

Perinatal Outcome in Term Pregnancies with Oligohydramnios

Dr. Sonam Muthamma U N¹, Dr. Jayashree Ashok Kumar²

¹Postgraduate, Department of Obstetrics and Gynaecology, GIMS, Gadag

²Professor and HOD, Department of Obstetrics and Gynaecology, GIMS, Gadag (Corresponding Author)

Abstract: Objectives: Oligohydramnios, is a significant obstetric condition associated with various perinatal complications. This study aims to investigate the impact of oligohydramnios on perinatal outcomes, identify predictive factors, and suggest clinical management strategies to improve prognosis. Methods: This prospective observational study was carried out in the department of Obstetrics and Gynaecology, GIMS, Gadag, from July 2022 to June 2024. 180 antenatal women admitted in labour room were assessed and enrolled in the study. Data were collected on maternal demographics, antenatal complications, delivery methods, maternal and perinatal outcomes. Statistical analysis was performed to compare outcomes and identify significant predictors of adverse events. Results: Key findings revealed that women with oligohydramnios had significantly higher rates of labor induction (40%) and cesarean deliveries (55.5%). Perinatal outcomes showed increased incidences of low birth weight (23.3%), and NICU admissions (35%) among neonates born to mothers with oligohydramnios. Interpretation and Conclusion: Oligohydramnios is associated with increased perinatal morbidity, necessitating enhanced prenatal monitoring and individualized care plans. Early detection and timely intervention are crucial to mitigating risks and improving outcomes. Future research should focus on long - term neonatal outcomes and the effectiveness of various intervention strategies to refine clinical management.

Keywords: Perinatal outcomes, perinatal morbidity, amniotic fluid index, cesarean delivery, fetal distress.

1. Introduction

Amniotic fluid is currently recognized as a highly complex and dynamic system that is investigated as a data point to interpret fetal health. As early as the seventh week of pregnancy, the amniotic fluid begins to develop from the maternal plasma by transudation. A number of tasks are carried out by amniotic fluid during the intrauterine period. It facilitates the development of the embryonic lung, shields the umbilical cord from compression during labour, and aids in the appropriate shaping of the fetal skeleton by establishing physical space. The most prevalent intrinsic defect that can be clinically detected is an excess or a shortage of amniotic fluid.¹ Oligohydramnios is associated with post - dated pregnancy, uteroplacental insufficiency, congenital malformations, particularly kidney abnormalities, meconium passage, irregular fetal heart rate, low 5 - minute APGAR, and increased NICU admission.² It has also been linked to higher rates of perinatal morbidity and mortality in other studies. Pregnant mothers with oligohydramnios must have antepartum fetal surveillance. Therefore when oligohydramnios occurs at term, it is thought to be a sign that the pregnancy should be ended. Therefore the present study was conducted to find out the maternal and perinatal outcome in term pregnancies with Oligohydramnios at tertiary care hospital.

Aims and Objective

To assess the perinatal morbidity and mortality in term pregnancies with oligohydramnios.

2. Materials and Methods

This prospective observational study was carried out in the department of Obstetrics and Gynaecology, Gadag institute of medical science and teaching hospital, Gadag, a rural tertiary care hospital from July 2022 to June 2024. 180

antenatal women admitted in labour room were assessed and enrolled in the study as per the formulated inclusion and exclusion criteria after taking written informed consent.

Inclusion criteria:

- 1) Gestational age of ≥ 37 completed weeks to 42 completed weeks confirmed by dates, clinical examination and ultrasound
- 2) AFI ≤ 5 cm
- 3) Single live pregnancy in vertex presentation.
- 4) Intact membranes

Exclusion criteria:

- 1) Ruptured membranes
- 2) Pregnancy complicated with IUGR
- 3) Hypertensive disorders of pregnancy
- 4) Anomalous fetus

The data was collected using preset proforma meeting the objectives of the study. A detailed history was obtained. Significant events in the present pregnancy were noted. Gestational age was confirmed by taking into account the last menstrual period and early scan EDD and an appropriate gestational age was assigned to each patient. An ultrasound examination for fetal well being and to diagnose oligohydramnios by using the criteria of four quadrants amniotic fluid index (AFI) ≤ 5 cm or maximum vertical pocket depth < 2 cm was done, followed by a thorough clinical examination. Fetal heart rate (FHR) was noted and NST (Non stress test) done for assessment of fetal well being. Per - speculum & per - vaginal examination was done to see any rupture of the membranes, to assess adequacy of pelvis and to note the Bishop score. The patients were followed up by observing the type of labour and the mode of delivery such as - normal vaginal delivery, assisted vaginal delivery or caesarean section. If delivery is made by caesarean section, the indication was recorded. The

condition of babies was assessed by birth weight, color of liquor, APGAR score at 1 minute and 5 minutes. The need for and reason for NICU admissions, perinatal death and its causes if any were assessed. These babies were followed up till 7 days after birth.

3. Results

A total of 180 pregnant women with oligohydramnios between 37 - 42 weeks of gestation were included in the study. Mean age in the study group is 26.57 ± 3.49 SD. The age range of 21 to 25 years old accounted for the largest number of cases ($n = 95$). The maximum antenatal women, that is 67.7% were primigravida. 27.7% belonged to second gravida and 4.4% of the study population had a gravida score of three or more. In contrast to the 18.3% of cases that were unbooked, 81.6% of the women in our research had booked their pregnancies and had frequent antenatal checkups.

Of the study population, 153 people (85%) had good perception of fetal movements, while 15% ($n = 27$) had diminished perception. There is a statistically significant association between $AFI \leq 5$ cm and decreased perception of fetal movements ($p = 1.77e^{-43}$). The mean gestational age is 39.6 ± 0.7 SD weeks. 17.2% of women in our study were between 37 and 38+6 weeks pregnant, 68.9% were between 39 and 40+6 weeks, and 13.9% of cases were between 41 and 41+6 weeks. Given that the p -value is extremely small, there is a significant association between gestational age groups and the number of cases with $AFI \leq 5$.

In our study, 100 women, or 55.5%, underwent cesarean sections; 56 of these women's labours began spontaneously, while the remaining 13 underwent induction. 31 women had cesarean sections prior to labour. Of the 60 (33.3%) women who gave birth vaginally, 39 had an induced labour, and 21 experienced a spontaneous commencement of labour. 20 (11.1%) of the women underwent assisted vaginal birth, all of which were induced cases and required the use of forceps or a ventouse. The Chi-square test indicates a significant association between the mode of delivery and the type of labour ($p = 3.98e^{-15}$). Of the 100 women in this study who had LSCS, 27.2% of the cases in the study group experienced fetal distress. Fetal distress was characterized by meconium-stained amniotic fluid, non-reassuring CTG pattern, or fetal bradycardia/tachycardia. Additional indications for LSCS included CPD (13.8%), failed induction (7.2%), obstructed labour (1.1%), persistent ROP (1.1%), placenta previa (1.6%), and anhydramnios (3.3%). p -value = $2.56e^{-9}$ indicates there is a significant difference between the observed frequencies of different indications with fetal distress being the most observed indication for cesarean section in this study.

Of the 72 induced cases in this study, 36.1% had liquor tinged with meconium, whereas 63.8% had clear liquor. 3.2% of the 31 cases that received a pre-labour cesarean section for various reasons had a clear liquor, while the remaining 96.7% had meconium stained liquor. Of the 77 patients that experienced a spontaneous commencement of labour, 62.3% had clear liquor and 37.6% had meconium stained liquor. This significant association (p -value =

$9.56e^{-9}$ which is significantly less than 0.05) suggests that the type of labour can influence the color of the amniotic fluid. In this study, the mean APGAR score at 1 minute was 6.6 ± 1.2 SD and the mean APGAR score at 5 minute was 8.08 ± 1.3 SD. The mean birth weight in Kgs was 2.7 ± 0.3 SD. 42 women in this study gave birth to low birth weight babies, making up 23.3% of the overall study population. 138 women gave birth to normal birth weight babies, making up 76.6% of the total. p value = $7.52e^{-85}$ indicates a strong association between birth weight and $AFI \leq 5$.

101 of them had male babies while 79 of them had female babies accounting upto 56.1% and 43.9% respectively. Given the p -value of 0.0269, we can conclude that the difference in the frequency of males and females among babies with $AFI \leq 5$ is statistically significant. 63 newborns overall, out of 180 deliveries, were admitted to the NICU with a duration of NICU stay ranging from 1 to 6 days. The complications observed were as follows: HIE in 6 babies, LBW with respiratory distress in 12 babies, LBW in 13 babies, meconium aspiration syndrome in 16 babies and respiratory distress in 16 babies. p value < 0.05 indicates that there is a significant association between the type of labour and NICU admission. Induced labour is associated with a lower rate of NICU admissions, while spontaneous labour and pre-labour cesarean sections are associated with higher rates of NICU admissions. This suggests that the type of labour significantly influences the likelihood of a newborn being admitted to the NICU.

4. Discussion

The majority of the patients ($N=95$), or 52.7% of the study population, were in the 26–30 age range. The average age of the participants was 26.57 ± 3.49 SD, in line with the results of Bhagat M *et al.*³, Fatima Lajber, Huma *et al.*⁴, and Hina Ahmad, Shama *et al.*⁵. 81.6% ($N = 147$) of the cases in our study were booked, whereas 18.3% ($N = 33$) were not. The research by S. Kemal, M. Kemal *et al.*⁶, Thobbi VA, and Sheema S *et al.*⁷ produced similar findings. This study included antenatal women with gestational age 37 weeks to 40+6 weeks period of gestation with oligohydramnios. The mean gestational age in our study population is 39.6 ± 0.7 weeks. The research conducted by Hadas Miremborg *et al.*⁸, Fatima Lajber *et al.*⁵, and Sandhyasri Panda *et al.*⁹ yielded comparable findings where the mean gestational age in the study group were 39.5 ± 1.3 , 38.02 ± 1.86 and 38.85 ± 1.57 weeks respectively. Research by Hina Ahmad, Shama *et al.*⁴, Brian M. Casey *et al.*¹⁰, and Elsandabesee *et al.*¹¹ revealed a higher percentage of induced labour, 64.3%, 42.1% and 45% respectively which was similar to our study in which 40% of cases in the study population had undergone induction of labour. Numerous studies have shown that the rate of caesarean sections in patients with oligohydramnios is high and noteworthy. Percentage of Caesarean section was 55.5% in our study which was comparable with the studies conducted by S Kemal. M Kemal⁶ and J fetal med.¹² with Caesarean section rate 66.8% and 29% respectively. Our analysis found that fetal distress is the most common reason for a caesarean section (27.2%), which is consistent with research by Conway *et al.*¹³ (31%), Haifa A., Alchalabi *et al.*¹⁴ (27.3%), and S. Kemal. M. Kemal *et al.*⁶ (26.8%). Meconium stained

liquor was present in 47.2% of cases in our study which is comparable with the studies conducted by Shubhadeep *et al.*¹⁵, Pradeep R Gaikwad *et al.*¹⁶ and Nazlima N, Fatima B *et al.*¹⁷ with 48%, 36.7% and 30.76% respectively, with significant association suggesting that the type of labour can influence the color of the amniotic fluid. In our study, an APGAR score of less than 7 at one minute accounted for up to 25.5%. These results are similar to those reported by Chate P *et al.*¹⁸, Pradeep R Gaikwad *et al.*¹⁶, and Haifa A. Al Chalbi *et al.*¹⁹ with 30%, 26.5% and 25.5% respectively. Birth weight less than 2.5 kg was seen in 42 cases comprising 23.3% of the study population which was comparable with the following studies S Kemal, M Kemal⁶ (36.4%) and Panda *et al.*²⁰ (32%). The extremely low p-value indicates a strong association between birth weight and AFI ≤ 5 with a notable incidence of low birth weight in the study group. The NICU admission rate in our study was 35% which is similar to S Kemal, M Kemal *et al.*⁶ with 43.6%. Our study further shows a p value. Our study showed 7 neonatal deaths out of the 180 women with oligohydramnios which is comparable with 2.4% and 3.9% as seen in the studies conducted by S Kemal M Kemal *et al.*⁶ and Nazlima N, Fatima b *et al.*¹⁸

5. Conclusion

This comprehensive study investigated the perinatal outcomes associated with oligohydramnios, a condition marked by an insufficient amount of amniotic fluid.

Neonates born to mothers with oligohydramnios were significantly more likely to have low birth weights. These outcomes contribute to prolonged hospital stays and a higher likelihood of NICU admissions. There was a notable increase in cases of fetal distress, often identified through non-reassuring fetal heart rate patterns and the presence of meconium-stained amniotic fluid. These conditions necessitated immediate medical interventions to prevent long-term adverse effects on the neonate.

Regular ultrasound assessments and timely intervention can mitigate risks associated with the condition. Developing tailored care plans for pregnant women diagnosed with oligohydramnios is crucial. This includes decisions regarding the timing and mode of delivery to optimize both maternal and neonatal outcomes. Future research should focus on the long-term developmental and health outcomes of children born to mothers with oligohydramnios.

In conclusion, this study underscores the significant impact of oligohydramnios on both maternal and perinatal outcomes. The findings highlight the importance of early detection, meticulous monitoring, and individualized care strategies to mitigate risks and enhance outcomes for affected mothers and their babies. By adopting a proactive and multidisciplinary approach, healthcare providers can improve the prognosis for pregnancies complicated by oligohydramnios, ultimately contributing to better maternal and neonatal health.

Table 1: Maternal demography

Parameters		Mean	Test of Significance
Age Distribution	21 - 25 years: 52.70% (N=95)	Mean age = 26.57 $\pm$ 3.49 SD	p value = 1.86e ⁻²⁷
Gravida Distribution	Primi: 67.7% (N=122)	-	p value = 1.0
Booked Pregnancy	81.6% (N=147)	-	p value = 1.0
Perception of fetal movements	Present: 85% Decreased: 15% Absent: 0%	-	p value = 1.77e ⁻⁴³
Gestational Age	39 - 40+6 weeks: 68.9% (N=124)	Mean gestational age = 39.6 $\pm$ 0.7 SD	p value = 5.00e ⁻²³

Table 2: Obstetric and perinatal outcome

Parameters		Mean	Test of Significance
Type of Labour	- Induced: 40% - Spontaneous: 42.7% - Pre labour caesarean section: 7.2%	-	p value = 2.45e ⁻⁵
Mode of Delivery	- Normal vaginal delivery: 33.3% - Assisted vaginal delivery: 11.1% - Cesarean section: 55.5%	-	p value = 3.98e ⁻¹⁵
Indication for caesarean section	- Fetal distress: 7.2% - CPD: 13.8% - Failed induction: 7.2% - Obstructed labour: 1.1% - Persistent ROP: 1.1% - Placenta previa: 1.6% - Anhydramnios: 3.3%	-	p-value: 2.56e ⁻⁹
Meconium stained liquor	- Induced (N=72): 36.1% - Spontaneous (N=77): 37.6% - Pre labour caesarean section (N=31): 96.7%	-	p-value: 9.56e ⁻⁹
APGAR score <7 at 1 minute	- Induced (N=72): 0% - Spontaneous (N=77): 27.27% - Pre labour caesarean section (N=31): 80.64%	mean APGAR score at 1 minute = 6.6 $\pm$ 1.2 SD	p value = 0.0145
Birth weight	- LBW (<2.5kg): 23.3% - Normal (2.5 - 4 Kg): 76.6%	mean birth weight in Kgs 2.7 $\pm$ 0.3 SD	P value = 7.52e ⁻⁸⁵
Sex of baby	- Male: 101 - Female: 79	-	p value = 0.0269
Admission to NICU	Induced (N=72): 0%	-	P value=7.99e ⁻¹⁷

	- Spontaneous (N=77): - Pre labour caesarean section (N=31):	49.35% 80.64%		
Baby at discharge	- Alive: - Dead:	173 7	-	p value = 1.0

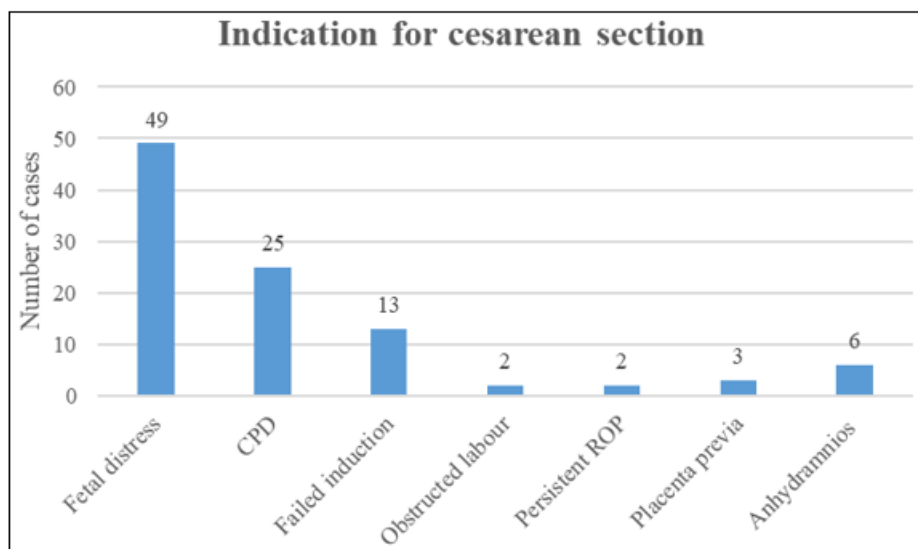


Figure 1: Indication for caesarean section

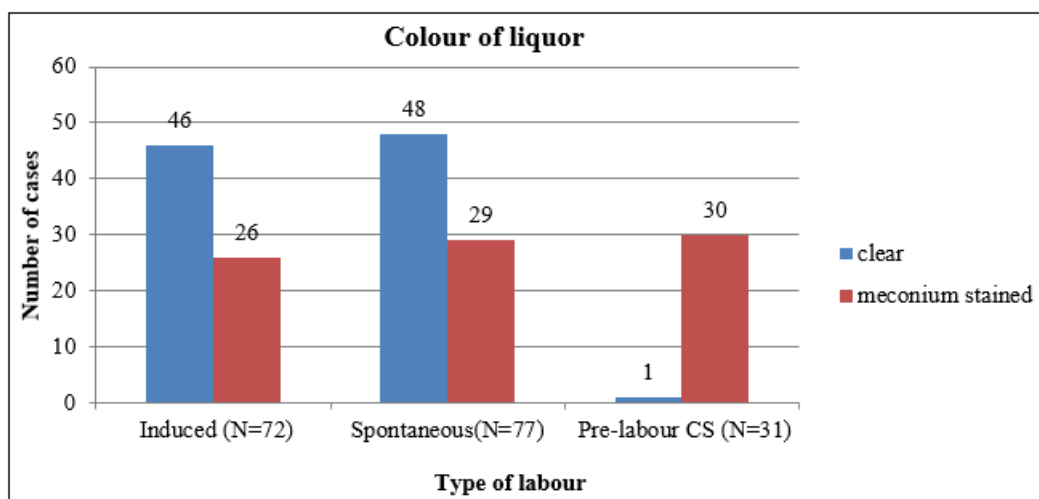


Figure 2: Intrapartum liquor status

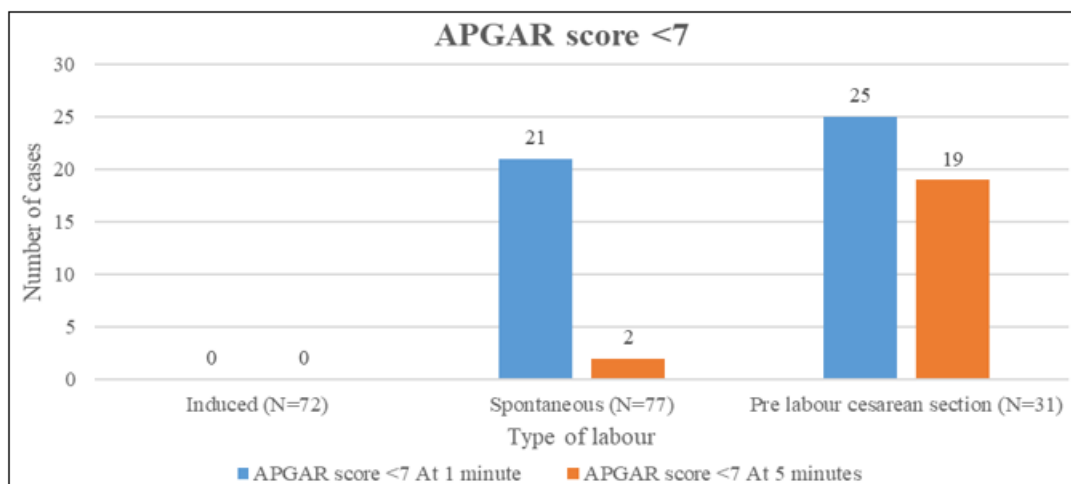


Figure 3: APGAR score at 1 and 5 minutes

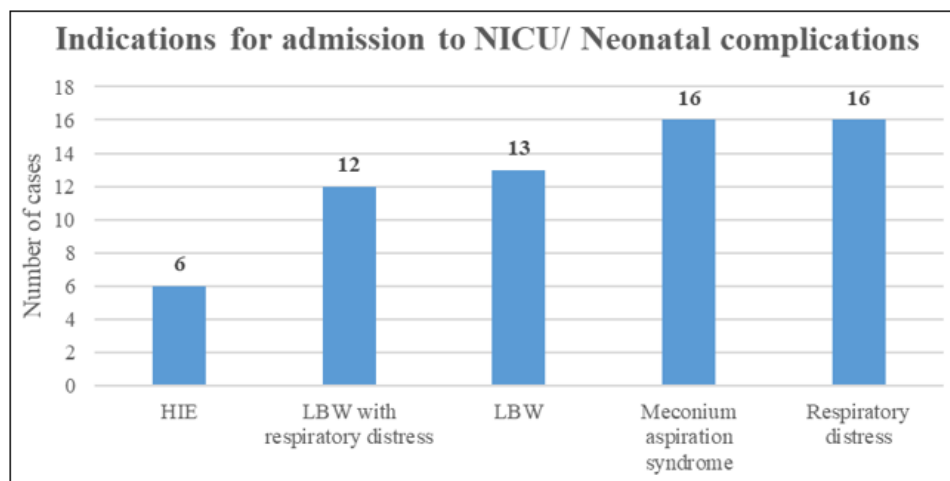


Figure 4: Indication for NICU admission

References

- [1] Cunningham FG, Leveno KJ, Bloom SL, et al. Disorders of amniotic fluid volume. Williams Obstetrics.2010; chap 21: 490 - 499
- [2] Guin Gita, Puneekar Shweth, Lele Arvind, Khare Shashi. A prospective clinical study of foeto - maternal outcome in pregnancies with abnormal liquor volume. The journal of Obstetrics and gynecology of India 2011 November - December 61 (6); 652 - 655.
- [3] Megha Bhagat, Indu Chawla. Correlation of Amniotic Fluid Index with Perinatal Outcome The Journal of Obstetrics and Gynecology of India 2014; 64: 32 - 35
- [4] Hina Ahmad, Shama Munim. Isolated oligohydramnios is not an indicator for adverse perinatal outcome. J Park med Assoc.2009; 59 (10): 691 - 694.
- [5] Fatima Lajberi, Huma Habib, Sumayya Khaliq, Rabia Kareem, Sumaira Inayat, Mehreen Lajber Role of Low Amniotic Fluid Index (AFI) on Perinatal Outcome in Women with Term Pregnancy, 2020; 14 (3)
- [6] Samina Kemal, Midhat Kemal, Shazia Sultana, Rubina Hussain, Khasheaa Nadeem. ORIGINAL ARTICLE. Effect of decreased amniotic fluid index on foeto - maternal outcome; 2021
- [7] Thobbi VA, Sabahath S. ORIGINAL ARTICLE. A study of perinatal outcome in patients with low Amniotic Fluid Index (AFI).2017.
- [8] Hadas Miremberg, Ehud Grinstein, Hadas Ganer Herman, Cindy Marelly, Elad Barber, Letizia Schreiber, Jacob Bar, Michal Kovo, Eran Weiner, The association between isolated oligohydramnios at term and placental pathology in correlation with pregnancy outcomes, Placenta, 2020; 90: 37 - 41, ISSN 0143 - 4004.
- [9] Dr Swati Gagare, Dr Ruchita Vaijpai, Dr Sai Borawake, Oligohydramnios - Incidence and perinatal outcome - Review, Indian Journal of Basic and Applied Medical Research, 2022; 11 (2) 91 - 94
- [10] Brian M. Casey, Donald D. McIntire, Steven L. Bloom, Michael J. Lucas, Rigoberto Santos, Diane M. Twickler, Ronald M. Ramus, Kenneth J. Leveno, Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks' gestation, American Journal of Obstetrics and Gynecology, 2000; 182 (4): 909 - 912, ISSN 0002 - 9378
- [11] Elsandabesee, D., Majumdar, S., & Sinha, S. Obstetricians' attitudes towards 'isolated' oligohydramnios at term. Journal of Obstetrics and Gynaecology, 2007; 27 (6): 574-576.
- [12] Peipert, Jeferey F, Donnenfeld, Alan E. Oligohydramnios: A Review. Obstetrical & Gynecological Survey 1991; 46 (6): p 325 - 339.
- [13] Conway DL, Growths, Adkin WB. Langer o. Management of isolated oligohydramnios in the teen pregnancy: a randomized clinical trial (Abstract). Amj Obstet Gynecol 2000; 182:521.
- [14] Haifa A. Alchalabi, Basil R. Obeidat, Mohammed F. Jallad, Yousef S. Khader, Induction of labor and perinatal outcome: The impact of the amniotic fluid index, European Journal of Obstetrics & Gynecology and Reproductive Biology, 2006; 129 (2): 124 - 127, ISSN 0301 - 2115.
- [15] Shubhadeep Bhattacharjee. Maternal and Fetal Outcome in Cases of Oligohydramnios Diagnosed By Ultrasonography after 34 Weeks of Gestation. JMSCR Vol 03; Issue: 02: 4106 - 4158
- [16] Pradip R. Gaikwad, Mona S. Oswal, Manisha R. Gandhewar, Binti R. Bhatiyani. Perinatal outcome in oligohydramnios and borderline amniotic fluid. Int J Reprod Contracept Obstet Gynecol.2016; 5 (6): 1964 - 1968
- [17] Nazlima. N, Fatima. B, Oligohydramnios at third trimester and perinatal outcome, Bangladesh Journal of Medical Science.2012; 11: 10.3329: 33 - 36
- [18] Chate P, Khatri M, Hariharan C. Pregnancy outcome after diagnosis of oligohydramnios at term. Int J Reprod Contracept Obstet Gynecol 2013; 2 (1): 23 - 6
- [19] Singer A, Maya I, Sukenik - Halevy R, Tenne T, Lev D, Ben Shachar S, Sagi - Dain L. Microarray findings in pregnancies with oligohydramnios - a retrospective cohort study and literature review. Journal of Perinatal Medicine.2020; 48 (1): 53 - 58
- [20] Sandhyasri Panda, M. Jayalakshmi, G. Shashi Kumari, G. Mahalakshmi, Y. Srujan and V. Anusha Oligoamnios and Perinatal Outcome, The Journal Of Obstetrics and Gynecology of India, 2017; 67: 104 - 108