



**WALLAGA UNIVERSITY
INSTITUTE OF HEALTH SCIENCE A
SCHOOL OF MEDICINE**

DEPARTMENT OBSTETRICS AND GYNECOLOGY

**UNFAVORABLE PERINATAL OUTCOME AND
ASSOCIATED FACTORS OF OLIGOHYDRAMINIOS
AMONG TERM PREGNANCIES AT WALLAGA
UNIVERSITY COMPREHENSIVE SPECIALIZED
HOSPITAL: A CROSS-SECTIONAL STUDY**

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**April, 2026
Nekemte, Ethiopia**



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**A THESIS TO BE SUBMITTED TO THE INSTITUTE OF HEALTH
SCIENCE, DEPARTMENTS OF OBSTETRICS AND GYNECOLOGY
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CERTIFICATE OF SPECIALTY IN OBSTETRICS AND
GYNECOLOGY**

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APPROVAL SHEET FOR SUBMITTING THESIS

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ACRONYMS AND ABBREVIATIONS

ACEI	: Angiotensin Converter Enzyme Inhibitors
ACOG	: American College of Obstetrics and gynecology
AF	: Amniotic fluid
AFI	: Amniotic Fluid Index
AFV	: Amniotic Fluid Volume
AP	: Abruptio placenta
APGAR	: Appearance, Pulse, Grimace, Activity, and Respiration
CD	: Cesarean section
CS	: Caesarian Section
DRC	: Democratic Republic of Congo
ENND	: Early Neonatal Death
ETB	: Ethiopian Birr
FGR	: Fetal Growth Restriction
GA	: Gestational Age
GMCTH	: Gandaki Medical College Teaching Hospital
GTD	Gestational trophoblastic disease
IUFD	: Intrauterine Fetal death
IUGR	: Intrauterine Growth Restriction
LBW	: Low Birth Weight
LNMP	: Last Normal Menstruation Period
MAS	: Meconium Aspiration Syndrome
MOH	: Ministry of Health
NICU	: Neonatal Intensive Care Unit
NMP	: Normal Menstruation Period
NSAIDS	Nonsteriodal Antiinflammatory Drugs
ORHB	: Oromia Regional Health Bureau
PP	: Placenta previa
PROM	: Premature Rupture of Membranes
SDP	: Single Deepest Pocket
SDVP	: Single Deepest vertical pocket
SVD	: Spontaneous Vertex Delivery
WUSCH	: Wallaga University Specialized Comprehensive Hospital

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ABSTRACT

Introduction: Oligohydramnios is an abnormality of amniotic fluid which is one of the common complications during pregnancy and a threat to fetal development. Oligohydramnios is a severe and common complication of pregnancy that is associated with a poor perinatal outcome. However, these findings solely considered data from cases of Oligohydramnios to conclude the existence of a substantial correlation between poor perinatal and maternal outcomes. Despite this, little research has been done on the perinatal outcome of Oligohydramnios.

Objective: To assess the Perinatal Outcome and Associated factors of Oligohydramnios at term at Wallaga University Comprehensive Specialized Hospital, East Wallaga, Ethiopia, from January 1, 2025-March 30, 2026.

Methods and Materials: An institutional-based cross-sectional study was conducted at Wallaga University Comprehensive Specialized Hospital from January 1, 2025, to April 30, 2026. About 220 sample size identified and selected randomly using simple random sampling from term pregnant mothers visiting at Wallaga university comprehensive specialized hospital. Data were collected by face-to-face interviews with mother patient medical records, and from senior residents involved in patient management. Data completeness was checked daily. The data were entered to Epidata version 4.6.02 and exported to SPSS version 26 for analysis. Descriptive statistics were used, with proportions for categorical variables and mean with measures of dispersion for numerical variables. Statistical significance was determined using a 95% confidence interval and a p-value < 0.05.

Result: The magnitude of Unfavorable perinatal outcome was 53.6% (95% CI: 47.01-60.2%). Single deepest pocket level <1cm [AOR= 2.84, 95% CI (1.45–5.56)], lack of Antenatal care follow up [AOR=2.31, 95% CI (1.15–4.63)], presence of hypertensive disorders of pregnancy [AOR=3.67, 95% CI (1.88–7.14)], duration of labor >12hrs [AOR=2.54, 95% CI (1.32–4.87)] were found to be associated factors of unfavorable perinatal outcomes.

Conclusion: More than half of the study population (53.6%) experienced unfavorable perinatal outcomes. The most significant predictors included hypertensive disorders during pregnancy, which more than tripled the risk, followed by Oligohydramnios (single deepest pocket <1cm), prolonged labor (>12 hours), and a lack of antenatal care. These findings highlight the urgent need for improved prenatal monitoring and timely obstetric intervention to mitigate these risks.

Keywords: Oligohydramnios, unfavorable perinatal outcome, Neeta, Ethiopia

CHAPTER ONE

1. INTRODUCTION

1.1. Background

Amniotic fluid (AF) not only provides physical protection, space for movement and growth, and enhancement of lung development for the fetus but it also constitutes a vital sign for the evaluation of fetal well-being (1–3). It offers space for appropriate movement and development as well as the nutrients necessary for growth (2,4,5). Amniotic fluid production in the first trimester is derived from fetal and maternal compartments. In the second trimester, it is exclusively from fetal urination (6).

Amniotic fluid serves to protect the fetus and umbilical cord from compression. It also has antibacterial properties, serves as a reservoir of water and nutrients and provides the necessary condition for normal development of fetal lung, musculoskeletal and gastrointestinal system regulates temperature, reduces the impact of uterine contractions on the fetus. It enables continued fetal growth in a non- restricted, sterile and thermally controlled environment (7). The amount of amniotic fluid is maximum at 34 weeks of gestation into the pregnancy, when it averages 800mL. About 600 mL of amniotic fluid surrounds the fetus at 40 weeks of gestation (8).

A clear, slightly yellowish liquid called amniotic fluid surrounds the fetus throughout pregnancy. The fetus floats in the amniotic fluid inside the uterus, where it is enclosed in the amniotic sac. The fetus continuously "inhales" and then "exhales" the amniotic fluid as it moves (9).

Oligohydramnios refers to the amniotic fluid volume that is less than the minimum expected for the gestational age. It's diagnosed by ultrasound examination, preferably based on an objective measurement such as amniotic fluid index (AFI) ≤ 5 cm or single deepest pocket (SDP) < 2 cm. Oligohydramnios can result from several congenital fetal defects, uteroplacental insufficiency, early membrane rupture, growth restriction, post-term pregnancy, chronic placental abruption, etc. (9).

Oligohydramnios is a state of deficient amniotic fluid defined objectively using ultrasound measurements as single deepest vertical pocket less than 2 centimeters and/or amniotic fluid index less than 5 centimeters (7).

The observed etiology of the relative reduction in amniotic fluid volume towards term and in uncomplicated post-term pregnancies remains unclear. It is enticing therefore to consider that teleological the fetus, by reducing amniotic fluid volume at advanced gestational ages, may contribute to the induction, or indirectly initiate, spontaneous uterine contractions simply by virtue of amniotic fluid volume reduction (10).

Fetal health can be seriously compromised by oligohydramnios, with complications such as pulmonary hypoplasia, meconium aspiration syndrome, and fetal compression and, in cases of prolonged rupture of membranes, infections. Women with oligohydramnios are more likely to have an infant with low birth weight. Oligohydramnios can be diagnosed with ultrasound performed during the late second trimester or the third trimester and is defined by an Amniotic Fluid Index (AFI) below 5cms or below the 5th percentile to approximate the amniotic fluid volume (11).

1.2. Statement of the Problem

Oligohydramnios, defined as an amniotic fluid index (AFI) ≤ 5 cm or a single deepest vertical pocket (SDP) < 2 cm, is a common complication of pregnancy that significantly increases the risk of adverse perinatal outcomes (2,21). The condition is associated with increased rates of neonatal intensive care unit (NICU) admission, meconium-stained amniotic fluid, meconium aspiration syndrome (MAS), cesarean delivery, low 5-minute Apgar scores, low birth weight (LBW), and respiratory distress syndrome ((22,23). In the context of this study, unfavorable perinatal outcome is defined as the occurrence of any one of the following: low 5-minute Apgar score (< 7), NICU admission, or early neonatal death (ENND) within 7 days of delivery (24,25).

Amniotic fluid volume serves as an indicator of fetal tolerance during labor, and its reduction is inversely associated with perinatal morbidity and mortality. Regular antenatal and intrapartum monitoring enables early diagnosis of fetal compromise, and timely interventions can reduce adverse outcomes(25,26).

Studies show that oligohydramnios is associated with an increased risk of several adverse outcomes, such as neonatal intensive care unit (NICU) admission, meconium-stained AF, meconium aspiration syndrome (MAS), cesarean delivery, lower five-minute Apgar scores, umbilical cord blood pH levels below 7.10, low birth weight (LBW), and respiratory distress syndrome (9,1).

Previously done studies found that oligohydramnios at term increases the risk of maternal morbidity, due largely to the risks associated with interventions required. However, there was an in- conclusive finding in the outcome of perinatal morbidity and mortality (13–15).

Previous research has found that the consequences of reduced fluid index increased likelihood hazard of caesarean delivery because of fetal distress, diminish Apgar score to lower than seven in the fifth minute, hazard of stillbirth and non-reassuring heart rate (8).

Studies show that oligohydramnios is associated with a variety of negative pregnancy outcomes, such as fetal distress, low birth weight, perinatal morbidity and mortality and increased incidence of cesarean section. However, other studies show that oligohydramnios is a poor predictor of adverse perinatal outcome, and even the existence of an entity like isolated term oligohydramnios has been questioned by some authors (13,15).

Most of the research on the topic has been limited to a few comparisons of pregnancy outcomes. For instance, a cross-sectional study conducted in Ethiopia showed the maternal and perinatal effects of oligohydramnios during the third trimester of pregnancy. However, these findings solely considered data from cases of oligohydramnios to conclude the existence of a substantial correlation between poor perinatal and maternal outcomes. Surprisingly, little research has been done on the impact of oligohydramnios (9,16).

There is paucity of published work on factors affecting maternal and perinatal outcome of oligohydramnios in late term and post term pregnancy in Sub-Saharan countries, including Ethiopia. Most of the studies done elsewhere in the world included pregnancies that are either preterm or term at diagnosis of oligohydramnios. To our knowledge there is no published study in outcome of oligohydramnios specifically in late term and post term pregnancies (17,18).

Oligohydramnios occurs in about 1–5% of term pregnancies worldwide; however, the prevalence rises to more than 12% in post-term pregnancies. In Africa, prevalence rates of oligohydramnios ranging from 4 to 23% have been reported previously. Additionally, several maternal, placental, and fetal factors, including ruptured amniotic membranes, fetal abnormalities, genetic factors, maternal illnesses, nutrition status, multiple pregnancies, use of non-steroidal anti-inflammatory drugs (NSAIDs), and use of certain angiotensin converting enzyme inhibitors (ACEIs), have been found to be associated with oligohydramnios (19,20).

Unfavorable perinatal outcomes associated with oligohydramnios remain a major concern, yet evidence is inconsistent and limited, particularly for term pregnancies in Ethiopia. Most existing studies focus on mixed gestational ages and lack context-specific data, making it difficult to guide clinical decisions and interventions. Therefore, this study was conducted to assess the magnitude of unfavorable perinatal outcomes and identify associated factors of oligohydramnios at term at Wallaga University Comprehensive Specialized Hospital

1.3. Significance of the Study

This study will provide new information for the readers about the effects of oligohydramnios and normal amniotic fluid in term gestation on maternal and perinatal outcomes for pregnant mother. The results of this study will also assist Wallaga University Specialized Comprehensive Hospital Medical Professionals Team to provide a better understanding of our context and in advising mothers and their families about potential outcomes so they may make an educated choice.

Furthermore, by providing a starting point for additional investigations, these research findings makes Oromia Regional Health Bureau (ORHB) will significantly advance the field of maternal and child health research in the Oromia. The results of our study will assist Ministry of Health (MOH) which national guidelines is being developed by policymakers to improve the perinatal outcome of oligohydramnious. Furthermore, by providing a starting point for additional investigations, these research findings will significantly advance the field of maternal and child health research.

In addition this will assist Policy-makers, health care providers and researchers to understand key concepts in prenatal outcome and associated factors of oligohydramnios at term in Wallaga University Specialized Comprehensive Hospital. This study will designed to assess the maternal and perinatal outcome of pregnancies complicated with oligohydramnious in at term and factors affecting the outcomes.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Magnitude of unfavorable perinatal outcome of Oligohydramnios

Globally the reported magnitude of adverse perinatal outcomes associated with Oligohydramnios varies considerably across studies, ranging from 9.7% to 53.6% depending on the setting, diagnostic criteria, and population characteristics (27,28).

In Pokhara, Nepal, among 100 patients with isolated Oligohydramnios, the incidence of adverse perinatal outcomes was high, with meconium passage (11% in borderline vs. 48.9% in severe), LBW (5.8% vs. 18%), low 1-minute Apgar (1.9% vs. 14%), and NICU admission (11% vs. 67%)(29) .

A study from Gaya, India, reported NICU admission rates of 18.3% in the oligohydramnios group compared to 3.3% in controls (30). In Bangkok, Thailand, birth asphyxia (4% vs. 1.4%, $p=0.024$), NICU admission (5.6% vs. 0.4%, $p<0.001$), and sick newborn admission (21% vs. 13.1%, $p=0.005$) were significantly more common in women with isolated Oligohydramnios (13) .

At Gondar University Specialized Hospital, the rate of adverse perinatal outcome was 46.6% (95% CI: 40.5–52.7%). Specific outcomes included LBW (19.3%), non-reassuring fetal heart rate pattern (25.4%), NICU admission (26.1%), meconium-stained amniotic fluid (23.1%), low 1-minute Apgar (2.3%), and perinatal asphyxia (1.5%). Four perinatal deaths were recorded(14). In Mekelle Public Hospitals, Northern Ethiopia, 15.4% of neonates with oligohydramnios required NICU admission(15).

There is wide variation in reported rates (5.6% to 67% for NICU admission) reflects differences in healthcare infrastructure, diagnostic criteria (AFI vs. SDP), gestational age at diagnosis, and sample sizes. Notably, no previous study has reported the magnitude of unfavorable perinatal outcomes specifically for term pregnancies in Western Ethiopia, a gap this study addresses.

2.2. Associated factors of unfavorable perinatal outcome of Oligohydramnios

Multiple maternal, fetal, and obstetrical factors influence perinatal outcomes in pregnancies complicated by oligohydramnios.

The degree of amniotic fluid reduction correlates directly with the risk of adverse outcomes. Severe oligohydramnios (SDP <1 cm) is associated with higher rates of umbilical cord compression, fetal distress, low Apgar scores, and NICU admission compared to mild or borderline oligohydramnios(16,32) . Research from India demonstrated that severe oligohydramnios significantly increases the likelihood of operative delivery and neonatal complications(18) .

Regular ANC attendance enables early detection of oligohydramnios, monitoring of fetal well-being, and timely intervention. Studies from Ethiopia have consistently shown that lack of ANC follow-up is associated with increased risk of adverse perinatal outcomes(14,33) . At Gondar University Specialized Hospital, women without ANC had significantly higher rates of unfavorable outcomes (AOR = 2.31, 95% CI: 1.15–4.63) (14). ANC provides opportunities for blood pressure monitoring, fetal growth assessment, and patient education on danger signs.

Chronic hypertension and preeclampsia are strongly associated with uteroplacental insufficiency, which reduces fetal urine production and amniotic fluid volume. Studies from Ethiopia and India have reported that HDP increases the risk of adverse perinatal outcomes by 3- to 4-fold in pregnancies complicated by oligohydramnios (14,20). The combination of HDP and oligohydramnios creates a "double hit" of reduced placental perfusion and increased cord compression risk.

Labor exceeding 12 hours in duration increases the risk of fetal distress, meconium aspiration, and low Apgar scores, particularly when compounded by reduced amniotic fluid(21). Prolonged labor reduces the cushioning effect of amniotic fluid, leading to increased umbilical cord compression and intermittent hypoxia during uterine contractions

(34). Other reported risk factors for adverse perinatal outcomes in oligohydramnios include post-term pregnancy (≥ 41 weeks), congenital fetal anomalies, premature rupture of membranes, maternal diabetes, and use of NSAIDs or ACE inhibitors(35,36) . These factors were either exclusion criteria or beyond the scope of the present study.

2.3. Unfavorable perinatal Outcomes of Oligohydramnios

Oligohydramnios has been correlated with increased risk of fetal stillbirth, meconium aspiration syndrome, severe birth asphyxia, low Apgar scores, and congenital abnormalities. It is also associated with maternal morbidity in the form of increased rates of induction and instrumental or operative deliveries. Women with oligohydramnios had a twofold increased risk of cesarean delivery for fetal distress and a fivefold risk for an Apgar score < 7 at 5 minutes compared with pregnancies with normal AF (20,25).

Women with oligohydramnios had a higher incidence of hemorrhage, fetal malposition, and cesarean birth compared to those without the syndrome. A study conducted at Gondar University Specialized Hospital in northwest Ethiopia found the prevalence of oligohydramnios in the third trimester of pregnancy to be 2.36% (as the total number of deliveries in the study period was 14,382) (2,30). Additionally, in two-thirds of cesarean deliveries in oligohydramnios-positive pregnancies, oligohydramnios was the only sign for the CD. Except for postpartum complications, vaginal birth did not significantly enhance the chances of negative outcomes in pregnancies with oligohydramnios compared to vaginal delivery without oligohydramnios(20,37) .

Oligohydramnios, particularly in the third trimester, is associated with multiple fetal risks, including musculoskeletal deformities (facial distortion, club foot), cord compression, intrauterine growth restriction (IUGR), low birth weight (LBW), fetal distress in labor, severe birth asphyxia, meconium aspiration syndrome (MAS), low APGAR scores, neonatal intensive care unit (NICU) admission, congenital abnormalities, and stillbirths(20,22). Several maternal, placental, and fetal factors, including ruptured amniotic membranes, fetal abnormalities, genetic factors, maternal illnesses, nutritional status, multiple pregnancies, use of non-steroidal anti-inflammatory drugs (NSAIDs), and use of certain angiotensin-

converting enzyme inhibitors (ACEIs), have been found to be associated with oligohydramnios and its adverse outcomes for both mother and baby (31,37).

According to a study conducted at Charoenkrung Pracharak Hospital in Bangkok, Thailand, adverse outcomes affecting both the mother and newborn were significantly more common in pregnant women with isolated oligohydramnios, including birth asphyxia (4% vs. 1.4%, $p = 0.024$), admission to a neonatal intensive care unit (5.6% vs. 0.4%, $p < 0.001$), and admission of a sick newborn (21% vs. 13.1%, $p = 0.005$) (9,38). Similarly, research from Gandaki Medical College Teaching Hospital (GMCTH), Pokhara, Nepal, found that low Apgar scores were significantly more common in the oligohydramnios group (18.3% vs. 3.3%), and NICU admission was also significantly greater in the oligohydramnios group ($p = 0.013$) (31,39).

Postdated pregnancy is found to be one of the dominant causes of both fetal and maternal complications. When pregnancy has crossed the expected date of delivery or gestation longer than 40 weeks or 280 days from the first day of the last menstrual period, it is called postdated pregnancy, which complicates up to 10% of all pregnancies and carries increased risk to both the mother and fetus(20,33) . Oligohydramnios influences the pregnancy result and the wellbeing of the fetus. In the absence of premature rupture of membranes and fetal anomalies, oligohydramnios is considered a symptom of chronic reduction in placental function, which results in reduced fetal urinary output(16) . Some cases of amniotic fluid decline are accompanied by urinary tract obstruction or renal agenesis, fetal growth disorders, chronic leaks from gaps in the fetal membrane, and, in 15-25% of cases, fetal anomalies, all of which simultaneously affect maternal management and fetal outcomes(16,40) .

2.4 Conceptual Framework

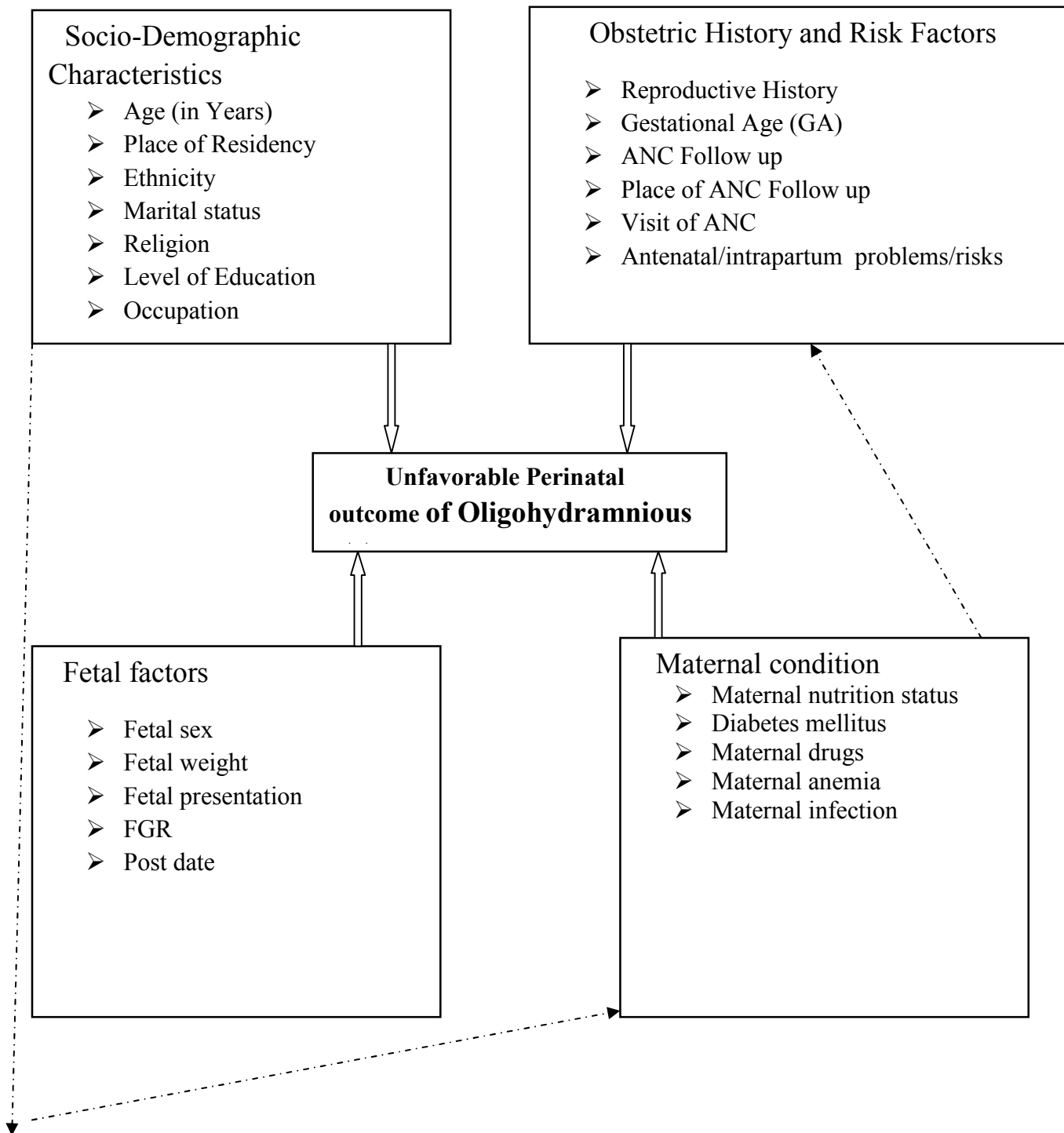


Figure 1: Oligohydramnios at term at Wallaga University Comprehensive Specialized Hospital(1, 5, 6)

CHAPTER THREE

3. OBJECTIVES OF THE STUDY

3.1. General Objective

To assess unfavorable perinatal outcome and associated factors of Oligohydramnios at term at Wallaga University Comprehensive Specialized Hospital, East Wallaga, Ethiopia, from May 1, 2025-March 30, 2026.

3.2. Specific Objectives

- ✚ To determine magnitude of unfavorable perinatal outcomes of oligohydramnios at term pregnancy at Wallaga University Comprehensive Specialized Hospital, East Wallaga, Ethiopia, from May 1, 2025-March 30, 2026.
- ✚ To identify the associated factors of unfavorable perinatal outcome among oligohydramnios at term pregnancy at Wallaga University Comprehensive Specialized Hospital, East Wallaga, Ethiopia, from May 1, 2025-March 30, 2026.

CHAPTER FOUR

4. METHODS AND MATERIALS

4.1. Study setting and Study Period

Wallaga University Specialized Comprehensive Hospital is one of the public hospitals founded in 2009 EC as Wallaga University Referral Hospital, later renamed Wallaga University Specialized Comprehensive Hospital (WUSCH), WUSCH is the only teaching and referral hospital in the Western region of the nation, located in the Western Ethiopia 328 kilometers from Addis Ababa. With a very large catchment population of roughly 5000,000 - 7000, 000 million people in the Western Ethiopia, it is a referral hospital that serves about 50,000 inpatient and 150,000 outpatient attendances annually. WUCSH is teaching hospital, used as referral center for catchment populations. It provides both specialty and subspecialist services including obstetrics and gynecology units in its inpatient and outpatient clinics. The hospital gives teaching services to under graduate and postgraduate students. In terms human resources and facility capacity the hospital has 7 Obstetricians and Gynecologists, 15 residents and 32 medwives. The also had well equipped NICU units 10 pediatricians and specially trained NICU nurses. The study was carried out at Wallaga University Specialized Comprehensive Hospital at Eastern Wallaga. The research was carried out from May 1, 2025-March 30, 2026 G.C.

4.2. Study Design

Institutional-based cross sectional study design.

4.3. Source population

All pregnant women who was admitted to labor and delivery with diagnosis of oligohydramnios at Wallaga University Specialized Comprehensive Hospital (WUSCH), Obstetric and Gynecologic department from May 1, 2025- March 30, 2026 G.C.

4.4. Study population

Selected a pregnant woman who was admitted with Oligohydramnios to labor and delivery at WUSCH's Obstetric and Gynecologic department.

4.5. Eligibility Criteria

4.5.1. Inclusion criteria

- Women diagnosed with Oligohydramnios and
 - Alive baby
 - Gestational Age between 37 weeks and <42 weeks
 - Intact Membrane
 - Singleton fetus despite their presentation and mode of delivery

4.5.2. Exclusion Criteria

- Women diagnosed with oligohydramnious and
 - IUFD
 - Lethal congenital anomalies
 - Not willing to participate

4.6. Sample Size Determination & sampling procedure

The sample size was calculated using the single proportion formula using the following formula and parameters.

$$n = \frac{z^2 \times p(1-p)}{d^2}$$

Where, n = the minimum sample size required

P: The Prevalence of the perinatal outcomes (NICU admission) in this particular study was 15.4% which have taken from a previous similar study conducted in Mekelle Public Hospitals, Northern Ethiopia (7).

d: Marginal error between sample size and population parameter (5%)

Z: Standard normal score at 95% confidence interval (1.96)

$$n = (1.96)^2 \times 0.154 \times 0.846 / (0.05)^2 = 3.8416 \times 0.130284 / 0.0025 = 0.50 / 0.0025 = 200$$

Considering 10 % non-respondent final sample size was $200 + 20 = 220$.

$n = 220$, Based on the above assumption, considering 10% of none response rate, the final sample size of the study becomes 220 (200 calculated from above and 20 considering 10% of none response rate).

4.6.1 Sampling Technique

All deliveries with Oligohydramnios at Wallaga University Specialized Comprehensive Hospital (WUSCH), Obstetric and Gynecologic department from May 1, 2025- March 30, 2026 G.C who fulfill the inclusion criteria were included in the study. Consecutive sampling method was employed. The cases were interviewed by mothers and physicians, was recorded from patients' cards and maternal and fetal outcomes will followed.

4.7. Study variables

4.7.1. Dependent variable.

- Unfavorable perinatal outcome of oligohydramnios.

4.7.2. Independent Variable

❖ Socio-Demographic Characteristics

- Age
- Place of Residency
- Ethnicity
- Marital status
- Religion
- Level of Education
- Occupation

❖ **Obstetric and Gynecological History**

- Reproductive History
- Gestational Age (GA)
- ANC Follow up
- Place of ANC Follow up
- Visit of ANC
- Antenatal and intranatal problems/risks

❖ **Maternal Factors**

- Maternal nutrition
- Diabetes mellitus
- maternal drugs
- Maternal anemia
- Maternal infection

❖ **Fetal Factors**

- Fetal sex
- Fetal weight
- Fetal presentation
- FGR
- Post dated

4.8. Data collection

4.8.1. Data Collection Procedure

Data was collected from the participant's medical records (Maternal outcome and perinatal outcomes) and from a face-to-face interview with the patient (socio-demographic characteristics of mothers and obstetrics history and risk factors), patient medical record and the most senior resident who participated in the management. The mothers and their newborns were followed through their whole stay in the hospital.

4.8.2. Data Collection Instrument

The data collection instrument was a structured, pretested questionnaire adapted from standard maternal and perinatal assessment tools. It was prepared in English and translated into the local language to ensure consistency. The tool consisted of four sections: socio-demographic characteristics, obstetric history and risk factors, maternal outcomes, and neonatal outcomes. Data were obtained through face-to-face interviews and supplemented by review of patient medical records. The questionnaire was pretested prior to data collection, and necessary modifications were made to ensure clarity, completeness, and reliability.

4.8.3. Data Collector

Data was collected by Midwives and residents of obstetrics and gynecology by using questionnaire. One day of training was given to data collectors about the data collection instrument and how to collect the data. The data collection process and the completeness of collected data were checked daily by the supervisor.

4.8.4. Data Quality Control

One day of training was given to the data collectors on to collect data. The data collection instrument was adapted from the Maternal and Perinatal Death Surveillance and Response Technical Guideline of Ethiopia and the questionnaire was tested and approved by the Federal Ministry of Health to be used at any hospital or health center in Ethiopia(38). The questionnaire was pretested while collecting data at WUCSH labor and maternity ward then the subsequent modification was done. The collected data was reviewed and checked for completeness daily by the investigator..

4.8.5. Data Processing and Analysis

Data were checked for completeness, coded, and entered into EpiData version 4.6.2, then exported to SPSS version 26 for analysis. Descriptive statistics were used to summarize variables using frequencies, percentages, and mean with standard deviation.

Bivariate logistic regression was performed to identify candidate variables ($p < 0.25$), which were then entered into multivariable logistic regression to determine independent predictors of unfavorable perinatal outcome.

Association was reported using adjusted odds ratios (AOR) with 95% confidence intervals.

P-value < 0.01 used to declare statistical significance. Model fitness was evaluated using the Hosmer–Lemeshow goodness-of-fit test, which yielded a p-value of > 0.05 . Multicollinearity was assessed using variance inflation factors (VIFs), all of which were less than 5 (range: 1.4 – 1.9), and tolerance values, all of which were greater than 0.2 (range: 0.53 – 0.71).

4.8.6. Operational Definition

- **Asphyxia:** A condition in which insufficient or no oxygen and carbon dioxide are exchanged on a ventilator basis or APGAR less than 7 at 1st and 5th minutes(9).
- **Oligohydramnios:** Oligohydramnios is term used to describe a state of decreased amniotic fluid defined as single deepest vertical pocket less than 2 centimeters (13).
- **Unfavorable Maternal outcome:** refers to occurrence of at least one of Caesarian Section (C/S), Post-Partum Hemorrhage (PPH), induction
- **Increased maternal morbidity:** Caesarian Section rate greater than 15% (24), induction rate greater than 25%
- **Low APGAR score:** Apgar score < 7 at the 5th minute
- **Unfavorable neonatal outcome:** refers to the occurrence of at least one of low Apgar score, NICU admission, and early neonatal death.
- **ENND:** Neonatal death within 7 days of postpartum period
- **Fetal Growth Restriction:** neonates whose weights are below the 10th percentile for their gestational age
- **NICU Admission:** Neonate admitted to NICU immediately after delivery and within 7 days after delivery
- **Unfavorable perinatal outcome:** occurrence of any one those defined adverse events affecting mother or the neonate during pregnancy, labor, delivery or postnatal

period(41,42)

- **Favorable obstetric outcome:** if there is no neonatal or maternal adverse outcome
- **Post date:** pregnancy that past due date

4.9. Ethical Considerations

The study was started after obtaining ethical approval and clearance from the Institute of health Sciences ethical review committee (**Ref.No: -IHSREC/13/11/2025**). Following this, permission was obtained from the Clinical Service Director of WUCSH, the Head of the Department of Obstetrics and Gynecology.

Informed consent was taken from participants to conform whether they are willing to participate. Those who were not willing to participate were given the right to do so. An effort was made to ensure privacy and confidentiality. Therefore the collected data was not be linked to others.

4.10. Dissemination Plan

The final results of the study will be presented at Institute of Health Sciences Department of Obstetrics and Gynecology, Wallaga University. This research would be submitted to WUCSH, the Institute of Health Sciences, Department of Public Health, as partial fulfillment of the requirements for a specialty certificate in Obstetrics and Gynecology. A copy of the results was archived in the library of the Wallaga University Institute of Health Sciences. In addition, efforts will be made to publish the findings in international peer-reviewed journals.

CHAPTER FIVE

5. RESULTS

5.1. Socio-Demographic Characteristics of Study Participants

A total of 220 mothers diagnosed with oligohydramnios at term were included in the study, yielding a 100% response rate. The age of the participants ranged from 18 to 42 years, with a mean age of 27.8 years (± 5.2 SD). The majority of respondents, 174(79.1%), were in the 20–34 years age group, followed by 24 (10.9%) aged >35 years (Table 1).

Table 1: Socio-Demographic Characteristics of women admitted with Oligohydramnios to labor and delivery at WUSCH.

Variable	Category	Frequency (n)	Percentage (%)
Age (years)(n=220)	<20	22	10
	20–34	174	79.1
	≥ 35	24	10.9
Residence(n=220)	Urban	115	52.3
	Rural	105	47.7
Marital Status(n=220)	Married	207	94.07
	Divorced	13	6
Educational Status(n=220)	Can't read and write	48	21.8
	No formal education, but can read and write	22	10
	Primary education	51	23.2
	Secondary education	70	31.8
	College and above	29	13.2
Occupation(n=220)	Housewife	106	48.2
	Government employee	27	12.3
	Merchant	66	30
	Farmer	21	9.5
			0.9
Religion(n=220)	Orthodox	87	39.5
	Protestant	111	50.5
	Muslim	21	9.5
	Catholic	1	0.5

5.2. Obstetric characteristics of study participant

Among the 220 study participants, 131 (59.5%) of mothers were multiparous, whereas 75 (34.1%) were primiparous. Concerning antenatal care (ANC) utilization, 162 (73.6%) had at least one ANC follow-up, while 58 (26.4%) had no ANC follow-up. Among those who attended ANC, 100 (61.9%) had four or more visits, whereas 62 (38.1%) had fewer than four visits. With respect to gestational age at delivery, the majority, 195 (88.6%), delivered at term (37–40 weeks), while 25 (11.1%) were post-term (≥ 41 weeks) (Table 2).

Table 2: Obstetric History and Risk Factors of women admitted with Oligohydramnios to labor and delivery at WUSCH'

Variable	Category	Frequency (n)	Percentage (%)
Parity	Primiparous	75	34.1
	Multiparous	131	59.5
	Grand multipara	14	6.4
ANC Follow-up(n=162)	Yes	162	73.6
	No	58	26.4
Number of ANC Visits(n=162)	<4 contact	62	38.2
	≥ 4 contact	100	61.9
Place of ANC Contact(n=162)	Health Center	52	32
	Public Hospital	106	65.4
	Private	4	2.6
Gestational Age(n=220)	Term (37–40 weeks)	195	88.6
	Late term (41-41 +6days weeks)	25	11.4
Hypertensive Disorders(n=220)	Yes	41	18.6
	No	179	81.4
APH(n=2200)	No	192	87.3
	Yes	20	9.1
Previous Adverse Outcome(n=220)	No	200	90.9
	Yes	38	17.3
	No	182	82.7

5.3. Perinatal Outcomes of study participant

Among 220 term oligohydramnios pregnancies the study revealed a high magnitude of unfavorable perinatal outcomes among mothers diagnosed with oligohydramnios at term, with 53.6% (95% CI: 47.01-60.2%), 58.2% delivered by cesarean section, 46.4% had induced labor, and 10.0% had postpartum complications. Severe oligohydramnios (SDP <1 cm) occurred in 40.0%. It also revealed 21.4% with 5th-minute Apgar <7, 24.1% NICU admission (asphyxia 31.7%, MAS 22.2%, sepsis 19.0%), 25.0% low birth weight, and 2.4% early neonatal death (42.9% within 24 hours from respiratory failure) (Table 3).

Table 3: Perinatal outcomes of women admitted with Oligohydramnios to labor and delivery at WUSCH'

Outcome category	Variable	Category	Frequency	Percentage (%)
Maternal outcome	SDP level	1-2cm	132	60.0
		<1cm	88	40.0
	Onset of labor	Induced	102	46.4
		Spontaneous	78	35.5
		Elective C/S	40	18.2
	Duration of labor	<8hrs	108	60.0
		8-12hrs	45	25.0
		>12hrs	27	15.0
	Mode of delivery	SVD	85	38.6
		Operative vaginal	7	3.2
Cesarean section		128	58.2	
Neonatal outcome	Postpartum complication	Yes	22	10.0
		No	198	90.0
	Birth weight	<2.5Kg	55	25.0
		>=2.5Kg	165	75.0
	Neonatal status	Alive	216	98.1
		ENND	4	2.4
	APGAR score (5 th min)	<7	47	21.4
		>=7	173	78.6
	NICU Admission	Yes	53	24.1
		No	167	75.9

5.5. Magnitude of Perinatal Outcomes

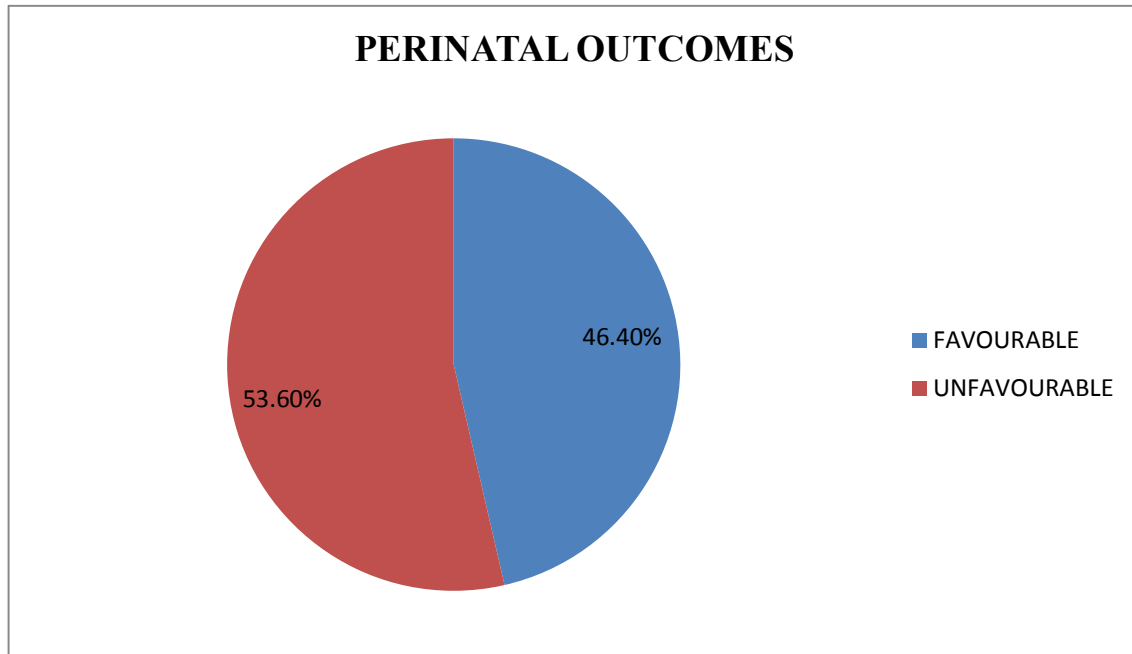


Figure 2: Magnitude of perinatal outcomes of women admitted with Oligohydramnios to labor and delivery at WUSCH'

Table 4: The statistical relationship between perinatal outcomes by socio demographic characteristics of study participants

Socio demographic characteristics		Perinatal outcomes		
		Unfavorable	Favorable	Total
Age	<20	9	13	22
	20–34	98	76	174
	≥35	11	13	24
Place of residency	Urban	60	55	115
	Rural	58	47	105
Marital status	Married	92	92	184
	Single	16	6	22
	Divorced	9	4	13
Occupation	Housewife	53	53	106
	Government employee	17	10	27
	Merchant	36	30	66
	Farmer	11	8	19
	Student	1	1	2

Table 5: The statistical relationship between perinatal outcomes and obstetric characteristics of study participants

Obstetric factors			Perinatal outcomes		
			Unfavorable	Favorable	Total
Parity	Primiparous		34	41	75
	Multipara		77	54	131
	Grand multipara		7	7	14
ANC follow up	Yes		91	71	162
	No		27	31	58
Gestational Age	Term		103	92	195
	late-term		15	10	25
Hypertensive Disorders	Yes		24	17	41
	No		94	85	179
	No		99	93	192
APH	Yes		12	8	20
	No		106	94	200
Previous Outcome	Adverse	Yes	23	15	38
		No	95	87	182

5.6. Factors Associated with unfavorable perinatal outcomes

5.6.1. Bivariate Logistic Regression Analysis of Factors Associated with Unfavorable Perinatal Outcome

In the bivariable logistic regression analysis, several independent variables were assessed for their association with unfavorable perinatal outcomes. The analysis showed that severity of oligohydramnios (SDP <1 cm), lack of ANC follow-up, presence of hypertensive disorders of pregnancy, prolonged duration of labor (>12 hours), and caesarean section delivery were significantly associated with unfavorable perinatal outcomes (Table 6).

Model fitness was evaluated using the Hosmer–Lemeshow goodness-of-fit test, which yielded a p-value of >0.05. Multicollinearity was assessed using variance inflation factors (VIFs), all of which were less than 5 (range: 1.4 – 1.9), and tolerance values, all of which were greater than 0.2 (range: 0.53 – 0.71).

Table 6: Bivariate and Multivariate Logistic Regression of women admitted with Oligohydramnios to labor and delivery at WUSCH'

Variable	Category	favorable	unfavorable	COR (95% CI)	p-value	AOR(95 CI)	P-value
Maternal Age	<20 years	13	9	1.45 (0.72–2.91)	0.29	--	-
	20–34 years	76	88	1	—	1	-
	≥35 years	13	11	1.78 (0.95–3.34)	0.07	-	-
Residence	Urban	55	60	1	—	-	-
	Rural	47	58	2.10 (0.25–3.53)	0.30	-	-
ANC	Yes	71	91	1	—	1	-
Follow-up	No	31	27	3.25 (1.85–5.71)	<0.001	2.31(1.15-4.63)	0.018
Parity	Primipara	41	34	1	—	-	-
	Multipara	54	77	0.82 (0.50–1.35)	0.44	-	-
Gestational Age	37–40 weeks	92	103	1	—	-	-
	>40 weeks	10	15	1.90 (1.10–3.28)	0.02	-	-
SDP Level	≥1 cm	55	71	1	—	1	-
	<1 cm	47	41	3.21 (1.75–5.89)	<0.001	2.84(1.45-5.56)	0.002
HDP	No	85	94	1	—	1	-
	Yes	17	24	4.12 (2.25–7.55)	<0.001	3.67(1.88-7.14)	0.005
Duration of Labor	≤12hrs	68	85	1	—	1	-
	>12hrs	13	14	2.89 (1.60–5.20)	<0.001	2.54(1.32-4.87)	0.005
Mode of Delivery	Vaginal	42	50	1	—	1	-
	Cesarean section	60	68	2.15 (1.20–3.84)	0.010	1.36(0.69-2.68)	0.371

5.6.2. Multivariate Logistic Regression Analysis of Factors Associated with Unfavorable Perinatal Outcome

In the multivariable logistic regression analysis, variables that showed association in the bivariable analysis ($p < 0.25$) were entered into the model to control for potential confounders. After adjustment, SDP level, ANC follow-up, presence of Hypertensive disorders of pregnancy, and duration of labor remained statistically significant independent predictors of unfavorable perinatal outcome. Mothers with severe oligohydramnios (SDP <1 cm) were approximately 2.8 times more likely to have unfavorable perinatal outcomes compared to those with SDP 1–2 cm (AOR = 2.84, 95% CI: 1.45–5.56). This indicates that the severity of reduced amniotic fluid plays a critical role in neonatal outcomes. The presence of Hypertensive disorders of pregnancy was strongly associated with unfavorable outcomes, with affected neonates having about 3.7 times higher odds (AOR = 3.67, 95% CI: 1.88–7.14), suggesting significant fetal compromise. Similarly, prolonged labor (>12 hours) increased the likelihood of unfavorable outcomes by 2.5 times (AOR = 2.54, 95% CI: 1.32–4.87), likely due to increased risk of fetal distress and hypoxia. Mothers who had no ANC follow-up were about 2.3 times more likely to experience unfavorable perinatal outcomes (AOR = 2.31, 95% CI: 1.15–4.63), emphasizing the importance of antenatal care in early detection and management of complications. However, mode of delivery did not show a statistically significant association after adjustment, indicating that its crude association was confounded by other clinical factors such as fetal condition and labor progression ([Table 6](#)).

6. DISCUSSION

This study assessed the perinatal outcomes and associated factors of oligohydramnios at term among 220 mothers. The results demonstrated a significant burden in the study context, with 53.6% (95%CI: 47.0%-60.2%) of neonates experiencing unfavorable perinatal outcomes. High rates of NICU admission (24.1%) and cesarean section (58.2%) were also noted, underscoring the seriousness of the illness and its effects on infant health. This finding is consistent with the global literature which reports that the magnitude of adverse perinatal outcomes associated with Oligohydramnios varies considerably across studies, ranging from 9.7% to 53.6% depending on the setting, diagnostic criteria, and population characteristics (20,31).

Our finding specifically aligns with the study conducted at Gondar University Specialized Hospital, which reported an adverse perinatal outcome rate of 46.6% (95% CI: 40.5–52.7%), with specific outcomes including low birth weight (19.3%), non-reassuring fetal heart rate pattern (25.4%), NICU admission (26.1%), and meconium-stained amniotic fluid (23.1%) (31). The similarity suggests that the burden of Oligohydramnios-related complications is uniformly high across Ethiopian referral hospitals.

However the magnitude of unfavorable perinatal outcomes observed in this study 53.6%(95%CI:47.0%-60.2%) is relatively high compared to findings from some previous studies but consistent with others conducted in similar low-resource settings(43). A study conducted in Mekelle Public Hospitals, Northern Ethiopia, reported that 15.4% of neonates required NICU admission (39), which is lower than the 24.1% observed in our study. Similarly, research from Jimma Medical Center, South West Ethiopia, found lower rates of adverse perinatal outcomes (40). Variations in research demographics, healthcare availability, early detection methods, and the severity of oligohydramnios at presentation could all account for this discrepancy. The larger percentage of poor outcomes in the current research area may have been caused by delayed presentation, low ANC utilization, and hospital referral of complex cases.

One of the key findings of this study was that mothers who had no ANC follow-up were significantly more likely to have unfavorable perinatal outcomes compared to those who attended ANC. This result is consistent with previous studies conducted in Ethiopia (36,37) which reported that ANC attendance plays an important role in improving perinatal outcomes. A study from Gondar University Specialized Hospital also found that lack of ANC was associated with increased risk of adverse outcomes (27). The possible explanation is that ANC provides opportunities for early identification of complications such as oligohydramnios, monitoring of fetal well-being, and timely intervention. In contrast, lack of ANC may result in delayed diagnosis and poor preparation for delivery, increasing the risk of adverse outcomes.

The study also found that severe oligohydramnios (SDP <1 cm) was significantly associated with unfavorable perinatal outcomes. This finding is in line with studies conducted elsewhere, which demonstrated that decreasing amniotic fluid volume is strongly linked with fetal compromise. Research from India reported similar findings, where severe oligohydramnios was associated with higher rates of low Apgar scores and NICU admissions (44). A study from Nigeria also found that reduced amniotic fluid volume correlates with poor perinatal outcomes (45). The likely explanation is that reduced amniotic fluid leads to increased risk of umbilical cord compression and decreased placental perfusion, which may result in fetal hypoxia, low Apgar scores, and increased need for NICU admission, as observed in this study.

Furthermore, hypertensive disorders of pregnancy were significantly associated with unfavorable perinatal outcomes. This finding agrees with previous research, which indicates that HDP adversely affects uteroplacental circulation. A study from the University of Gondar found that hypertensive disorders were strongly associated with adverse perinatal outcomes among women with oligohydramnios (25,46). Similarly, research from Jimma Medical Center reported that preeclampsia and chronic hypertension increased the risk of poor neonatal outcomes (6,47). In the presence of oligohydramnios, this effect may be amplified, leading to further compromise of fetal oxygenation and growth. This could explain the higher proportion of adverse outcomes among mothers with HDP in this study.

Another important finding was that prolonged labor (>12 hours) was associated with an increased likelihood of unfavorable perinatal outcomes.

This is consistent with studies conducted in similar settings. Research from India found that prolonged labor significantly increased the risk of fetal distress and low Apgar scores in pregnancies complicated by Oligohydramnios(5). Prolonged labor can lead to fetal distress due to sustained uterine contractions and reduced oxygen supply, which may contribute to low Apgar scores and increased NICU admissions. This highlights the importance of effective labor monitoring and timely intervention.

The study also reported a high rate of cesarean section (58.2%), which may reflect the clinical response to fetal compromise in cases of oligohydramnios. Similar findings have been reported in other studies, where oligohydramnios is associated with increased operative delivery. A study from Nepal reported that 83.6% of women with oligohydramnios required emergency cesarean section (6,47). Research from India found a twofold increased risk of cesarean delivery for fetal distress among women with Oligohydramnios (26,48). While cesarean section can reduce the risk of adverse outcomes, the high rate observed in this study may also indicate late presentation and severity of cases at admission. However, after adjustment for confounders, mode of delivery was not independently associated with unfavorable perinatal outcomes, suggesting that underlying fetal compromise rather than the procedure itself drives adverse outcomes.

In addition, the NICU admission rate (24.1%) observed in this study further emphasizes the burden of neonatal complications associated with oligohydramnios. This finding is comparable to reports from similar settings, where compromised fetal conditions often require advanced neonatal care. A study from Thailand reported that NICU admission was significantly higher in pregnancies with isolated oligohydramnios (5.6% vs 0.4%, $p < 0.001$)(31). Research from Nepal also found NICU admission rates of 18.3% in the oligohydramnios group compared to 3.3% in controls (31). The higher NICU admission rate in this study may be linked to the high proportion of severe oligohydramnios, lack of ANC follow-up, and presence of maternal complications such as HDP. The leading reasons for NICU admission in our study were asphyxia (31.7%), meconium aspiration syndrome

(22.2%), and sepsis (19.0%), which are consistent with findings from other studies (21,37,39).

The early neonatal death rate in this study was 2.4%, which is concerning but comparable to findings from other low-resource settings. A study from the University of Gondar reported a perinatal mortality rate of approximately 5-8% among women with Oligohydramnios(25). Research from Jimma Medical Center also found elevated rates of END in pregnancies complicated by Oligohydramnios (6,49). The majority of END in our study occurred within the first 24 hours (42.9%) and was attributed to respiratory failure/asphyxia (42.9%) and multi-organ failure (28.6%), highlighting the need for improved intrapartum monitoring and neonatal resuscitation capabilities.

7. STRENGTHS AND LIMITATIONS OF THE STUDY

This study has several important strengths. First, it employed a relatively adequate sample size, which enhances the reliability and statistical power of the findings. Second, the use of multivariable logistic regression analysis allowed for controlling potential confounding variables and identifying independent predictors of unfavorable perinatal outcomes.

Despite these strengths, the study has some limitations that should be considered when interpreting the findings. The cross-sectional study design limits the ability to establish a causal relationship between oligohydramnios and adverse perinatal outcomes. Furthermore, as the study was conducted in a single health facility, the generalizability of the findings to other settings may be limited.

8. CONCLUSION

This study confirmed that oligohydramnios at term is associated with a high magnitude of unfavorable perinatal outcomes, affecting more than half (53.6%) of the neonates in the study population. Key independent predictors of adverse perinatal outcomes included severe oligohydramnios (single deepest pocket <1 cm), lack of antenatal care follow-up, presence of hypertensive disorders of pregnancy, and prolonged labor (>12 hours). These findings underscore the critical importance of early detection, regular antenatal surveillance, and timely obstetrical interventions. Addressing these modifiable risk factors through strengthened maternal and neonatal healthcare services is essential to reducing perinatal morbidity and mortality in resource-limited settings like eastern Ethiopia.

9. RECOMMENDATIONS

Clinical level:

Ensure routine ultrasound screening (SDP measurement), closely monitor high-risk mothers (no ANC, HDP), and prevent prolonged labor through timely intervention.

Institutional level:

Strengthen NICU readiness, ensure availability of ultrasound and fetal monitoring tools, and enforce standardized protocols for oligohydramnios management.

Health system level:

Expand ANC coverage, strengthen referral linkage, and provide targeted training on early risk identification and management.

National level:

Integrate oligohydramnios screening into ANC guidelines, improve ANC utilization, and invest in maternal–neonatal care infrastructure.

Research:

Conduct multicenter prospective studies to assess causality and long-term neonatal outcomes.

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Annex

Questionnaires

Questionnaires for the study of Prenatal Outcome and associated factors of Oligohydraminous at Wallaga University Specialized Comprehensive Hospital, East Wallaga, Ethiopia, from May 1, 2025-April 30, 2026.

Information sheet and mothers Consent form (English) Information sheet: Good morning. / Good afternoon. My name is Dr. Negero Teferi Wattle. I am 4th (final) year obstetrics and gynecology resident at Wallaga University Specialized Comprehensive Hospital. I am conducting a study on Perinatal Outcome and Associated factors of Oligohydraminous at tem in Wallaga University Specialized Comprehensive Hospital for my partial fulfillment of the requirements for the Speciality certificate in Obstetrics and Gynecology.

You are chosen to participate in the study. We need to give data about socio-demography and economic information from you. The chart of the deceased was reviewed to get data about your obstetric characteristics and pregnancy outcome. I assure you that all your answers were kept strictly secret. I will not keep a record of your name or address. You have the right to stop the interview at any time or skip any questions you don't want to answer. Your participation is completely voluntary but your experiences could be very helpful to design a better action plan to mitigate Maternal and Fetal Outcomes occurring from the same scenario in the future.

If you agree to participate in the study, the interview will take about 30 minutes to complete. Do you have any questions?

Do you agree to be interviewed?

Yes No

May I begin the interview now?

Yes No

To be signed by the interviewer: I certify that I have read the above consent procedure to the participant. Signed: _____

Questionnaires for the study of Prenatal Outcome and Associated factors of
Oligohydraminous at term at Wallaga University Specialized Comprehensive Hospital East
Wallaga, Ethiopia, from May 1, 2025-March 30, 2026.

S/No.	Question	Answers	Remark
Part I: Socio-demographic Characteristics			
01	Card No. Phone No	_____ _____	
02	Age (in Years)	_____	
03	Place of Residency	Rural	
		Urban	
04	Ethnicity	Oromo	
		Amhara	
		Tigre	
		Gurage	
		Others _____	
05	Marital status	Single	
		Married	
		Cohabited	
		Divorced	
		Separated	
		Widowed	
06	Religion	Orthodox	
		Muslim	

		Catholic	
		Protestant	
		Others	
07	Level of Education	Can't read and write	
		No formal education, but can read and write	
		Grade 1-8	
		Grade 9-12	
		College & above	
08	Occupation	Gov't Employer	
		Merchant	
		House Wife	
		Farmer	
		Student	
		Others (mention)	
Part II: Obstetric History and Risk Factors			
09	Reproductive History?	Gravidity _____	
		Parity _____	
		Abortion _____	
		Ectopic _____	
		GTD _____	
10	Gestational Age (GA)	In weeks _____	

		Unknown (Ballard)	
11	ANC Follow up	Yes	
		No	
12	If Yes to Q.12, where is the ANC follow up?	Health Post	
		Health Center	
		Public Hospital	
		Private Hospital	
		Private Clinic	
13	If Yes to Q.13, How many visit ?	_____	
14	If No to Q.13, Why?		
15	Antenatal/intranatal problems/risks (Tick ALL that apply)	Preeclampsia/eclampsia	
		Prolonged pregnancy	
		IUGR	
		Other (specify) _____	
Part III:- Maternal Outcome			
16	Level of Amniotic Fluid	SDP	
		AFI	
17	Onset of Labor ?	Spontaneous	
		Induced	
		No labor (Elective C/S)	
18	Duration of labor	Hour _____	
19	Mode of Delivery	Spontaneous vaginal delivery (SVD)	

		Operative vaginal delivery (vacuum or forceps)	
		Operative Abdominal delivery (caesarean section)	
20	If mode of delivery is Operative vaginal delivery, what is the Indication?		
21	If mode of delivery is Operative Abdominal delivery (caesarean section), what is the Indication?		
22	Is there any Post-Operative or /and Postpartum complications?	Yes	
		No	
23	If yes to above question what is it?	Postpartum Infection and sepsis	
		Wound dehiscence	
		Anemia	
		Other and specify	
24	Duration of stay at Hospital before delivery Specify	_____ Hrs	
25	Total stay at Hospital? Specify	_____ day/s	
26	Status of the mother on discharge?	Improved	
		Others	
Part IV:- Perinatal			

27	Neonatal OutCome	Sex	M	
			F	
		Weight	_____ Kg	
		Status	Alive	
			ENND	
		Apgar score at 1st and 5th minute		
28	If alive, Any need for NICU admission?	Yes		
		No		
29	If yes to the above question, what reason for admission to NICU?	Prematurity with respiratory problem		
		Neonatal sepsis		
		Asphyxia		
		Meconium Aspiration Syndrome		
		Hyperbilirubinemia		
		Others and specify		
30	Status of the New born finally	Discharged improved		
		ENND		
		Alive till 7th day		
31	If complicated by ENND, when was the time of death respective to age?	Within 24hr		
		24 - 72hr		
		72hr – 7th day		
32	If complicated by ENND, what is the immediate cause of death?	Respiratory		
		Multi organ failure		
		Lethal congenital malformation		
		Others (mention)		
33				