International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Prevalence of Oligohydramnios Among Pregnant Women in the Third Trimester- A Cross-Sectional Study

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Received: 28-02-2026
Accepted: 20-03-2026
Available online: 27-03-2026

ABSTRACT

Background: Oligohydramnios, defined as a decreased amniotic fluid volume, is an important indicator of fetal well-being and is associated with adverse maternal and perinatal outcomes. Its prevalence varies across populations and is influenced by maternal, fetal, and placental factors.
Objectives: To determine the prevalence of oligohydramnios among pregnant women in the third trimester and to identify associated maternal and obstetric factors.
Materials and Methods: A hospital-based cross-sectional observational study was conducted in the Department of Obstetrics and Gynecology of a tertiary care hospital over a period of six months (January–June 2025). A total of 250 pregnant women with gestational age ≥28 weeks were included using consecutive sampling. Amniotic fluid index (AFI) was measured using the four-quadrant ultrasonographic technique. Oligohydramnios was defined as AFI ≤5 cm. Relevant demographic and clinical data were collected and analyzed using SPSS version 20.
Results: The prevalence of oligohydramnios was found to be 12.8%. The majority of affected women were in the 20–30 years age group and primigravida. Most cases were observed between 32–36 weeks of gestation. Commonly associated conditions included hypertensive disorders (28.1%), postdated pregnancy (21.9%), intrauterine growth restriction (18.7%), and maternal anemia (15.6%).
Conclusion: Oligohydramnios is relatively common in the third trimester and is frequently associated with identifiable maternal and obstetric risk factors. Routine antenatal ultrasonographic assessment is essential for early detection and timely management to improve maternal and perinatal outcomes.

Keywords*: Oligohydramnios, Amniotic Fluid Index, Third Trimester, Pregnancy, Prevalence, Antenatal Care.*

INTRODUCTION

Amniotic fluid is an essential component of the intrauterine environment and plays a critical role in fetal growth and development throughout pregnancy. It provides mechanical protection to the fetus, facilitates fetal movement, prevents umbilical cord compression, and contributes to the development of the fetal lungs and musculoskeletal system. The volume of amniotic fluid changes during the course of pregnancy, increasing gradually until the late second trimester and reaching its peak during the early third trimester before slightly declining toward term. Adequate amniotic fluid volume is therefore considered an important indicator of fetal well-being and placental function. [1]

Oligohydramnios refers to a reduced quantity of amniotic fluid relative to the gestational age. It is commonly diagnosed through ultrasonography using measurements such as the amniotic fluid index (AFI) or the single deepest vertical pocket. An AFI of 5 cm or less or a deepest vertical pocket of less than 2 cm is widely accepted as diagnostic criteria for oligohydramnios. Ultrasonographic assessment of amniotic fluid volume has become a routine part of antenatal care because it is a simple and non-invasive method for evaluating fetal condition and placental function.[2]

The occurrence of oligohydramnios may be associated with a variety of maternal, fetal, and placental factors. Maternal conditions such as hypertensive disorders of pregnancy, dehydration, chronic hypertension, and uteroplacental insufficiency have been linked with reduced amniotic fluid volume. Similarly, fetal anomalies affecting renal development, intrauterine growth restriction, and post-dated pregnancy can also contribute to decreased production of amniotic fluid. Since fetal urine is the primary contributor to amniotic fluid during the second and third trimesters, any condition that compromises fetal renal perfusion or placental circulation may result in oligohydramnios. [3]

The clinical significance of oligohydramnios lies in its strong association with adverse maternal and perinatal outcomes. Reduced amniotic fluid volume has been linked with complications such as fetal distress, umbilical cord compression, intrauterine growth restriction, and meconium aspiration syndrome. In addition, pregnancies complicated by oligohydramnios are more likely to require operative delivery, including cesarean section, due to abnormal fetal heart rate patterns during labor. Neonates born from such pregnancies may also have higher rates of low birth weight, neonatal morbidity, and admission to neonatal intensive care units.[4]

The reported prevalence of oligohydramnios varies widely across different populations and healthcare settings. In general obstetric populations, it is estimated to occur in approximately 1–5% of pregnancies, although the prevalence may increase significantly in post-term pregnancies and high-risk obstetric groups. Studies conducted in tertiary care centers have reported prevalence rates ranging from 5% to 15% in the third trimester, reflecting differences in maternal risk factors, antenatal care access, and diagnostic practices. [5]

Assessment of amniotic fluid volume during the third trimester is particularly important because this period represents a critical phase of fetal growth and preparation for delivery. Detection of oligohydramnios during this stage often necessitates closer fetal monitoring, including repeated ultrasound examinations and fetal surveillance tests. Early identification allows obstetricians to implement appropriate management strategies, such as increased monitoring or timely delivery, thereby reducing potential maternal and neonatal complications. [6]

In developing countries, the burden of oligohydramnios may be greater due to limited access to regular antenatal care, nutritional deficiencies, and higher prevalence of maternal comorbidities. Despite its clinical importance, the epidemiological characteristics of oligohydramnios in many regions remain insufficiently documented. Determining the prevalence of this condition in specific populations can help improve antenatal screening strategies and guide appropriate obstetric management.

The present study was undertaken to determine the prevalence of oligohydramnios among pregnant women in the third trimester attending a tertiary care hospital.

MATERIAL AND METHODS

Study Design

The present study was conducted as a hospital-based cross-sectional observational study to determine the prevalence of oligohydramnios among pregnant women in the third trimester.

Study Setting

The study was carried out in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital, which provides antenatal and obstetric services to both urban and rural populations.

Study Duration

The study was conducted over a period of six months from January 2025 to June 2025.

Study Population

The study population consisted of pregnant women in the third trimester (≥28 weeks of gestation) attending the antenatal outpatient department or admitted to the obstetric ward during the study period.

Sample Size

A total of 250 pregnant women who satisfied the inclusion criteria were included in the study.

Sampling Method

Participants were selected using consecutive sampling, where all eligible pregnant women presenting during the study period were enrolled until the required sample size was achieved.

Inclusion Criteria

Pregnant women were included in the study if they met the following criteria:

- Gestational age 28 weeks or more
- Singleton pregnancy
- Women willing to provide informed consent

Exclusion Criteria
Participants were excluded if they had:
- Multiple pregnancies
- Premature rupture of membranes
- Known fetal congenital anomalies
- Severe maternal systemic illness
- Incomplete clinical or ultrasonographic records

Data Collection Procedure
After obtaining written informed consent, relevant demographic and obstetric information was collected using a structured data collection form. Information recorded included maternal age, parity, gestational age, and obstetric history.
Gestational age was determined based on the last menstrual period (LMP) and confirmed by available early pregnancy ultrasound reports whenever available.

Ultrasonographic Assessment of Amniotic Fluid
All participants underwent ultrasonographic examination to assess the amniotic fluid volume. The amniotic fluid index (AFI) was measured using the four-quadrant technique described by Phelan et al.[9]

In this method, the uterus is divided into four quadrants using the maternal midline vertically and a transverse line passing through the umbilicus horizontally. The maximum vertical pocket of amniotic fluid in each quadrant, free from fetal parts and umbilical cord, was measured in centimeters. The measurements obtained from the four quadrants were then summed to calculate the amniotic fluid index (AFI).

Definition of Oligohydramnios
In the present study, oligohydramnios was defined as an amniotic fluid index (AFI) of 5 cm or less, which is a commonly accepted diagnostic criterion for reduced amniotic fluid volume.[10]

Pregnancies with AFI values between 6 and 24 cm were considered to have normal amniotic fluid volume.

Study Variables
The following variables were recorded for each participant:
Maternal Variables
- Age
- Parity
- Gestational age
- Associated maternal conditions

Fetal Variables
- Amniotic fluid index
- Fetal presentation
- Obstetric complications

Statistical Analysis
All collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Categorical variables were expressed as frequencies and percentages. Continuous variables were presented as mean ± standard deviation. The prevalence of oligohydramnios was calculated and presented as a percentage of the total study population.

Ethical Considerations
Ethical approval for the study was obtained from the Institutional Ethics Committee of the medical college prior to the commencement of the study. Written informed consent was obtained from all participants.

RESULTS
A total of 250 pregnant women in the third trimester were included in the present study. The majority of participants belonged to the 20–30 years age group (59.2%), followed by the 31–35 years age group (21.6%). Women younger than 20 years accounted for 11.2%, while 8.0% of participants were older than 35 years. (Table 1).

Table 1: Age Distribution of Participants (n = 250)

Age Group (years)	Number	Percentage (%)
<20	28	11.2
20–30	148	59.2
31–35	54	21.6
>35	20	8.0
Total	**250**	**100**

Among the 250 pregnant women examined, 32 cases were diagnosed with oligohydramnios, giving an overall prevalence of 12.8%. The remaining 218 women (87.2%) had normal amniotic fluid levels. (Table 2)

Table 2: Prevalence of Oligohydramnios

Amniotic Fluid Status	Number	Percentage (%)
Oligohydramnios	32	12.8
Normal AFI	218	87.2
Total	**250**	**100**

The distribution of oligohydramnios cases according to maternal age is shown in Table 3. The highest proportion of oligohydramnios was observed in the 20–30 years age group (46.9%), followed by the 31–35 years age group (28.1%). A smaller proportion of cases occurred among women younger than 20 years (15.6%) and those older than 35 years (9.4%). (Table 3).

Table 3: Distribution of Oligohydramnios According to Maternal Age

Age Group (years)	Cases	Percentage (%)
<20	5	15.6
20–30	15	46.9
31–35	9	28.1
>35	3	9.4
Total	**32**	**100**

Parity distribution among women with oligohydramnios is presented in Table 4. Among the affected women, 18 cases (56.3%) were primigravida, while 14 cases (43.7%) were multigravida. (Table 4)

Table 4: Distribution of Oligohydramnios According to Parity

Parity	Number	Percentage (%)
Primigravida	18	56.3
Multigravida	14	43.7
Total	**32**	**100**

The majority of cases were observed between 32–36 weeks of gestation (40.6%), followed by pregnancies at 37 weeks or more (37.5%). Fewer cases were observed between 28–31 weeks (21.9%). (Table 5)

Table 5: Distribution of Oligohydramnios According to Gestational Age

Gestational Age	Number	Percentage (%)
28–31 weeks	7	21.9
32–36 weeks	13	40.6
≥37 weeks	12	37.5
Total	**32**	**100**

Some maternal conditions were observed among women diagnosed with oligohydramnios. Hypertensive disorders of pregnancy were present in 9 cases (28.1%), while postdated pregnancy was observed in 7 cases (21.9%). Other associated conditions included intrauterine growth restriction and maternal anemia. (Table 6).

Table 6: Maternal Conditions Associated with Oligohydramnios

Associated Condition	Number	Percentage (%)
Hypertensive disorders	9	28.1
Postdated pregnancy	7	21.9
Intrauterine growth restriction	6	18.7

Maternal anemia	5	15.6
No associated condition	5	15.6
Total	**32**	**100**

DISCUSSION

The present hospital-based cross-sectional study assessed the prevalence of oligohydramnios among third-trimester pregnant women and found an overall prevalence of 12.8%. This finding is consistent with several studies conducted in tertiary care settings, where the reported prevalence ranges between 5% and 15%, reflecting a higher burden in hospital-based and high-risk populations. [11] Such variation in prevalence may be attributed to differences in study design, population characteristics, and access to antenatal care services.

In the current study, the majority of participants belonged to the 20–30 years age group (59.2%), which also accounted for the highest proportion of oligohydramnios cases (46.9%). This distribution is comparable to findings from other studies, where reproductive age groups constitute the largest proportion of obstetric populations. However, age itself may not be an independent risk factor; rather, associated maternal conditions and obstetric complications contribute significantly to reduced amniotic fluid volume. [12]

Parity-wise distribution in the present study showed that 56.3% of oligohydramnios cases occurred in primigravida women. Similar observations have been reported in previous studies, suggesting that primigravida women may be more frequently monitored and thus more likely to be diagnosed, or may have a higher incidence of pregnancy-related complications such as hypertensive disorders. [13] However, other studies have reported no significant association between parity and oligohydramnios, indicating that parity alone may not be a consistent predictor.

With respect to gestational age, the majority of oligohydramnios cases were observed between 32–36 weeks (40.6%), followed by term pregnancies (≥37 weeks, 37.5%). This trend aligns with physiological changes in amniotic fluid volume, which tends to decline toward term due to reduced placental efficiency and decreased fetal urine production. [14] Studies have also shown an increased incidence of oligohydramnios in postdated pregnancies, supporting the findings of the present study where 21.9% of cases were associated with postdated gestation.

Maternal conditions played a significant role in the occurrence of oligohydramnios in this study. Hypertensive disorders of pregnancy (28.1%) were the most common associated condition. This is in agreement with previous literature, which identifies uteroplacental insufficiency resulting from hypertension as a major cause of reduced amniotic fluid volume. [15] Reduced placental perfusion leads to decreased fetal renal blood flow and urine output, thereby contributing to oligohydramnios.

Other associated factors observed in this study included intrauterine growth restriction (18.7%) and maternal anemia (15.6%). These findings are consistent with earlier reports indicating that compromised fetal growth and poor maternal nutritional status can adversely affect placental function and amniotic fluid dynamics. [16] In addition, a proportion of cases (15.6%) had no identifiable associated condition, suggesting that idiopathic oligohydramnios remains a clinically relevant entity.

The clinical implications of oligohydramnios are significant due to its association with adverse perinatal outcomes. Previous studies have demonstrated increased risks of fetal distress, meconium-stained liquor, operative delivery, and neonatal intensive care unit (NICU) admissions in pregnancies complicated by oligohydramnios. [17] Although the present study primarily focused on prevalence, the identified burden underscores the importance of early detection and close fetal surveillance.

Ultrasonographic assessment using the amniotic fluid index (AFI), as employed in this study, remains a widely accepted and reliable method for evaluating amniotic fluid volume. However, some studies suggest that the single deepest vertical pocket method may reduce unnecessary interventions without compromising fetal outcomes. [18] Despite this, AFI continues to be extensively used in clinical practice due to its ease of measurement and widespread familiarity.

The relatively higher prevalence observed in this study may be attributed to its setting in a tertiary care hospital, where high-risk pregnancies are more likely to be referred. Additionally, factors such as maternal comorbidities, nutritional deficiencies, and variable access to antenatal care in developing regions may contribute to the increased burden of oligohydramnios. [11]

Overall, the findings of the present study highlight that oligohydramnios is a relatively common condition in the third trimester and is frequently associated with identifiable maternal and fetal risk factors. Routine antenatal ultrasonographic screening, especially in high-risk pregnancies, is essential for early diagnosis and timely intervention to improve maternal and perinatal outcomes.

CONCLUSION

The present study identified a 12.8% prevalence of oligohydramnios among third-trimester pregnant women, indicating that it is a relatively common obstetric condition. A higher proportion of cases was observed in primigravida women and during the late third trimester, highlighting the need for increased vigilance during this period.

Oligohydramnios was frequently associated with hypertensive disorders, postdated pregnancy, intrauterine growth restriction, and maternal anemia, emphasizing the role of maternal and placental factors in its development.

Routine antenatal ultrasonographic assessment of amniotic fluid is crucial for early detection. Timely diagnosis and appropriate monitoring can help guide clinical management and reduce the risk of adverse maternal and perinatal outcomes.

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