Paediatrics Section

# Perinatal Outcome with Isolated Oligohydramnios in Term Pregnancies: A Case-control Study from a District Hospital of Southern India

CHERUKU AMANI[1], SOWMYA GOPINATH[2], SUMAN MEENAKSHI GURURAJA[3]

## ABSTRACT

**Introduction:** Oligohydramnios is an abnormality of amniotic fluid which is one of the common complications during pregnancy and a threat to foetal development. Often it is associated with maternal risk factors like uteroplacental insufficiency, hypertension and preeclampsia which by themselves can affect perinatal outcome.

**Aim:** To determine the perinatal outcome in isolated oligohydramnios with Amniotic Fluid Index (AFI) ≤5 cm at term pregnancies.

**Materials and Methods:** This was a hospital-based prospective case-control study done in Department of Obstetrics and Gynaecology at District Hospital Tumakuru, Karnataka, India, from January 2019 to July 2020. The study included two groups i.e, case group included 150 pregnant females with Amniotic Fluid Index (AFI) ≤5 cm and control group included 150 pregnant females with AFI range between 6-24 cm. After interview of all participants, all the information was entered in the proforma. All newborn babies birth weight, APGAR scores (Appearance, Pulse, Grimace, Activity, and Respiration) at 1st and 5th minute was recorded. Categorical outcomes were compared between the groups using Chi-square test. A p-value <0.05 was considered statistically significant.

**Results:** The mean age was 23.16±3.09 years in case group and it was 23.42±2.99 years in control group, the difference of age between study group was statistically not significant (p-value=0.460). Abnormal doppler in 19.33% of cases versus 6% of controls (p-value <0.001). Non reactive Non Stress Test (NST) was seen in 46.67% versus 10.67% in control group (p-value <0.001). The foetal distress as a cause for caesarean section was seen in 64.8% cases group in comparison with 23.9% of control group. Low birth weight was found in 58.67% of cases versus 30% in control groups (p-value <0.001). Low APGAR scores (<7) were seen in 24.67% of case group versus 5.33% in control groups. The difference in the proportion of APGAR score at 5 minutes between study group was statistically significant (p-value <0.001) Neonatal intensive care unit admissions were seen in 42.67% of cases versus 12.67% in controls (p-value <0.001). Perinatal deaths was in 5.33% in cases versus 0.67% in controls (p-value=0.017).

**Conclusion:** Isolated oligohydramnios was a significant risk factor during term pregnancies. Incidence of operative deliveries (instrumental vaginal delivery and caesarean section) is significantly increased in these patients with significant increase in perinatal morbidity and mortality.

**Keywords:** Amniotic fluid index, Caesarean section, Foetal distress, Perinatal mortality

## INTRODUCTION

Amniotic fluid plays a vital role in foetal growth and development. It is the fluid in the amniotic cavity surrounding the embryo. Polyhydramnios and oligohydramnios are two common abnormal entities of Amniotic Fluid Volume (AFV). Hydramnios means Amniotic Fluid Index (AFI) >25 cm which is often mild and usually has benign prognosis.

Oligohydramnios is an abnormality of amniotic fluid volume which is defined as AFI <8 cm or amniotic fluid volume ≤5th centile or the absence of a pocket measuring at least 2×1 cm [1]. The AFI ranging from 5.1 cm to 8 cm known as borderline or marginal oligohydramnios. It is one of the common complications of pregnancy and a threat to foetal development. Incidence of oligohydramnios is about 1-5% of total pregnancies [2]. Oligohydramnios can complicate 12% of pregnancies that go beyond 41 weeks of gestation [3]. In high risk pregnancy conditions, its incidence is much more higher about 19-20%. It can occur any time in pregnancy but more common during the last trimester. Once a pregnancy reaches 42 weeks of gestation, the level of amniotic fluid reduces to half.

Oligohydramnios can be associated with maternal risk factors such as uteroplacental insufficiency, postdatism, chronic abruptio placenta, hypertension, preeclampsia, ruptured membranes. Many studies show that oligohydramnios with the above risk factors are associated with increased caesarean rates, increased perinatal morbidity and mortality [4-6]. Some studies which has compared isolated oligohydramnios group to normal liquor group have showed that there is no statistical difference in the perinatal outcome. This prompted us to determine the effect of isolated oligohydramnios in term pregnancies and its perinatal outcome [7-9].

Oligohydramnios particularly in third trimester is associated with multiple foetal risks like: Musculoskeletal deformities (facial distortion, club foot), cord compression, Intrauterine Growth Restriction (IUGR), Low Birth Weight (LBW), foetal distress in labour, severe birth asphyxia, Meconium Aspiration Syndrome (MAS), low APGAR scores (Appearance, Pulse, Grimace, Activity, and Respiration), Neonatal Intensive Care Unit (NICU) admission, congenital abnormalities and still births.

The sequelae of long standing oligohydramnios includes: pulmonary hypoplasia, potters syndrome, club foot, hip dislocation. As oligohydramnios can be diagnosed accurately by antenatal ultrasonography and early intervention will change the perinatal outcome, it is one of the most important complication to be focused during pregnancy [3].

The present study was aimed to determine the perinatal outcome in isolated oligohydramnios (AFI ≤5 cm) at term when compared with pregnant female with normal AFI in a District Hospital at Tumakuru, Karnataka, where most of the patients are from rural background.

## MATERIALS AND METHODS

This prospective hospital-based prospective case-control study conducted in Department of Obstetrics and Gynaecology at District Hospital of Tumakuru, Karnataka, India, from January 2019 to July 2020. The study was done after obtaining after obtaining Ethical Committee clearance by Institute of Ethical Clearance (SSMC/DNB/IEC-1/Jan- 2019) and written informed consent from the patients. Total 300 pregnant females with gestational age >37 weeks and <42 weeks were studied.

**Sample size calculation:** According to Biradar KD and Shamanewadi AN, 5% of pregnancies has oligohydramnios [10]. The sample size was calculated using formula:

$$N=Z^2 \times P \times (1-P)/e^2$$

Where, P=0.05

(1-P)=0.95

e=allowable error (0.05)

Z=2.58 (99% confident interval)

After calculation, the sample size (N) obtained was 126 with non responsive of 10% of sample size, the total sample was 139 in the study group applying 1:1 ratio for study and control group, the total subjects required were 278. The final sample size was 300.

Inclusion criteria:

• Pregnant women with gestational age >37 weeks and <42 weeks.

• Intact membranes.

• Singleton pregnancy.

• Amniotic Fluid Index (AFI) <25 cm

  Cases: Pregnant female with AFI ≤5 cm.

  Control: Pregnant female with AFI between 6-24 cm.

**Exclusion criteria:** Pregnant females with Premature Rupture of Membranes (PROM), intra uterine deaths, pregnancies with known foetal abnormalities, with any chronic disease, preeclampsia and eclampsia patients, gestational diabetes mellitus patients, previous Lower (uterine) Segment Caesarean section {LSCS} patients.

• **Case group (n=150):** Pregnant female with AFI ≤5 cm.

• **Control group (n=150):** Pregnant female with AFI 6-24 cm.

### Procedure

The data was collected from the patients attending Obstetrics and Gynaecology by interview after satisfying both inclusion and exclusion criteria. A detailed history was taken and thorough clinical examination was done at admission. Baseline investigations, ultrasound were performed on all the subjects. All the information was entered in the proforma, analysed and observations were made, accordingly discussion and recommendations were taken.

Phelan method of four quadrant technique was used for measurement of AFI [11]. Cases were evaluated for underlying aetiological factor and antepartum foetal surveillance was done by ultrasound, Non Stress Test (NST) and umbilical artery doppler.

• To study the maternal outcomes for the type of delivery (vaginal vs caesarean) according to appropriate protocols.

• To determine neonatal outcome in the form of NICU admissions, APGAR score at 1st and 5th minute, birth weight and perinatal outcome.

## STATISTICAL ANALYSIS

Data and results were expressed in mean, standard deviations and proportions. Data was statistically analysed by using Statistical Package for Social Sciences (SPSS) version 20.0. Study group was considered as explanatory variable. All quantitative variables were checked for normal distribution within each category of explanatory variable by using visual inspection of histograms and normality Q-Q plots. Shapiro-Wilk test was also conducted to assess normal distribution. Shapiro-Wilk test p-value >0.05 was considered as normal distribution. For normally distributed quantitative parameters the mean values were compared between study groups using independent sample t-test (two groups). Categorical outcomes were compared between study groups using Chi-square test. A p-value <0.05 was considered statistically significant.
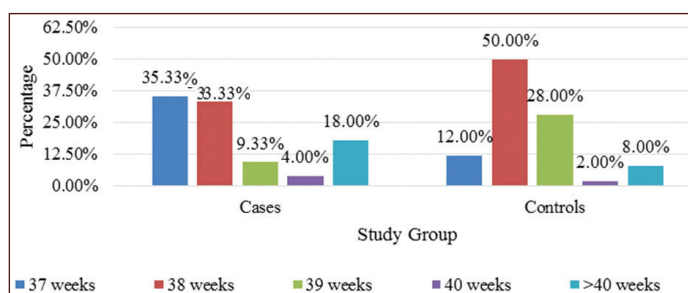
## RESULTS

The mean age was 23.16±3.09 years in case group and 23.42±2.99 years in control group, the difference of age between study group was statistically not significant (p-value=0.460). Statistically significant differences were seen with respect to abnormal doppler (p-value <0.001), birth weight (p-value <0.001), AFI (p-value <0.001), NST (p-value <0.001), APGAR scores (p-value <0.001), NICU admissions (p-value <0.001) and neonatal mortality (p-value=0.017) [Table/Fig-1].

| Clinical variable | Cases (Mean±SD) | Controls (Mean±SD) | p-value |
|---|---|---|---|
| Maternal age (years) | 23.16±3.09 | 23.42±2.99 | 0.460 |
| Gestational age at delivery (weeks) | 38.36±1.45 | 38.44±1.01 | 0.580 |
| Abnormal doppler (%) | 19.33% | 6% | <0.001 |
| Amniotic fluid index (cm) | 3.19±1.14 | 9.83±1.90 | <0.001 |
| Birth weight (kg) | 2.55±0.39 | 2.74±0.39 | <0.001 |
| Non reactive NST (%) | 46.67% | 10.67% | <0.001 |
| Meconium Stained Liquor (MSL) (n, %) | 64 (42.67) | 27 (18.00%) | <0.001 |
| Neonatal mortality (%) | 5.33% | 0.67% | <0.017 |

**[Table/Fig-1]:** Comparison of clinical variable among groups (N=300).
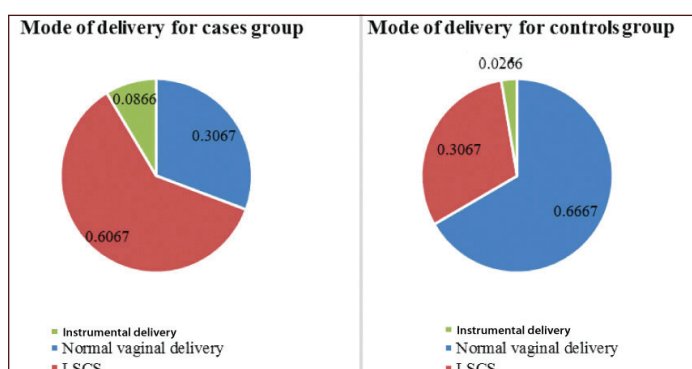
The difference in the proportion of gestational age at delivery between study groups was statistically not significant (p-value=0.580) with no significant differences in gestational age distribution [Table/Fig-2]. In the cases group, 105 (70%) women were primipara and 45 (30%) women were multipara. In the control group, 97 (64.67%) women were primipara and 53 (35.33%) women were multipara with no statistically significant differences between the groups

**[Table/Fig-2]:** Clustered bar chart for comparison of gestational age at delivery between study groups (N=300).
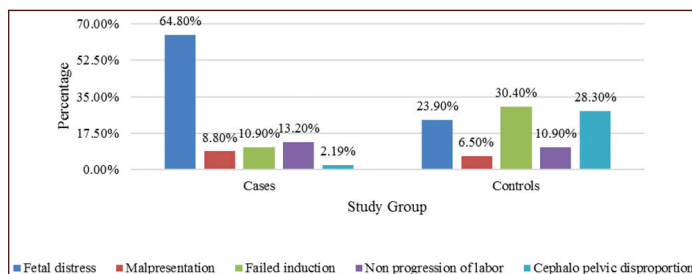
(p-value=0.325). In the cases group, 82 (54.67%) women had spontaneous labour and 68 (45.33%) women had induced labour. In the control group, 122 (81.33%) women had spontaneous labour and 28 (18.67%) women had induced labour. The difference in the proportion of type of labour between case group and study groups was statistically significant (p-value <0.001).

In the cases group, 80 (53.33%) women had reactive NST. In the control group, 134 (89.33%) women had reactive NST. In the cases, non reactive NST was about 70 (46.67%) and in controls 16 (10.67%). The difference in the proportion of NST between study groups was statistically significant (p-value <0.001) [Table/Fig-1]. In the cases group, 46 (30.67%) women had normal vaginal delivery, 91 (60.67%) women underwent caesarean section and 13(8.66%) of them had instrumental vaginal delivery. In the control group, 100 (66.67%) women had normal vaginal delivery, 46 (30.67%) women underwent caesarean section and 4 (2.66%) women had instrumental vaginal delivery. The difference in the proportion of mode of delivery between study group was statistically significant (p-value <0.001) [Table/Fig-3].



**[Table/Fig-3]:** Pie chart for comparison of mode of delivery between study group (N=300).

In the cases group, 59 (64.8%) women had foetal distress and 32 (35.2%) women had other indication for caesarean section. In the control group, 11 (23.9%) women had foetal distress and 35 (76.1%) women had other indication for caesarean section [Table/Fig-4]. The difference in the proportion of indication for caesarean section between study group was statistically significant (p-value <0.001). Significant differences in the birth weight was found between cases and control groups which was statistically significant. Babies in the low birth weight category were significantly higher in case group in comparison to control group [Table/Fig-5].
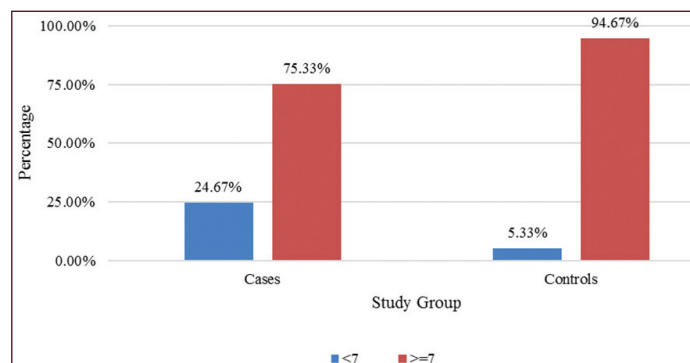


**[Table/Fig-4]:** Clustered bar chart for comparison of indication for LSCS between study group (N=300).
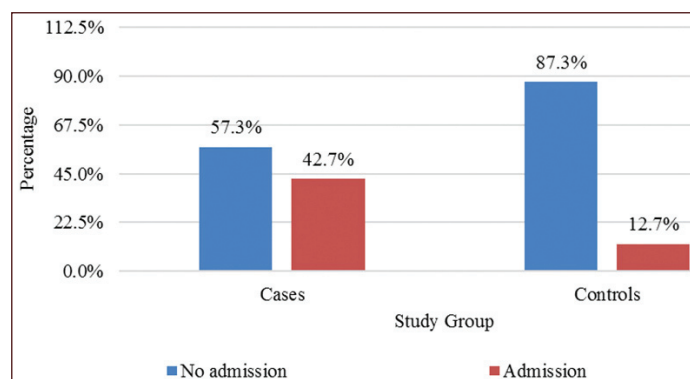
| Birth weight category | Cases (n, %) | Controls (n, %) | Chi-square | p-value |
|---|---|---|---|---|
| 1500-2499 grams | 88 (58.67%) | 45 (30%) | | |
| 2500-2999 grams | 54 (36.00%) | 72 (48%) | 31.72 | <0.001 |
| >3000 grams | 8 (5.33%) | 33 (22%) | | |

**[Table/Fig-5]:** Comparison of birth weight category between study group (N=300).

Among the participants in case group,37 (24.67%) babies were with APGAR score <7, and 113 (75.33%) babies were with APGAR score ≥7. Among the participants in control group, 8 (5.33%) babies were with APGAR score <7, and 142 (94.67%) babies were with APGAR score ≥7 [Table/Fig-6].The difference in the proportion of APGAR score at 5 minutes between study group was statistically significant (p-value <0.001). In the case group, 64 (42.67%) babies admitted in NICU, whereas in control group, 19 (12.67%) babies admitted to NICU. The difference in the proportion of NICU admission between study group was statistically significant (p-value <0.001) [Table/Fig-7]. In the case group, perinatal deaths was seen in 8 (5.33%) in comparison with 1 (0.67%) in the control group. The difference in the proportion of perinatal death between study group was statistically significant (p-value=0.017).



**[Table/Fig-6]:** Clustered bar chart for comparison of APGAR score between study group (N=300).



**[Table/Fig-7]:** Clustered bar chart for comparison of NICU admission between study group (N=300).

## DISCUSSION

In the present study, the mean age of the cases in the oligohydramnios group was 23.16±3.09 years and the mean age of the patients in the control group was 23.42±2.99 years which was not statistically significant (p-value=0.460). This is similar to the study done by Patil SV and Shaik mohammed FZ (22.3±3.97 vs 22.6±3.9) and Swati and Vyas L (25.26±3.64 vs 24.27±3.98), where statistically significant difference in the mean age of the patients was not found among the case and control groups [12,13]. The mean gestational age at delivery in the current study was 38.36±1.45 weeks in cases group and it was 38.44±1.01 weeks in control group, and there was no statistically significant difference between the study and control group (p-value=0.580). Similar results were found in studies done by Patil SV and Shaik mohammed FZ (38.1±2.3 vs 37.2±1.9) and Kaur P et al., (39.3±1.58 vs 39.56±1.5) which showed that there was no statistically significant difference [4,12]. However, study done by Ibrahim HA and Zween ZM (39.74±1.23 vs 39.01±0.85; p-value <0.001) showed statistically significant difference in mean gestational age of the oligohydramnios and control group [14].

Maximum number of patients in cases group (68.7%) were at gestational age of 37-38 weeks of gestation, where as in control group (78%) in 38-39 weeks of gestation. The difference in the proportion of gestational age at delivery between study groups was statistically significant (p-value <0.001; $\chi^2$=43.023). Similarly, in a study done by Madaan S et al., the maximum number of cases had a gestational age between 36-38 weeks [15].
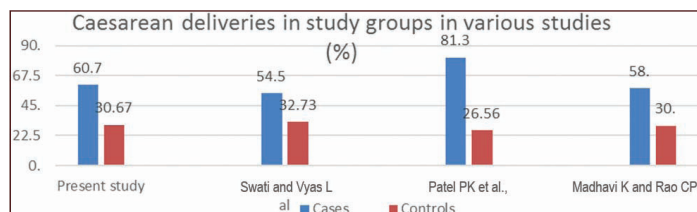
In the present study, 70% women were primigravida in oligohydramnios group compared to 64.7% in control group, and 30% cases were multipara compared to 35.3% of controls. This is correlates to the study done by Jagatia K et al., (52% primigravida) and Jandial C et al., (60% primigravida) [16,17]. In contrast to the current study, the study done by Chaudhari KR et al., (64.1% multigravida), and Nazlima N and Fatima B (64.1% multigravida) showed that oligohydramnios was more common in multigravida [18,19].

In the present study, 19.33% participants from cases and 6% participants from controls had various doppler abnormalities. The difference in the proportion of umbilical artery doppler between study groups was statistically significant (p-value <0.001; $\chi^2$ =12.053). A study done by Patel PK et al., (47.5% vs 7.5%; p-value <0.0001) also showed statistically significant difference between the cases and control groups [7].

Incidence of Meconium Stained Liquor (MSL) between cases and controls was statistically significant (p-value <0.001; $\chi^2$ =31.59) in the present study which is similar to a study done by Madhavi K and Rao CP, and Sreelakshmi U et al., [20,21].

In the current study, the incidence of non reactive NST was more in cases (46.67%) than in control (10.67%), this difference in the proportion of non reactive NST between study groups was statistically significant (p- value <0.001; $\chi^2$=47.53). This correlates with study done by Patel PK et al., (65% vs 38.44%; p-value <0.0001), Kavitha G (20% vs 4%; p-value <0.01) [7,22].

In present study, the mode of delivery was significantly influenced by oligohydramnios. Caesarean deliveries were high (60.67%) in patients with oligohydramnios group comparative to controls which was statistically significant (p-value <0.001; $\chi^2$=31.59). This correlates with other studies done by Madhavi K and Rao CP (p-value <0.05), Swati and Vyas L (p-value=0.021) [Table/Fig-8] [13,20].



**[Table/Fig-8]:** Caesarean deliveries in study groups in various studies [7,13,20].

In the present study, most common indication for caesarean section in oligohydramnios group was foetal distress (64.8%), whereas in control group most common indication was failed induction (30.4%). This difference in the proportion of indication for caesarean section between study groups was statistically significant (p-value <0.001; $\chi^2$=20.477). A study done by Baron C et al., (78%) and Bachhav AA and Waikar M (53%), also depicts foetal distress as most common indication for caesarean section [23,24].

The mean birth weight was 2.55±0.39 kg in cases group and it was 2.74±0.39 kg in control group, the difference of birth weight between study groups was statistically significant (p-value <0.001). Majority of the babies (58.67%), in oligohydramnios group were low birth weight (<2.5 kg), whereas in controls only 30% of babies were low birth weight babies. The difference in the proportion of birth weight between study groups was statistically significant (p-value <0.001; $\chi^2$-31.72). This is similar to the study done by Madhavi K and Rao CP (68% vs 26%, p-value <0.005) and study by Kavitha G (62% vs 24%, p-value <0.01) [20,22]. This association of low APGAR scores at 5th minute of life with oligohydramnios was statistically significant in the present study (p-value <0.001; $\chi^2$-31.72) similar to study by Bachhav AA and Waikar M [Table/Fig-9] [13,24,26]. In disagreement with the above finding study by Chaudhary KR et al., only 3.8% showed that, APGAR score of <7 in the oligohydramnios group was at 5th minute, and 4.6% by Golan A et al., [5,18].

| Study | Case group | Control group | p-value |
|---|---|---|---|
| Bachhav AA and Waikar M [24] | 34% | 11% | 0.0003 |
| Sarma N [26] | 21.4% | 5% | 0.0005 |
| Swati and Vyas L [13] | 6.8% | 6.3% | 0.002 |
| Present study | 24.67% | 5.33% | <0.001 |

**[Table/Fig-9]:** Apgar score at 5th minute <7 [13,24,26].

The NICU admission rates were significant in this study similar to a study by Kavitha G [22]. In contrast to above studies, in a study done by Patel PK et al., [7] NICU admission rate was not statistically different in case (20.0%) and control (18.75%) [Table/Fig-10] [22,24,26]. In the present study, 5.33% of the babies in oligohydramnios group died whereas only 1 baby (0.67%) died in the control group. The difference in the proportion of perinatal death between study group was statistically significant (p-value=0.017; $\chi^2$-33.729). This is similar to a study done by Casey BM and Leveno KJ , where it was 5% vs 0.3% and p-value <0.001. Also similar to study by Sarma N (8.6% vs 1% and p-value=0.0005) [25,26]. Studies done by Nazlima N and Fatima B (2.4%), also reported more perinatal deaths in oligohydramnios group, however, it was not statistically significant [19].

| Study | NICU admission | | |
|---|---|---|---|
| | Cases | Controls | p-value |
| Kavitha G [22] | 18% | 4% | <0.05 |
| Sarma N [26] | 25.7% | 3% | 0.0005 |
| Bachhav AA and Waikar M [24] | 33% | 10% | 0.0002 |
| Present study | 42.67% | 12.67% | <0.001 |

**[Table/Fig-10]:** NICU admission [22,24,26].

## Limitation(s)

The present study was done in a single centre. Multicentric studies would contribute in validating the findings of the present study.

## CONCLUSION(S)

The study concluded that there was no significant association between isolated oligohydramnios and factors like mean maternal age, mean gestational age and parity. Isolated oligohydramnios was a significant risk factor for delivery in early term pregnancy with an increase in incidence of operative deliveries (instrumental vaginal delivery and caesarean section). It also was associated with adverse perinatal outcomes like intrapartum foetal distress, Meconium Stained Liquor (MSL), LBW, NICU admission, low 5 minute APGAR and perinatal mortality. Early intervention in the form of induction of labour, close intrapartum monitoring, artificial rupture of membranes in active phase of labor and grading of liquor and early decision making regarding mode of delivery should be considered. It warrants close foetal monitoring antenatally with

timely intervention by the obstetrician and resuscitation by the paediatrician for better perinatal outcome.

## REFERENCES

[1] Kehl S, Schelkle A, Thomas A, Puhl A, Meqdad K, Tuschy B, et al. Single deepest vertical pocket or amniotic fluid index as evaluation test for predicting adverse pregnancy outcome (SAFE trial): A multicenter, open-label, randomized controlled trial. Ultrasound Obstet Gynecol. 2016;47(6):674-79.

[2] Moore TR. Clinical assessment of amniotic fluid. Clin Obstet Gynecol. 1997;40(2):303-13.

[3] Beall MH, van den Wijngaard JP, van Gemert MJ, Ross MG. Regulation of amniotic fluid volume. Placenta. 2007;28(8-9):824-32.

[4] Kaur P, Desai DA, Taraiya A. A study on the perinatal outcome in cases of oligohydramnios. Int J Reprod Contracept Obstet Gynecol. 2016;5:98-109.

[5] Golan A, Lin G, Evron S, Arieli S, Niv D, David MP. Oligohydramnios: Maternal complications and fetal outcome in 145 cases. Gynecol Obstet Invest. 1994;37(2):91-95.

[6] Casey BM, Leveno KJ. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks gestation. Am J Obstet Gynecol. 2000;182:909-12.

[7] Patel PK, Pitre DS, Gupta H. Pregnancy outcome in isolated oligohydramnios at term. Ntl J of Community Med. 2015;6(2):84-88.

[8] Conway DL, Adkins WB, Schroeder B, Langer O. Isolated oligohydramnios in the term pregnancy: Is it a clinical entity? J Matern Fetal Med. 1998;7(4):197-200.

[9] KS, Varghese SB, Borkar UY. Effect of isolated oligohydramnios in otherwise normal term pregnancy. Int Jour of Biomed Res. 2014;5(2):98-101.

[10] Biradar KD, Shamanewadi AN. Maternal and perinatal outcome in oligohydramnios: Study from a tertiary care hospital, Bangalore, Karnataka, India. Int J Reprod Contracept Obstet Gynecol. 2016;5:2291-94.

[11] Phelan JP, Ahn MO, Smith CV, Rutherford SE, Anderson E. Amniotic fluid index measurements during pregnancy. J Reprod Med. 1987;32(8):601-04.

[12] Patil SV, Shaik Mohammed FZ. Study of Oligohydramnios and its perinatal outcome. Int J Reprod Contracept Obstet Gynecol. 2019;8:2705-08.

[13] Swati, Vyas L. Comparative study of maternal and fetal outcome between low and normal amniotic fluid index. Sch Int J Obstet Gyne. 2019; 2(11): 272-76.

[14] Ibrahim HA, Zween ZM. Oligohydramnios and fetal outcome in term pregnancy. Zanco J Med Sci. 2020;24(3):347-53.

[15] Madaan S, Mendiratta SL, Jain PK, Mital M. Aminotic fluid index and its correlation with fetal growth and perinatal outcome. J Fetal Med. 2015;2:61-67.

[16] Jagatia K, Singh N, Patel S. Maternal and fetal outcome in oligohydramnios: A study of 100 cases. Int J Med Sci Public Health. 2013;2:724-27.

[17] Jandial C, Gupta S, Sharma S, Gupta ML. Perinatal outcome after antepartum diagnosis of oligohydramnios at or beyond 34 weeks of gestation. JK Science. 2007;9(4):213-14.

[18] Chaudhari KR, Chaudhari KR, Desai OM. Perinatal outcome associated with oligohydramnios in third trimester. Int J Reprod Contracept Obstet Gynecol. 2017;6(1):72-77.

[19] Nazlima N, Fatima B. Oligohydramnios at third trimester and perinatal outcome. Bangladesh Journal of Medical Science. 2012;11(1):33-36.

[20] Madhavi K, Rao CP. Study of Oligohydramnios, Mode of Delivery and Perinatal Outcome. Volume 14, Issue 4 Ver. X (Apr. 2015), PP 06-11.

[21] Sreelakshmi U, Bindu T, Subhashini T. Impact of oligohydramnios on maternal and perinatal outcome: A comparative study. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2018;7(8):3205-10.

[22] Kavitha G. Pregnancy outcome in isolated oligohydramnios at or beyond 34 weeks of gestation. Int J Cur Res Rev. 2015;7(13):62-68.

[23] Baron C, Morgan MA, Garite TJ. The impact of amniotic fluid volume assessed intrapartum on perinatal outcome. Am J Obstet Gynecol. 1995;173(1):167-74.

[24] Bachhav AA, Waikar M. Low amniotic fluid index at term as a predictor of adverse perinatal outcome. J Obstet Gynaecol India. 2014;64(2):120-23.

[25] Casey BM, Leveno KJ. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks gestation. Am J Obstet Gynecol. 2000;182:909-91.

[26] Sarma N. Pregnancy outcome in pregnant women with oligohydramnios at term pregnancy. The New Indian Journal of OBGYN. 2018;4(2):141-45.

PARTICULARS OF CONTRIBUTORS:
1. Postgraduate, Department of Obstetrics and Gynaecology, District Hospital, Tumakuru, Karnataka, India.
2. Associate Professor, Department of Obstetrics and Gynaecology, Shridevi Institute of Medical Sciences and Research Hospital, Tumakuru, Karnataka, India.
3. Assistant Professor, Department of Paediatrics, East Point College of Medical Sciences and Research Centre, Bengaluru, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Sowmya Gopinath,
Priyadarshini, 6th Cross, T P Kailasam Road, Sapthagiri Extension,
Tumakuru, Karnataka, India.
E-mail: sowmyasubri@gmail.com

AUTHOR DECLARATION:
• Financial or Other Competing Interests:   None
• Was Ethics Committee Approval obtained for this study?   Yes
• Was informed consent obtained from the subjects involved in the study?   Yes
• For any images presented appropriate consent has been obtained from the subjects.   NA