

FREQUENCY OF OLIGOHYDROMNIOS AMONG HYPERTENSIVE WOMEN IN THIRD TRIMESTER

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Abstract

Background

Oligohydramnios is a significant obstetric condition associated with adverse maternal and fetal outcomes, particularly in high-risk pregnancies such as those complicated by hypertension. Reduced amniotic fluid volume in the third trimester may lead to fetal distress, intrauterine growth restriction, and increased operative delivery rates

Objective

To determine the frequency of oligohydramnios among hypertensive pregnant women in the third trimester and to assess its association with selected maternal factors

Methodology

A descriptive cross-sectional study was conducted in the

Obstetrics and Gynecology

Department of a tertiary care hospital in Mansehra over six months. A total of 131 hypertensive pregnant women in their third trimester (≥ 28 weeks) were included using consecutive

sampling. Data were collected through questionnaires, medical records, and ultrasound reports. Oligohydramnios was defined as AFI < 5 cm. Data were analyzed using SPSS v25, with associations tested by Chi-square at $p \leq 0.05$.

Results

The frequency of oligohydramnios was 14.5% (19/131). It was slightly higher in women aged 18–30 years (17.2%) compared to 31–45 years (11.9%), and more common in preeclampsia (17.5%) than gestational hypertension (11.8%). By parity, the highest frequency was in parity 0 (25%), followed by parity 2 (13.3%) and parity 3 (12.9%), while primigravida and multigravida showed equal distribution (14.5% each).

Conclusion

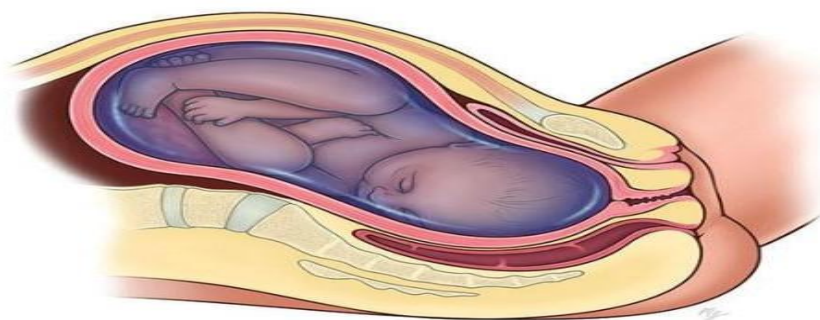
Oligohydramnios is common in hypertensive pregnancies, especially in preeclampsia and primiparous women. Early ultrasound detection and close monitoring are important for better maternal and fetal outcomes.

1- INTRODUCTION

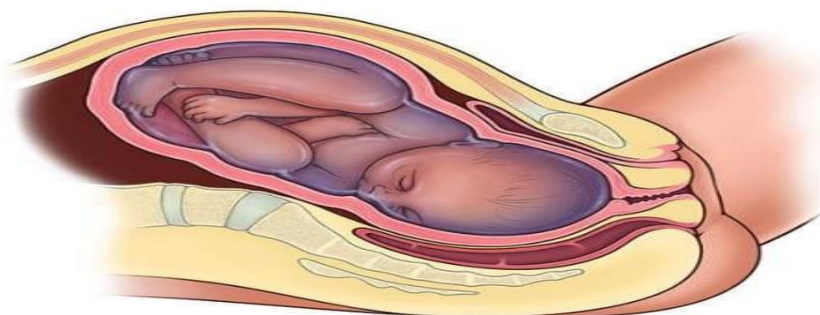
Oligohydramnios is characterized by decrease in Amniotic fluid level, leading to increase neonatal morbidity and adversely effects on both maternal and fetal outcomes. (oligohydramnios values). Amniotic fluid vital component surrounding the fetus in uterus, providing protection and nutrition (1). It plays a critical role in normal fetal growth, development and facilitating organogenesis (Amniotic fluid its role in fetal development and beyond). The Amniotic fluid undergoes recirculation, initially in the fetal lungs, followed by Absorption in the fetal Gastrointestinal tract (GIT) and is subsequent excreted through fetal urine production. Sufficient Amniotic fluid is crucial for fetal wellbeing. However, alterations in Amniotic fluid levels can leads to complications during pregnancy (2).

Oligohydramnios

Healthy amniotic fluid



Low amniotic fluid



Oligohydramnios is usually diagnosed on ultrasound in terms of the Amniotic fluid index (AFI) and deepest vertical Pocket. AFI of less than 5cm / single deepest Pocket of less than 2cm on ultrasound is the sign of oligohydramnios. Complications that can occur with oligohydramnios include fetal distress, birth Asphyxia, intrauterine growth restriction, prolonged labor, raise the chance of Cesarean section, meconium aspiration and ante placental insufficiency (3).

Low AFI in high risk of pregnancy and poor Apgar score at birth. Oligohydramnios is a leading cause of death during utero in the low- and middle-income countries, amounting to about 6.5%. Causes and Associated factors still birth in low middle income countries. Oligohydramnios occurs in 1-5% of pregnancies worldwide, with prevalence of 12% in post term or prolonged pregnancies (4). Factor associated with oligohydramnios, age, hydration status and fetal

condition in Nepal. Serial assessment of AFI in uncomplicated term in pregnancies prognosis value of AFI reduction. The complications of oligohydramnios have not been fully determined, particularly in developing countries. Prevalence rate, probable causes and perinatal outcomes in low middle income countries (5).

In Pakistan, pregnant Women in their 3rd trimester were diagnosed with oligohydramnios at Al Sadaqa teaching hospital, Gynecology and obstetrics Department in yeh period of study from 01January to 31 December 2020, with an Amniotic fluid index (AFI) of less than 5cm (6).

According to this study the prevalence of oligohydramnios is 1.5%. Upon reviewing the previous studies, it was noted that Anemia was identified as potential common cause of oligohydramnios as it can contribute to its development (7).

When decrease in Amniotic fluid (oligohydramnios), it can lead to kidney problems in the fetus, possibly due to congenital anomalies of urinary tract. Serial amnio infusion as regenerative therapy for plume hypoplasia in fetus with intrauterine renal failures. Numerous maternal and fetal factors contribute to oligohydramnios including rupture of membrane, Fetal Abnormalities, maternal illness, poor nutritional status, multiple pregnancies and intrauterine growth restriction (8).

Factor associated with oligohydramnios, age hydration). Delayed diagnosis of oligohydramnios often results in missed opportunities for timely intervention, adversely affecting fetal and maternal outcomes. The status of clinical diagnostic imaging service in Uganda regional Reffell hospital 2005. In spite of oligohydramnios leads to poor outcomes for newborns. There is limited data on oligohydramnios in Mansehra and Abbottabad (9). We are conducting research to identify factors and determines its prevalence are identifies in 3rd trimester, effective management can lead to improve delivery and Healthy care outcomes allowing for better control over the situation and ensuring delivery occurs at the optimal time.

Newly study conducted at Department of Obstetrics and Gynecology, Ayub teaching Hospital Abbottabad from September 2024 to March 2025. It identifies serious neonatal outcomes

associated with oligohydramnios, including meconium aspiration, respiratory distress syndrome and low birth weight which were prevalence among the affected neonate's pregnancy outcomes in pregnant women with oligohydramnios. The current research focuses on the outcomes of the condition, highlighting the result without emphasizing the specific outcomes (10).

In addition to the physiological importance of amniotic fluid, its assessment has become a key component in antenatal surveillance, particularly in high-risk pregnancies. Ultrasound-based measurement of the Amniotic Fluid Index (AFI) is widely used as a reliable, non-invasive method for evaluating fetal wellbeing. Reduced AFI is considered an early indicator of uteroplacental insufficiency and fetal compromise, especially in pregnancies complicated by maternal hypertension (11).

Hypertensive disorders of pregnancy, including gestational hypertension and preeclampsia, are among the leading causes of maternal and perinatal morbidity and mortality worldwide. These conditions result in vasoconstriction and endothelial dysfunction, which impair placental perfusion and reduce oxygen and nutrient supply to the fetus. Consequently, decreased fetal renal perfusion leads to reduced urine production, which is a major contributor to amniotic fluid volume in the second and third trimesters (12).

Furthermore, oligohydramnios in hypertensive pregnancies is not only a diagnostic concern but also a prognostic marker. Studies have shown that reduced amniotic fluid is associated with increased risks of fetal distress, low birth weight, preterm delivery, and higher rates of cesarean section (13). Therefore, timely identification and monitoring of AFI can play a crucial role in preventing adverse outcomes.

In developing countries like Pakistan, the burden of hypertensive disorders and their complications is further exacerbated by limited access to quality antenatal care, delayed diagnosis, and lack of awareness among pregnant women. Despite this, there remains a scarcity of region-specific data addressing the relationship between hypertension and oligohydramnios, particularly in smaller cities such as Mansehra. This gap highlights the importance of

conducting localized studies to better understand disease patterns and improve clinical management strategies (14).

Oligohydramnios in hypertensive pregnancies carries significant clinical implications and is considered an important predictor of adverse perinatal outcomes. Reduced amniotic fluid volume reflects underlying uteroplacental insufficiency, which may lead to compromised fetal oxygenation and nutrient supply. As a result, affected pregnancies are at increased risk of intrauterine growth restriction (IUGR), fetal distress, low Apgar scores, meconium aspiration, and perinatal mortality. Furthermore, oligohydramnios is associated with a higher likelihood of labor complications, including abnormal fetal heart rate patterns and increased rates of operative deliveries such as cesarean section (15).

From a clinical perspective, early identification of oligohydramnios allows timely intervention, including close fetal monitoring, decision regarding the timing of delivery, and prevention of avoidable complications. Therefore, routine ultrasound assessment of amniotic fluid volume, particularly in hypertensive pregnancies, is essential for improving both maternal and neonatal outcomes (16).

In the context of Pakistan, hypertensive disorders of pregnancy remain a major public health concern, contributing significantly to maternal and neonatal morbidity. However, most available studies in Pakistan have focused on general obstetric populations rather than specifically targeting high-risk groups such as hypertensive pregnant women (17).

Regional variations in socioeconomic status, nutritional factors, access to antenatal care, and healthcare infrastructure may influence the prevalence and outcomes of oligohydramnios. Despite these differences, there is a lack of localized evidence assessing the frequency and associated factors of oligohydramnios in hypertensive pregnancies within this region. This gap in knowledge limits the ability of healthcare providers to develop targeted management strategies (18).

Therefore, this study aims to address this gap by providing region-specific data on the

frequency of oligohydramnios among hypertensive pregnant women in the third trimester in Mansehra, which may help in improving early diagnosis, clinical decision-making, and overall pregnancy outcomes (19).

LITERATURE REVIEW

Oligohydramnios is a reduction in the amount of amniotic fluid, which is usually classified based on an amniotic fluid index (AFI) of less than 5 cm on ultrasound. Amniotic fluid is one of the most important factors of fetus development as it offers mechanical protection, movement, and lung development. A decreased amniotic fluid volume, especially during the third trimester, has been linked to the poor perinatal outcomes such as intrauterine growth restriction (IUGR), fetal distress, umbilical cord compression, and a higher risk of cesarean section (11).

Gestational hypertension and preeclampsia are a few of the most common hypertensive disorders of pregnancy that are the leading causes of maternal and neonatal morbidity globally. These conditions are characterized by increased vascular resistance and endothelial dysfunction, leading to compromised uteroplacental perfusion. As a result, fetal blood flow may be reduced, which can negatively affect amniotic fluid production. Studies have shown that hypertension during pregnancy is strongly associated with placental insufficiency, which may result in decreased fetal urine output a primary contributor to amniotic fluid volume in later gestation (13).

Several studies have demonstrated a significant association between hypertensive disorders and oligohydramnios. A study by Casey et al. (2000) reported that women with preeclampsia had a higher incidence of oligohydramnios compared to normotensive pregnancies. Similarly (14). found that reduced amniotic fluid volume was more prevalent in pregnancies complicated by hypertension due to impaired placental function.

Magann et al. (2011) further highlighted that oligohydramnios in hypertensive pregnancies is often indicative of chronic placental insufficiency and is associated with poor fetal outcomes. These findings emphasize the importance of monitoring amniotic fluid levels in high-risk

pregnancies (20).

The third trimester is a critical period of fetal growth and development whereby the amount of amniotic fluid is highly reliant on fetal urine production and placenta. Oligohydramnios occurring during this stage is particularly concerning as it is strongly associated with fetal compromise and adverse delivery outcomes (16).

Research indicates that third trimester oligohydramnios is linked with increased risks of labor complications, including fetal heart rate abnormalities and operative interventions. Therefore, early detection in this stage is essential for appropriate clinical management. The reported prevalence of oligohydramnios varies across different populations and study settings. Globally, it is estimated to occur in approximately 1–5% of all pregnancies, with higher rates observed in high-risk groups such as hypertensive women (18).

A study conducted in South Asia reported an increased frequency of oligohydramnios among women with hypertensive disorders, suggesting regional variations influenced by maternal health status, nutrition, and access to antenatal care (21).

In Pakistan, limited studies have explored oligohydramnios specifically among hypertensive pregnant women. Most available research focuses on general obstetric populations, with insufficient emphasis on high-risk groups. Additionally, there is a lack of data from smaller cities such as Mansehra, where healthcare access and maternal health indicators may differ significantly from urban centers.

This lack of localized evidence highlights the need for region-specific studies to better understand the burden of oligohydramnios in hypertensive pregnancies and to guide clinical decision-making in these settings (22).

RATIONALE:

Hypertensive disorders of pregnancy, including gestational hypertension and preeclampsia,

significantly contribute to maternal and perinatal morbidity by impairing uteroplacental circulation. This compromised perfusion can lead to reduced amniotic fluid volume, known as Oligohydramnios, particularly in the third trimester. Oligohydramnios is associated with adverse fetal outcomes such as intrauterine growth restriction, fetal distress, and increased operative deliveries.

Despite established global evidence, there is a lack of region-specific data in Mansehra regarding the frequency of oligohydramnios among hypertensive pregnant women. Local variations in healthcare access and maternal factors necessitate context-specific research. Therefore, this study aims to generate local evidence to support timely diagnosis and improve maternal fetal outcomes.

AIMS AND OBJECTIVES:

1. General Objective

- To determine the frequency of oligohydramnios among hypertensive pregnant women in the third trimester.

2. Specific Objectives

- To assess the distribution of oligohydramnios across different maternal age groups.
- To calculate the proportion of hypertensive pregnant women presenting with oligohydramnios.
- To evaluate the association between parity (primigravida vs multigravida) and oligohydramnios.

STUDY GAP

- There is limited evidence regarding the frequency of oligohydramnios among hypertensive pregnant women in Pakistan or specifically in Kpk.
- Most existing studies focus on the general obstetric population, rather than specifically targeting hypertensive pregnancies.

- No Study specifically compare association between parity (primigravida vs multigravida) and oligohydramnios.

2- RESEARCH METHODOLOGY

2.1 Study Design

A cross-sectional study will be conducted.

2.2 Study Setting

The study will be conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital in Mansehra (King Abdullah Teaching Hospital, Mansehra).

2.3 Study Duration

The study will be carried out over a period of six months (e.g., January 2026 to June 2026).

2.4 Study Population

The study population will include pregnant women diagnosed with hypertension presenting in the third trimester (≥ 28 weeks of gestation).

2.5 Sample Size

The sample size will be calculated using the WHO sample size formula:

$$n = \frac{Z^2 \times P(1 - P)}{d^2}$$

Where:

- $Z = 1.96$ (95% confidence level)
- $P = 0.094$ (9.4%)
- $d = 0.05$ (5%)

$$n = (1.96)^2 \times 0.094 \times (1 - 0.094) / (0.05)^2$$

$$n = 3.84 \times 0.094 \times 0.906 / 0.0025$$

$$n = 0.327 / 0.0025$$

$$(n = 131)$$

WHO formula ($n = Z^2 \times P(1-P) / d^2$) was used to calculate the sample size. With a 95% confidence level and a margin of error of 5 by taking the prevalence of 9.4% in an earlier study, the resulting sample size was 131 (20).

2.6 Sampling Technique

Non-probability consecutive sampling technique will be used.

2.7 Inclusion Criteria

- Pregnant women diagnosed with hypertension (gestational hypertension or preeclampsia)
- Gestational age ≥ 28 weeks
- Age between 18–45 years
- Singleton pregnancy
- Willing to provide informed consent

2.8 Exclusion Criteria

- Multiple pregnancies (e twins or triplets)
- Premature rupture of membranes
- Known fetal congenital anomalies
- Patients with chronic renal diseases

2.9 Data Collection Tool

Data will be collected using:

- A structured questionnaire
- Patient medical records
- Ultrasound reports for measurement of amniotic fluid index (AFI)

2.10 Data Collection Procedure

Eligible participants will be recruited from the outpatient department (OPD) and inpatient wards. After obtaining informed consent, demographic and clinical data will be recorded using a structured questionnaire. Blood pressure measurements will be taken to confirm hypertension status. Ultrasound reports will be reviewed to obtain AFI values. Oligohydramnios will be defined as AFI < 5 cm.

1.12 Data Analysis

- Data entry and analysis SPSS version 25 will be used to enter and analyze data.
- Descriptive statistics (frequency, percentage) will be used to determine the frequency of oligohydramnios.
- All data Will be in Table form and Graphs and charts.
- A p-value ≤ 0.05 will be considered statistically significant.

2.13 Ethical Considerations

- Ethical approval will be obtained from the Institutional Review Board (IRB).
- All the participants will receive informed consent through writing.
- Patient data will have confidentiality and anonymity.
- The study will not be harmful to participants in any way.

3- RESULTS

3.1 AGE DISTRIBUTION:

The age distribution shows that the majority of participants were within the reproductive age group, with a higher proportion falling between 31–45 years compared to younger women. This indicates that hypertensive pregnancies were more commonly observed in relatively older maternal age groups. The distribution reflects typical obstetric trends where advanced maternal age is associated with increased pregnancy-related complications.

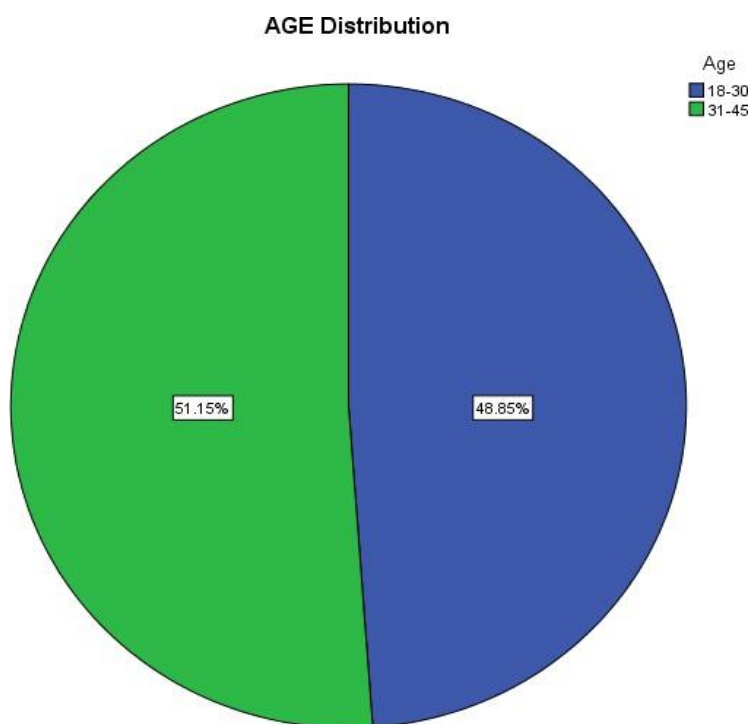


Figure: 3.1 Age Distribution

3.2 : PREVALANCE OF OLIGOHYDRAMNIOS

The overall prevalence of oligohydramnios in the study population was 19 out of 131 patients. The majority of hypertensive pregnant women did not develop oligohydramnios. However, a considerable proportion was affected, highlighting its clinical importance in high-risk pregnancies.

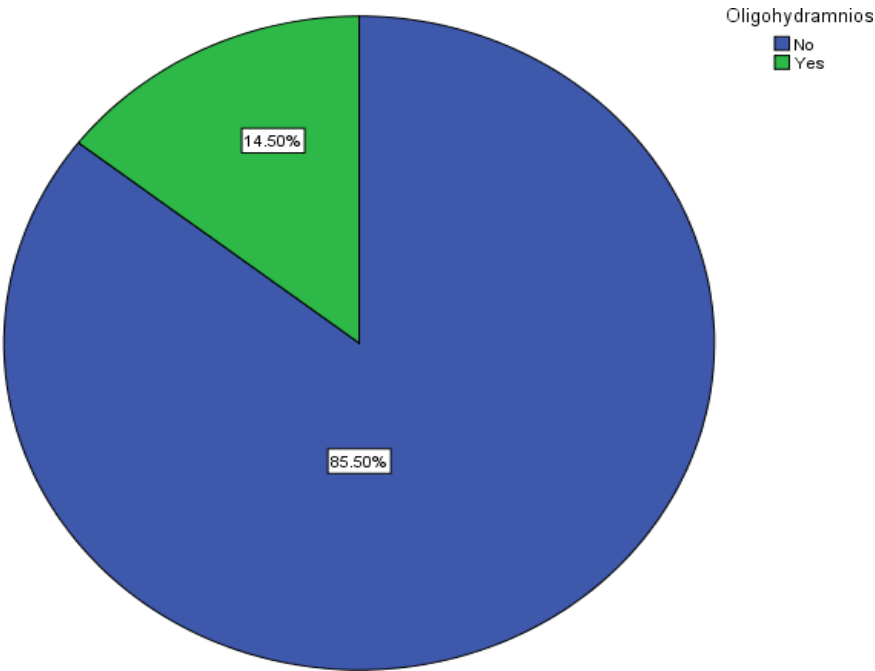


Figure: 3.2: prevalence of oligohydramnios

3.3 : PRIMIGRAVIDA VS MULTIGRAVIDA

The distribution of gravida type indicates that multigravida women were slightly more frequent than primigravida in the study population. This suggests that women with previous pregnancies constituted a larger proportion of hypertensive cases. The difference, however, was not markedly significant between the two groups.

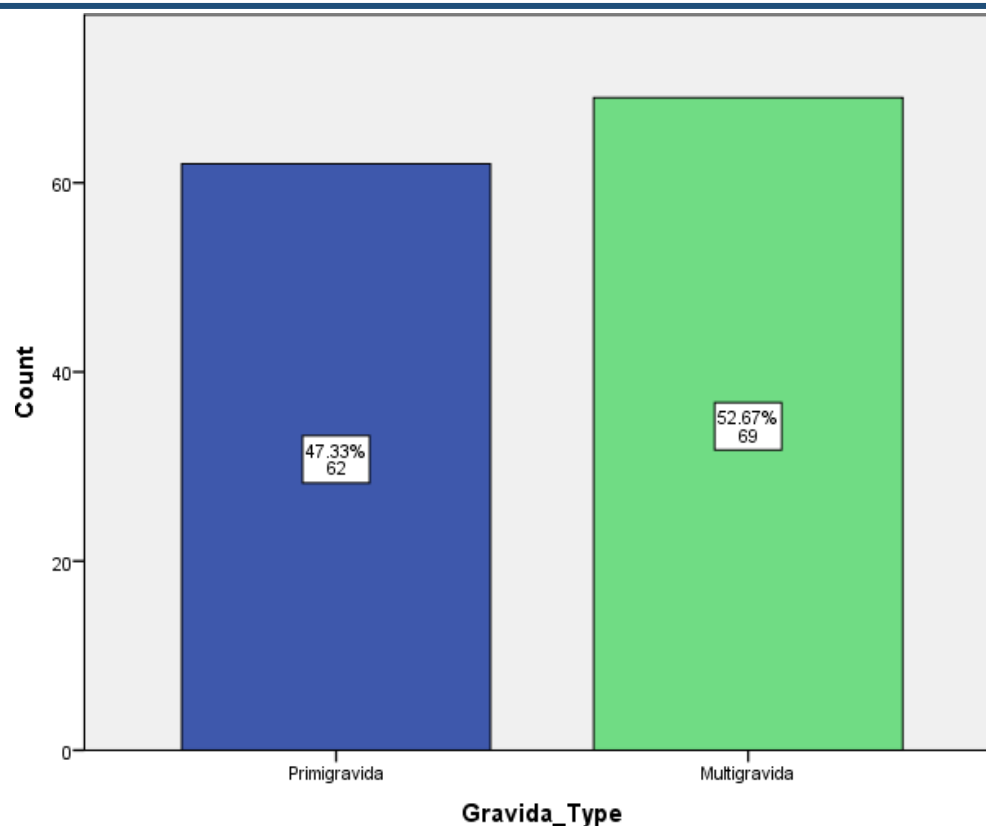


Figure: 3.3: Primigravida Vs Multigravida

3.4 TYPE OF HYPERTENSION

The study shows that both gestational hypertension and preeclampsia were almost equally represented among participants. Slight variation was observed between the two groups, indicating that both conditions are common in third trimester pregnancies. This reflects the diverse spectrum of hypertensive disorders in pregnancy.

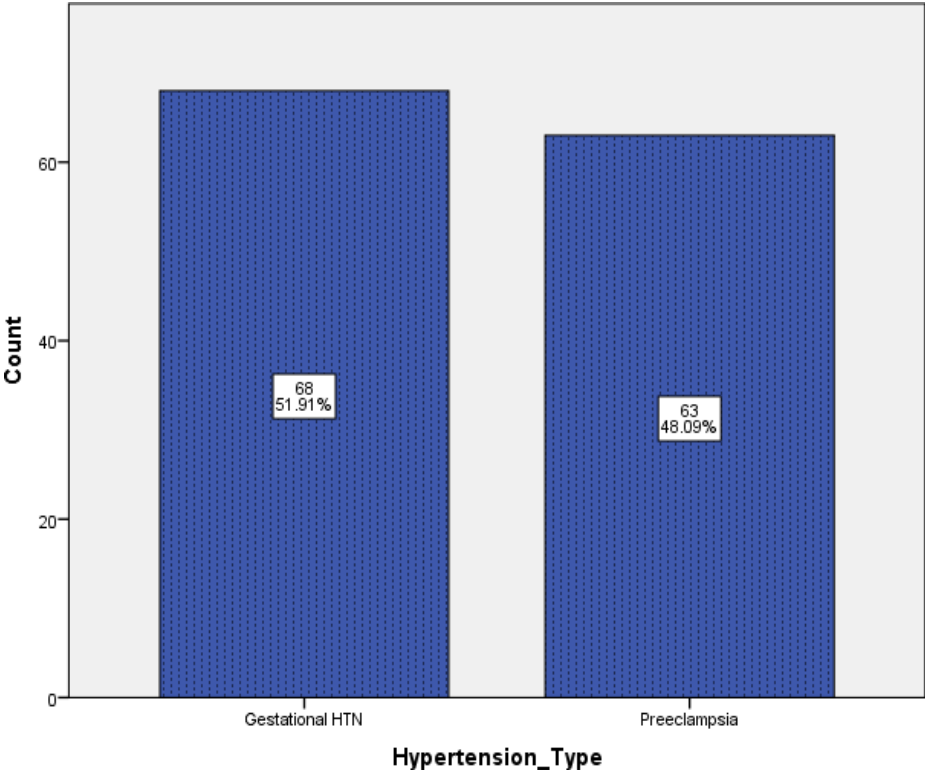


Figure: 3.4 Type of Hypertension

3.5 PARITY (NUMBERS OF PRAGNENCIES):

The parity distribution demonstrates that patients were spread across different parity levels, with a noticeable number of women having parity between 0 and 3. A relatively lower number of cases were observed in higher parity groups. This indicates that hypertensive pregnancies are not limited to a specific parity level but are distributed across all groups.

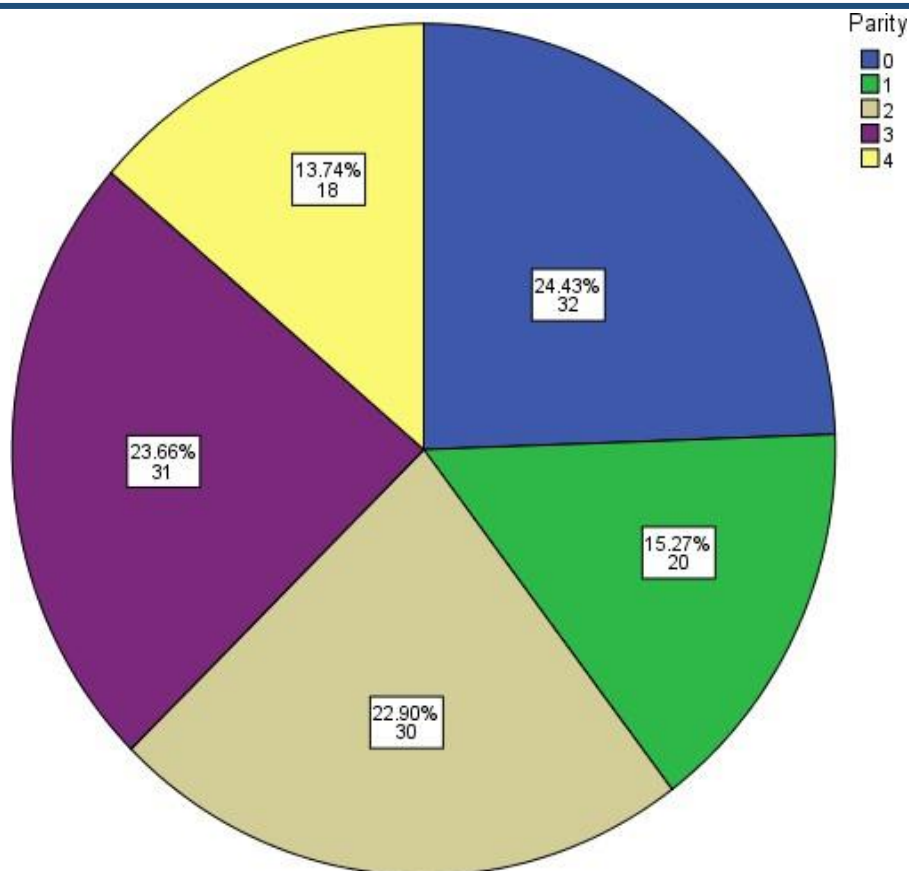


Figure:3.5 Parity (Numbers of Pregnancies):

3.6 CROSS TABULATION

3.6.1 AGE WITH OLIGOHYDRAMNIOS

The results show that oligohydramnios was slightly more common in the younger age group (18–30 years) with 11 cases compared to 8 cases in the 31–45 years group. However, the overall distribution is relatively similar between both age groups. This suggests that maternal age may not have a strong influence on the occurrence of oligohydramnios in this study population.

Age with Oligohydramnios Crosstabulation

Table: 3.6.1 Age with Oligohydramnios Crosstabulation

	Oligohydramnios		Total
	No	Yes	
Age 18-30	53	11	64
31-45	59	8	67
Total	112	19	131

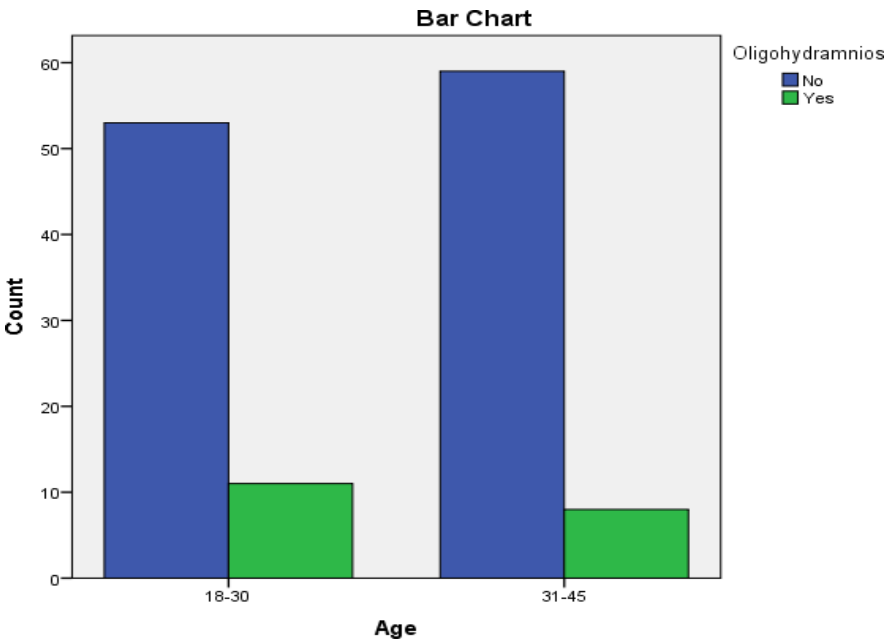


Figure:3.6.1 Age with Oligohydramnios Crosstabulation

3.6.2 HYPERTENSION WITH OLIGOHYDRAMNIOS

Oligohydramnios was more frequently observed in patients with preeclampsia (11 cases) compared to gestational hypertension (8 cases). This indicates a higher risk of reduced amniotic fluid in more severe hypertensive conditions. The findings suggest a possible association between

the severity of hypertension and oligohydramnios.

Hypertension with oligohydramnios

Table:3.6.2 Hypertension with oligohydramnios

	Oligohydramnios		Total
	No	Yes	
Gestational HTN	60	8	68
Hypertension Type			
Preeclampsia	52	11	63
Total	112	19	131

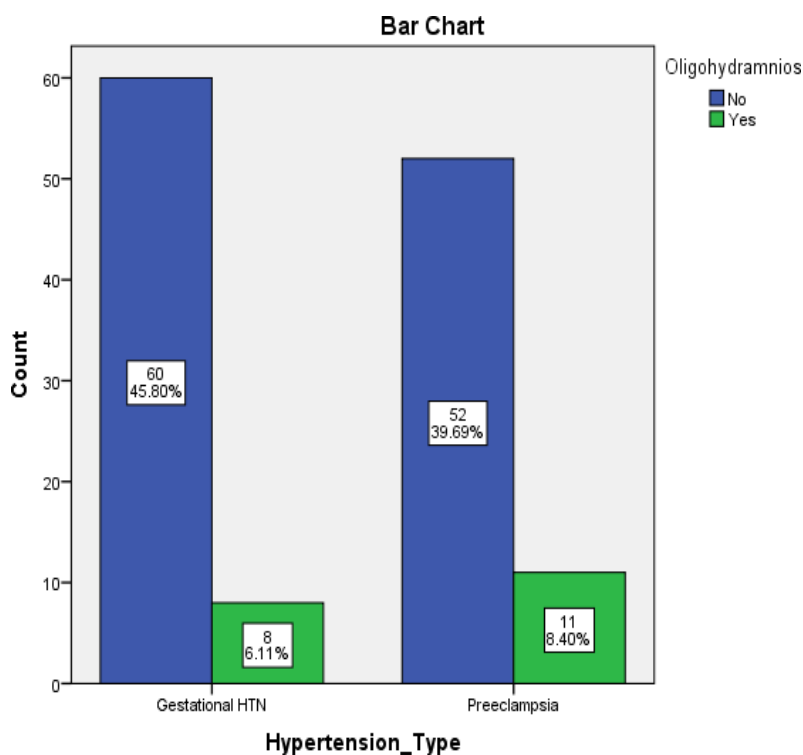


Figure:3.6.2 Hypertension with oligohydramnios

3.6.3 PARITY WITH OLIGOHYDRAMNIOS

The highest number of oligohydramnios cases was observed in women with parity 0 (8 cases), followed by parity 2 and 3 (4 cases each). Lower frequencies were noted in higher parity groups. This pattern suggests that first-time pregnancies may have a relatively higher occurrence of oligohydramnios compared to multiparous women.

Parity with Oligohydramnios Crosstabulation

Table:3.6.3 Parity with Oligohydramnios Crosstabulation

		Oligohydramnios		Total
		No	Yes	
Parity	0	24	8	32
	1	18	2	20
	2	26	4	30
	3	27	4	31
	4	17	1	18
Total		112	19	131

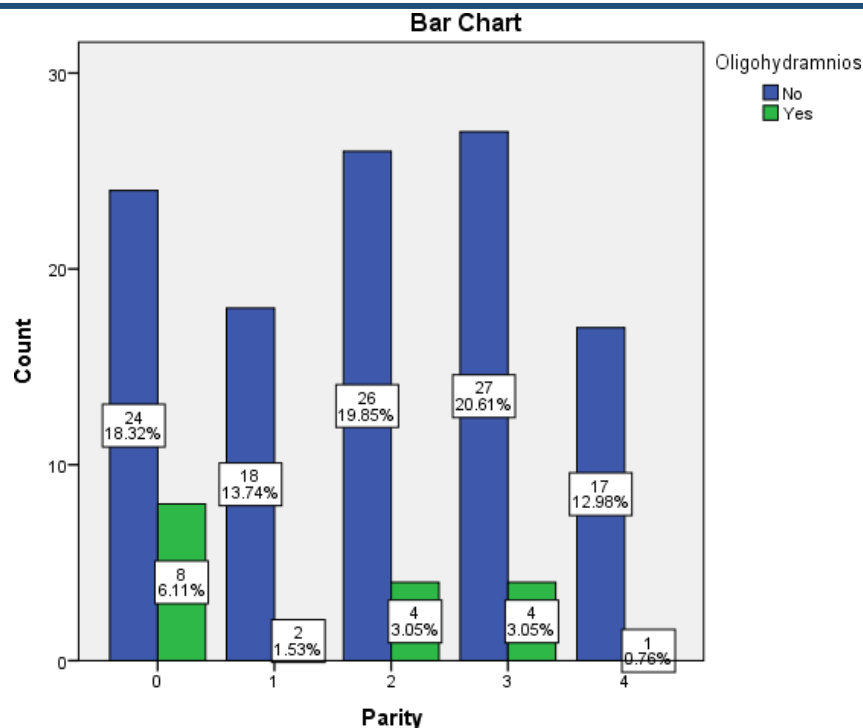


Figure:3.6.3 Parity with Oligohydramnios

3.6.4 GRAVIDA TYPE WITH OLIGOHYDRAMNIOS

Oligohydramnios was slightly more common in multigravida women (10 cases) compared to primigravida (9 cases). However, the difference between the two groups is minimal. This indicates that gravida status may not significantly influence the occurrence of oligohydramnios in hypertensive pregnancies.

Table 3.6.4 Gravida Type with Oligohydramnios

Gravida Type with Oligohydramnios	Oligohydramnios		Total
	No	Yes	
Primigravida	53	9	62
Multigravida	59	10	69
Total	112	19	131

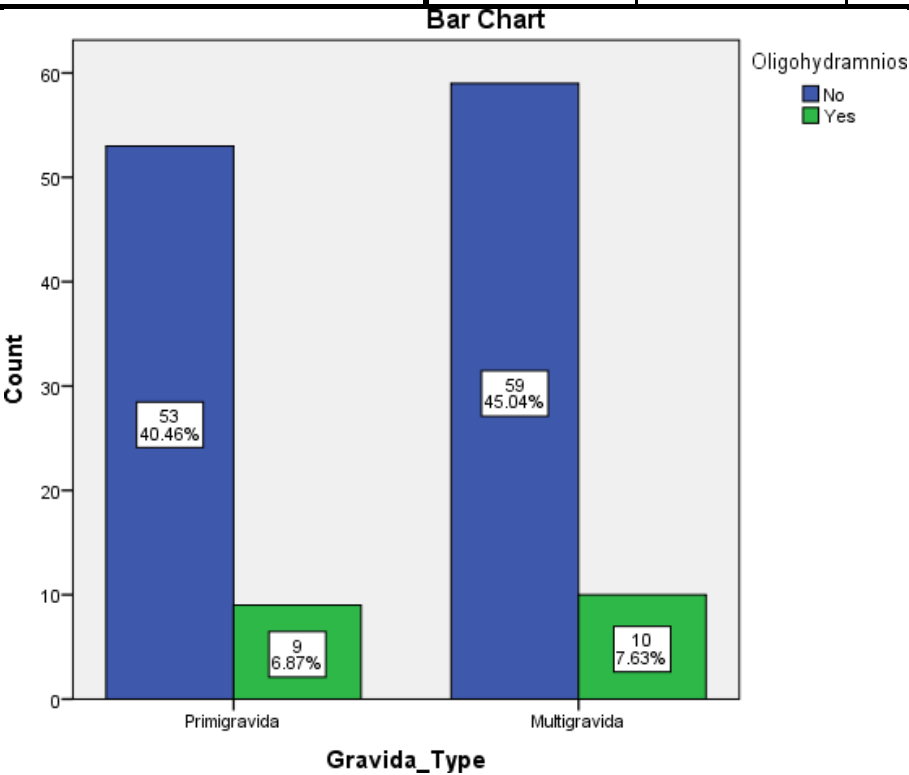


Figure 3.6.4 Gravida Type with Oligohydramnios

4 DISCUSSION

This research was carried out to find out the prevalence of Oligohydramnios in pregnant women carrying hypertension during the third trimester and to ascertain its correlation with the desired

maternal variables such as age, parity, status of gravida as well as the type of hypertension.

In the present study, oligohydramnios was observed in 19 out of 131 patients (14.5%), indicating a considerable burden among hypertensive pregnant women. This finding is higher than the global prevalence (1–5%) reported in general obstetric populations (14) which may be due to the high-risk nature of the selected population.

A similar study conducted by Chaudhry et al. (2017) also reported an increased frequency of oligohydramnios in hypertensive pregnancies, supporting the findings of the current study. The higher prevalence in hypertensive women can be attributed to impaired uteroplacental perfusion, which reduces fetal urine output and ultimately decreases amniotic fluid volume.

Age and Oligohydramnios

The current study demonstrated that oligohydramnios was slightly more frequent in the younger age group (18–30 years) compared to older women. However, the difference was not substantial, suggesting that maternal age may not be a strong independent predictor of oligohydramnios in hypertensive pregnancies.

These findings are consistent with previous studies, which indicate that although advanced maternal age is associated with increased obstetric risks, its direct relationship with oligohydramnios remains inconclusive (18). Therefore, other clinical factors such as hypertension severity may play a more significant role.

Type of Hypertension and Oligohydramnios

In this study, oligohydramnios was more frequently observed in patients with preeclampsia (11 cases) compared to those with gestational hypertension (8 cases). This suggests that more severe forms of hypertension are associated with a higher risk of reduced amniotic fluid.

This finding is supported by Casey et al. (2000), who reported a higher incidence of oligohydramnios in preeclamptic women due to placental insufficiency. Similarly,

Cunningham et al. 2018 explained that endothelial dysfunction in preeclampsia leads to reduced uteroplacental blood flow, thereby affecting amniotic fluid production. (20)

Parity and Oligohydramnios

The study findings revealed that oligohydramnios was more commonly observed in women with parity 0 (primiparous), followed by lower frequencies in higher parity groups. This indicates that first-time mothers may be at relatively higher risk.

These results are in agreement with studies suggesting that primigravida women are more prone to pregnancy complications, including hypertensive disorders and their associated outcomes (21). However, some studies report no significant association between parity and oligohydramnios, indicating variability across populations.

Gravida Type and Oligohydramnios

The comparison between primigravida and multigravida women showed only a minimal difference in the occurrence of oligohydramnios (9 vs 10 cases). This suggests that gravida status alone may not be a strong determinant of oligohydramnios in hypertensive pregnancies (22).

Similar findings were reported by Locatelli et al. 2004 where no significant difference was observed between gravida groups. This indicates that while gravida status is clinically relevant, it may not independently influence amniotic fluid levels without the presence of other risk factors.

Clinical Implications

The findings of this study highlight that oligohydramnios is relatively common among hypertensive pregnant women, particularly in cases of preeclampsia. Early identification through ultrasound assessment of AFI is essential for timely intervention. Regular monitoring of high-risk pregnancies can help reduce adverse maternal and fetal outcomes.

5- CONCLUSION

This study concluded that the frequency of Oligohydramnios among hypertensive pregnant women in the third trimester was 14.5% (19/131), indicating a notable burden in this high-risk group. Age-wise distribution showed that oligohydramnios was slightly more common in women aged 18–30 years (17.2%: 11/64) compared to 31–45 years (11.9%: 8/67), suggesting no strong age-related variation. Regarding hypertension type, a higher proportion was observed in preeclampsia (17.5%: 11/63) compared to gestational hypertension (11.8%: 8/68), indicating a greater risk with severe hypertensive conditions.

In terms of parity, the highest frequency was noted in women with parity 0 (25%: 8/32), followed by parity 2 (13.3%: 4/30) and parity 3 (12.9%: 4/31), while lower rates were observed in parity 1 (10%: 2/20) and parity 4 (5.6%: 1/18). This suggests a relatively higher occurrence among first-time mothers. Gravida status showed nearly equal distribution, with oligohydramnios present in 14.5% of primigravida (9/62) and 14.5% of multigravida (10/69), indicating no significant difference between the two groups.

Overall, the findings suggest that oligohydramnios is relatively common among hypertensive pregnancies, particularly in cases of preeclampsia and primiparous women, highlighting the need for careful monitoring in such patients.

LIMITATIONS

- The study was conducted in a single-center setting, which may limit the generalizability of results.
- The sample size (131), although adequate, was relatively small for broader population representation.
- The study design was cross-sectional, so causal relationships could not be established.
- Some potential confounding factors such as maternal nutrition, hydration status, and socioeconomic status were not assessed.

- Lack of follow-up prevented evaluation of maternal and neonatal outcomes associated with oligohydramnios.

RECOMMENDATIONS

- Regular antenatal ultrasound screening (AFI measurement) should be emphasized in hypertensive pregnancies, especially in the third trimester.
- Special attention should be given to patients with preeclampsia, as they show a higher risk of oligohydramnios.
- Early identification and monitoring of primigravida women may help in reducing complications.
- Larger multi-center studies should be conducted to improve generalizability of findings.
- Future research should include maternal and fetal outcomes to better understand the clinical impact of oligohydramnios.
- Health education programs should be implemented to improve antenatal care awareness among pregnant women.

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