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Research Article

Perinatal Outcomes with Isolated Oligohydramnios in Term Pregnancies

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ABSTRACT

Background: Oligohydramnios at term has been associated with fetal growth restriction, meconium-stained liquor, birth asphyxia, low Apgar scores, neonatal intensive care unit (NICU) admission, and other adverse perinatal outcomes.

Objective: To determine the frequency of isolated oligohydramnios in term pregnancies and to compare perinatal outcomes among women with and without isolated oligohydramnios.

Methods: This cross-sectional study was conducted in the Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi, from February 10, 2022, to August 9, 2022. A total of 200 pregnant women aged 18–45 years with term pregnancies were included. Women with uteroplacental insufficiency on Doppler ultrasonography, prelabor rupture of membranes, diabetes mellitus, ischemic heart disease, chronic liver disease, or chronic kidney disease were excluded. All participants underwent ultrasonographic assessment for oligohydramnios by a consultant obstetrician.

Results: Isolated oligohydramnios was identified in 64 of 200 women, giving a frequency of 32.0%. In the overall study population, cesarean delivery occurred in 129 (64.5%) patients, meconium staining was observed in 125 (62.5%), and an Apgar score <7 at five minutes was recorded in 128 (64.0%) neonates. NICU admission was required in 36 (18.0%) neonates, while 18 (9.0%) neonatal deaths were recorded.

Conclusion: Isolated oligohydramnios was observed in approximately one-third of term pregnancies in this study. Adverse maternal and neonatal outcomes, including cesarean delivery, meconium staining, low five-minute Apgar scores, NICU admission, and neonatal mortality, were also observed in the study population.

Keywords: Isolated Oligohydramnios, Term Pregnancy, Cesarean Delivery, Apgar score, NICU Admission and Perinatal Outcome.

INTRODUCTION

The amniotic fluid (AF) is a part of the baby's life support system. It aids in the development of muscles, limbs, lungs and digestive system. Amniotic fluid is produced soon after the amniotic sac is formed at about 12 days after conception. It is first made up of effusion that is provided by the mother's circulation and then around the 20th weeks fetal urine becomes the primary substance.[1] the adequate amount of amniotic fluid is necessary for the good pregnancy outcomes. The amniotic fluid index (AFI) is used to assess the quantity of amniotic fluid during pregnancy. It is calculated by adding vertical diameters (in cm) from each of four uterine quadrants with deepest pocket area on ultrasound examination.[2,3] The term oligohydramnios is defined as when AFI is less than 5 cm. The amount of amniotic fluid may fall

<500 ml in cases of oligohydramnios. The incidence of oligohydramnios varies among various populations and it ranges from 0.5 to 8%.[4] Careful fetomaternal monitoring is required in cases of oligohydramnios. The isolated cases of decreased AFI may have the comparable outcomes to normal AFI but the literatures showed that oligohydramnios is associated with increased frequency of postpartum hemorrhage, risk of cesarean section, fetal distress, intensive care admissions and perinatal deaths.[5-7] Figueroa, L., et al. (2020) studied the oligohydramnios and its associated fetomaternal morbidities in low middle-income countries. They found that incidence of oligohydramnios in Pakistan is 1.5%.[4] In Pakistan the ultrasound examination during pregnancy is not done in all women and proper diagnosis of oligohydramnios and its associated adverse outcomes cannot be assessed properly. Women with oligohydramnios had high risk of complications as compared to those without oligohydramnios i.e. stillbirths (80.5 vs. 14.9 per 1000 births), neonatal deaths within 28 days (75.0 vs 16.7 per 1000 live births), LBW (29.9% vs 11.7%).[4] The frequency of isolated oligohydramnios is found to be 24% in study conducted by Elsandabesse D in 2007.[8] In one study, incidence of oligohydramnios was more in primipara (52%) and operative morbidity was also more in primipara. Most common cause of Oligohydramnios is idiopathic (52%). Second commonest cause is PIH (25%). Operative morbidity is highest in PIH (60%). Operative morbidity was significantly higher in NST (non-stress test) non-reactive (3.12 ± 75=78.12%) group than NST reactive (26.47%) group. Most common reason to perform caesarean was fetal distress which was either due to cord compression or IUGR. 7% patients were found with fetoplacental insufficiency on Doppler study. Oligohydramnios was related to higher rate of growth retardation and NICU (neonatal intensive care unit) admission.[9]
The aim of my study was to determine frequency of isolated oligohydramnios in our population and to compare fetomaternal outcomes in term pregnancies with and without isolated oligohydramnios. The results of my study would help us to determine the true magnitude of the problem and to anticipate and manage the related adverse outcomes.

METHODOLOGY

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi, from February 10, 2022, to August 9, 2022. The sample size was calculated using the WHO sample size calculator for estimation of a single population proportion. Using an anticipated proportion of isolated oligohydramnios of 24%, a 95% confidence level, and an absolute precision of 6%, the minimum required sample size was approximately 195 patients. A total of 200 women were therefore included in the study. Participants were enrolled through non-probability consecutive sampling. Women aged 18–45 years with a term pregnancy, as defined according to the predefined operational criteria, were included. Women carrying a fetus with a congenital anomaly detected on antenatal anomaly scan, those with uteroplacental insufficiency diagnosed on Doppler ultrasonography, prelabor rupture of membranes diagnosed clinically, or chronic medical conditions including diabetes mellitus, ischemic heart disease, chronic liver disease, or chronic kidney disease were excluded.

Data Collection Procedure

Approval was obtained from the institutional ethical review committee before commencement of the study. Women fulfilling the eligibility criteria were recruited from the Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi. Written informed consent was obtained from all participants. A detailed obstetric and medical history was taken, followed by relevant clinical examination and investigations. All participants underwent ultrasonographic assessment by a consultant obstetrician to determine the presence or absence of isolated oligohydramnios according to the predefined operational definition. Based on the sonographic findings, participants were categorized into two groups: women with isolated oligohydramnios and women without isolated oligohydramnios. Participants were followed until delivery.

Maternal and neonatal outcomes recorded included mode of delivery, presence of meconium-stained liquor, neonatal birth weight, neonatal sex, Apgar score at five minutes, neonatal intensive care unit (NICU) admission, and neonatal death. All study variables were recorded on a specially designed proforma.

Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics for Windows, version 24.0. Quantitative variables, including maternal age, gestational age, body mass index (BMI), neonatal birth weight, and five-minute Apgar score, were presented as mean ± standard deviation. Categorical variables, including parity, neonatal sex, presence of isolated oligohydramnios, mode of delivery, meconium staining, NICU admission, and neonatal mortality, were presented as frequencies and percentages. Perinatal outcomes were compared between women with and without isolated oligohydramnios. Categorical outcomes, including mode of delivery, meconium staining, low five-minute Apgar score, NICU admission, and neonatal mortality, were compared using the Chi-square test or Fisher's exact test, where appropriate. Continuous variables, including neonatal birth weight and five-minute Apgar score when analyzed as a continuous variable, were compared using the independent-samples t-test. The data were stratified according to maternal age, gestational age, BMI, and neonatal sex to assess their possible influence on the observed outcomes. After stratification, the Chi-square test or Fisher's exact test was applied to categorical variables, while the independent-samples t-test was used for continuous variables. A two-sided p-value ≤0.05 was considered statistically significant.

RESULTS

A total of 200 women with term pregnancies were included in the study. The results are summarized below, including baseline maternal and neonatal characteristics, the frequency of isolated oligohydramnios, overall perinatal outcomes, comparative outcomes between women with and without isolated oligohydramnios, and stratified analysis according to selected maternal and fetal characteristics.

Table 1. Baseline Maternal and Neonatal Characteristics (N=200)

Characteristic	n (%) / Mean ± SD
Age, years	29.01 ± 4.49
18–30 years	100 (50.0)
31–45 years	100 (50.0)
Gestational age, weeks	38.54 ± 1.43
37–39 weeks	135 (67.5)
40–42 weeks	65 (32.5)
BMI, kg/m²	29.29 ± 3.09
BMI ≤30 kg/m²	100 (50.0)
BMI >30 kg/m²	100 (50.0)
Male neonate	119 (59.5)
Female neonate	81 (40.5)
Birth weight, kg	2.97 ± 1.01
Five-minute Apgar score	8.32 ± 0.87

A total of 200 women were analyzed. The mean maternal age was 29.01 ± 4.49 years and the mean gestational age was 38.54 ± 1.43 weeks. Half of the participants were aged 18–30 years and half were aged 31–45 years. The mean BMI was 29.29 ± 3.09 kg/m². Male neonates accounted for 59.5% of births, the mean neonatal birth weight was 2.97 ± 1.01 kg, and the mean five-minute Apgar score was 8.32 ± 0.87.

Values are presented as mean ± SD or n (%).

Table 2. Frequency of Isolated Oligohydramnios in Term Pregnancies (N=200)

Isolated oligohydramnios	n (%)
Present	64 (32.0)

Absent	136 (68.0)
Total	200 (100.0)

Isolated oligohydramnios was identified in 64 (32.0%) women, while 136 (68.0%) women had no isolated oligohydramnios. Thus, approximately one-third of the term pregnancies included in the study were complicated by isolated oligohydramnios.

Table 3. Overall Maternal and Neonatal Outcomes (N=200)

Outcome	Present, n (%)	Absent, n (%)
Cesarean section	129 (64.5)	71 (35.5)
Meconium staining	125 (62.5)	75 (37.5)
Five-minute Apgar score <7	128 (64.0)	72 (36.0)
NICU admission	36 (18.0)	164 (82.0)
Neonatal death	18 (9.0)	182 (91.0)

In the overall study population, cesarean section was performed in 129 (64.5%) women and meconium staining was observed in 125 (62.5%). A five-minute Apgar score below 7 was reported in 128 (64.0%) neonates. NICU admission was required in 36 (18.0%) neonates, while 18 (9.0%) neonatal deaths were recorded.

Table 4. Comparison of Perinatal Outcomes between Women with and Without Isolated Oligohydramnios

Outcome	Oligohydramnios (n=64), n (%)	No oligohydramnios (n=136), n (%)	χ^2	p-value
Cesarean section	40 (62.5)	89 (65.4)	0.16	0.685
Meconium staining	44 (68.8)	81 (59.6)	1.57	0.210
Five-minute Apgar score <7	39 (60.9)	89 (65.4)	0.38	0.536
NICU admission	14 (21.9)	22 (16.2)	0.96	0.328
Neonatal death	9 (14.1)	9 (6.6)	2.95	0.086

Cesarean delivery occurred in 62.5% of women with isolated oligohydramnios compared with 65.4% of women without oligohydramnios (p=0.685). Meconium staining and NICU admission were numerically more frequent in the oligohydramnios group, but the differences were not statistically significant. Neonatal mortality was also higher in the oligohydramnios group (14.1% vs. 6.6%); however, this difference did not reach statistical significance (p=0.086).

Table 5. Stratified Analysis of Isolated Oligohydramnios According To Maternal and Fetal Characteristics

Variable	Category	Oligohydramnios, n (%)	No oligohydramnios, n (%)	χ^2	p-value
Maternal age	18–30 years	31 (31.0)	69 (69.0)	0.09	0.762
	31–45 years	33 (33.0)	67 (67.0)		
Gestational age	37–39 weeks	44 (32.6)	91 (67.4)	0.07	0.796
	40–42 weeks	20 (30.8)	45 (69.2)		
BMI	≤30 kg/m²	41 (41.0)	59 (59.0)	7.44	0.006
	>30 kg/m²	23 (23.0)	77 (77.0)		
Fetal sex	Male	38 (31.9)	81 (68.1)	<0.01	0.980
	Female	26 (32.1)	55 (67.9)		

Stratified analysis showed no significant association between isolated oligohydramnios and maternal age, gestational age, or fetal Sex. A significant association was observed with BMI: oligohydramnios occurred in 41.0% of women with BMI ≤30 kg/m² compared with

23.0% of women with BMI >30 kg/m² (χ^2=7.44, p=0.006).

DISCUSSION

Oligohydramnios has been correlated with increased risk of fetal growth retardation (FGR), meconium aspiration syndrome (MAS), severe birth asphyxia, low APGAR scores and congenital anomalies. In this study, frequency of isolated oligohydramnios in term pregnancies was seen in 64 (32.0%) patients. Frequency of perinatal outcome in oligohydramnios was as follows; cesarean section was found in 129 (64.50%), meconium staining in 125 (62.50%) patients, APGAR score <7 at 5 minutes in 128 (64.0%), NICU admission in 36 (18.0%) and neonatal death in 18 (9.0%) patients. Women with oligohydramnios had high risk of complications as compared to those without oligohydramnios i.e. stillbirths (80.5 vs. 14.9 per 1000 births), neonatal deaths within 28 days (75.0 vs 16.7 per 1000 live births), LBW (29.9% vs 11.7%).[10-12] The frequency of isolated oligohydramnios is found to be 24% in study conducted by Elsandabesse D in 2007.[8] The present study evaluated the frequency of isolated oligohydramnios at term and compared maternal and neonatal outcomes between women with and without isolated oligohydramnios. Isolated oligohydramnios was identified in 32.0% of the study population. This frequency is higher than that reported in several previous studies, although differences in study setting, patient selection, gestational age at assessment, and ultrasonographic criteria may explain this variation. In a large multicountry study that included Pakistan, oligohydramnios was detected in approximately 1.5% of women at the Pakistan study site, while other international studies have reported similarly variable frequencies depending on the population examined. In the present study, cesarean section was performed in 62.5% of women with isolated oligohydramnios compared with 65.4% of those without oligohydramnios, and this difference was not statistically significant. This finding differs from several previous reports in which isolated oligohydramnios was associated with a higher likelihood of operative delivery.[13] A systematic review and meta-analysis of 12 studies involving 35,999 women found that isolated oligohydramnios was associated with approximately twice the odds of cesarean delivery. Similarly, a Pakistani prospective cohort study conducted at Aga Khan University Hospital reported significantly greater rates of induction and cesarean section for fetal indications among women with isolated oligohydramnios. The absence of a significant difference in the present study may be related to the already high overall cesarean delivery rate in both groups or to differences in local obstetric practice and indications for operative delivery.[14]

Meconium staining was observed in 68.8% of women with isolated oligohydramnios compared with 59.6% without oligohydramnios, but the difference was not statistically significant. This finding is consistent with a previous meta-analysis in which isolated oligohydramnios at term was not associated with a significant increase in meconium-stained amniotic fluid. Similarly, another systematic review found no significant difference in meconium-stained liquor despite increased rates of intervention among women with isolated oligohydramnios.[15] These findings suggest that reduced amniotic fluid volume in isolation may not necessarily indicate acute fetal compromise. The proportion of neonates with a five-minute Apgar score <7 also did not differ significantly between the two study groups, occurring in 60.9% of neonates in the oligohydramnios group and 65.4% in the comparison group. Previous literature has been inconsistent regarding this outcome. Shrem et al. reported a modestly increased risk of a low five-minute Apgar score among pregnancies complicated by isolated oligohydramnios, whereas Rossi and Prefumo found no significant difference in low Apgar scores between isolated oligohydramnios and normal-amniotic-fluid pregnancies. A prospective Pakistani study also reported no significant difference in Apgar scores between women with isolated oligohydramnios and controls.[16-18]

NICU admission occurred in 21.9% of neonates born to women with oligohydramnios compared with 16.2% of those without oligohydramnios; however, this difference was not statistically significant. Previous evidence is similarly mixed. One meta-analysis reported a

modest increase in NICU admission among pregnancies with isolated oligohydramnios, while another found no significant difference in NICU admission or other major neonatal outcomes. Ahmad and Munim also found no significant difference in NICU admission between Pakistani women with isolated oligohydramnios and those with normal amniotic fluid. Taken together, these findings support the view that isolated oligohydramnios may lead to closer surveillance and intervention without consistently translating into poorer neonatal outcomes.[19]

Neonatal mortality was numerically higher among women with isolated oligohydramnios, occurring in 14.1% compared with 6.6% among women without oligohydramnios. Although this difference approached significance, it did not reach the predefined statistical threshold (p=0.086). This observation should therefore be interpreted cautiously. Some studies from low- and middle-income countries have reported increased neonatal mortality among pregnancies complicated by oligohydramnios; however, those studies often included non-isolated cases, preterm pregnancies, fetal growth restriction, or other maternal and fetal complications and are therefore not directly comparable with the present population. In contrast, systematic reviews specifically evaluating isolated oligohydramnios at term have generally not demonstrated a clear increase in perinatal mortality.[20]

The present study has several limitations. It was conducted at a single tertiary-care hospital and included a relatively modest sample size, which may limit generalizability. The study also did not adjust the comparison of perinatal outcomes for potential confounders such as parity, induction of labor, previous cesarean delivery, and fetal growth. In addition, umbilical artery pH, cardiotocographic abnormalities, and longer-term neonatal outcomes were not evaluated. Nevertheless, the study provides local evidence regarding isolated oligohydramnios at term and shows that, despite a relatively high observed frequency, most measured adverse perinatal outcomes did not differ significantly between women with and without isolated oligohydramnios.

CONCLUSION

This study concluded that frequency of isolated oligohydramnios in term pregnancies is quite high with adverse perinatal outcome in isolated oligohydramnios pregnancies. So, we recommend that proper antenatal monitoring and management should be done in these high risk patients in order to reduce the morbidity and mortality of the fetus.

REFERENCES

1. Naveiro-Fuentes M, Puertas Prieto A, Ruiz RS, Carrillo Badillo MP, Ventoso FM, Gallo Vallejo JL. Perinatal outcomes with isolated oligohydramnios at term pregnancy. J Perinat Med. 2016;44(7):793-8.
2. Choi SR. Borderline amniotic fluid index and perinatal outcomes in the uncomplicated term pregnancy. J Matern Fetal Neonatal Med. 2016;29(3):457- 60.
3. Shrem G, Nagawkar SS, Hallak M, Walfisch A. Isolated Oligohydramnios at Term as an Indication for Labor Induction: A Systematic Review and Meta-Analysis. Fetal Diagn Ther. 2016;40(3):161-73.
4. Figueroa L, McClure EM, Swanson J, Nathan R, Garces AL, Moore JL, et al. Oligohydramnios: a prospective study of fetal, neonatal and maternal outcomes in low-middle income countries. Reprod Health. 2020;17(1):19.
5. Sahin E, Madendag Y, Tayyar AT, Sahin ME, Col Madendag I, Acmaz G, et al. Perinatal outcomes in uncomplicated late preterm pregnancies with borderline oligohydramnios. J Matern Fetal Neonatal Med. 2018;31(23):3085-8.
6. Amir F, Ara G, Basharat A, Amir S. Fetomaternal Outcome In Women With Oligohydramnios Induced With Misoprostol. J Ayub Med Coll Abbottabad. 2019;31(3):407-10.
7. Karahanoglu E, Akpinar F, Demirdag E, Yerebasmaz N, Ensari T, Akyol A, et al. Obstetric outcomes of isolated oligohydramnios during early-term, full- term and late-term periods and determination of optimal timing of delivery. J Obstet Gynaecol Res. 2016;42(9):1119-24.

8. Elsandabesee D, Majumdar S, Sinha S. Obstetricians' attitude towards 'isolated oligohydramnios at term. J Obstet Gynaecol 2007;27:574-576.
9. Krishna J, Nisha S, Sachin P. Maternal and fetal outcome in oligohydramnios- Study of 100 cases. Int J Med Sc Public Health. 3. 724.
10. Satyaprabha S, Vivekanand A, Sarojini A, Sethi P. The role of amino acid infusion in isolated Oligohydramnios. Perspec Med Res. 2015;3:1-5.
11. Roberts D, Vause S, Martin W, Green P, Walkinshaw S, Bricker L, et al. Williamson P. Amnioinfusion in very early preterm prelabor rupture of membranes (AMIPROM): pregnancy, neonatal and maternal outcomes in a randomized controlled pilot study. Ultrasound Obstet Gynecol. 2014;43(5):490-9.
12. Sari AE, Tanziha I. Effect of Water Intake on Sprague-Dawley Rat Off Spring's Linear Growth. Pak J Nutr. 2015 Jul 1;14(7):436.
13. Nicksa GA, David CY, Kalish BT, Klein JD, Turner CG, Zurakowski D, et al. Serial amnioinfusions prevent fetal pulmonary hypoplasia in a large animal model of oligohydramnios. J Pediatr Surg. 2011;46(1):67-71.
14. Kahkhaie KR, Keikha F, Keikhaie KR, Abdollahimohammad A, Salehin S. Perinatal Outcome After Diagnosis of Oligohydramnious at term. Iran Red Crescent Med J.2014 May; 16(5): e11772.
15. Siraj A, Baqai S, Naseer S, Raja A. The effect of oligohydramnios on perinatal outcome. Pak Armed Forces Med J 2016; 66(3):333-36.
16. Pritchard JA. Fetal swallowing and amniotic fluid volume. Obstet Gynecol 1996;28: 606.
17. Boddy K, Dawes GS: Fetal breathing. Br Med Bull 1975;31: 3.
18. Duenhoelter JH, Pritchard JA. Fetal respiration: Quantitative measurements of amniotic fluid inspired near term by human and rhesus fetuses. Am J Obstet Gynecol 1976;125: 306.
19. Leontic EA, Schruefer JJ, Andreassen B et al. Further evidence for the role of prolactin on human fetoplacental osmoregulation. Am J Obstet Gynecol 1979;133: 435.
20. Hebertson RM, Hammond ME, Bryson MJ. Amniotic epithelial ultrastructure in normal, polyhydramnic, and oligohydramnic pregnancies. Obstet Gynecol 1986;68: 74.