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RESEARCH ARTICLE

Maternal and fetal outcome in pregnant women with abnormal amniotic fluid volumes at ESIC MC and PGIMSR

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ABSTRACT

Background: Polyhydramnios, severe oligohydramnios in the published literature are around 1.25% and 1- 5% of the pregnancies respectively. Polyhydramnios causes more maternal and fetal morbidity. Oligohydramnios is associated with fetal morbidities and maternal hypertension. **Objectives:** The present study was designed to compare the maternal and neonatal outcome in women with normal versus abnormal amniotic fluid index. **Method:** A cross sectional study was conducted in the Department of Obstetrics and Gynaecology, ESIC-PGIMSR Bangalore between January 2019 to June 2020.302 pregnant women with normal and abnormal AFI were included in the study. The maternal and fetal outcomes were observed. **Results**: Among 302 women 151 had normal AFI, 103 had oligohydramnios and 48 had polyhydramnios. Age ranged from 26-28 years. In abnormal AFI group, higher induction of labor 90(59.6%) vs 40(26.5%), cesarean section rate 85(56.3%) vs 46(30.5%), APGAR <7 at 5 minutes 45(29.8%) vs 16(10.6%), low birth weight babies 50(33.2%) vs 27(17.9%) and NICU admission 51(33.8%) vs 25(16.6%) with a p≤0.001 when compared to normal AFI group. PPH was 7(14.6%) vs 5(3.3%), p=0.004. **Conclusion:** Amniotic fluid index is an important part of antepartum fetal surveillance. Abnormalities of AFI are associated with increased obstetric interventions and higher maternal cesarean sections and NICU admissions.

Keywords: Amniotic fluid index, oligohydramnios, polyhydramnios, neonatal intensive care unit, APGAR score, PPH.

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]. 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 [2].

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.

In first half of pregnancy composition of amniotic fluid is similar to plasma. In late pregnancy the composition is much altered which includes 98-99% of water and solids 1-2%. Solid constituents are organic, inorganic and suspended particles [3].

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

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compression [3].

Oligohydramnios is a condition where the liquor amnii is decreased in amount which is measured in ultrasonography as amniotic fluid index (AFI)[4] less than 5cm. Oligohydramnios is a severe and common complication of pregnancy and the incidence is about 1-5 % of total pregnancies [5]. 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 [6].

Polyhydramnios is a condition where the liquor amnii increased with AFI more than 25 cm. There is incidence of around 1.25%.[7] The common maternal complications are premature rupture of membrane (PROM), cord prolapse, malpresentation, unstable lie and fetal complication, occult gastrointestinal anomalies.[8]

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 or increased amniotic fluid values in these groups 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

This prospective case control study was carried out among pregnant women with gestational age ≥36 - ≤40weeks attending the Department of Obstetrics and Gynaecology, ESIC-PGIMSR 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 of data - All the pregnant women who fulfill the inclusion criteria had undergone AFI measurement by Phelan technique [9] 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 to5 Hz. Phelan technique [2] is an ultrasound procedure to assess the amount of amniotic fluid. The linea nigra was used to divide uterus into right and left halves, the umbilicus serves as the dividing point for the upper and lower halves. The transducer was kept parallel to patients longitudinal axis and perpendicular to the floor. The deepest unobstructed vertical fluid was measured in each quadrant in centimeters. The 4 pockets measured were added to calculate the AFI.

Normal AFI ranges from 8<20 centimeters.

AFI of <8cm was considered as oligohydramnios.

AFI of >20cm was considered as polyhydramnios.

AFI was measured from 36 weeks onwards every 14 days till the time of delivery in both the groups. The last AFI measurement was considered for evaluation.

In the above groups maternal outcome was measured as,

A. Onset of labour

1. Spontaneous labour
2. Induced labour

B. Labour complications

1. Prolonged labour (a)
2. Obstructed labour (b)

C. Mode of delivery:

1. Vaginal delivery,
2. Instrumental delivery
3. Caesarean delivery

D.Postpartum complications like postpartum haemorrhage.

a: Prolonged latent phase of >20 hours in nulliparas and >14 hours in multiparas [10].

b: Difficulty labour characterized by slow labour progress due to abnormality in uterine contraction, maternal expulsive efforts, fetus, pelvis.[11]

Foetal outcome was measured as,

A. APGAR score at 1 and 7 minutes

B. Birth weight

C. Congenital malformations

D. NICU admissions

Sample size: A total of 302 pregnant women were enrolled for the study. 151women in each group**.** Sampling was done by simple random sampling.151 women in the

normal AFI group, and 151 abnormal AFI group**.** The two groups were matched for their age. This obstetric population was sampled from 4500 deliveries across 18 months. 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 and we got sample size (n) 289, by adding confidence limit of 5%, 289+5%, we got sample size as 302.

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

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 three groups (normal AFI, oligo and poly). 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.

Results

302 women were included in the study after fulfilling the inclusion criteria. 60% of the women were manual labourers in the present study. 151/302 (50%) had normal amniotic fluid index and 151/302 (50%) had an abnormal AFI. When the amniotic fluid index was abnormal 103/151 (34.1%) had oligohydramnios, 48/151(15.9%) had polyhydramnios (table 1). 31.78%, (48/151) had polyhydramnios and they

Table 1: Distribution of amniotic fluid index

Groups	Number	Percentage
Normal AFI	151	50
Oligohydramnios	103	34.1
Polyhydramnios	48	15.9
Total	302	100

were further graded as normal when the AFI was >8 to <20 centimeters, mild (≥20 to 25) in 45.8% (22/48), moderate (≥25 to 30) in 52.1% (25/48) and severe (≥30 to 35) in 2.1%(1/48). In the oligohydramnios group 68.2% (103/151) of the women were further classified as mild (5 to ≤ 8 centimeters) in 67% (69/151) and severe oligohydramnios (0 - ≤5 centimeters) in 33% (34/151) of the women (table 1).

There was almost equal distribution of the primigravidae and multigravidas in both the groups' viz., when AFI was normal49% (74/151) vs 51% (77/151) and abnormal AFI groups 45.69% (69/151) vs 54.96% (83/151). On further subgroup analysis, when the amniotic fluid index was ≥8 cms and <8 cms the parity was comparable, where as in the polyhydramnios group 30/48(70%) were multiparous women. 57.6% (87/151) of women had comorbidities in normal AFI group and 64.6% (31/151) of women had comorbidities in polyhydramnios group which was statistically significant, p <0.007. 14.58% (7/48) had gestational diabetes in the poyhydramnios group. 52% (25/48) did not have comorbidities or congenital anomalies or malformations in the fetus and they contributed to isolated polyhydramnios group. The commonest associated comorbidity was gestational hypertension in 19.4% (20/103) in the oligohydramnios group. 26.5% (40/151) women required induction of labor and 73.5%(111/151) women had spontaneous onset of labor in normal AFI group .Whereas, 60.4%(29/48) women required induction of labor and 39.6%(19/48) women had spontaneous onset of labor in polyhydramnios group, this difference was statistically significant with a p value ≤0.001. In the present study we had to induce 60.4% of women in the polyhydramnios due to associated comorbidities.

Table 2: Comparison of onset of labor between normal AFI and abnormal AFI

Onset of labour	Normal AFI (n-151)	Polyhydramnios (n-48)	Oligohydramnios (n-103)	Abnormal AFI(n-151)
Spontaneous	111(73.5%)	19(39.6%)	42(40.8%)	61(40.4%)
Induced	40(26.5%)	29(60.4%)	61(59.2%)	90(59.6%)
Total	151(100%)	48(100%)	103(100%)	151(100%)
Chi square p value ≤ 0.001 (Significant)				

In the oligohydramnios group 59.2% (61/103) women required induction of labor and 40.8% (42/103) of women had spontaneous onset of labor, p value ≤ 0.00. Commonest reasons for induction of labour being pregnancy induced hypertension 32.7% (20/61), postdatism 26.22% (16/61), doppler flow changes suggestive of uteroplacental insufficiency 16.3% (10/61) and term IUGR 24.5% (15/61).

Overall 90/151(59.6%) women required induction of labor and 40.4% (61/151) women had spontaneous onset of labor in abnormal AFI group compared to the normal AFI group and this was statistically significant with a p value ≤ 0.001 (table 2).

In normal AFI group 2% (3/151) of women had prolonged labor where as in abnormal AFI group 5.3% (8/151) of women had prolonged labor with p value=0.010 (significant).

In the present study, vaginal delivery in normal AFI group was 66.9% (101/151) while in polyhydramnios group

Table 3: Comparison of mode of delivery between the normal AFI, polyhydramnios, oligohydramnios and abnormal AFI

Mode of delivery	Normal AFI (n-151)	Polyhydramnios (n-48)	Oligohydramnios (n-103)	Abnormal AFI (n-151)
Vaginal	101 (66.9%)	20(41.7%)	38(36.9%)	58(38.4%)
Instrumental	4(2.6%)	2(4.2%)	6(5.8%)	8(5.3%)
Cesarean	46(30.5%)	26(54.2%)	59(57.3%)	85(56.3%)
Total	151(100%)	48(100%)	103(100%)	151(100%)
Chi square p value ≤ 0.001 (Significant)				

it was 41.7% (20/48) with a significant p value ≤0.008. Instrumental delivery in the normal AFI group was 2.6% (4/151) and in the polyhydramnios group it was 4.2% (2/48) which was statistically significant, with a p value ≤0.008.

Table 4: Comparison of birth weight between normal AFI, oligohydramnios and abnormal AFI

Birth weight (kg)	Normal AFI (n-151)	Oligohydramnios (n-103)	Abnormal AFI (n-151)
≤2	1(0.7%)	9(8.7%)	9(6%)
2.1-2.5	26(17.2%)	33(32%)	41(27.2%)
2.6-3.0	71(47%)	43(41.7%)	67(44.4%)
>3	53(35.1%)	18(17.5%)	34(22.5%)
Total	151(100%)	103(100%)	151(100%)
Chi square p value≤0.003 (Significant)			

Cesarean section in the normal AFI group was 30.5% (46/151) but in polyhydramnios group it was 54.2% (26/48) which was statistically significant, p value ≤0.008. A statistically significant association was found between the normal AFI and the abnormal AFI group in relation to the vaginal delivery 66.9%(101/151) vs 38.4% (58/151), p value ≤0.001, instrumental delivery 2.6% (4/151) vs 3%(8/151), p value ≤0.001 and cesarean section was 30.5%(46/151) vs 56.3%(85/151), p value ≤0.001 (table 3).

A significant association was found regarding the post partum haemorrhage (PPH) in normal AFI group 3.3% (5/151) and in polyhydramnios group 14.6% (7/48), p value=0.004. In the oligohydramnios group 4.9 % (5/103) had PPH.

In the normal AFI group 10.6%(16/151) of neonates had APGAR score of < 7 at 1 minute as compared to oligo-hydramnios group where 34%(35/103) of neonates had APGAR score < 7 at 1 minute, p value ≤0.001. In the normal AFI group 10.6%(16/151) of neonates had APGAR score < 7 at 1 minute compared to abnormal AFI group where 29.8% (45/151) of neonates had APGAR score < 7 at 1 minute which was statistically significant, with a p value ≤0.001 and 35/45(77.77%) of them had oligohydramnios. In the normal AFI group 2%(3/151) of neonates had APGAR score <7 at 5 minutes compared to oligohydramnios group where 16.5%(17/103) of neonates had APGAR score <7 at 5 minutes, which was statistically significant with a p value ≤0.001. In the normal AFI group 2%(3/151) of neonates had APGAR score < 7 at 5 minutes compared to abnormal AFI group where 11.9%(18/151) of neonates had APGAR score < 7 at 5 minutes, which was statistically significant with a p value=0.001 and among them 17/18(94.44%) had associated oligohydramnios. Further highlighting the neonates with intrauterine oligohydramnios has a significantly lower APGAR score <7 at 1 and 5 minutes compared to polyhydramnios group.

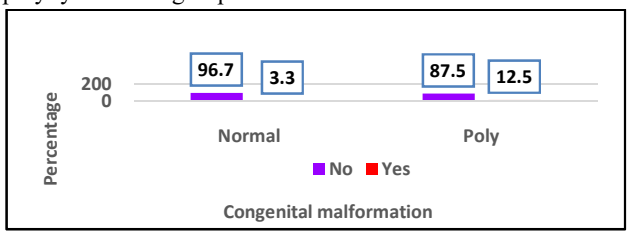

Figure 1: Comparison of congenital malformations between normal AFI and Polyhydramnios.

When the birth weight was ≤ 2.5 kilograms, in the normal AFI group there were 17.9% (27/151) neonates as compared to 33.1% (50/151 when the AFI was abnormal, p≤ 0.003. The birth weight was comparable between the two groups when the neonatal weight was between 2.6 to 3 kilograms ie., normal AFI 47%(71/151) vs abnormal AFI 44.4% (67/151). On sub group analysis there was a statistically significant number of neonates born in the oligohydramnios group with a birth weight ≤2.5 kilograms compared to the normal AFI group ie., 40.7% (42/103) vs 17.9% (27/151), p≤ 0.003 (table 4).

Table 5: Comparison of transfer of the new born to NICU between normal AFI and abnormal AFI.

NICU	Normal (n-151)	Polyhydramnios (n-48)	Oligohydramnios (n-103)	Abnormal AFI (n-151)
No	126(83.4%)	33(68.8%)	67(65%)	100(66.2%)
Yes	25(16.6%)	15(31.3%)	36(35%)	51(33.8%)
Total	151(100%)	48(100%)	103(100%)	151(100%)
Chi square p value=0.001 (Significant)				

In the present study, 3.3%(5/151) of neonates had congenital anomalies [congenital heart diseases (n=3), renal anomalies (n=1), oropharyngeal anomalies (n=1)] in normal AFI group compared to 12.5%(6/48) neonates had congenital anomalies [oropharyngeal anomalies (n=3), congenital heart disease (n=1), central nervous system anomaly (n=1), gastrointestinal anomaly (n=1)] in polyhydramnios group with p value=0.015 (figure 1).

NICU admissions of neonates were observed in 16.6% (25/151) in the normal AFI group and 33.8% (51/151) in the abnormal AFI groups; p value ≤0.001 (table 5).

On sub group analysis 16.6% (25/151) of neonates had NICU admission in normal AFI group where as 35%(36/151) of neonates had NICU admission in oligohydramnios group, which was statistically significant with a p value=0.001. 16.6% (25/151) of neonates had NICU admission in normal AFI group where as 31.3%(15/48) of neonates had NICU admission in polyhydramnios group, which was statistically significant with a p value=0.027. On analysing the reasons for transfer to the NICU in both the groups we observed a statistically significant higher transfer in the abnormal AFI group compared to the normal AFI, the predominant reasons were fetal distress 25.49% (13/51) Vs 32% (8/25), meconium aspiration 19.6% (10/51) vs 32% (8/25), IUGR 15.6% (08/51) vs 20% (5/25), TTNB 15.6% (8/51) vs nil, hypoglycemia 3.92% (2/51) vs nil and APGAR score < 7 at 5 min. 9.6%(10/51) vs nil, respectively (table 6).

Table 6: Reason for NICU transfer of neonates

Reasons for transfer to NICU	Normal AFI (n=25)	Polyhydramnios (n=15)	Oligohydramnios (n=36)	Abnormal AFI (n=51)
Fetal distress	8(32%)	5(33.33%)	8(22.22%)	13(25.49%)
Meconium Aspiration	8(32%)	---------	10(27.77%	10(19.6%)
IUGR	5(20%)	---------	8(22.22%)	08(15.6%)
RDS	4(16%).	---------	---------	---------
TTNB	---------	8(53.33%)	---------	8(15.6%)
Hypoglycemia	---------	2(13.33%)	---------	2(3.92%)
APGAR score < 7 at 5 minutes	---------	---------	10(27.77%)	10(19.6%)
Congenital malformation/anomalies	3(12%)	3(20%)	2(5.55%)	5(9.8%)

Discussion

In the present study out of 302 (100%) participants we found 50%women with normal AFI, 15.9% women with polyhydramnios and 34.1% women with oligohydramnios. 60% of the women were manual workers in the abnormal AFI group. The study group and control groups were selected from the obstetric population attending the department during 18 months of the study. The occurrence of abnormal amniotic fluid index was 151/4500 (3.35%) pregnancies. Polyhydramnios was found in 48/4500(1.06%) and oligohydramnios in 103/4500(2.28%) pregnancies respectively.

Associated comorbidities like gestational diabetes was observed in 14.5%, gestational hypertension in 8.3%, anemia in 6.25% and hypothyroidism in 2%of women with polyhydramnios. Mathew M et al [12] reported a higher occurrence of anemia in his series. Many authors have reported an observation of associated gestational diabetes in the range of 4.8%, 11.9%, 17%, 30% [13 - 16] which suggests an higher occurrence than the present study. However, 25/48(52%) did not have comorbidities or congenital anomalies or malformations in the fetus and they contributed to isolated hydramnios group. Associated comorbidities with polyhydramnios were found to be 54.5%, 57% and 58.1% as reported by Rajgire AA et al [7], Choudhary V et al[14] and Arun Kumar Chauhan et al[17] respectively.

The commonest associated comorbidity was gestational hypertension in 20(19.4%) in the oligohydramnios group. An higher occurrence was noted by Bansal L et al [16] 22.2%, 30.7% by Parmar MM et al[18].

Pregnancies with oligohydramnios versus normal AFI had a greater risk of labor induction (18% vs 9%, OR = 3.18, 95% CI 1.62–6.25, P = 0.001)[19]. Bansal L et al [16] reported induction of labour in 30%, Guin.G et al[20] had to induce labour in13.3% due to comorbid factors. In the present study we had to induce 60.4% of women in the polyhydramnios due to associated comorbidities. In the present study we had to induce labour in 59.2% of the women with oligohydramnios. Similar findings were also observed by Casey BM et al [6] (42%), Chiniwar MA et al[21] (54%). Overall induction of labour was performed in abnormal AFI group in 90(59.6%), similar observations were reported by Ravi S et al[22] (72%) and Bansal L et al[16] (61%).

Vaginal delivery was accomplished in 41.7%, cesarean delivery in 54.2% and instrumental delivery in 4.2% of the polyhydramnios group similar to Bansal L et al[16] and Sonak M et al[15] but Tashfeen K et al [23] had 74.4% vaginal delivery, cesarean delivery in 24% and instrumental delivery in 1.6%. Chiniwar MM et al [21] and Gosh R et al [24] reported better vaginal delivery in 42% and 47.3%, similar cesaren section rates in 58% and 49.1% respectively. Gosh R et al [24] had 3.6% instrumental delivery almost similar to the present series. In the abnormal AFI group we had vaginal delivery in 38.4%, instrumental delivery in 5.3% and cesarean section was 56.3% compared to Bansal et al[16] who reported 64% cesarean section and 36% had vaginal delivery and Parmar MM et al [18] had 46% vaginal delivery and 54% cesarean section and no instrumental delivery.

Overall postpartum haemorrhage was encountered in14.6% of the women in polyhydramnios due to atonic PPH. Similarly Crimmins S et al[25] reported 17.5% (OR 4.2 95% CI: 2.4-7.6), Sonak M et al[15] (10%), Aviram A et al [26] 2.8%. In the oligohydramnios group 4.9% had PPH in the

present study and we could not find this association in the published literature.

In the present study APGAR score <7 at 1 minute was significantly higher in the oligohydramnios group 34% compared to the normal AFI group10.6%. Many authors reported similar findings ranging from 29.7% to 35% [16, 27,28]. On overall comparison we found that in the abnormal AFI group 29.8% of the neonates had APGAR score <7 at 1 minute as compared to 10.6% in the normal AFI group, but an higher occurrence was noted by Ravi S et al[22] - 97% and Bansal L et al[16] -51.1%. In the present series when the AFI was <8 cms, 16.5% neonates had APGAR score <7 at 5 minutes compared to the normal AFI group 2% which was statistically significant. Similar observations were reported by Bansal D et al[28] 17.5% and Zhang J et al[27] 8.9%. Neonates who had APGAR score < 7 at 5 minutes in the abnormal AFI group was 11.9% as compared to 2% in the normal AFI group, but a higher occurrence was noted by Palmar MM et al[18] (47.7%) and Bansal L et al[16] (28.9%).

In the present study there was a marginal difference in the birth weight between the normal AFI and the polyhydramnios group. However, Crimmins S et al[25] had reported macrosomia in their series (AOR 6.4; 95% CI: 2.5-16.1) 9.6%. When the birth weight was < 2500 grams there was a significantly higher observations in the oligo-hydramnios group 40.7% compared to the normal AFI 17.9%, other authors reported that in the oligohydramnios group the birth weight <2500 grams were in the range 19% to 62% [21,22]. On Overall comparison in the abnormal AFI group when the birth weight was <2500 grams 33.2% of neonates as compared to the normal AFI group 17.9%, but an lower occurrence was noted by Ravi Set al [22] (16%).

In the present study congenital malformations were significantly higher in the polyhydramnios group 12.5% compared to the normal AFI group 3.3% commonest being the oropharyngeal malformations 50%. In the literature they have reported a range from 8.2% to 30% ,Tashfeen K et al[23] 8.2%, Bansal L et al[16] 10% with cleft palate being the most common anomaly. An higher occurrence of central nervous system anomaly was noted by Rajgire AA et al[7] 27% and Neethika Raghuwanshi et al[29] (30%). In the oligo hydramnios group total anomalies seen wee 4.9% the commonest anomaly was the urogenital anomalies 60%. A higher occurrence of congenital malformations were reported by Bansal D et al[28] (9%) and Ghosh R et al[24] (7.3%). Overall 7.3% anomalies were observed in the abnormal AFI group compared to normal AFI 3.3%, similar finding was reported by Bansal L et al[16] (10%).

31.3% neonates in the polyhydramnios group had NICU transfer similar to Bansal et al [16] (30%), as against Asadi N et al [30] (38.6%). Biradar KD et al [31] reported a higher transfer rates to NICU (40%), Kehl S et al [32] reported lower (4.2%) transfer to NICU and compared to 35% in the present series in the oligohydramnios group. Overall 33.8% of neonates were observed in the abnormal AFI group compared to normal AFI group with 16.6 % neonates who were transferred to the NICU. Other authors had a higher occurrence of NICU transfers [18,16]. In the normal AFI group, neonates transferred to NICU were 16.6% and the reasons for transfer were fetal distress in 32%, meconium aspiration in 32%, IUGR in 20%, respiratory distress syndrome in (RDS) in 16%. In the polyhydramnios group 31.3% of the neonates were transferred to NICU. The reasons for transfer were fetal distress in 33.33%, transient tachypnoea of new born (TTNB) in 53.33%, hypoglycemia in 13.33%. Erez O et al [33] reported a 10% occurrence of NICU transfer due to fetal distress which were lesser than in the present series. In the oligohydramnios group 35% neonates were transferred to NICU. The reasons for transfer were fetal distress in 22.22%, meconium aspiration in 27.77%, IUGR in 22.22%, low APGAR score < 7 at 5 minutes in 27.77%. Casey BM et al [6] observed 1% had meconium aspiration needing NICU transfer. NICU admissions of neonates were observed in16.6% in the normal AFI group and 33.8% in the abnormal AFI groups; p value ≤0.001. On analysing the reasons for transfer to the NICU in both the groups we observed a statistically significant higher transfer in the abnormal AFI group compared to the normal AFI. The predominant reasons were fetal distress 25.49% vs 32%, meconium aspiration 19.6% vs 32%, IUGR 15.6% vs 20%, TTNB in 15.6% vs nil, hypoglycemia in 3.92% vs nil and APGAR score < 7 at 5 min. in 19.6%vs nil, respectively. RDS was observed in 16% neonates in the normal AFI group and none in the abnormal AFI group. Ravi S et al[22] reported a lower occurrence of RDS (16%), hypoglycemia (4%) and IUGR in 4% of neonates born to mothers with abnormal AFI. Only in the polyhydramnios group two neonates had cleft lip and cleft palate and one had Ebstein anomalies. 20% of neonates compared to Bansal L et al [16] reported a 10% occurrence in the oligohydramnios group and Ahmar R et al [34] observed a 3.33% occurrence which was lesser.

Conclusion

Abnormal amniotic volumes either increased (polyhydramnios) or decreased (oligohydramnios) were associated with increased risk of maternal and fetal complications. As majority of the women were employed in garment factories and engaged in manual work, had more predisposition to have abnormal amniotic fluid volumes. Therefore, AFI measurement in antepartum period can help to identify women who need increased antepartum surveillance during pregnancy and follow up in specialized units for optimum maternal and neonatal outcomes.

Conflict of interest: None. **Disclaimer:** Nil.

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