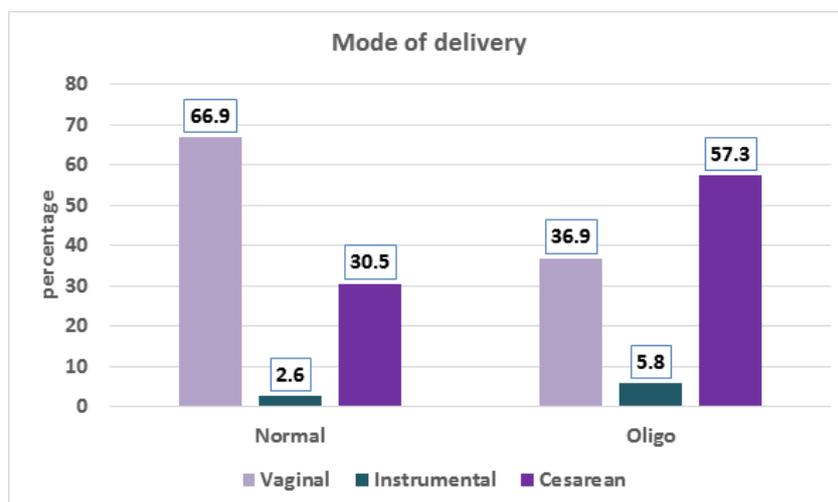


Figure 7: Comparison of Mode of delivery between the Normal AFI and Oligohydramnios

Table 8: Comparison of APGAR score at 5 minute <7 with Normal AFI and Oligohydramnios.

| APGAR at 5 minute<7 | Normal | | Oligohydramnios | |
|---|--------|-----|-----------------|------|
| | n | % | n | % |
| No | 148 | 98 | 86 | 83.5 |
| Yes | 3 | 2 | 17 | 16.5 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=<0.001 (Significant) | | | | |

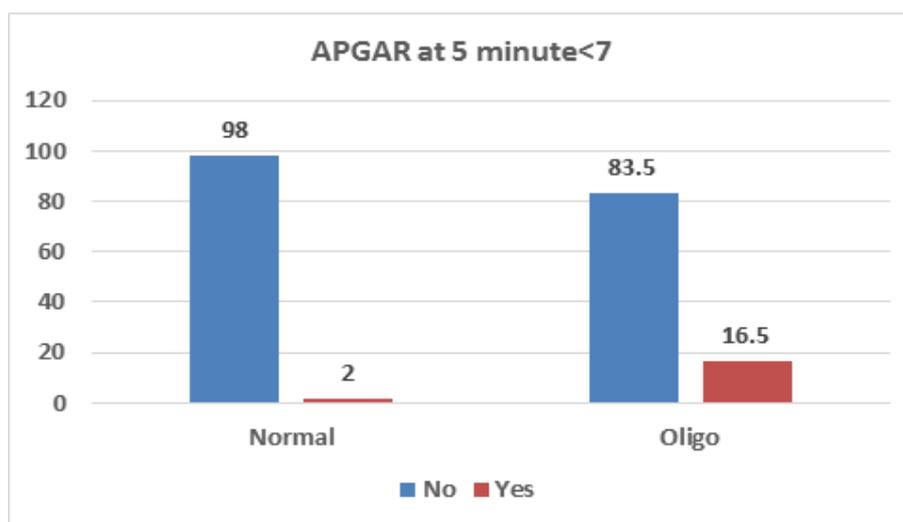


Figure 8: Comparison of APGAR score at 5 minute <7 with Normal AFI and Oligohydramnios.

Table 9: Comparison of birth weight between normal AFI and Oligohydramnios.

| Birth weight (kg) | Normal | | Oligohydramnios | |
|---|--------|------|-----------------|------|
| | n | % | n | % |
| ≤2 | 1 | 0.7 | 9 | 8.7 |
| 2.1-2.5 | 26 | 17.2 | 33 | 32 |
| 2.6-3.0 | 71 | 47 | 43 | 41.7 |
| >3 | 53 | 35.1 | 18 | 17.5 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=<0.001 (Significant) | | | | |

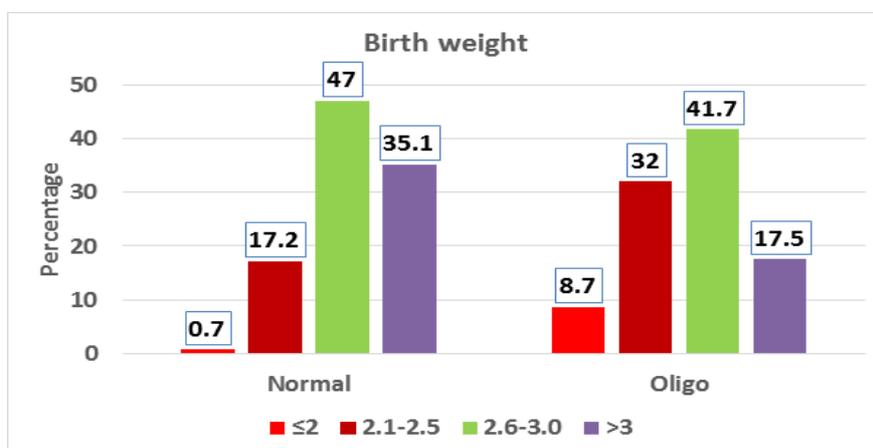
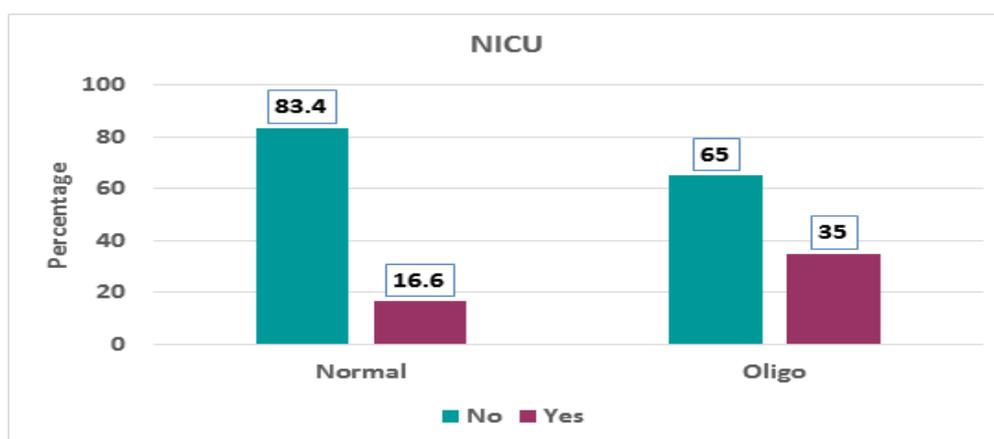


Figure 9: Comparison of birth weight between normal AFI and Oligohydramnios.

Table 10: Comparison of transfer of the new born to NICU between Normal AFI and Oligohydramnios.

| NICU | Normal | | Oligohydramnios | |
|--|--------|------|-----------------|-----|
| | n | % | n | % |
| No | 126 | 83.4 | 67 | 65 |
| Yes | 25 | 16.6 | 36 | 35 |
| Total | 151 | 100 | 103 | 100 |
| Chi square p value=0.001 (Significant) | | | | |

**Figure 10: Comparison of transfer of the new born to NICU between Normal AFI and Oligohydramnios****Discussion:**

In the present study out of 254 (100%) participants who were enrolled following the fulfillment of the inclusion criteria we found 151 women had normal AFI and 103 women had oligohydramnios. 60% of the women were manual workers in the abnormal amniotic fluid index group.

34(33%) of the women had severe oligohydramnios < 5 centimeters, whereas Dalal N et al [6] had a higher occurrence of 61% among 200 women.

Mild oligohydramnios was reported by Dalal N et al [6] in about 72(36%) women, whereas in the present study we had a higher number of women with mild oligohydramnios 69(67%).

In oligohydramnios group, there were 54(52.4%) women who were primigravida

and 49(47.6%) women were multigravida and they were comparable, similar findings were reported by Jagatia K et al [7] (52% and 48%) and Chiniwar MA et al [8] (47.8% and 52.2%) but oligo hydramnios was noted more frequently in the primigravida by Ahmar R et al [9] 64.4% and 35.6% and Sinha G et al [10] 54.55% and 14.55%. However, Ghosh R et al [11] reported oligohydramnios more frequently in the multigravidas(35.5% vs 65.5%).

The commonest associated comorbidity was gestational hypertension in 20(19.4%) in the oligohydramnios group. An higher occurrence was noted by 10.9% by Jeyamani B et al [12] Bansal L et al [13] 22.2%, 30.7% by Parmar MM et al [14], 28.5% by Sinha G et al [10] in women with PIH. [15,16]

Table 11 : Comparison of Mode of delivery between the Normal AFI and Oligohydramnios

| MODE OF DELIVERY | Bansal D et al[1] | Chiniwar MM et al[8] | Ghosh R et al[11] | Bansal L et al[13] | Musthaq ACM et al[15] | Present study |
|------------------|-------------------|----------------------|-------------------|--------------------|-----------------------|---------------|
| Vaginal | 53% | 42% | 47.3% | 34.4% | 77.1% | 36.9 |
| Instrumental | 0% | 0% | 3.6% | 0 | 1.4% | 5.8 |
| Caesarean | 47% | 58% | 49.1% | 65.6% | 21.5 | 57.3 |

Table 12 : Discussion of Comparison of transfer of the new born to NICU between Normal AFI and Oligohydramnios

| | Bansal D et al[13] | Jagatia Ket al[7] | Palmer MM et al[14] | Present study |
|----------------|--------------------|-------------------|---------------------|---------------|
| NICU admission | 36% | 22% | 25.6% | 35% |

In the oligohydramnios group 36(35%) neonates were transferred to NICU. The reasons for transfer were fetal distress 8(22.22%), meconium aspiration 10(27.77%), IUGR 8(22.22%), low APGAR score < 7 at 5 minutes 10(27.77%). Casey BM et al⁷ observed 1% had meconium aspiration needing NICU transfer.

Conclusion:

In the present study we observed that, Oligohydramnios is associated with significantly increased risk of maternal morbidity like gestational hypertension, increased need for induction of labour and associated complications, increased association with instrumental delivery and caesarean section and perinatal morbidities like low or poor Apgar score of <7 at 1min and 5 minutes. There was significant association with low birth weight and increased need for NICU admission.

Hence, AFI measurement in antepartum period can help to identify women who need increased antepartum surveillance during pregnancy followed by the associated complications. There were no maternal, fetal or neonatal deaths in the present study as they were monitored effectively in special units anticipating complications in the mother and the baby.

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