

Original Article

A Comparative Study to See The Pregnancy Outcome of Oligohydramnios And Normal Amniotic Volume at Term

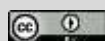
DOI: dx.doi.org

Fatematuz Zuhora^{1*}, Dilip Kumar Voumik²

Received: 21 November 2023
Accepted: 25 November 2023
Published: 28 November 2023

Published by:
 Sheikh Sayera Khatun Medical
 College (SSKMC), Gopalganj,
 Bangladesh

*Corresponding Author



This article is licensed under a
[Creative Commons Attribution 4.0
 International License](https://creativecommons.org/licenses/by/4.0/).

**ABSTRACT**

Introduction: Oligohydramnios, reduced amniotic fluid, raises risks like growth issues, birth complications, and abnormalities. Detecting and managing it early can cut perinatal problems, mortality, and cesarean rates, improving both maternal and fetal outcomes. Timely interventions for oligohydramnios can significantly enhance the overall well-being of both mother and baby.

Aim of the study: This study aimed to compare the pregnancy outcome of oligohydramnios and normal amniotic volume at term.

Methods and Materials: Conducted between July to December 2014, this case-control study examined 50 third-trimester pregnant patients with Oligohydramnios alongside 50 randomly chosen controls with normal amniotic levels from Sylhet MAG Osmani Medical College Hospital. Selection followed set criteria, and comprehensive history, examinations, and investigations were conducted through convenient consecutive sampling. Oligohydramnios

diagnosis was based on AFI measurements. **Results:** Both the rate of incidence of oligohydramnios and operative morbidity were higher in primipara cases. The selected outcomes showed significant variations in both groups. There were statistically significant increased chances of FHR decelerations (SD 6.07 and mean value), thick meconium, low Apgar score at 5 minutes, birth weight <2.5 kg, admission to NICU, congenital anomalies and neonatal mortality in patients with oligohydramnios. The most common reason to perform a cesarean was fetal distress. Oligohydramnios were related to a higher rate of neonatal ward admission. **Conclusion:** A high rate of intrapartum complications and 'perinatal morbidity and mortality' are associated with oligohydramnios. To reduce perinatal morbidity and mortality, intensive fetal surveillance, and proper 'antepartum and intrapartum' care is essential.

Keywords: Pregnancy outcome, Oligohydromnions, Normal delivery, Amniotic volume, Term

(The Insight 2023; 6(1): 110-117)

1. Junior Consultant, Department of Obstetrics & Gynecology, Chatok Upazila Health Complex, Sunamganj, Bangladesh
2. Professor & Head, Department of Obstetrics & Gynecology, Parkview Medical College & Hospital, Sylhet, Bangladesh

INTRODUCTION

Amniotic fluid provides temperature stability, cushioning and a necessary presence in collapsed airways to help stimulate lung development. The importance of amniotic fluid volume as a prominent indicator of fetal well-being has made its evaluation an important part of antenatal fetal surveillance. Abnormalities like meconium staining, growth retardation, congenital anomalies, dysmaturity and fetal asphyxia have been related to reduce amniotic fluid volume [1,2]. It has been reported that amniotic fluid contains certain bacteriostatic properties that protect against potential infectious processes and that a decrease in amniotic fluid volume may impair the gravid woman's ability to combat such infections [3]. Amniotic fluid index (AFI) of ≤ 5 cm expresses oligohydramnios as originally defined by Phelan et al. [4]. Oligohydramnios complicate between 0.5%-5% of all pregnancies. The prevalence relies heavily on how oligohydramnios are defined and the criteria employed, along with the specific population under examination [5]. Common underlying causes associated with oligohydramnios encompass ruptured membranes, congenital abnormalities, and placental insufficiency. Employing ultrasonographic evaluation to gauge reduced amniotic fluid volume has gained recognition as a means of forecasting adverse perinatal outcomes. The presence of oligohydramnios, defined as an amniotic fluid index equal to or less than 5cm, has exhibited a correlation with elevated rates of perinatal morbidity and mortality. It has also been linked to instances such as the passage of meconium, the necessity for cesarean delivery due to fetal distress, low APGAR scores, a heightened requirement for neonatal resuscitation, and subsequent admission to the intensive care unit [6, 7]. Detecting deviations in fluid volume via ultrasound is a commonly employed technique for identifying fetal conditions.

At risk of experiencing adverse outcomes, as indicated by the identification of irregular fluid volumes. The concept of amniotic fluid index was introduced by Phelan et al. [4], involving the summation of the largest vertical pockets of amniotic fluid within all four quadrants of the uterus. This method for evaluating amniotic fluid volume has gained significant traction within obstetric practice. Diminished amniotic fluid volume has been linked anecdotally to various unfavorable pregnancy consequences, including perinatal mortality, fetal distress during labor, and compromised infant well-being at birth [8, 9]. Obstetricians have increasingly turned to inducing labor or conducting antepartum testing to evaluate fetal health in pregnancies complicated by reduced amniotic fluid volume. We aimed to assess the relevance of the Amniotic Fluid Index (AFI) concerning pregnancy outcomes, particularly focusing on delivery methods, fetal morbidity, and mortality. We chose to examine a group of women experiencing oligohydramnios during term pregnancies, given the distinct etiology, management approaches, and outcomes associated with late-onset oligohydramnios. It's noteworthy that certain investigations suggest that the amniotic fluid index might not be a robust predictor of adverse outcomes [10,11]. Furthermore, certain authors have not been able to establish a conclusive link between adverse perinatal outcomes and oligohydramnios [12, 13]. The objective of this current study was to compare the pregnancy outcome of oligohydramnios and normal amniotic volume at term.

METHODS & MATERIALS

This prospective observational study was carried out at the Department of Obstetrics and Gynecology, Sylhet M.A.G Osmani Medical College Hospital, Sylhet, Bangladesh, spanning from July 2014 to December 2014. The study enrolled a total of 100 patients, consisting of 50 cases in

the third trimester of pregnancy with oligohydramnios and 50 cases in the control group with normal amniotic volume. These participants were randomly selected from patients admitted to all obstetrics wards within the mentioned hospital, utilizing a convenient consecutive sampling method. Ethical approval for the study was obtained from the hospital's ethical committee, and comprehensive written consent was obtained from all participants before data collection. Patients with a gestational age of fewer than 37 completed weeks, those presenting associated fetal malformations, and those with concurrent medical disorders were excluded following the study's exclusion criteria. Thorough documentation of the demographic and clinical particulars of the participants was conducted. The collected data were subsequently processed, analyzed, and interpreted using MS Excel and SPSS version 23.0 software, as required.

RESULTS

The assessment of the amniotic fluid index was conducted using the four-quadrant technique for evaluating amniotic fluid volume. The average AFI for the study group measured 3.55 cm, while the control group exhibited an average AFI of 9.71 cm. Notably, the control group demonstrated a broad spectrum of AFI values, with the highest measurement reaching 17 cm. To facilitate the study, smaller ranges of AFI groups were employed. In terms of fetal heart rate (FHR) abnormalities, the most frequent anomaly observed was variable decelerations, which were considered significant when the FHR dropped below 70 bpm and persisted for more than 60 seconds. Among the women in the study group, 20 individuals (40%) exhibited significant variable decelerations (below 70 bpm for over 60 seconds), and 10 individuals (20%) displayed repetitive late decelerations. In the control group, 9 women encountered variable

decelerations, while 6 women experienced late decelerations. Notably, these concerning FHR patterns emerged within the control group among individuals with lower-range AFI measurements. Statistically, there was no significant disparity in the occurrence of FHR decelerations between the two groups ($P=0.66$). In the study group, 50% of women had thick meconium-stained amniotic fluid, while 10% had thin meconium staining. Comparatively, in the control group, 16% had thick meconium staining, and 14% had thin meconium staining. The difference in meconium staining occurrence was statistically significant. Regarding labor, 58% of women with $AFI < 5$ cm underwent induced labor, while 28% with $AFI > 5$ cm underwent induction. Induction decisions were based on AFI, gestational age, complications like preeclampsia, post-term pregnancy, non-reactive NST results, and cervical favorability. A significant difference was observed between the two groups ($P < 0.05$). Cesarean sections were performed on 24 women, and forceps deliveries were conducted for 6 women. In the study group, 50% of women experienced fetal distress, with 42% of them undergoing cesarean section and 8% forceps delivery. In comparison, the control group had 20% of women with fetal distress, resulting in 18% undergoing cesarean section and 2% undergoing forceps deliver. However, these differences were not statistically significant ($P=0.64$). Notably, in our study, cases with oligohydramnios (< 5 cm) had a notably high rate of undergoing cesarean section due to fetal distress (42%), while the control group's rate was 18%. For the study group, the mean Apgar score was 6.9 at 1 minute and 8.02 at 5 minutes. Among women with AFI measurements greater than 5 cm, the mean Apgar score was 7.8 at 1 minute and 9.2 at 5 minutes. Apgar scores below 7 at 5 minutes were observed in 16% of the study group and 6% of the control group. There were no statistically

significant differences in the mean Apgar scores, nor was there a significant difference in the occurrence of Apgar scores below 7 ($P=0.90$). The average birth weight measured was 2.31 Kg in the study group and 2.64 Kg in the control group. The occurrence of birth weights below 2.5 Kg was observed in 60% of the study group and 28% of the control group. Although there was no statistically significant difference in the mean birth weight, the presence of low birth weight (<2.5 Kg) exhibited a significant difference ($P<0.05$). A total of 22 neonates from the study group were admitted to the neonatal ward due to various conditions like birth asphyxia, neonatal seizures, and meconium aspiration. In contrast, only 8 neonates (16%) from the control group required admission to the neonatal ward. This discrepancy between the two groups was statistically significant ($P < 0.01$). Bilateral congenital tulips equinox virus was found in 1 infant born to women with AFI measurements below 5 cm, while none were observed in infants born to women with AFI measurements above 5 cm. The study group experienced 4 early neonatal deaths, while the control group had 1 early neonatal death. However, the distinction in neonatal mortality rates between the two groups was not statistically significant ($P=0.61$).

Table I: Distribution of amniotic fluid index (AFI) in the study group (n=50)

AFI in cm	n	%
2-3	17	34
3.1-4	15	30
4.1-5	18	36

Table II: Distribution of AFI in the control group

AFI in cm	n	%
5-8	19	38
8.1-11	13	26
11.1-14	14	28
14.1-17	4	8

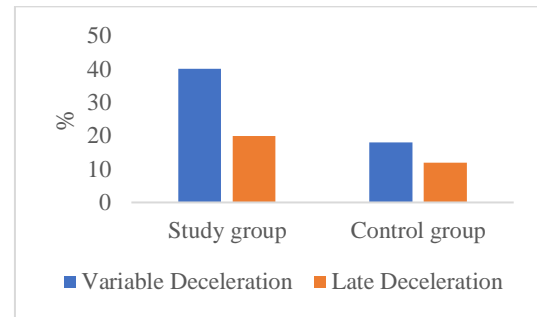


Figure 1: Multiple representing FHR declaration

Table III: Occurrence of variable decelerations and late decelerations

FHR pattern	Study group		Control group	
	n	%	n	%
Variable deceleration	20	40	9	18
Late deceleration	10	20	6	12
Total deceleration	30	60	15	30

($P = 0.66$ - non-Significant, $X^2 = 0.19$)

Table IV: Nature of amniotic fluid (N=100)

Liquor	Study Group		Control Group	
	n	%	n	%
Clear	20	40	35	70
Thin meconium	5	10	7	14
Thick meconium	25	50	8	16

Table V: Induced versus spontaneous labor (N=100)

Labor	Study group		Control group	
	n	%	n	%
Induced	29	58	14	28
Spontaneous	21	42	36	72

($\chi^2 = 9.17, P < 0.05$)

Table VI: Mode of delivery (N=100)

Mode of delivery	Study group		Control group	
	n	%	n	%
Normal vaginal delivery	20	40	36	72
LSCS	24	48	11	22
Forceps delivery	6	12	3	6

Table VII: Interventions for foetal distress (N=100)

Interventions	Study group		Control group	
	n	%	n	%
LSCS	21	42	9	18
Instrumental delivery	4	8	1	2

$\chi^2 = 0.21 P=0.64$ (NS)* (of total No. of Cases) # (of total No. of control)

Table VIII: LSCS for foetal Distress in Non-Reactive NST

Groups	Non-reactive NST	LSCS	%
Study group	17	11	64.7
Control group	9	5	55.5

Table IX: LSCS for foetal distress in reactive NST

Groups	Reactive NST	LSCS	%
Study group	29	10	34.4
Control group	40	5	12.5

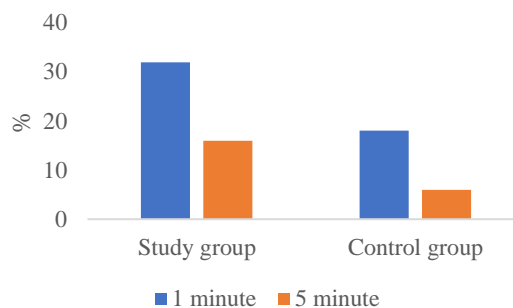


Figure 2: Representing occurrence of APGAR score less than 7
 $\chi^2 = 0.02 P = 0.09$ (NS)

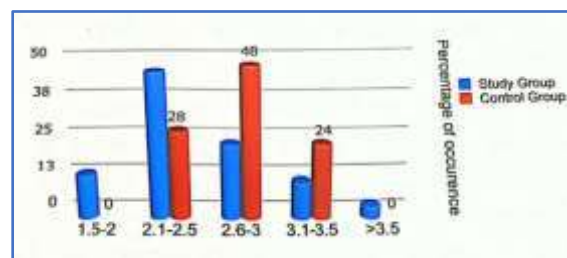


Figure 3: Representing distribution of birth weight (Kg)

Table X: Admission to neonatal ward

Study group		control group	
n	%	n	%
22	44	8	16

Table XI: Neonatal mortality

Study group		Control	
n	%	n	%
4	8	1	2

DISCUSSION

This study aimed to compare the pregnancy outcome of oligohydramnios and normal amniotic volume at term. In our study, post-term pregnancy was observed in 10% of women with AFI < 5cm, whereas Sriya R. reported rates of 15.38% and 25% in their respective studies [14]. Within the oligohydramnios group, 20% experienced mild pre-eclampsia and 12% had severe pre-eclampsia in our study. This contrasts with Sriya R.'s findings of 38.46% and 31% for mild and severe pre-eclampsia in their oligohydramnios group [14]. Our study showed a statistically significant increase (60%) in meconium passage for patients with <5cm AFI and 30% for those with AFI between 5-7cm (P<0.05). Our study aligns closely with their findings. Notably, during the intrapartum period, fetal heart rate (FHR) decelerations indicative of fetal distress were commonly observed in pregnant women with AFI < 5cm. Variable decelerations attributed to cord compression were the most prevalent. The presence of ominous FHR patterns was noted in 40% of cases, which is in line with the 48% and 36.11% reported in studies by Casey et al. and Sriya R. et al., respectively [14, 16]. Various studies have shown differing rates of cesarean section for fetal distress in pregnant women with AFI ≤ 5cm. In our current study, 24 patients required a caesarean section due to fetal distress, accounting for 42% of cases. The incidence of fetal distress was notably higher (P value < 0.05). Alchalabi et al. similarly found a significantly higher rate of fetal distress (27.3%) in patients with AFI < 5cm, which corresponds with our study's results [15]. On the other hand, Chauhan et al. reported a cesarean section rate of 14.5% for presumed fetal distress in patients with AFI < 5cm, possibly due to advanced hospital facilities and experienced resources [17]. In this study, the APGAR scores of the patients varied based on different AFI levels. At the first minute after birth, a maximum of 32% of

babies born to patients with <5 cm of AFI had an APGAR score of ≤ 7. After the fifth minute, this figure decreased to 16%. Comparing different oligohydramnios severities, a significantly higher occurrence (P < 0.05) of APGAR scores < 7 was observed at the first minute for severe oligohydramnios. However, by the fifth minute, the difference between severe and mild oligohydramnios became almost negligible. Umber reported that at the first minute after birth, APGAR scores < 7 were 8.0% and 1.1% in cases of severe and mild oligohydramnios, respectively [18]. After the fifth minute, these percentages changed to 6.0% for severe oligohydramnios and 0.56% for mild oligohydramnios. Chauhan et al. indicated APGAR scores < 7 at the fifth minute were 9.3% for severe and 6.5% for mild oligohydramnios [17]. Similarly, Alchalabi et al. found APGAR scores < 7 at the first minute to be 25.8% and 12.3% for severe and mild oligohydramnios, respectively [17]. Chauhan et al. and Morris et al. have documented that decreased amniotic fluid or oligohydramnios is associated with an elevated risk of lower APGAR scores, lending support to the findings of the present study [19]. In our study, the occurrence of birth weight below 2.5 Kg was observed in 60% of patients with AFI ≤ 5 cm, and this finding was statistically significant (P < 0.05). In contrast, Umber et al. reported a low birth weight incidence of 36.3%, while Alchalabi et al. found a rate of 10.6% [18, 15]. Our study established a clear association between low birth weight and oligohydramnios, paralleling findings from Locatelli et al., who also linked AFI < 5 cm with low birth weight [20]. The higher occurrence of low birth weight could likely stem from chronic placental insufficiency leading to fetal growth restriction. In our study, 44% of newborns were admitted to the neonatal ward due to various issues like neonatal seizures, birth asphyxia, and meconium aspiration. This contrasts with the findings of Casey et al. [16]. However, Sriya R. et al.

reported an even higher incidence (88.8%) of neonatal ward admissions ^[14]. Among the cases in our study, four neonatal deaths were recorded, while in the control group, none were reported.

Limitation of the study:

Conducted with only 50 cases due to time constraints, the study's depth of findings may have been impacted. Fetal distress diagnosis relied on FHR tracing, as methods like fetal scalp blood sampling were unavailable for confirming fetal acidosis. The absence of backup methods like blood sampling, acoustic stimulation, and amnioinfusion might have affected outcomes. Additionally, limited neonatal intensive care capabilities could have influenced neonatal death rates. Incomplete neonatal follow-up beyond 7 days limits longer-term assessment. Future research with larger samples, comprehensive monitoring, and improved neonatal care is essential for stronger insights.

CONCLUSION & RECOMMENDATION

As per the findings of this current study, we can conclude that oligohydramnios is associated with an increased risk of cesarean delivery due to fetal distress, meconium-stained amniotic fluid, abnormal fetal heart rate, meconium aspiration, neonatal ward admission, and lower APGAR scores. The measurement of amniotic fluid index (AFI) during antepartum or intrapartum stages can serve as a valuable tool for identifying women who require enhanced monitoring for potential pregnancy complications. Such cases should be managed within specialized units to proactively address these complications and ensure optimal outcomes for both the mother and the baby. To get more specific results, we would like to recommend conducting similar studies in several places with larger-sized samples.

Funding: No funding sources.

Conflict of interest: None declared.

REFERENCES

1. Moore TR. Amniotic fluid dynamics reflect fetal and maternal health and disease. *Obstet Gynecol.* 2010;116:759-65.
2. Hashimoto BE, Kramer DJ, Brennan L. Amniotic fluid volume: fluid dynamics and measurement technique. *Semin Ultrasound CT MR.* 1993;14:40-55.
3. Vermillion Stephen T, Kooba Austin M, Soper David E. Amniotic fluid index values after preterm premature rupture of the membranes and subsequent perinatal infection. *Am J Obstet Gynecol.* 2000; 183:271-5.)
4. Phelan JP, Smith CV, Small M. Amniotic fluid volume assessment with four-quadrant technique at 36-42 weeks of gestation. *J Reprod Med* 1987;32:540-2. 6. Hill LM, Breckle R, Wolfgram KR, O'Brien PC.
5. Oligohydramnios; ultrasonically detected incidence and subsequent foetal outcome. *Am J Obstet Gynecol* 1983;147:407-10)
6. Rainford M, Adain R, Scialliar, Gehin Dimi A. Amniotic fluid index in the uncomplicated pregnancy at term, prediction of outcome. *J Reprod Med* 2001; 46: 589.
7. Everett F, Magann MD, Suneet P, Dorota A, Doherty Chauhan MD, et al. Predictability of intrapartum and neonatal outcomes with the amniotic fluid index, single deepest pocket and a dye-determined amniotic fluid volume. *Am J Obstet Gynecol* 2003; 188: 1523-28.
8. Moore TR, Cayle JE. The amniotic fluid index in normal human pregnancy. *Am J Obste Gynecol.* 1990; 162:1168-1173.
9. Seeds AE. Current Concepts of amniotic fluid dynamics. *Am J Obstet Gynecol.* 1980;138:575-586.
10. Chamberlain PF, Manning FA, Morrison I, et al. Ultrasound evaluation of amniotic fluid volume. *Am J Obstet Gynecol* 1984;150:245-9.
11. Chamberlain PF, Manning FA, Morrison I, et al. Ultrasound evaluation of amniotic fluid volume II the relationship of increased amniotic fluid volume to perinatal outcome. *Am J Obstet Gynecol* 1984;150:250-4.
12. Rainford M, Adair R, Scialli AR, Ghidini A, Spongy CY. Amniotic fluid index in the uncomplicated term pregnancy. *Prediction*

- of outcome. *J Reprod Med* 2001;46:589-92.
13. Ott WJ. Re-evaluation of the relationship between amniotic fluid volume and perinatal outcome. *Am J Obstet Gynecol* 2005;192:1803-9.
 14. Sriya R, Singhai S, et al. Perinatal outcome in patients with amniotic fluid index <5 cm *J obstet gynaecol. India* 2001;51:99-100.
 15. Alchalabi, H.A., Obeidat, B.R., Jallad, M.F., Khader, Y.S., 2006. Induction of labor and perinatal outcome: The impact of the amniotic fluid index. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 129, pp. 124-127.
 16. Casey BM. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks gestation. *Am J Obstet Gynecol* 2000;182:909-12.
 17. Chauhan SP, Hendrix NW, Morrison JC, Magann EF, Devoe LD. Intrapartum oligohydramnios does not predict adverse peripartum outcomes among high-risk parturients. *Am J Obstet Gynaecol* 1997;176:1130-8.
 18. Umber, A., 2009, *Perinatal Outcome in Pregnancies Complicated by Isolated Oligohydramnios at Term. Annals.* 15.1.
 19. Morris, J.M., Thompson, K., Smithey, J., et al., 2003. The usefulness of ultrasound assessment of amniotic fluid in predicting adverse outcome in prolonged pregnancy: a prospective blinded observational study. *BJOG.* 110, pp. 989-994.
 20. Locatelli A, Zaqarella A, Toso L, Assi F, Ghidini A, Biffi A. Serial assessment of AFI in uncomplicated term pregnancies: Prognostic value of amniotic fluid reduction. *J Matern Fetal Neonatal Med* 2004; 15:233-6.