

## PERINATAL OUTCOMES IN PATIENTS WITH LOW AMNIOTIC FLUID INDEX (OLIGOHYDRAMNIOS): A COMPARATIVE STUDY

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Received : 20/11/2023  
Received in revised form : 18/12/2023  
Accepted : 25/12/2023

**Keywords:**

Perinatal outcome, Apgar scores, Cesarean sections, oligohydraminos, and amniotic fluid index.

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DOI: 10.47009/jamp.2024.6.1.431

Source of Support: Nil,  
Conflict of Interest: None declared

*Int J Acad Med Pharm*  
2024; 6 (1); 2160-2163



### Abstract

**Background:** The main focus of contemporary perinatal medicine is obstetrics, which addresses the health of the mother and the fetus by identifying and measuring the risks of neonatal problems resulting from immaturity and deciding on the best timing and method of intervention. An essential component of prenatal fetal surveillance is now the measurement of amniotic fluid volume. One of the first sonographic indicators of an obstetric issue is an amniotic fluid index **Materials and Methods:** 180 prenatal patients with gestational ages ranging from 34 to 40 weeks were used in this prospective study, which was conducted in the Radiology department of the World College of Medical Sciences Research and Hospital. AFI was measured at 34 weeks of gestation, the participants' history and clinical examination were documented, and the perinatal outcomes of the  $AFI \leq 5$  and  $\geq 5$  groups were compared. **Result:** We found that participants with oligohydramnios had a higher rate of cesarean sections for fetal distress and low birth weight neonates ( $<2.5$  kg) ( $p < 0.5$ ). There were negligible variations between the two groups' prenatal meconium staining results and delivery Apgar scores of less than 7. **Conclusion:** Therefore, it may be said that oligohydramnios is highly associated with NICU admission, low birth weight newborns, and cesarean sections for fetal distress.

## INTRODUCTION

The protecting substance found in a gravid uterus's amniotic sac is called amniotic fluid. This fluid helps the fetus and mother exchange nutrition, water, and metabolic products while also serving as a cushion for the developing fetus. Osmotic and hydrostatic forces allow amniotic fluid, which is the ultrafiltrate of maternal plasma, to cross the fetal barrier. Fetal urine also adds to the fluid when the fetal kidneys start to function, which is at 16 weeks. Even while the fetus swallows most of the amniotic fluid, the fetal skin also absorbs some of it. Gestational age and amniotic fluid volume are correlated.<sup>[1]</sup>

The main focus of contemporary perinatal medicine is obstetrics, which addresses the health of the mother and the fetus by identifying and measuring the risks of neonatal problems resulting from immaturity and deciding on the best timing and method of intervention.<sup>[2]</sup> An essential component of prenatal fetal surveillance is now the measurement of amniotic fluid volume.<sup>[3]</sup> Low amniotic fluid, which is typically interpreted as a symptom of placental insufficiency, occurs in about 3-8% of

pregnant women. A vital component of fetal screening is the clinical measurement of amniotic fluid volume (AFV), since variations in its amount have been linked to pregnancy complications.<sup>[4]</sup> Prenatal testing for chronic uterine stress is based on the measurement of amniotic fluid index. Because ultrasound is non-invasive and repeatable, it is perfect for large-scale application. There has been evidence of a link between low amniotic fluid index and fetal abnormalities, as well as an increase in incidence of cesarean sections due to fetal distress.<sup>[5]</sup> Using the four-quadrant technique previously described by Phelan et al,<sup>[6]</sup> amniotic fluid was quantified in this study to determine whether an antepartum AFI of 5 cm or less is associated with abnormal perinatal outcomes. We sought to determine whether a low amniotic fluid index (AFI) ( $\leq 5$ ) was indicative with adverse perinatal outcomes. Low birth weight, meconium staining, low Apgar scores, NICU admission, and cesarean section due to fetal distress were examples of abnormal perinatal outcomes.

## MATERIALS AND METHODS

The present study was carried out in the Department of Obstetrics and Gynaecology, World College of Medical Sciences Research and Hospital, Jhajjar collaboration with Radiology department. Over the course of a year and a half, 180 women with gestational ages ranging from 34 to 40 weeks took part in the study. Women who had a singleton with intact membranes met the inclusion requirements. The study excluded women with multiple pregnancies, gestational diabetes, Rh incompatibility, placental abnormalities, known fetal or chromosomal abnormalities, and preterm rupture of membranes. Following the gestational age assessment at admission, a thorough history was obtained from the patients and a clinical examination was conducted. At the time of admission, the amniotic fluid index was calculated using Phelan's technique.<sup>[6]</sup> Based on their AFI, the women were split into two groups: Group 1 (AFI  $\leq$  5) and Group 2 (AFI  $\geq$  5). Birth weight, Apgar score at 1 and 5 minutes, the final mode of delivery, and meconium staining of amniotic fluid were noted. SPSS-20 was used for the statistical analysis, and the significance threshold was set at  $p < 0.05$ .

## RESULTS

The mean maternal age for Group 1 and Group 2 was  $28.52 \pm 10.36$  and  $28.71 \pm 10.42$ , respectively, out of 180 women; 19 (63.3%) and 90 (60.0%) of these women were nulliparous. 43.3% (13) of the women in Group 1 had a gestational age of 37 weeks, while 49 (32.6%) of the women in Group 2 had the same gestational age. Compared to 14 (9.3%) women in Group 2, 10 (33.3%) women in Group 1 had maternal weight gains of less than 10 kg [Table 1].

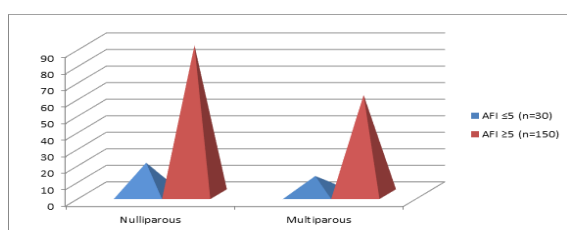


Figure 1: Shows the (Parity) demographic and obstetric characteristics.

Table 1: Shows the demographic and obstetric characteristics

Obstetrical features and maternal demographics	AFI $\leq$ 5 (n=30)	AFI $\geq$ 5 (n=150)	P-value
Maternal age (mean)	$28.52 \pm 10.36$	$28.71 \pm 10.42$	0.25
Parity	19 Nulliparous	90 Nulliparous	0.148
	11 Multiparous	60 Multiparous	
Gestational age of 37 weeks	13	49	0.801
Weight gain of $<10$ kg	10	14	0.068

A total of 22 (73.3 %) women were induced in Group 1 as compared to 92 (61.3 %) in Group 2. Analysis of associated ante-natal risk factors was carried out and it was observed that 36.6 % patients with hypertension in pregnancy (HIP) and 40% patients with intrauterine growth retardation (IUGR) were significantly associated with oligohydramnios [Table 2]. Obstetric and perinatal outcomes were studied in both the groups. An observation was made that 7 (23.3 %) subjects in Group 1 and 26 (17.3 %) subjects in Group 2 had meconium-stained liquor. The differences was not statistically significant ( $p = 0.26$ ). The cesarean section was carried out in 18 (60.0 %) women in Group 1 as compared to 67 (44.7 %) in Group 2 ( $p = 0.02$ ). The cesarean section for fetal distress was observed to be higher in women with oligohydramnios (68 %) as compared to women with AFI  $\geq$  5 (42 %) ( $p = 0.04$ ). In Group 1, the Apgar score at 1 min was less than 7 in 36.7 % women (11) when compared to 27 (18.0 %) in Group 2 ( $p = 0.24$ ). An Apgar score  $< 7$  at 5 min was noted in 2 (6.7 %) woman in Group 1 and 8 (5.3 %) women in Group 2 ( $p = 0.18$ ), Birth weight of less than 2.5 kg was found in 14 (46.7 %) neonates in Group 1 as compared to 45 (30.0 %) in Group 2 ( $p = 0.02$ ). The values for perinatal outcomes are outlined in [Table3].

In Group 1, out of 30 women, 26 (86.7 %) showed normal cardiotocography (CTG) and 4 (13.3 %) were presented with pathological CTG. In Group 2, out of a total of 150 patients, 147 (98.0 %) had a normal CTG and 3 (2.0 %) with a pathological CTG. The rate of Pathological CTG in Group 1 was statistically significant [Table 4].

Significantly more patients in Group 1 (32%), as opposed to Group 2 (11.0%), had non-reactive NST. 26 neonates (86.7%), or the majority of the neonates in Group 1, were admitted to the neonatal intensive care unit (NICU). Nonetheless, 89 (59.3%) of the infants in Group 2 were admitted to the NICU. Therefore, a significant connection to NICU admission ( $p = 0.02$ ) was found in Group 1 [Table 4].

**Table 2: Shows the ante-natal risk factors.**

Correlated risk factors	AFI $\leq 5$ (n=30)	AFI $\geq 5$ (n=150)	P-value
HIP	11 (36.6%)	49 (32.7%)	0.3
IUGR	12 (40.0%)	25 (16.7%)	0.16
Abruptio placentae	3 (10.0%)	8 (5.3%)	0.32
Severe anemia	2 (6.7%)	4 (2.7%)	0.12
Prolonged pregnancy	4 (13.3%)	22 (14.7%)	0.48

**Table 3: Shows the perinatal outcomes.**

Perinatal Outcome	AFI $\leq 5$ (n=30)	AFI $\geq 5$ (n=150)	P-value
Induction of labour	22 (73.3%)	92 (61.3%)	0.29
Meconium stained liquor	7 (23.3%)	26 (17.3%)	0.26
Cesarean section	18 (60.0%)	67 (44.7%)	0.02
Cesarean for Fetal distress	68%	42%	0.04
Birth weight $< 2.5$ kg	14 (46.7%)	45 (30.0%)	0.02
Apgar score			
1 min $< 7$	11 (36.6%)	27 (18.0%)	0.24
5 min $< 7$	2 (6.6%)	8 (5.3%)	0.18

**Table 4: Shows the Secondary outcome**

Secondary outcome measure	AFI $\leq 5$ (n=30)	AFI $\geq 5$ (n=150)	P-value
NST	32%	11.0%	0.01
Admission to NICU	86.7%	59.3%	0.02

## DISCUSSION

In order to predict the perinatal outcome, the measurement of amniotic fluid volume is essential for both the Biophysical Profile and antepartum fetal observation. Demographic characteristics, related prenatal risk factors, and perinatal variables were compared between these two groups in the current study. 7 (23.3%) of the patients in Group 1 and 26 (17.3%) of the patients in Group 2 in the current study had meconium-stained beverages; the difference between the two groups was not statistically significant ( $p > 0.24$ ). Group 1 had a greater rate of cesarean sections (18, 60.0%) than Group 2 (67, 44.7%), and the difference was statistically significant ( $p = 0.02$ ). Nevertheless, our study was comparable to the one published by Voxman et al., even though other investigations have also found a statistically significant relationship.<sup>[7,8]</sup> Patients with oligohydramnios also had a higher rate of cesarean sections for fetal distress than those with normal AFI (68% vs. 42%) ( $p = 0.0003$ ). The findings of Chauhan et al,<sup>[9]</sup> who found that intrapartum AFI  $\leq 5$  was linked to an increased risk of cesarean section for fetal distress are further supported by our investigation. Rutherford et al. found a negative correlation between the amniotic fluid index and cesarean section for fetal distress.<sup>[10]</sup> 14 (46.7%) of the patients in Group 1 and 45 (30.0%) of the patients in Group 2 in the current study had birth weights under 2.5 kg, and the difference was statistically significant ( $p = 0.02$ ). AFI  $\leq 5$  raised the probability of a small for gestational age newborn in oligohydramnios patients, according to similar findings by Locatelli et al.<sup>[11]</sup> According to Morris et al,<sup>[12]</sup> 60% of the infants in the group with AFI  $\leq 5$  had low birth weights, indicating a link between oligohydramnios and development restriction. According to a research by Rutherford et al,<sup>[10]</sup>

pregnancies that resulted in children with intrauterine growth restriction (IUGR) occurred when the AFI was less than 5 (36%) percent.<sup>[13,14]</sup> Eleven (36.7%) of the patients with AFI  $\leq 5$  in the current study had a 1-min Apgar score of less than 7, compared to 18 % of the normal AFI group. Regarding secondary outcome indicators, our findings were consistent with Ghike et al.'s findings that the NICU admission rate was considerably greater in the oligohydramnios group than in the borderline group.<sup>[15]</sup>

## CONCLUSION

In conclusion, the antepartum oligohydramnios (AFI  $\leq 5$ ) is discussed in the current study and was found to be linked to an increased risk of cesarean birth, especially in cases of fetal distress. Fetal distress, IUGR, PIH, and oligohydramnios were found to be substantially correlated with caesarean section. A strong association between admission to the NICU and secondary outcome analysis was found. Thus, in order to improve the perinatal outcome, women with oligohydramnios should get antepartum care, such as induction of labor.

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