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ORIGINAL RESEARCH

A Clinical Study of maternal factors in Pregnancies with Oligohydramnios- a tertiary hospital-based study

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ABSTRACT

Background: Oligohydramnios is a condition characterized by a decrease in theamount of amniotic fluid surrounding the fetus.**Objectives:** To study the maternal and fetal outcomes in women with oligohydramnios and to correlate various maternal factors with oligohydramnios.**Methods:** A hospital-based study was conducted among 100 women diagnosed with oligohydramnios in the third trimester. The women were divided into two groups based on the amniotic fluid index (AFI): ≤ 5 cm and > 5-8 cm.**Results:** The majority of women (89%) were booked cases, and 56% were primigravidas. The mean gestational age was 37.42 ± 2.39 weeks. There was a significant association between AFI status and maturity (P = 0.035). The most common associated maternal condition was intrauterine growth restriction (IUGR) (21%). The number of mothers who gave birth via vaginal route was 41%, while 59% underwent lower segment cesarean section (LSCS).**Conclusion:** Oligohydramnios is a common complication of pregnancy, and its occurrence is more common in the late gestational period. IUGR is the most common associated maternal condition. The mode of delivery is not significantly associated with booking status, gravidity, or gestational age.

Keywords: Oligohydramnios; Amniotic fluid index; Intrauterine growth restriction (IUGR); Maternal outcomes; Mode of delivery

INTRODUCTION

Amniotic fluid is an important and integral part of the healthy survival of the foetus. Amniotic fluid is the fluid surrounding the foetus which helps in various ways like cushioning effect to the foetus from injury, helps to prevent compression of the umbilical cord, regulation of temperature helps in foetal movement, bacteriostatic actions, creating a physical space for musculoskeletal development, promotes normal lung development.[1]Oligohydarnios is characterized by an insufficient amount of amniotic fluid, which can be diagnosed sonographically by a single deepest vertical pocket of less than 2 centimeters and/or an amniotic fluid index of less than 5 centimeters.[2] This condition complicates approximately 0.5-5% of all pregnancies, with prevalence rates varying depending on the definition used and the population studied.[3]

Early detection, as well as management of cases of oligohydramnios, may help in reducing perinatal morbidity as well as mortality and also reduce caesarean rates.[4] Since oligohydramnios has got a significant impact on perinatal outcome and maternal morbidity, oligohydramnios is a severe common complication of pregnancy.[5]Hence, the present study was undertaken to correlate variousmaternal factors in association with Oligohydramnios.

MATERIALS AND METHOD

The Present study was carried out among 100 clinically diagnosed cases of oligohydramnios in the third trimester (≥ 28 weeks of gestation) in the Department of Obstetrics & Gynecology, Sri Aurobindo Medical College and Postgraduate Institute, Indore, with the permission from the institutional ethics committee and after obtaining voluntary informed consent from the patients. The study was carried from October 2015 to March 2017.

Inclusion criteria comprised of singleton pregnancy, be at least 28 weeks gestation, have a live fetus, and an Amniotic Fluid Index (AFI) of 8cm or less. Exclusion criteria consisted of women with multifetal gestation or intrauterine death (IUD)

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A thorough history was collected as well as whether they were booked or emergency cases. Additionally, a detailed history of the presenting complaints, menstrual history (LMP, EDD, PMC), obstetric history (gravida, para), and past medical history (hypertension, pre-eclampsia, eclampsia, congenital malformations) were recorded.

A thorough physical examination was conducted, comprising general examination, systemic examination and obstetric examination (height of the uterus, lie of the fetus, presentation, symphysis-fundal height, abdominal girth, and fetal heart rate). Furthermore, per speculum and per vaginal examinations were performed to rule out PROM.

Routine laboratory investigations were also carried out including (hemoglobin, blood grouping, fasting blood sugar, VDRL, urine routine/microscopic) and high vaginal swab for culture and sensitivity if PROM was present. Ultrasonographic examination was performed to determine the number of fetuses, presentation, gestational age (BPD, HC, AC, FL), placental localization, amniotic fluid volume (amniotic fluid index), and congenital anomalies (head, spine, abdomen, limbs).

Patients with AFI more than 8 cm excluded from the study. In patients with AFI less than 8 cm, a meticulous scanning of each system of the fetus were done for congenital anomalies as the fetal examination in cases of oligohydramnios were considerably more difficult as compared to that of normal AFV.The patients were monitored carefully during labor for fetal heart rate (CTG), meconium staining, and mode of delivery.

The initial data was captured in the customized proforma and then transferred to Microsoft excel 2007 for tabulation. The data was analyzed using online software for statistical analysis. Pearson chi-square test was applied to find out the association between two non-parametric variables. A p value of < 0.05 was taken as statistically significant.

RESULTS

Table 1: Distribution of women according to AFI

AFI	Number	Percentage
≤ 5	51	51.0
>5-8	49	49.0
Total	100	100.0

The above table 1 shows the distribution of women according to AFI status.There were 51 (51.0%) women having AFI≤ 5 cm and 49 (49.0%) women were having AFI>5-8 cm in our study.

Table 2: Association of AFI in relation to booking status

AFI Status	Booked	Emergency	Total
≤ 5 cm	44 49.44%	6 54.55%	50 50.00%
>5-8 cm	45 50.56%	5 45.45%	50 50.00%
Total	89 100.0%	11 100.0%	100 100.0%

$\chi 2=0.102$, df=1, P value = 0.749, Not significant

The above table 2 shows the association between booking status and AFI status.In the booked status, 44 (49.44%) were having AFI≤ 5 cm, while 45 (50.56%) were having AFI> 5-8 cm.In the emergency, 6 (54.55%) were having AFI≤ 5 cm, while 5 (45.45%) were having AFI> 5-8 cm.There was no statistically significant association seen between booking status and AFI status (P>0.05), showing that booking status is not dependent on the AFI status.

Table 3: Association of AFI status in relation to age group

AFI Status	≤ 20 years	21-25 years	>25 years	Total
≤ 5 cm	9 69.2%	20 42.6%	21 52.5%	50 50.0%
>5-8 cm	4 30.8%	27 57.4%	19 47.5%	50 50.0%
Total	13 100.0%	47 100.0%	40 47.5%	100 100.0%

$\chi 2=3.066$, df=2, P value = 0.216, Not significant

The above table 3 shows the association between AFI status and age group.In the age group ≤ 20 years, 9 (69.2%) were having AFI≤ 5 cm and 4 (30.8%) were having AFI> 5-8 cm.In the age group 21-25 years, 20 (42.6%) were having AFI≤ 5 cm and 27 (57.4%) were having AFI> 5-8 cm.In the age group >25 years, 21 (52.5%) were having AFI≤ 5 cm and 19 (47.5%) were having AFI> 5-8 cm.There was no statistically significant

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association seen between AFI status and age group (P>0.05), showing that AFI status is not dependent on the age group.

Table 4: Gravidity wise distribution of women in relation to AFI

Gravidity	AFI≤ 5 cm		AFI> 5-8 cm		Total	
	No.	%	No.	%	No.	%
Primigravida	29	56.9	27	55.1	56	56.0
Gravida 2	12	23.5	13	26.5	25	25.0
Gravida>2	10	19.6	9	18.4	19	19.0
Total	51	100.0	49	100.0	100	100.0

The above table 4 shows the distribution of women according to parity in relation to AFI.In the AFI≤ 5 cm, there were 29 (56.9%) primi, 12 (23.5%) were gravida 2 and 10 (19.6%) were gravida>2.In the AFI> 5-8 cm, there were 27 (55.1%) primi, 13 (26.5%) were gravida2 and 9 (18.4%) were gravida>2.Majority of the women in study were primi in both the AFI groups.There were 56 (56%) primigravidae, 25 (25.0%) gravida 2 and 19 (19.0%) gravida>2 women in our study.

Table 5: Association of AFI status in relation to maturity

AFI Status	Preterm	Term	Total
≤ 5 cm	22 64.7%	28 42.4%	50 50.0%
>5-8 cm	12 35.3%	38 57.6%	50 50.0%
Total	34 100.0%	66 100.0%	100 100.0%

$\chi 2$=4.456, df=1, P value = 0.035, Significant

The above table 5 shows the association between AFI status and maturity.In the preterm, 22 (64.7%) women had AFI≤ 5 cm, while 12 (35.3%) had AFI>5-8 cm.In the term, 28 (42.4%) women had AFI≤ 5 cm, while 38 (57.6%) had AFI>5-8 cm. There was statistically significant association seen between AFI status and maturity (P<0.05), showing that AFI status is dependent on the maturity of the baby.

Table 6: Maternal condition in relation to AFI

Comorbidity	AFI≤ 5 cm		AFI> 5-8 cm		Total	
	No.	%	No.	%	No.	%
IUGR	11	21.6	10	20.4	21	21.0
Anemia	6	11.8	2	4.1	8	8.0
Breech presentation	5	9.8	0	0.0	5	5.0
Gestational hypertension	4	7.8	3	6.1	7	7.0
Hypothyroidism	4	7.8	4	8.2	8	8.0
PROM	3	5.9	1	2.0	4	4.0
Preeclampsia	3	5.9	3	6.1	6	6.0
Chorioamnionitis	1	2.0	0	0.0	1	1.0
Postdatism	8	15.6	10	20.0	1	18.0

The table 6 shows the distribution of maternal condition in women according to AFI.In the AFI≤ 5 cm, majority of the women had IUGR 11 (21.6%), postdatism 8(15.6%) anemia in 6 (11.8%), breech presentation in 5 (9.8%), gestational hypertension in 4 (7.8%), hypothyroidism in 4 (7.8%), PROM in 3 (5.9%), preeclampsia in 3 (5.9%), chorioamnionitis in 1 (2.0%).In the AFI> 5-8 cm, majority of the women had IUGR 10 (20.4%),postdatism 10(20%) hypothyroidism in 4 (8.2%), gestational hypertension in 3 (6.1%), preeclampsia in 3 (6.1%), anemia in 2 (4.1%) and PROM in 1 (2.0%) each.Most common associated factor wasIUGR in both the AFI groups.

Table 7: Chorioamnionitis Associated With Oligohydramnios

Number of Cases of PROM with Oligohydramnios	No. of Cases of chorioamnionitis	Percentage
4	1	25.0%

Out of 4 cases of PROM with oligohydramnios, 1 case had chorioamnionitis, thus the incidence of chorioamnionitis was 25%.

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Table 8: Pregnancy outcome in relation to AFI

Pregnancy outcome	AFI≤ 5 cm		AFI> 5-8 cm	
	No.	%	No.	%
LSCS	38	74.5	21	42.9
Vaginal	12	23.5	28	57.1
VBAC	1	2.0	0	0.0

The table 8 shows the distribution of women according to pregnancy outcome in relation to AFI.In the AFI≤ 5 cm, 38 (74.5%) had undergone LSCS, 12 (23.5%) had normal vaginal delivery, 1 (2.0%) had VBAC while 3 (5.9%) had meconium stained liquor.
In the AFI> 5-8 cm, 21 (42.9%) had undergone LSCS, 28 (57.1%) had normal vaginal delivery and 9 (18.4%) had meconium stained liquor.Thus, we can see that in women with low AFI (≤ 5 cm), LSCS are more common in comparison to vaginal, while in the AFI>5-8 cm, vaginal deliveries are more in comparison to LSCS and meconium stained liquor was more in AFI> 5-8 cm group.

DISCUSSION

This study revealed a significant correlation between amniotic fluid index (AFI) and fetal maturity, with oligohydramnios being more prevalent in preterm births. Intrauterine growth restriction (IUGR) was the most common associated maternal condition, affecting 21% of cases, while hypertension and anemia were also notable comorbidities. The study found no significant link between delivery mode and booking status, gravidity, or gestational age. Pregnancy outcomes showed that 59% of mothers underwent cesarean section, while 41% had vaginal deliveries. These findings underscore the importance of AFI in predicting pregnancy outcomes and emphasize the need for vigilant monitoring of women with oligohydramnios.
Assessment of AFV during the antenatal period is considered a helpful tool in determining who is at risk for the potentially adverse perinatal outcome. Perinatal morbidity and mortality are significantly increased when oligohydramnios is present at delivery. Thus this study was carried out to assess the impact of oligohydramnios on the maternal and fetal outcome.
During the study period, 100 women were clinicallydiagnosed with oligohydramnios (AFI≤ 8cm) who fulfilled our inclusion and exclusion criteria were included in this study.Out of these 100 cases, we found by the ultrasound that women having AFI ≤5 were 51(51%) and 49 (49%) women had AFI>5. Gaikwad PR et al(2016)[6]&Ritu Bawa et al (2017)[7] had 49 cases & 68 cases with AFI≤5 and 51 cases & 332 cases with AFI >5 respectively similar to our study.
In our study maximum patients were booked 89 (89.0%) women as against 11(11%) women had an emergency admission. Our results were consistent with the following authors, Sudha.H.C et al.(2017)[8] 33(66%) patients were booked& Unbooked17(34%) patients. Chetani M et al.(2017)[9] 60 (60%)females were booked whereas 40 women were unbooked.
In present study statistically (P value = 0.749) there was no significant association seen between booking status with the occurrence ofoligohydramnios.
Out of these 100 cases, 43.1% of cases had age > 25 years. The mean (±SD) maternal age was 24.96 ± 3.86, reflecting the most common childbearingage. Similar studies are tabulated below

Comparison of mean maternal age in cases of oligohydramnios with various studies:

Authors	Mean maternal age(years)
Zhang et al. (2004)[10]	28.4 ± 3.4
Jagatia et al.(2013)[11]	23.66
Gaikwad PR et al(2016)[6]	25.31 ±5.06
Chetani M et al.(2017)[9]	22.87
Sudha.H.C et al.(2017)[8]	22.7
RituBawa et al (2017)[7]	27.67
Present study	24.96 ± 3.86

Thus above studies were in agreement with our study.
In the present study with AFI<=5 & AFI more than 5, 29 patients (56.9%) and 27(55.1%) patients were primigravidas while remaining cases were multigravida. Our results were similar to following study tabulated below.

Comparison of Occurrence of primigravidae in cases of oligohydramnios with various studies:

Authors	Primigravidae
Gaikwad et al(2016)[6]	31(63.2%)
Chetani et al.(2017)[9]	63 (63%)
Sudha et al.(2017)[8]	28

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Bawa et al (2017)[7]	46 (67.6%).
Present study	56(56%)

The Mean gestation age in the present study was 37.42 ± 2.39 weeks. Studies done by various authors indicates that oligohydramnios is more common in the late gestational period. It is mainly due to physiological or pathological causes of reduced placental perfusion near term. There were 18(18%) cases that had crossed 40 weeks of pregnancy.

Comparison of mean gestational age in cases of oligohydramnios with various studies:

Authors	Mean gestational age (weeks)
Gaikwad et al(2016)[6]	37.95±2.29
Chetani et al(2017)[9]	38.18±2.35
Chaudhari et al(2017)[12]	74(47.4%)
Nankali et al (2017)[13]	38.18 ± 1.24
Present study	37.42 ± 2.39

There was a significant association seen between AFI status and maturity (P value = 0.035), showing that AFI status is dependent on the maturity. Thus, the occurrence of oligohydramnios is seen more in late gestation.

In our study, themost common associated maternal condition was found to be IUGR 21 (21%) cases. 11(21.6%) women with AFI<=5 and 10(20.4%) women with AFI>5 had IUGR. Our results were partial in agreement to study of Gaikwad PR et al (2016)[6] in which58.5% had IUGR and similar to study of Chetani M et al.(2017)[9] in which29.6% had IUGR. In both, the study IUGR was frequently associated with oligohydramnios.

Thus, IUGR is a mostcommon associated maternal condition in women with oligohydramnios.

In our study 13(13%) women had PIH, it is next probable factor in women with oligohydramniosafter IUGR. In the studies by Bangal et al. (2011)[14] and Vidyasagar et al (2015)[15], the prevalence of PIH among the Oligohydramnios was 16% and 16.38% respectively. In the study by Jagatia et al.(2013)[11] 25% had PIH. Our study has comparable results with various studies given above.

Third prevailing factor in women with oligohydramnios in our study was hypothyroidism 8(8%) cases and anemia 8(8%) cases. Similarly, in studies by Gaikwad PR et al (2016)[6] 6% had anemia with oligohydramnios and Vidyasagar et al (2015)[15] 9.8% had hypothyroidism with oligohydramnios.

Malpresentation was present in 5(9.85%) women and postdatism was present in 18(18%) women.

PROM was noted in 4 (4%) women, it was a similar and partial in agreement to study by **Guin et al(2011)[16]** in which it was 7.1%. **Wolff et al (1994)[17]** had reported 16.5% incidence of PROM in cases of oligohydramnios.

In present study 1(1%) women suffered from Chorioamnionitis and for cases of PROM with Chorioamnionitis outcome is 25%.Identical to study by **Moses et al(2016)[18]**1(1.5%) woman had chorioamnionitis.

The number of mothers who gave birth via vaginal route was 41 (41%) while 59 (59%) mothers undergone LSCS. Our results in corresponding to various studies are tabulated below.

Comparison of pregnancy outcome incases of oligohydramnios with various studies:

Authors	LSCS	Vaginal
Gaikwad et al(2016)[6]	59(59%)	41 (41%)
Moses et al(2016)[18]	64(42%)	86(57%)
Chetani et al.(2017)[9]	54(54%)	46(46%)
Bawa et al (2017)[8]	30(44.1%)	38(55.9%)
Nankali et al (2017)[13]	64(75.3%)	21(24.7%)
Present study	59 (59%)	41 (41%)

Comprehensively, the cesarean section rate was higher in all studies except studies by
Moses et al(2016)[18] and **Bawa et al (2017)[8]** in which vaginal delivery rate was higher.

In present study there was no statisticallysignificant association seen between booking status(P value = 0.559), gravidity (P value = 0.861)and gestational age (P value = 0.405) to themode of delivery in cases of oligohydromnios.

As elective LSCS was planned for booked patients than unbooked patients and Referred subjects coming from rural areas usually come in late labor without prior antenatal check-ups and they delivered vaginally.There was no significant association seen between booking status and AFI (P value = 0.753), showing that AFI status is independent of booking status in cases of oligohydramnios.

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CONCLUSION

To conclude, the present study found a significant association between amniotic fluid index (AFI) status and maturity, with oligohydramnios more common in preterm births. The most common associated maternal condition was intrauterine growth restriction (IUGR), which occurred in 21% of cases. Hypertension and anemia were also prevalent among the study population. The study also found that the mode of delivery was not significantly associated with booking status, gravidity, or gestational age. In terms of pregnancy outcomes, 59% of mothers underwent lower segment cesarean section (LSCS), while 41% delivered vaginally. The study highlights the importance of AFI in predicting pregnancy outcomes and the need for close monitoring of women with oligohydramnios.

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