

Fetomaternal Outcomes of Borderline Oligohydramnios during the Third Trimester at a Specialized Medical Facility

Mussarat Sultana¹, Asma Batool², Zaiba Sher³, Rakhshanda Hanfi¹, Sadia Kashif¹,
Hina Haroon¹

Department of Obs/ Gynae, NESCOM Hospital¹, Specialist Care Hospital², PAEC Hospital³, Islamabad.

Abstract

Background: Adequate amniotic fluid is vital for fetal growth, with reduced levels, especially borderline oligohydramnios posing potential risks despite often being asymptomatic. Borderline oligohydramnios, defined as an AFI of 5.1–8 cm, lacks clear management guidelines and is frequently idiopathic.

Objective: To study maternal morbidity in the form of operative delivery & fetal morbidity in terms of APGAR score at 5 min, birth weight of neonate, admission in NICU, in patients with borderline oligohydramnios.

Study type, settings & duration: This descriptive study was done at Islamabad Medical Complex Hospital, Islamabad from August 2021 to July 2022.

Methodology: A total of 551 Patients delivered in obstetrical unit during the study period were included in this study detailed history and examination were done. All standardized investigations were performed. Borderline oligohydramnios was confirmed by measuring AFI (amniotic fluid index) by radiologist.

Results: Out of total 551 cases incidence of borderline oligohydramnios was 121 (22%). Mean maternal age borderline oligohydramnios was 29.65 years and average gestational age was 33.45 weeks. The most common cause of oligohydramnios was idiopathic 50 (45.5%) patients, followed by anaemia 48 (43.6%) patients. Operative morbidity was significant 80 (80.9%) patients delivered by lower segment caesarean section. Borderline oligohydramnios was associated with low birth weight and extremely low birth weight in 49 (44.5%) patients and 2 (1.8%) cases respectively. Low APGAR at 5 minutes was in 15 (13.6%) patients and 34 (30.9%) had admission in NICU. No significant difference was found between mode of delivery and gestational age of the patient (p -value is 0.660).

Conclusion: Oligohydramnios is quite common in our population. Timely detection and appropriate management can decrease maternal and perinatal morbidity.

Key words: Borderline AFI, mode of delivery, NICU admission, APGAR score, birth weight.

Introduction

A sufficient quantity of amniotic fluid is crucial for normal fetal development and growth.¹ Decreased amount of liquor (Oligohydramnios) is identified by lower than expected amniotic fluid volume below the expected minimum for the

corresponding gestational age. It can have various causes and complications, affecting both the mother and the fetus. The amniotic fluid index (AFI) serves as a method to evaluate amniotic fluid volume. It involves summing the depths, measured in centimeters, of the largest vertical pocket in each of the four equal uterine quadrants. Oligohydramnios is defined by an Amniotic Fluid Index (AFI) of ≤ 5 cm. An AFI ranging from 5.1 to 8 cm is classified as borderline oligohydramnios. In analysis done by a recent study,² the incidence of oligohydramnios detected in last trimester ultrasound was 0.7%. The prevalence of this condition varied among different regions. It is minimum in Zambia 0.2% to maximum in Pakistan 1.5%. Another study reported prevalence rates ranging from 4% to 23% in Africa.³

Its causes include pregnancy induced hypertension, placental insufficiency, ruptured membranes, fetal renal anomalies and postdate pregnancy. Most cases of borderline

Corresponding Author:

Asma Batool

Department of Obs/ Gynae, Specialist Care Hospital
Islamabad.

Email: drasmafaisal@yahoo.com

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Authors Contribution

MS conceptualized the project. MS & HH did the data collection. MS, AB, ZS & RH did the literature search. MS & AB also performed the statistical analysis. Drafting, revision & writing of manuscript were done by MS, AB, ZS, RH & SK.

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oligohydramnios are idiopathic.⁴ Patients with Oligohydramnios can have increased risk of operative delivery and serious fetal problems like growth restriction,⁵ limb deformities, lung problems, infections, cord compression, still birth or neonatal death. The management and prognosis depend upon cause and gestational age of the patient.

Borderline oligohydramnios has emerged as a grey area in obstetrics. The condition usually goes unnoticed as it is idiopathic in majority of the cases & does not produce obvious maternal symptoms as seen in cases of oligohydramnios. However, it is associated with increased maternal morbidity in the form of operative delivery and fetal morbidity in terms of hypoxic stress (Low APGAR score at 5 minutes, low birth weight and admission in NICU). There are still no clear clinical guidelines for management of borderline oligohydramnios. This study aims to bridge the gap in existing literature and provide the evidence to guide clinical decision making.

The objective of the present study is to assess the frequency of borderline oligohydramnios and maternal morbidity in the form of operative abdominal delivery and fetal outcome in borderline oligohydramnios. Fetal outcome is measured in terms of 5 min APGAR score, birth weight and admission in NICU. As all these parameters are necessary to measure to access hypoxic stress and predict future health of the neonate.

Methodology

This descriptive study was conducted in Islamabad Medical Complex Hospital, Islamabad, Pakistan. This study was conducted in one year from August 2021 to July 2022. A total of 551 patients in their third trimester were considered and followed up for borderline oligohydramnios. Antenatal patients with singleton pregnancy in their last trimester with borderline oligohydramnios and intact amniotic membranes were included. Antenatal patients with recognized medical conditions such as heart diseases, pre-eclampsia, premature rupture of amniotic sac, polyhydramnios, multiple pregnancies, and anomalous fetuses were excluded from the study.

A detailed history and examination were performed. Borderline oligohydramnios was confirmed by the ultrasound assessment of the amniotic fluid in four quadrants conducted by a radiologist with a curvilinear probe of 7 MHz. Traditional treatment comprising rest in the lateral position, and both oral and intravenous hydration, was administered. Fetal surveillance was done by USG. Patients were monitored on a weekly basis

until delivery, with the mode of delivery and perinatal outcomes recorded on a standardized Performa. Neonatal outcomes were accessed by APGAR score at 5 minutes by a doctor attending the neonate, birth weight of the neonate and admission to neonatal intensive care unit. Maternal outcomes were measured by mode of delivery (vaginal delivery or lower segment caesarean section). Risk factors for borderline oligohydramnios were also recorded.

Statistical analysis was done on SPSS 22. Frequencies and percentage were calculated for categorical variables. Corelation of gestational age in weeks with mode of delivery in borderline oligohydramnios was also assessed. A p value <0.05 was considered significant.

The ethical approval was obtained from the Ethical Committee of Islamabad Medical Complex - NESCOM, Islamabad vide letter no. NESCOM-44(33)/2021-IMC.

Results

Out of total number of 551 enrolled participants, borderline oligohydramnios was found in 121 (22%) with 11 patients lost to follow up, leaving 110 patients to be included in final analysis. The participants mean age was 29.65 years. The minimum age was 19 years and maximum age of participants was 40 years. Primigravida were 45 (40.9%), multipara was 65 (58.9%). The minimum gestational age was 28 weeks, and maximum was 38 weeks with an average of 33.45 weeks. So majority was delivered pre-term.

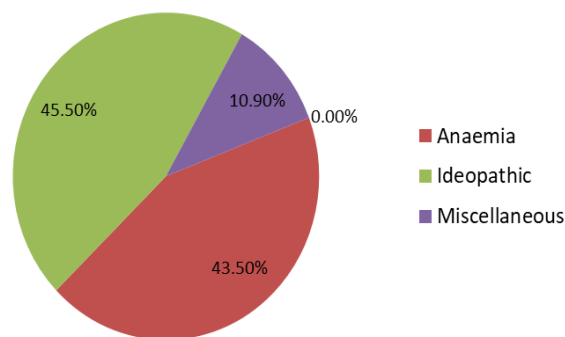


Figure: Risk factors of borderline oligohydramnios.

Figure showed that majority of the cases were idiopathic followed by association with maternal anaemia and 10.9% cases with Pregnancy induced hypertension, Intrahepatic obstetrical cholestasis that developed after enrolment.

As regard to mode of delivery 80.9% of our patients delivered by abdominal route and only

19.1% delivered by vaginal route as shown in Table-1. Regarding APGAR score, 13.6% neonates had APGAR score less than 7 at 5 min. Neonatal intensive care admission needed in 30.9% neonates.

Table 1: Mode of delivery, APGAR score and admission in NICU.

Variable	Categories	Frequency	Percentage
Mode of delivery	SVD	21	19.1
	LSCS	89	80.9
APGAR at 5 min	<7	15	13.6
	>7	95	76.4
NICU admission	No	76	69.1
	Yes	34	30.9

NICU=neonatal intensive care unit, LSCS=lower segment cesarean section, SVD=spontaneous vertex delivery.

Table-2 reveals the frequency of low-birth-weight neonates. Extremely low birth weight was 1.8% of neonates while 44.5% fell into the category of low birth weight.

Table 2: Birth weight of the neonates.

Variable	Categories	Frequency	Percentage
Birth weight	Less than 1 kg	2	1.8
	1.1-2.5 kg	49	44.5
	2.6-3.5 kg	59	53.6
	3.5-4.5kg	nil	Nil

Correlation explained in Table-3 shows no significant difference in mode of delivery in borderline oligohydramnios at different gestational age (*p* value is 0.660).

Table 3: Correlation of gestational age in weeks with mode of delivery in borderline oligohydramnios.

Gestational age in weeks	Mode of Delivery		Total	<i>p</i> -value
	SVD	LSCS		
Less than 34	14	46	60	0.660
34-36+6 weeks	8	33	41	
Term	3	6	9	
Total	25	85	110	

Discussion

In the present study the mean maternal age & gestational age was observed in 29.65 years and 33.45 weeks respectively. Borderline oligohydramnios was observed in 22% patients. The most frequent etiology was idiopathic 45.5% followed by maternal anaemia in 43.6% patients. Operative morbidity was observed in 80.9% indicating increased burden on obstetric unit. It is also associated with increased perinatal morbidity

with extremely low birth weight in 1.8% and low birth weight in 44.5% neonates. Admission in neonatal unit accounts for 35% neonates and low APGAR score at 5 minutes was found in 15% neonates.

The present study observation of borderline oligohydramnios in about every 5th woman in third trimester is strengthened by findings from a study conducted in India (17%) and South Africa (23%).^{6,7} Both are low resource countries and has nutritional deficiencies. However, it notably surpasses the prevalence reported in China (4.4%)⁸ and Italy (11%).⁹ The divergence in prevalence estimates compared to present study may stem from good nutritional status in these countries and methodological disparities among various studies. For instance, the study conducted in China utilized secondary data extracted from individual medical records, while the present study predominantly relied on primary data to determine the absence or presence of borderline oligohydramnios.

Idiopathic oligohydramnios was found to be the most common cause 45.5% patients. This finding is supported by the study done by Barhava.¹⁰ Oligohydramnios was associated with anaemia in about 40% patients. The author failed to find any study in literature who studied association of anaemia with borderline oligohydramnios.

In the present study 81% patients delivered by lower segment caesarean section and only 19.1% delivered by vaginal delivery contrary to the study done in Sir Gangaram hospital,¹¹ Manzanares et al¹² study showed 32% by caesarean section and 68% by vaginal delivery respectively. Their included only term pregnancies in their study as contrary to present study in which all patients with borderline oligohydramnios were included in third trimester (from 28 weeks of gestation onwards). High lower segment caesarean section rate in the present study can be explained by the fact that we being low resource country was doing lower segment caesarean section on cardio toco graphic findings, not on scalp blood sampling even on term fetuses. If the fetal monitoring can be done by scalp blood sampling this high rate may be decreased. Our results are comparable to a study done by Vyas,¹³ Knoun JW¹⁴ and Chaudhari KR¹⁵ which showed quite higher lower segment caesarean section rate.

APGAR score that is <7 at 5 minutes was observed in 13.6% neonates in the present study. A study done in Lahore¹⁶ (Pakistan) observed, low APGAR score in 23% neonates but they measured not <7 but <10 at 5 min. So this may be the reason for a bit higher rate in their study.

Admission to neonatal intensive care unit is observed in 30.9% neonates in the present study. Our admissions were twice as compared to a study

done by Asgharnia M¹⁷ 14.9% and Shamim Ali¹⁸ 18%. The observed difference can be explained by larger percentage of women delivered by LSCs in the present study, that lead to transient tachypnea of newborn and so leading to neonatal admission to neonatal intensive care unit.

Borderline oligohydramnios is associated with low birth weight as supported by other studies,¹⁹ Contrary to the present finding, another study conducted in India by Mathuriya G,²⁰ they found that 18% of the neonates were low birth weight. This difference was due to difference in methodology. They only included term pregnancies while present study was conducted on all deliveries in 3rd trimester. This explains the high rate of low birth weight in the present study.

Limitations of present study include the fact that this study was conducted at a single centre in an urban area. As a result, the generalizability of our findings may be limited to similar urban areas in Pakistan. To generalize the results, larger sample sizes and multicentre research are warranted.

The borderline oligohydramnios was found to be relatively common. It was also associated with increased operative delivery, and notable neonatal complications such as low birth weight, reduced APGAR scores at five minutes and NICU admissions. These findings emphasize the importance of early detection and comprehensive antenatal and intrapartum care to reduce complications and lessen the burden on the healthcare system. However, further research is needed to further explore the problem and to find a solution.

Conflict of interest: None declared.

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