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FETAL OUTCOME IN UNEXPLAINED OLIGOHYDRAMNIOS

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Abstract

Objective: *To assess fetal outcomes in unexplained oligohydramnios, including low APGAR scores, low birth weight, and NICU admissions.*

Study Design: *Descriptive observational study.*

Duration & place of study: *Obstetrics & Gynecology department of Hameed Latif Hospital Lahore, Pakistan, from 06/08/ 2024 to 06/02/2025.*

Methodology: *Ninety pregnant women with diagnosis of oligohydramnios were enrolled and data regarding maternal demographics age, parity, gestational age, and neonatal status (APGAR score at five minutes, birth weight, and neonatal intensive care unit admission) were recorded. Statistical analysis was conducted with SPSS 25 employing the chi-square test, where a p-value of less than 0.05 was taken as significant.*

Results: *Neonates born to 90 pregnant women with diagnosis of oligohyramnios were assessed. Among these neonates, 18 (20%) had an APGAR score below 7 at 5 minutes, 31% had a low birth weight (less than 2.5 kg), and 15% required admission to the NICU. Although younger mothers seemed to have more babies with low APGAR scores but the difference across age groups did not achieve statistical significance (p=0.047).*

Conclusion: *Unexplained oligohydramnios is associated with increased risks of low APGAR scores, low birth weight, and NICU admission. Early detection and timely intervention can significantly improve fetal outcomes.*

INTRODUCTION

The primary goal of modern obstetrics is to ensure maternal and fetal wellbeing by identifying and managing risk factors that contribute to adverse outcomes. Amniotic fluid plays a vital role in fetal protection, development and homeostasis.[1] Its composition and volume evolve with gestational age increasing from about 200 mL at 16 weeks to 1000 mL at 28 weeks before decreasing slightly near term.[2]

Amniotic fluid abnormalities like oligohydramnios which is defined as amniotic fluid index (AFI)≤ 5 cm) can result from maternal conditions such as hypertension, preeclampsia or ruptured membranes or may occur without an identifiable cause referred to as unexplained oligohydramnios.[3] It has been reported in 0.5–5% of term pregnancies globally, while local studies in Pakistan estimate its prevalence between 3% and 8%.[2,4]

Ultrasonography is the standard, non-invasive tool for assessing amniotic fluid volume with AFI being a key metric to predict fetal wellbeing.[5] Several studies have shown the association of reduced AFI with poor fetal outcomes like in a study conducted by Bansal et al. on pregnant women with oligohydramnios, 65.6% women

needed cesarean section and 31.1% women drained meconium-stained liquor manifesting fetal distress due to reduced liquor.[6] In another study on pregnant women with oligohydramnios it was found that 42.67% of neonates born required NICU admission while 24.67% of neonates had an APGAR score <7 at 5 minutes and 58.67% were low birth weight.[7] In a local study conducted in Nawabshah, in women with unexplained oligohydramnios, low birth weight was observed in 34.15% of neonates, NICU admission in 30.5%, birth asphyxia in 27.44%, respiratory distress syndrome in 12.8%, APGAR score <7 at 1 and 5 minutes in 43.35% and 23.2% respectively and perinatal mortality in 4%.[8]

Therefore, this study aims to evaluate fetal outcomes in pregnancies complicated by unexplained oligohydramnios as AFI measurement is most feasible in low resource settings. This will provide evidence to guide appropriate management strategies and reduce perinatal morbidity and mortality through early AFI monitoring.

METHODOLOGY

This was a descriptive observational (cross sectional) study conducted in the department of Obstetrics & Gynecology at Hameed Latif Hospital Lahore with approval of Institutional Review Board (HLH/ADM/IRB/2025-007) over a period of six months from 06/08/2024 to 06/02/2025.

Inclusion criteria: Women were included if they had a singleton pregnancy, an AFI of ≤5 cm, between 28 and 36 weeks of gestation (as per last menstrual period), and intact membranes, with no known maternal or fetal causes for oligohydramnios. Women with age between 18 to 40 years were included.

Exclusion criteria: Patients with any complications like maternal medical diseases (e.g., hypertension, preeclampsia, systemic lupus erythematosus (SLE), antiphospholipid antibody syndrome, chronic renal disease), pre-labor rupture of membranes, known fetal anomalies, fetal growth restriction documented at 28 weeks or later, or multiple gestations were excluded from study.

The sample size was calculated using the WHO Sample Size Calculator Version 2.0. Using a 95% confidence level (Z = 1.96), an anticipated prevalence (P) of 24.67% for adverse fetal outcome (low Apgar score at 5 minutes) based on previous literature[7], and an absolute precision (d) of 9%, the calculated sample size was 89 rounding off to final sample size of **90**.

Sampling was done using consecutive non-probability sampling, where all eligible women presenting with unexplained oligohydramnios during the study period were included until the required sample size was achieved. Informed written consent was obtained and AFI was measured with the Phelan method, which involves measuring the deepest vertical pocket of fluid in all four uterine quadrants (delineated by linea nigra with a transverse line at the umbilicus) taking an AFI ≤5 cm as oligohydramnios.

Demographic details like age, parity and gestational age were recorded on a structured proforma. Neonatal outcomes including five-minute APGAR scores (<7 considered low), neonatal weight at birth (less than 2.5 kg considered low), the need for neonatal intensive care unit admissions were also recorded. All participants received standard care as per hospital protocol.

Data were entered and analyzed using IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Quantitative variables like maternal age, gestational age was calculated as means and standard deviations (SD). Qualitative variables including low APGAR score, low birth weight and NICU admissions and parity were described as frequencies and percentages.

The dataset was subsequently stratified by maternal age, and gestational age to investigate the potential associations between these stratifying variables and the neonatal outcomes. Chi square test was applied taking p-value of <0.05 as significant statically.

RESULTS

A total of 90 women with unexplained oligohydramnios were included in the study. Among the neonates born 20% had a low Apgar score (<7 at 5 minutes), 31.1% had a birth weight less than 2.5 kg and 15.6% required admission to the neonatal intensive care unit (NICU). Figure I

In this study, 50 (56%) were primiparous while 40 (44%) were multiparous and the mean maternal age was 29.3±4.1 years. The mean gestational age was 33.2±2.3 gestational weeks. Table-I

Table-I: Baseline Maternal and Obstetric Characteristics (n = 90)

Maternal Characteristics	Mean±Standard Deviation (SD)	n (%)
Age in years	29.3 ± 4.1	
Parity		
Primiparous (Para 1)		50 (56%)
Multiparous (Para 2+)		40(44%)
Gestational Age (weeks)	33.2 ± 2.3	

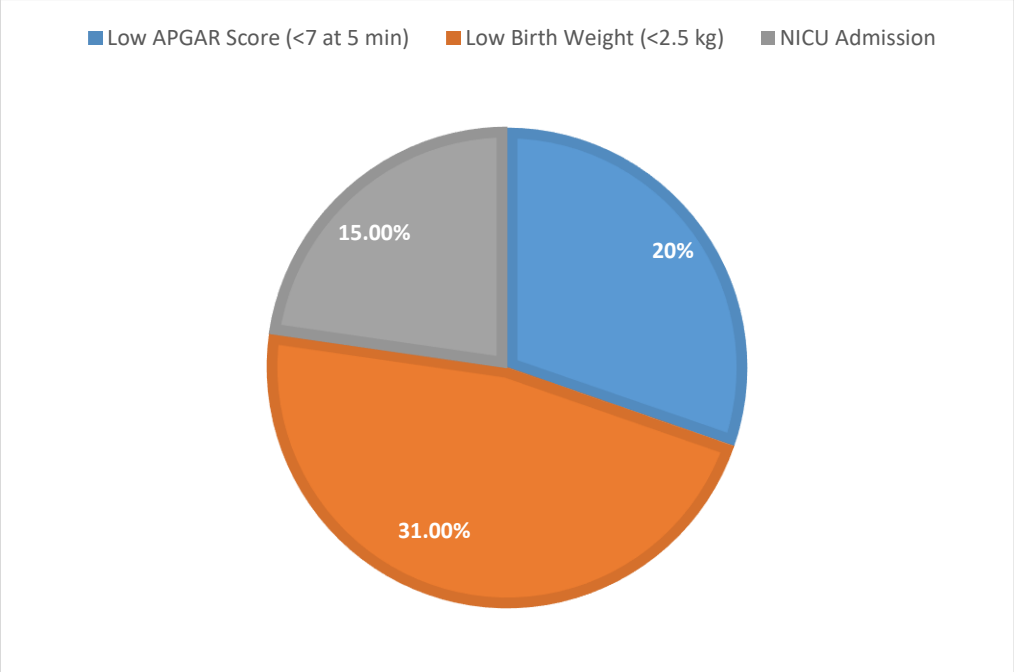

Figure 1. Frequency of adverse fetal outcomes among study neonates (n=90)

When stratified by maternal age, a statistically significant association was observed between age and low Apgar scores at 5 minutes (p = 0.047). Neonates born to mothers aged ≤25 years had a higher proportion of low Apgar scores (33.3%) compared to those aged 26–30 years (20.6%) and >30 years (6.9%). In contrast, when stratified by gestational age, no statistically significant association was found (p = 0.725), although a higher percentage of low Apgar scores was noted among neonates born between 28 and 32.6 weeks (25%) compared to those born between 33–34.6 weeks (18.2%) and 35–36 weeks (17.2%). Table-II

Table-II: Association of Low APGAR Score at 5 minutes (<7) by Maternal Age and Gestational age (n = 90)

Parameter	Study Groups	Low APGAR Score <7 n (%)	Normal APGAR Score ≥7 n (%)	P-value
Maternal Age (years)	≤ 25	9 (33.3%)	18 (66.7%)	0.047
	26–30	7 (20.6%)	27 (79.4%)	
	> 30	2 (6.9%)	27 (93.1%)	
Gestational Age (weeks)	28–32.6	7 (25.0%)	21 (75.0%)	0.725
	33–34.6	6 (18.2%)	27 (81.8%)	
	35–36	5 (17.2%)	24 (82.8%)	

DISCUSSION

Unexplained oligohydramnios is frequently linked with adverse fetal outcomes and our findings are consistent with this. In the present study, 20% of neonates had an APGAR score <7 at 5 minutes, 31.1% had a birth weight <2.5 kg, and 15.6% required admission to the neonatal intensive care unit (NICU). These results are supported by Amani D et al. who reported that 24.67% of neonates had APGAR scores <7 at 5 minutes, 58.67% were low birth weight and 42.67% required NICU admission.[7] Similarly, another study found a high cesarean section rate (65.6%) and meconium-stained liquor in 31.1% of cases, reinforcing the association between reduced AFI and poor perinatal outcomes.[8]

The mean maternal age in our study was 28.1 ± 3.5 years slightly higher than those reported by Ahmar R et al. (26.1 years)[9] and Talesara H et al. where maximum number of women were between age 20 -25 years.[10] This variation may reflect demographic differences, trends of delayed childbearing or better prenatal awareness in slightly older women, potentially contributing to improved outcomes.

Primigravidas accounted for 56% of our cohort aligning with Reddy MD et al. (61.1%), Jeyamani B et al. (60%), and Sreelakshmi U et al. (73%), suggesting a greater vulnerability in first pregnancies due to less adapted uteroplacental circulation.[11,12,13]

Regarding APGAR scores, our findings of 20% with scores <7 at 5 minutes are comparable to Ibrahim HA et al. (24.7%), and Reddy MD et al. (17%).[14,11] Markam T et al. reported an even higher rate of 38%.[15] These outcomes highlight the importance of close fetal monitoring. Tamber KK et al. advocated for enhanced fetal surveillance e.g., non-stress tests and Doppler studies which significantly reduced neonatal morbidity.[16]

Nearly 70% of neonates in our study had a birth weight >2.5 kg which aligns with Thorat SN et al.[17] and Ravi S et al.[5] yet contrasts with Sharma M et al. who reported that 75% of neonates had a birth weight <2 kg.[18] Ibrahim HA et al. found 21.3% of neonates <2.5 kg,[14] indicating variations possibly due to differences in monitoring or timing of delivery.

NICU admission rates in our study (15.6%) were lower than those reported by Nagar N et al. (32.6%)[19] and slightly higher than Jeyamani B et al. (11%).[12] Variability in NICU admission thresholds and institutional resources may explain these differences. Administration of antenatal corticosteroids as recommended by Berger R[20] and Cutland CL et al.[21] may reduce respiratory complications and NICU admissions in anticipated early deliveries.

These collective findings along with evidence from both international and local studies reinforce the importance of early detection and vigilant monitoring of unexplained oligohydramnios. AFI remains a valuable, non-invasive screening tool especially in resource

constrained settings. Timely interventions such as corticosteroids and planned delivery can substantially reduce neonatal morbidity and improve outcomes.

CONCLUSION

This study demonstrated that unexplained oligohydramnios in late pregnancy is associated with increased risk of low Apgar scores, low birth weight, and NICU admissions. These findings highlight the importance of early detection through routine ultrasound monitoring and timely intervention to improve neonatal outcomes in such high risk pregnancies.

LIMITATIONS OF STUDY

This study is conducted in one center only which may limit the generalizability of its findings and the lack of a control group prevents direct comparisons with pregnancies unaffected by oligohydramnios. Also, the study focuses on immediate neonatal outcomes so long term consequences of unexplained oligohydramnios are not captured.

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CONFLICT OF INTEREST

None

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AUTHORS CONTRIBUTION

1,2: Conception, study design, drafting the manuscript, approval of final version to be published.

3,4: Acquisition of data, article writing, data analysis & interpretation analysis, critical review & proofreading.

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