ORIGINAL ARTICLE

COMPARISON OF FREQUENCIES OF ADVERSE FETAL OUTCOMES IN THE THIRD TRIMESTER OF PREGNANCY IN FEMALES WITH AND WITHOUT OLIGOHYDRAMNIOS

Fatima Anwar[1], Ambreen Fatima[2], Nadia Bokhari[3], Asia Raza[4], Nazish Shifa[5], Rubina Jabeen[6]

[1]Post graduate trainee, [2]Associate Professor, [3]Associate Professor, [4]Assistant Professor, [5]Senior Registrar, [6]Senior Registrar
Foundation University Medical College, Rawalpindi (FUMC).

ABSTRACT

Objective: To compare the frequencies of adverse fetal outcomes in females with and without oligohydramnios in the third trimester.

Study Design: Prospective Cohort Study.

Place and Duration of Study: Department of Obstetrics & Gynaecology, Fauji Foundation Hospital, Rawalpindi, six months (Dec 2021 to June 2022).

Methodology: Sample size calculation was done by open epi calculator, with a 95% confidence interval, 80% power of the study and 41.57% anticipated frequency of meconium-stained liquor in patients with amniotic fluid index (AFI) < 5 cm and 13.48% frequency in females with a normal volume of AFI. The calculated sample size was 80 patients. Two groups of 40 patients each were made. One group (Group A) included females diagnosed with oligohydramnios while the other (Group B) included those without oligohydramnios.

Results: The mean ages of the pregnant females were 28.2±5.0 years and 28.3±4.7 years in Group A and Group B respectively. The mean gestational age of Group A was 35.3±1weeks and 36.7±0.6 of Group B. In Group A, 17(42.5%) females were primigravida and 23(57.5%) were multigravida while in Group B, 22 (55%) were primigravida and 18 (45%) were multigravida. It was observed that adverse fetal outcomes such as abnormal Cardiac topography (CTG), presence of meconium, fetal distress and low birth weight were significantly more in Group A than Group B.

Conclusion: Oligohydramnios is significantly associated with adverse fetal outcomes. Once diagnosed, it needs careful evaluation and fetal surveillance in the antenatal and intrapartum periods to reduce perinatal morbidity and mortality.

Key words: *Fetal distress, Infant, low birth weight, Meconium, Oligohydramnios, Pregnancy outcome, Pregnancy trimester, third.*

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INTRODUCTION

Amniotic fluid, the fluid around the fetus in the amniotic sac, is formed from maternal plasma which crosses placental membranes into the sac in early gestation. After embryogenesis, the main source of amniotic fluid is fetal urination. The fetal kidneys begin to produce urine at the end of 1st trimester and the urine production rate continues to increase till term, reaching approximately 1000-1200ml/day[1,2,3.] During the 3rd trimester, major amniotic fluid volume (AFV) comes from swallowing and urination by the fetus. Other sources include fetal gastrointestinal & respiratory tracts, and the umbilical cord, contributing to a 40% increase in AFV. A near-term fetus swallows about 200-450ml/day & urinates about 600-800ml/24hrs[2,3]. It is observed that fetal hemostatic variations affect the volume of fetal urine, swallowing and lung secretions, so AFV reflects the fetal status. Any condition of decreased renal blood flow leads to reduced urine production and oligohydramnios.

Amniotic fluid has the important functions of providing an aquatic cushion and protecting the fetus from internal trauma, decreasing the impact of uterine contractions as well as regulating temperature[1]. The best non-invasive method

Correspondence to: Dr. Ambreen Fatima, Associate Professor, Department of OBGYN, (FUMC), FFH Rawalpindi.

Email: drambreen643@gmail.com

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for accurately estimating AFV is ultrasonographically measuring amniotic fluid index (AFI) or single deepest vertical pool (DVP)[4].

Oligohydramnios is reduced liquor volume for a given gestational age. It is defined as AFI <5cm qualitatively or a single DVP of <1 cm quantitatively. The reported incidence of oligohydramnios varies from 0.5%to 5% [5].

CAPSULE SUMMARY

A significant association was found between oligohydramnios and poor fetal outcomes. To lower perinatal morbidity and mortality, close assessment and fetal monitoring after the diagnosis of oligohydramnios are required.

The causes of oligohydramnios can be fetal, maternal or idiopathic. Common obstetrical problems associated with oligohydramnios are hypertensive disorder, dehydration, antiphospholipid syndrome(APS), premature rupture of membranes (PROM), multiple pregnancies, and postdate pregnancy. Fetal causes include renal agenesis and obstetric uropathy in late pregnancy. Oligohydramnios in the third trimester is usually associated with uteroplacental insufficiency due to conditions like preeclampsia and other maternal vascular diseases. It is associated with intrauterine growth retardation (IUGR).

Oligohydramnios in late pregnancy can result in adverse perinatal & maternal outcomes like increased prevalence of induction of labour, emergency lower section cesarean section (LSCS) due to fetal distress, birth weight < 2.5kg, low APGAR score, neonatal hospitalization & neonatal death. The management of late-onset oligohydramnios depends upon the underlying causes. Treatment options in the 3rd trimester include serial transabdominal amino infusions, transcervical infusions, desmopressin, occlusion of the cervical canal with fibrin gel and vesico-amniotic shunting in obstetric uropathy. Maternal oral or parenteral hydration is associated with improvement in AFV, as shown by recent studies.

Oligohydramnios in late pregnancy requires strict antenatal and intrapartum fetal surveillance to reduce fetal morbidity and mortality[6,7].

Local studies are sparse. This study was planned to compare the frequencies of adverse fetal outcomes in females with and without oligohydramnios in 3rd trimester so as it can provide a baseline for making treatment decisions in our own setting.

METHODOLOGY

This prospective cohort study was done over six months, from Dec 2021to June 2022, in the Department of Obstetrics & Gynaecology, Fauji Foundation Hospital, Rawalpindi, Pakistan. Ethical approval was sought from the Institutional Review Board (Reference number: 873/RC/FFH/RWP, Date: 09-12-2021). Sample size was calculated using open epi calculator with a 95% confidence interval, 80% power of study and 41.57% anticipated frequency of meconium- stained liquor in patients with AFI < 5 cm and 13.48% frequency in females with a normal volume of AFI[8]. The total calculated sample was 80 patients. Total 2 groups of 40 each were made. Group A included females diagnosed with oligohydramnios while Group B included those without oligohydramnios.

Inclusion Criteria: Women with singleton pregnancy with AFI <5cm (Group A) and those with AFI >5cm (Group B), and gestational age between 36-40 weeks.

Exclusion Criteria: Women with PROM, hypertensive disorders of pregnancy, systemic diseases such as SLE, APS, diabetes mellitus, vascular diseases, anemia, postdate pregnancy, fetal congenital and chromosomal abnormalities.

All participants were asked about their medical, obstetrical and gynecological history. Patients diagnosed with oligohydramnios were called for antenatal follow-up till delivery and fetal outcomes were evaluated.

Statistical analysis was done with SPSS 20. For quantitative variables, mean ± SD was calculated. Frequencies and percentages were calculated for variables like fetal distress and low birth weight. Chi-square / Fishers exact test was used for the comparison of frequencies of fetal outcomes between the two groups. Significance was taken at p-value of ≤ 0.05. The relative risk was calculated. Effect-modifiers like age, parity and gestational age at birth were controlled by stratification, applying chi-square.

RESULTS

A total of 80 pregnant women were included in this study. Group A included those with oligohydramnios (AFI<5cm) and grouped as exposed while women with AFI >5cm were grouped as unexposed in Group B. The mean age of Group A was 28.2±5 years and 28.3±4.7 years of Group B.

The mean gestational age at diagnosis was 35.3±1.1 weeks in Group A and 36.7±0.6 weeks in Group B. Regarding parity, 17 (42.5%) were primigravida and 23(57.5%) women were multigravida in the exposed group (Group A) while in the unexposed group (Group B) 22 women (55%) were primigravida and 18 (45%) were multigravida. The age group of 18-25 years showed a significant difference in more adverse fetal outcomes than the group having older participants ($p<0.05$). These outcomes show that the age of the mother is a factor involved in the adverse fetal outcomes with oligohydramnios (Table1). When we compared parity with adverse fetal outcomes, there was a significant difference ($p<0.05$) between primigravida and adverse fetal outcomes with oligohydramnios as compared to the group of multigravida and oligohydramnios (Table 2).

Frequencies of adverse fetal outcomes and fetal distress, including abnormal cardiotocography (CTG), and meconium staining were higher in Group A in comparison with Group B (Figure 1). The mean birth weight of the fetus in Group A was

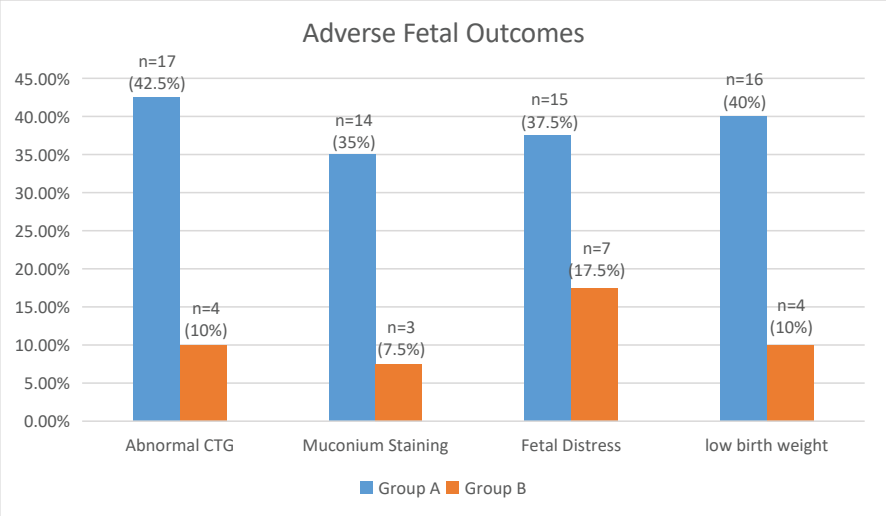

Figure 1: Comparison of adverse fetal outcome in groups.

Table 1: Comparison of Age with Adverse Fetal Outcome.

Age (year)	Group	Adverse Fetal Outcomes n(%)		Total	Relative Risk	p–value
		Yes	No			
18-25	Group A	7 (64)	4(36)	11	6.363	0.05
	Group B	1(10)	9(90)	10		
Total		8	13	21		
26-35	Group A	11(38)	18(62)	29	3.793	0.02
	Group B	3(10)	27(90)	30		
Total		14	45	59		

Table 2: Comparison of parity with Adverse Fetal Outcome.

Parity	Group	Adverse Fetal Outcomes n(%)		Total	Relative Risk	p-value
		Yes	No			
Primigravida	Group A	10(59)	7(41)	17	6.470	0.00
	Group B	2(9)	20(91)	22		
Total		12	27	39		
Multigravida	Group A	8(35)	15(65)	23	3.130	0.11
	Group B	2(11)	16(89)	18		
Total		10	31	41		

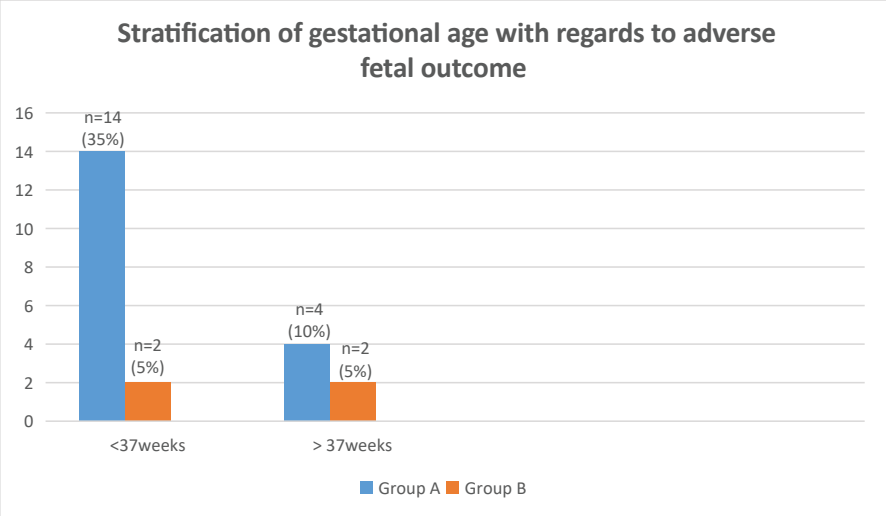

Figure 2: Stratification of gestational age with regards to adverse fetal outcome

2.4±0.05 kg and it was 2.9±0.5 kg in Group B (p-value <0.05).

More adverse effects were noted in fetuses of mothers in Group A with a gestational age of <37 weeks as compared to gestational age of >37 weeks. However, no difference was seen in the fetuses of mothers in Group B (Figure 2).

DISCUSSION

Our study has shown that oligohydramnios at term is associated with adverse perinatal outcomes. In this study 72.5% of women were between 25-35 years of age. Total 42.5% were primigravida while 57.5% were multigravida. A study by Chaudhari KR showed that 65.3% of women were age 20-25 years, 35.8% were primigravida and 64.1% were multigravida [9]. Similarly, a study by Sebastian G showed that 80% of females were 20-30years and 46.3% were primigravida[6]. A study by Bhat S showed that 86% of women were between 20-30 years and 54% were primigravida [1]. Nath J in their study showed that 15 were aged 25-30 years which is in contrast to findings in our study while 36% were primigravida and 64% were multigravida which is compatible to our study [10]. The age group of 18 to 25 years showed significant difference of more adverse fetal outcomes than the group having older participants (p<0.05). These outcomes show that the age of the mother is a factor involved in the adverse fetal outcomes with oligohydramnios. When we compared parity with adverse fetal outcomes, the difference was statistically significant (p<0.05) between primigravida & adverse fetal outcomes with oligohydramnios as compared to the group of multigravida & oligohydramnios.

In the current study, 40% of babies in Group A had low birth weight (< 2.5 kg), abnormal CTG was found in 42.5%, 35% had meconium staining of liquor and frequency of fetal distress was found in 37.5%, while Nath J showed it in 59%, 80% and 13.2% respectively which is in contrast to our study [10]. A study showed that 36% of babies were low birth weight (<2.5kg) which is compatible to our study [1],while contrast results have been found in studies by Nath J (65.38%), Chate P (62%), Chaudhari KR (65.3%) and Seraj A (83%) [10,11,9,5]. A study by Jamal A showed 18.7% low birth weight babies in contrast to our study [12]. Our study showed that 42.5% women in Group A had abnormal CTG. Comparable results were found in study by Chate P that is 38%, 42.3%, in a study by Chaudhari KR while it was 43.6% by Jamal A [11,9,12]. Nath J showed frequency of 66% of abnormal CTG, while VidyaSagar V showed 19.5% which were in contrast to results of our study [10,13]. Meconium staining of liquor was found in 30.7% in a study by Chaudhari KR and 36% by Madhavi K and 31% in a study by Nath J [9,14,10]. These results were comparable to our study. Results in contrast to our study were found in studies by Chate P , Seraj A, Jamal A and VidyaSagar V, 46%,54.7%,17.2%, and 9.7% respectively [11,5,12,13].

CONCLUSION

Oligohydramnios increases the risk of adverse perinatal outcomes including abnormal CTG, thick meconium staining and fetal distress in intrapartum period which may be associated with increased requirement of caesarean sections. These features are more common when associated with low gestational age. It is also observed that oligohydramnios causes a greater risk of low birth weight. Since, it is a frequent occurrence, so early detection, evaluation and extensive antepartum and intrapartum surveillance can improve perinatal outcomes. The variables with adverse fetal outcomes need to be explored with a larger sample size which was one of the limitations of our study.

ETHICAL APPROVAL: *Reference number: 873/RC/FFH/ RWP, Date: 09-12-2021*
CONSENT FOR PUBLICATION: *Written, informed consent was obtained from the study participants.*
AVAILABILITY OF DATA: *Data is available from the corresponding author on a justified request.*
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AUTHORS' CONTRIBUTION

- **Fatima Anwar:** *Acquisition of data, Drafting the article*
- **Ambreen Fatima:** *Analysis and interpretation of data, Critical Revision*
- **Nadia Bokhari:** *Conception and design, Analysis and interpretation of data*
- **Asia Raza:** *Conception and design, Drafting the article,*
- **Nazish Shifa:** *Conception and design, Drafting the article,* **Rubina Jabeen:** *Drafting the article, Acquisition of data*

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