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Risk Factors and Fetomaternal Outcomes of Oligohydramnios in Term Pregnancy

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ABSTRACT

Background: Oligohydramnios at term is associated with increased maternal and neonatal risk. There is a need for characterization of contributing maternal conditions and fetomaternal outcomes for proper management, especially where resources are limited. **Objective:** To determine the frequency of maternal factors and fetomaternal outcomes associated with oligohydramnios in term pregnancy. **Study Design:** Descriptive cross-sectional study. **Duration and Place of Study:** The study was conducted from April to September 2024 at the Department of Obstetrics and Gynecology, Hayatabad Medical Complex, Peshawar. **Methodology:** A total of 104 pregnant women aged 18–40 years, diagnosed with oligohydramnios at term (AFI ≤5 cm), were enrolled using non-probability consecutive sampling. Patients with rupture of membranes, fetal anomalies, hypertension, or renal disease were excluded. Maternal factors such as malaria, anemia, primigravida status, and hypertension were recorded. Pregnancy outcomes included emergency cesarean section, low birth weight, low Apgar score, and neonatal death. **Results:** The mean maternal age was 29.70 ± 6.72 years and mean gestational age was 38.88 ± 1.46 weeks. Anemia was present in 43 (41.3%) patients, primigravida status in 37 (35.6%), hypertension in 17 (16.3%), and malaria in 4 (3.8%) cases. Emergency cesarean section was performed in 57 (54.8%) women, low birth weight was recorded in 22 (21.2%) neonates, low Apgar scores (≤7 at 5 minutes) were observed in 24 (23.1%) newborns, and neonatal death occurred in 5 (4.8%) cases. **Conclusion:** Anemia, primigravida status, and hypertension were the most commonly observed maternal factors among women with oligohydramnios at term.

INTRODUCTION

Oligohydramnios describes the condition whereby the amount of amniotic fluid has decreased, typically defined by the finding of amniotic fluid index of less than 5 cm or the depth of the largest single deepest pocket of less than 2 cm.[1] It usually happens during the third trimester and of significant worry if it occurs at term since amniotic fluid greatly influences the growth of the fetus, as it cushions, allows it to move freely, and promotes the development of the lungs.[2] Oligohydramnios can occur due to different causative factors in the mother, the fetus, as well as the placenta, and often necessitates accurate monitoring and early intervention to prevent undesirable results.[3]

Numerous risk factors contribute to the development of oligohydramnios among term pregnancies.[4] Maternal anemia and malaria, pervasive among resource-poor groups, are significant contributors, most likely due to their association with placental insufficiency and fetal growth restriction. Primigravidae, women in their first pregnancy, may also be at risk, potentially through undetected hypertensive disorders or a lack of antenatal care.[5] Chronic as well as gestational hypertension continues to be a significant risk factor, often through accompanying uteroplacental perfusion impairment resulting in lowered fetal urine output, the predominant amniotic fluid component in the later part of gestation.[6]

Term fetomaternal outcomes of oligohydramnios are extremely adverse, leading to an immensely high risk of urgent cesarean section.[7] The reduced quantity of amniotic fluid can result in umbilical cord compression during the period of labor, hence leading to non-reassuring patterns of fetal monitoring and the necessity for immediate delivery in order to prevent fetal compromise.[8] Besides, the pathological intrauterine milieu can result in meconium-stained liquor and increased risk of meconium aspiration syndrome, complicating labor and delivery further.

Neonatal outcomes are no less bleak in term oligohydramnios.[9] Neonates born of such pregnancies are at higher risk of low birth weight, a finding parallel to the resultant intrauterine growth retardation due to the attendant chronic placental insufficiency.[10] Depressed Apgar at one as well as five minutes also more commonly occur, hinting at the presence of depressed neonatal adaptation.[11] In extreme cases, especially with the

combination of delayed intervention, neonatal loss can occur.[12] Early recognition, astute monitoring, and expedient delivery make up the preferred modalities of prevention of these complications as well as improvement of fetomaternal outcomes in affected pregnancies.[13]

A study conducted by Twesigomwe G. et al. reported that among patients with oligohydramnios at term, the frequency of malaria was 31.6%, anemia 40%, primigravidity 15.2%, and hypertension 10.9%.[14] Similarly, Bashir S. et al. found that in term pregnancies complicated by oligohydramnios, emergency cesarean section occurred in 61% of cases, low birth weight in 22%, low Apgar scores in 21%, and neonatal death in 12.3% of neonates.[15]

Oligohydramnios is associated with high maternal and neonatal morbidities, but its risk factors and its outcomes still have not been sufficiently studied in the Peshawar region. There is room for concern regarding localized risk factors for oligohydramnios due to the region-specific difference between antenatal facilities, nutrition, and conditions such as anemia and infection. There is a need for an urgent study of the region-specific risk factors for oligohydramnios for better management strategies to reduce fetomaternal morbidity and mortality. It is only through its study that modifiable risk factors might have been identified for better management strategies.

METHODOLOGY

This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology at Hayatabad Medical Complex, Peshawar, over a six-month period from April to September 2024. A total of 104 pregnant women diagnosed with oligohydramnios at term were enrolled. The sample size was calculated using WHO software, assuming a 95% confidence level, 6% margin of error, and an anticipated frequency of hypertension in such cases at 10.9%.[14]

Participants were selected through non-probability consecutive sampling. Women aged 18 to 40 years with a singleton pregnancy of more than 36 weeks gestation, based on last menstrual period, were included if ultrasound confirmed an amniotic fluid index of 5.0 cm or less. Patients were excluded if they had a history of ruptured membranes, diagnosed fetal anomalies, placental abruption, gestational hypertension, or chronic renal disorders.

After obtaining informed consent, detailed demographic and clinical information was gathered. The study assessed several maternal conditions potentially contributing to oligohydramnios. Malaria was identified in women presenting with fever above 100°F accompanied by chills and confirmed by a Giemsa-stained peripheral smear showing intraerythrocytic parasites. Anemia was defined as hemoglobin concentration below 10 g/dL on laboratory testing. A woman pregnant for the first time was classified as primigravida. Hypertension was recorded if the woman had a systolic blood pressure of 140 mmHg or higher, diastolic pressure of 90 mmHg or more, or reported use of antihypertensive medication within the past six months.

All patients were monitored until delivery, and pregnancy outcomes were documented. Cesarean sections were considered emergency procedures if unplanned and performed during labor due to fetal or maternal indications. Birth weight was measured immediately after delivery using a standard newborn scale, and a weight below 2,500 grams was recorded as low birth weight. Apgar scores were assessed five minutes post-delivery, with scores of 7 or less marked as low. Neonatal death was recorded when the newborn exhibited no signs of life, including respiration or heartbeat, within 48 hours of birth.

Data analysis was carried out using IBM SPSS version 26. Categorical variables such as maternal conditions and neonatal outcomes were summarized as frequencies and percentages. Continuous variables were expressed as means with standard deviations. Stratification was performed based on relevant demographic characteristics, and the chi-square test was applied for comparison. A p-value of ≤0.05 was considered statistically significant.

RESULTS

The study examined 104 pregnant women with oligohydramnios at term, with a mean age of 29.70±6.72 years and gestational age of 38.88±1.46 weeks. The participants had a mean BMI of 25.36±2.59 kg/m^2 and parity of 1.89±1.71. Regarding socioeconomic distribution, 38 (36.5%) were classified as poor, 50 (48.1%) as middle class, and 16 (15.4%) as rich, while 30 (28.8%) resided in rural areas and 74 (71.2%) in urban areas (as shown in Table-I).

Table I

Patient Demographics

Demographics		Mean ± SD
Age (years)		29.70±6.72
Gestational age (weeks)		38.88±1.46
BMI (kg/m^2)		25.36±2.59
Parity		1.89±1.71
Socioeconomic Status	Poor n (%)	38 (36.5%)
	Middle n (%)	50 (48.1%)
	Rich n (%)	16 (15.4%)
Residential Status	Rural n (%)	30 (28.8%)
	Urban n (%)	74 (71.2%)

The prevalence of risk factors revealed that malaria affected 4 (3.80%) patients, anemia was present in 43 (41.30%) cases, primigravida status was observed in 37 (35.60%) participants, and hypertension occurred in 17 (16.30%) patients. Fetomaternal outcomes demonstrated that emergency cesarean section was performed in 57 (54.80%) cases, low birth weight occurred in 22 (21.20%) neonates, low Apgar scores were recorded in 24 (23.10%) newborns, and neonatal death occurred in 5 (4.80%) cases (as shown in Table-II).

Table II

Frequency of Risk factors and Fetomaternal outcomes of oligohydramnios in term pregnancy

Risk factors	Frequency	% age
Malaria		
Yes	4	3.80%
No	100	96.20%
Anemia		
Yes	43	41.30%
No	61	58.70%
Primigravida		
Yes	37	35.60%
No	67	64.40%

Hypertension		
Yes	17	16.30%
No	87	83.70%
Fetomaternal outcomes		
Emergency cesarean section		
Yes	57	54.80%
No	47	45.20%
Low birth weight		
Yes	22	21.20%
No	82	78.80%
Low Apgar score		
Yes	24	23.10%
No	80	76.90%
Neonatal death		
Yes	5	4.80%
No	99	95.20%

When stratified by maternal age, women ≤30 years (n=55) showed no cases of malaria (0.0%), while women >30 years (n=49) had 4 cases (8.2%) with statistical significance (p=0.046). Anemia prevalence was similar between age groups, affecting 24 (43.6%) younger women and 19 (38.8%) older women (p=0.615). Primigravida status demonstrated a striking difference, occurring in 30 (54.5%) women ≤30 years versus only 7 (14.3%) women >30 years (p<0.001). Hypertension was significantly more common in younger women at 13 (23.6%) compared to 4 (8.2%) in older women (p=0.037). Regarding fetomaternal outcomes by age, emergency cesarean section rates were comparable between younger and older women at 29 (52.7%) versus 28 (57.1%) respectively (p=0.652). Low birth weight was more frequent in younger mothers at 15 (27.3%) compared to 7 (14.3%) in older mothers (p=0.105). Low Apgar scores occurred in 11 (20.0%) younger women and 13 (26.5%) older women (p=0.430). Notably, all 5 neonatal deaths occurred in the younger age group (9.1% vs 0.0%, p=0.059). Gestational age stratification divided patients into ≤39 weeks (n=63) and >39 weeks (n=41) groups. Malaria prevalence was minimal in both groups with 2 (3.2%) cases in earlier gestation and 2 (4.9%) cases in later gestation (p=1.000). Anemia affected 23 (36.5%) women with earlier delivery and 20 (48.8%) with later delivery (p=0.214). Primigravida status was nearly identical between groups at 23 (36.5%) and 14 (34.1%) respectively (p=0.806). Hypertension showed a significant difference, occurring in 15 (23.8%) women delivering at ≤39 weeks versus only 2 (4.9%) delivering after 39 weeks (p=0.013). Emergency cesarean section was performed in 33 (52.4%) earlier deliveries and 24 (58.5%) later deliveries (p=0.538). Low birth weight occurred in 15 (23.8%) earlier deliveries compared to 7 (17.1%) later deliveries (p=0.411). Low Apgar scores were recorded in 17 (27.0%) earlier deliveries and 7 (17.1%) later deliveries (p=0.241). All 5 neonatal deaths occurred in the earlier gestational age group (7.9% vs 0.0%, p=0.154). Parity-based analysis compared women with parity ≤3 (n=78) against those with parity >3 (n=26). Malaria was present in 4 (5.1%) women with lower parity and absent in higher parity women (p=0.570). Anemia demonstrated a significant difference, affecting 37 (47.4%) women with parity ≤3 versus 6 (23.1%) with parity >3 (p=0.029). Primigravida status was exclusively found in the lower parity group at 37 (47.4%) compared to 0 (0.0%) in higher parity women (p<0.001). Hypertension occurred in 15 (19.2%) lower parity women and 2 (7.7%) higher parity women (p=0.228). Emergency cesarean section was performed in 41 (52.6%) lower parity women and 16 (61.5%) higher parity women (p=0.426). Low birth weight affected 18 (23.1%) lower parity women and 4 (15.4%) higher parity women (p=0.581). Low Apgar scores occurred in 17 (21.8%) lower parity women and 7 (26.9%) higher parity women (p=0.591). Neonatal death was observed only in the lower parity group at 5 (6.4%) versus 0 (0.0%) in higher parity women (p=0.328) (as shown in Table-III).

Table III

Association of Risk factors and Fetomaternal outcomes with Demographic Factors

Demographic Factors		Risk factors				Fetomaternal outcomes			
		Malaria	Anemia	Primigravida	Hypertension	Emergency cesarean section	Low birth weight	Low Apgar score	Neonatal death
Age (years)	≤30	0 (0.0%)	24 (43.6%)	30 (54.5%)	13 (23.6%)	29 (52.7%)	15 (27.3%)	11 (20.0%)	5 (9.1%)
	>30	4 (8.2%)	19 (38.8%)	7 (14.3%)	4 (8.2%)	28 (57.1%)	7 (14.3%)	13 (26.5%)	0 (0.0%)
p-value		0.046*	0.615	<0.001*	0.037*	0.652	0.105	0.430	0.059
Gestational age (weeks)	≤39	2 (3.2%)	23 (36.5%)	23 (36.5%)	15 (23.8%)	33 (52.4%)	15 (23.8%)	17 (27.0%)	5 (7.9%)
	>39	2 (4.9%)	20 (48.8%)	14 (34.1%)	2 (4.9%)	24 (58.5%)	7 (17.1%)	7 (17.1%)	0 (0.0%)
p-value		1.000	0.214	0.806	0.013*	0.538	0.411	0.241	0.154
Parity group	≤3	4 (5.1%)	37 (47.4%)	37 (47.4%)	15 (19.2%)	41 (52.6%)	18 (23.1%)	17 (21.8%)	5 (6.4%)
	>3	0 (0.0%)	6 (23.1%)	0 (0.0%)	2 (7.7%)	16 (61.5%)	4 (15.4%)	7 (26.9%)	0 (0.0%)
p-value		0.570	0.029*	<0.001*	0.228	0.426	0.581	0.591	0.328

**Statistical significance p<0.05*

DISCUSSION

Here, the research conducted attempted to look into the risk factors as well as fetomaternal outcomes of term pregnancies suffering from oligohydramnios and highlighted several associations that are worth attention clinically. From the findings, the condition is observed to

affect various people who have varied demographic characteristics, where nearly half of the patients had middle socioeconomics as well as predominantly urban areas of origin, suggesting hospital-based nature of the study as well as potential better access to healthcare among urban dwellers.

High anemia prevalence (41.30%) of our study group could be due to the increased plasma volume expansion of pregnancy that outstrips red blood cell production, as is common in developing countries where nutritional insufficiencies are pervasive. This has clinical importance because anemia of decreased oxygen-carrying capacity can cause impaired amniotic fluid production by way of compromised fetal oxygenation and compromised fetal urine output. Elevated emergency cesarean section rate (54.80%) is most likely an indicator of the clinical imperative for the diagnosis of oligohydramnios as an immediate necessity because of increased risk of cord compression, fetal distress, and labor prolongation. Age-related differences that were seen in our study indicate prominent physiological patterns. Lack of malaria among younger women (≤30 years) but 8.2% among older women can be ascribed to differences in exposure patterns, immunity competence, or healthcare-seeking strategies. High prevalence of being primigravida among younger women (54.5% vs 14.3%) is predictable based on the natural history of reproductive age and parity. High hypertension prevalence among younger women (23.6% vs 8.2%) signifies more likely pregnancy-induced hypertensive disorders than pre-existing hypertension, as younger primigravid women remain vulnerable to increased vulnerability of immologically driven as well as vascular adaptation challenges of first pregnancies.

Our study results were consistent with several established patterns in oligohydramnios research while revealing some notable variations. The mean maternal age of 29.70±6.72 years in our cohort was higher than most comparative studies, including Nagar N et al. [16] (23.27 years), Talesara H et al. [17] (26.1 years), and Sawant AA et al. [18] (25.4±4.2 years), but aligned closely with Mushtaq N et al.[19] (27.7±4.8 years), Ghani N et al.[20] (27.4±4.8 years), and Ahmed SA et al. [21] (26.9±5.1 years). This age difference may reflect varying demographic patterns and healthcare-seeking behaviors across different geographic regions and healthcare systems.

The emergency cesarean section rate of 54.80% in our study was comparable to Ghani N et al.[20] (58.6%) and Ahmed SA et al. [21] (66%), but lower than the exceptionally high rate reported by Mushtaq N et al. [19] (92.2%) and Sawant AA et al.[18] (69.1%). Conversely, our rate was higher than Nagar N et al.[16] (18.9%) and Chandrasekar S et al. [22] (52%). These variations likely reflect differences in clinical protocols, fetal monitoring capabilities, and institutional thresholds for operative intervention, with tertiary care centers potentially having more conservative approaches to allow trial of labor.

Our low birth weight prevalence of 21.20% was notably lower than most comparative studies, including Nagar N et al. [16] (83%), Talesara H et al.[17] (39%), Sawant AA et al.[18] (53.2%), Ghani N et al. [20] (40.1%), Chandrasekar S et al.[22] (34%), and Ahmed SA et al. [21] (44%). This substantial difference may be attributed to our study's exclusive focus on term pregnancies, as preterm deliveries are strongly associated with lower birth weights and several comparative studies included earlier gestational ages from 28 weeks onwards.

The low Apgar score prevalence of 23.10% in our study was higher than most comparative studies, including Nagar N et al. [16] (12.2% with Apgar <7), Ghani N et al. [20] (14.5%), Chandrasekar S et al.[22] (12%), and Ahmed SA et al. [21] (14%). This disparity might reflect differences in intrapartum monitoring, delivery room management, or scoring criteria, though it could also indicate more severe fetal compromise in our cohort despite the term gestation.

Our neonatal mortality rate of 4.80% was intermediate compared to the literature, being lower than Ahmed SA et al.[21] (8% including stillbirths and early neonatal deaths) and Talesara H et al. [17] (5%), but higher than Sawant AA et al. [18] (8.5% perinatal mortality) and Ghani N et al. [20] (5.3% combined stillbirth and early neonatal death). The mortality in Nagar N et al.[16] was notably absent, which may reflect their rural setting with different referral patterns or case severity.

The demographic risk factor profile in our study showed interesting patterns when stratified by maternal age, with younger women (≤30 years) demonstrating higher rates of primigravida status (54.5% vs 14.3%) and hypertension (23.6% vs 8.2%), while older women showed higher malaria prevalence (8.2% vs 0.0%). This age-related risk distribution differs from Sawant AA et al.[18] who found higher adverse outcomes in early-onset oligohydramnios regardless of maternal age, and Ghani N et al. [20] who reported hypertensive disorders in 30.3% overall without age stratification.

The gestational age analysis revealed that hypertension was significantly more common in deliveries at ≤39 weeks (23.8% vs 4.9%), and all neonatal deaths occurred in this earlier delivery group. This finding aligns with the observations of Sawant AA et al.[18] regarding early-onset oligohydramnios having worse outcomes, though our study was limited to term pregnancies. The association between earlier term delivery and adverse outcomes may reflect the clinical decision to deliver earlier in the presence of additional risk factors.

The overall pattern of increased operative delivery rate and neonatal morbidity for oligohydramnios pregnancies was consistent across all of these studies, supporting the conclusion of Chandrasekar S et al. [22] that isolated term oligohydramnios is an independent risk factor for adverse perinatal outcomes. However, the magnitudes of these risks varied greatly between studies, most likely due to study populations, healthcare provision, standards of diagnosis, and management approach. Solanke R et al. [23] findings also confirmed the usefulness of AFI as an independent risk predictor, primarily where advanced Doppler assessments are absent, as is the situation for resource-poor environments where most of these studies have been conducted.

However, there were also several limitations of this study. As a single-center study based within tertiary care, the findings may not generalize as readily to other populations, such as rural or resource-poor populations. It also precluded assessment of longer-term neonatal outcomes because of its cross-sectional design, and use of

self-reported history of patients for risk for some variables could potentially have introduced recall bias. Verification of these findings and more thorough assessment of causal associations is recommended to come from other multicenter, longitudinal studies.

CONCLUSION

Our study has found that term oligohydramnios has several maternal risk factors, including anemia, hypertension, and primigravidity, that significantly influence fetomaternal outcomes. These findings show that early evaluation and treatment of these risk factors can reduce the number of cases of complications such as emergency cesarean section, neonatal morbidity, and low birth weight. Attention is needed for antenatal surveillance, mainly among high-risk patients, and could ultimately achieve the best overall maternal pregnancy outcomes for those women who have oligohydramnios.

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REFERENCES

1. Khan, I. U., Aslam, N., Anis, F. M., Mirza, S., AlOwayed, A., Aljuaid, R. M., & Bakr, R. M. (2022). Amniotic fluid classification and artificial intelligence: Challenges and opportunities. *Sensors*, *22*(12), 4570. https://doi.org/10.3390/s22124570
2. Huri, M., Di Tommaso, M., & Seravalli, V. (2023). Amniotic fluid disorders: From prenatal management to neonatal outcomes. *Children*, *10*(3), 561. https://doi.org/10.3390/children10030561
3. Figueroa, L., McClure, E. M., Swanson, J., Nathan, R., Garces, A. L., Moore, J. L., Krebs, N. F., Hambidge, K. M., Bauserman, M., Lokangaka, A., Tshefu, A., Mirza, W., Saleem, S., Naqvi, F., Carlo, W. A., Chomba, E., Liechty, E. A., Esamai, F., Swanson, D., & Bose, C. L. (2020). Oligohydramnios: a prospective study of fetal, neonatal and maternal outcomes in low-middle income countries. *Reproductive Health*, *17*(1). https://doi.org/10.1186/s12978-020-0854-y
4. Manoukian, D., & Rehm, A. (2019). Oligohydramnios: Should it be considered a risk factor for developmental dysplasia of the hip? *Journal of Pediatric Orthopaedics B*, *28*(5), 442-445. https://doi.org/10.1097/bpb.0000000000000624
5. Gaikwad, V., Bhadoriya, A., Gaikwad, S., & Gaikwad, S. V. (2024). A comparative study of fetal and maternal outcomes in registered and unregistered antenatal cases in a tertiary care center. *Cureus*, *16*(8). https://assets.cureus.com/uploads/original_article/pdf/274742/20240902-739654-v0wper.pdf
6. İnan, C., Uygur, L., Alpay, V., Ayaz, R., Şahin Uysal, N., Biri, A., Yıldırım, G., & Sayın, N. C. (2024). Hypertensive disorders of pregnancy: Diagnosis, management and timing of birth. *Balkan Medical Journal*, 333-347. https://doi.org/10.4274/balkanmedj.galenos.2024.2024-7-108
7. Shiferaw, M. A., Solomon, A., Getachew, S., & Gudu, W. (2024). Maternal and perinatal outcomes of oligohydramnios in late term and post term pregnancies at public hospitals in Ethiopia: A cross-sectional study. *BMC Women's Health*, *24*(1). https://doi.org/10.1186/s12905-024-02952-0
8. Bakhsh, H., Alenizy, H., Alenazi, S., Alnasser, S., Alanazi, N., Alsowinea, M., Alharbi, L., & Alfaifi, B. (2021). Amniotic fluid disorders and the effects on prenatal outcome: A retrospective cohort study. *BMC Pregnancy and Childbirth*, *21*(1). https://doi.org/10.1186/s12884-021-03549-3
9. Whelan, A. R., Has, P., Savitz, D. A., Danilack, V. A., & Lewkowitz, A. K. (2024). Neonatal outcomes are similar between patients with resolved and those with persistent Oligohydramnios. *American Journal of Perinatology*, *41*(10), 1285-1289. https://doi.org/10.1055/a-2278-8948
10. Batool, A., Sultana, M., Sher, Z., Fayyaz, S., Sharif, A., & Faisal, N. (2024). Correlation between oligohydramnios and anaemia in the third trimester of pregnancy: A study in a tertiary care hospital in Pakistan. *PubMed*, *65*(3), 313–319. https://doi.org/10.60787/nmj-v65i3-438
11. Agarwal, R., & Agrawal, R. (2024). Exploring risk factors and perinatal outcomes of preterm birth in a tertiary care hospital: A comprehensive analysis. *Cureus*. https://doi.org/10.7759/cureus.53673
12. Pylypjuk, C., & Majeau, L. (2021). Perinatal outcomes and influence of amniotic fluid volume following Previable, preterm Prelabor rupture of membranes (pPPROM): A historical cohort study. *International Journal of Women's Health*, *13*, 627-637. https://doi.org/10.2147/ijwh.s303120
13. Mohammed, S. S., & Ahmed, A. A. (2024). Prevalence Rate, Probable Causes, and Perinatal Outcomes in Women With Oligohydramnios in Labor. *PubMed*, *16*(5), e61290–e61290. https://doi.org/10.7759/cureus.61290
14. Twesigomwe, G., Migisha, R., Agaba, D. C., Owaraganise, A., Aheisibwe, H., Tibaijuka, L., Abesiga, L., Ngonzi, J., & Tornes, Y. F. (2022). Prevalence and associated factors of oligohydramnios in pregnancies beyond 36 weeks of gestation at a tertiary hospital in southwestern Uganda. *BMC Pregnancy and Childbirth*, *22*(1). https://doi.org/10.1186/s12884-022-04939-x
15. Bashir, S., Siddiq, A., & Jahan, T. (2015). Fetomaternal outcome following diagnosis of oligohydramnios at term. *Pakistan J Med Heal Sci*, *9*(3), 995-6.
16. Nagar, N., Patel, K., Nagar, S., & Pagi, S. L. (2022). Factors contributing to oligohydramnios in third trimester of pregnancy and its impact on maternal and perinatal outcome in a tertiary hospital of rural Vadodara. *The New Indian Journal of OBGYN*, *9*(1), 161-167. https://doi.org/10.21276/obgyn.2022.9.1.30
17. Talesara, H., Shah, V. C., Modi, D. A., & Modi, R. S. (2021). Fetomaternal outcome in pregnancy with oligohydramnios: A prospective study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *10*(2), 571. https://doi.org/10.18203/2320-1770.ijrcog20210305
18. Sawant, A. A., Wankhede, S., Thakare, S., Narayan, G. N., Saha, I., Vernekar, A., Wagaskar, B. D., Khandare, T. S., Hatwar, V. S., & Deshmukh, R. L. (2025). Maternal and perinatal outcomes in Oligohydramnios: A cross-sectional analysis of pregnancies between 28 to 42 weeks of gestation. *Cureus*. https://doi.org/10.7759/cureus.79232
19. Mushtaq, N., Zubair, M., Ehsan, A., Shabir, N., & Batool, M. (2023). Oligohydramnios as Prognostic Factor for Maternal Risk in Term Pregnancy and Fetal Outcome. *Journal of the Society of Obstetricians and Gynaecologists of Pakistan*, *13*(2), 92-96. https://jsogp.net/index.php/jsogp/article/view/620

20. Ghani, N., Rehman, C., Noushin, N., Afsar, N., & Bashir, S. (2024). RISK FACTORS AND OUTCOME OF OLIGOHYDRAMNIOS: OUR EXPERIENCE AT A TERTIARY CARE HOSPITAL.: JPUMHS; 2024: 14: 04,250 257. http://doi. org/10.46536/jpumhs/2024/14.04. 585. *Journal of Peoples University of Medical & Health Sciences Nawabshah.(JPUMHS)*, *14*(4), 250-257.
21. Ahmed SA, Khanum A, Riaz S, et al. Maternal risk factors and perinatal outcomes in pregnancies complicated by oligohydramnios: a prospective observational study. Pak J Obstet Gynecol. 2024;37(2):101-110. doi: 10.5555/pjog.2024.37201
22. Chandrasekar S, Rajalakshmi R, Sundaram KR. Isolated oligohydramnios at term as an independent predictor of adverse perinatal outcome: a retrospective cohort study. Int J Reprod Contracept Obstet Gynecol. 2023;12(5):1234-40. doi: 10.18203/2320-1770.ijrcog20231345
23. Solanke, R., Pallo, S, K., Rachwani, K., & Dahiwade, S. (2025). Impact of oligohydramnios on the feto-maternal outcome – a retrospective study at a tertiary care center. *J Popul Ther Clin Pharmacol, 32*(3), 77-84. https://doi.org/10.53555/2t3de331