

Frequency of Ultrasonographically Detectable Fetal Anomalies in Known Oligohydramnios Pregnancies

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ABSTRACT

Background: The amniotic fluid protects and cushions the developing baby. Reduced amniotic fluid, or oligohydramnios, is linked to a higher rate of birth defects. **Objective:** To find out the frequency of ultrasonographically detectable fetal anomalies in pregnancies complicated by oligohydramnios. **Study Design:** Cross sectional study. **Settings:** Department of Diagnostic Radiology, University of Child Health Sciences (UCHS), Children Hospital, Lahore Pakistan. **Duration:** 6th October 2020 to 5th April 2021. **Methods:** A total of 173 women 19 to 40 years old having oligohydramnios during their second or third trimester of pregnancy were included. Patients with multiple gestation and intrauterine fetal death were excluded. They were scanned in detail with ultrasound machine having a convex 3.5 MHz probe for the severity of Amniotic Fluid Index (AFI) and for congenital fetal anomalies. Patients' demographics and clinical characteristics were recorded. **Results:** Age range in this study was from 19 to 40 years with mean age of 27.8±5.1 years. Majority of the patients 144(83.23%) were between 25 to 35 years of age. Among pregnancies complicated by oligohydramnios, 39(22.54%) were reported to have ultrasonographically identifiable foetal abnormalities. Among the females, 58 (33.52%) had a vaginal delivery, while 115(66.47%) underwent a cesarean delivery. Still births observed in 7(4.04%), fetal renal tract anomalies 17(9.82%), fetal distress 13(7.51%), musculoskeletal anomalies 11(6.35%), cardiac anomalies 5(2.89%), central nervous system anomalies 6(3.46%), gastrointestinal anomalies 13(7.51%) hydronephrosis 6(3.46%), hydrocephalus 4(2.31%), meningocele 3(1.73%), diaphragmatic anomalies 5(2.89%) and hernias was noted in 8(4.62%) females. Lastly, multiple congenital anomalies were identified in 17(9.82%) cases. **Conclusion:** This study concluded that frequency of ultrasonographically detectable fetal anomalies in pregnancies complicated by oligohydramnios is quite high.

Keywords: Oligohydramnios, Fetal anomalies, Ultrasonography, Pregnancies, Amniotic Fluid Index, Delivery

INTRODUCTION

The volume of amniotic fluid in the body is one of the most important factors in determining a safe pregnancy, which act as a cushion for the fetus, stops the umbilical cord from being compressed, and helps the fetus' lungs develop.^{1,2} Decreased volume of amniotic fluid relative to gestational age characterizes oligohydramnios. Over the course of a pregnancy, amniotic fluid volume (AFV) increases linearly until around 34–36 weeks of gestation, until it reaches a steady

state of about 400 mL and maintains that level till delivery.³ Birth volumes in post-term pregnancies tend to be smaller because the AFV starts to decrease about week 40 of pregnancy. Clinical evaluation of AFV is possible all during pregnancy by measuring fundal height and analyzing ultrasound images.⁴ If the Amniotic Fluid Index (AFI) is below 5 cms, or smaller than 5% to approximately the amniotic fluid volume, an ultrasound performed during the late second or early third trimester of pregnancy can reveal oligohydramnios.⁵

Rates of oligohydramnios among pregnant women range from 0.5% to 8% in areas with widespread access to ultrasound technology. The risk of fetal anomalies and other pregnancy issues increases when oligohydramnios is present, which occurs in up to 37% of pregnancies.⁶ Rates of occurrence of oligohydramnios populations and the related effects are mainly unknown in contexts pertaining to low- and middle-income countries (LMICs), however, because ultrasonography is not widely used during routine prenatal treatment in these areas.^{7,8} Congenital fetal abnormalities, premature membrane rupture, uteroplacental insufficiency, hypertensive disease and placental abruption after delivery are all linked to oligohydramnios. There is strong evidence linking it to increased rates of maternal and fetal illness and death. Mechanically, amniotic fluid serves primarily to insulate the umbilical cord from the harsh environment of labor.⁹ In the absence of this padding, the umbilical cord can become compressed between the fetus and the uterine wall during contractions or fetal movement, leading to fetal distress and the attendant risks of low Apgar scores, neonatal acidosis, meconium staining, cesarean section, and operative vaginal delivery.^{10,11}

Some fetal anomalies may be better if the condition is diagnosed and treated promptly. However, there are still unanswered questions about oligohydramnios, such as its prevalence in low- and middle-income countries (LMIC), its underlying causes and its connection to unfavorable pregnancy outcomes. To fill this gap, we therefore aimed to find out the frequency of fetal anomalies that could be diagnosed with ultrasound in pregnant patients with oligohydramnios.

METHODS

After approval from the hospital's ethical review board (ERB), this cross-sectional study was conducted at Department of Diagnostic Radiology, University of Child Health Sciences (UCHS), Children Hospital, Lahore Pakistan and will include in-patients as well as out-patients presenting with oligohydramnios during second or third trimester of pregnancy from 6th October 2020 to 5th April 2021. Informed consent was taken from patients.

Sample size of 173 cases is calculated by using the WHO sample size calculator, with a margin of error of 7%, a confidence interval of 95%, and an incidence of fetal abnormalities of 18.33%.²⁰ Non-probability, consecutive sampling method was used. A thorough history, general physical exam, and standard investigation were completed. Pregnant women 19 to 40 years old having oligohydramnios during their second or third trimester of pregnancy having singleton pregnancy and AFI up to 5 cm were included in this study. Premature membrane rupture, intrauterine foetal growth retardation (FGR), chronic sickness in the mother, foetal abnormalities, and

chromosomal disorders are all examples of secondary causes of oligohydramnios. Foetal chromosomal or genetic disorders, preterm birth and current or previous intrauterine foetal mortality were all reasons for exclusion.

All women admitted to our obstetric emergency room or delivery ward had their amniotic fluid assessed by ultrasonography as part of their prenatal care. The obstetricians checked the amniotic fluid with abdominal ultrasound machine having a convex 3.5 MHz probe for Amniotic Fluid Index (AFI) and for congenital fetal anomalies. Patients' demographics and clinical characteristics were recorded on the approved pro forma.

The statistical analysis was executed using SPSS software, version 21.0. Results were presented as (SD) for numerical variables like maternal age, gestational age, occupation and gravidity. Frequencies and percentages were calculated for categorical variables. Chi square test was applied and p-value ≤ 0.05 was considered as statistically significant.

RESULTS

The mean age of the included females were 27.8 years, with a standard deviation of 5.1 year. A detail of demographics like maternal age, occupation, gravidity and gestational age is given in table 1. Among the females, 58 (33.52%) had a vaginal delivery, while 115 (66.47%) underwent a cesarean delivery. In the context of fetal abnormalities, 39 (22.54%) females experienced fetal anomalies, while 51 (29.47%) females did not encounter fetal anomalies as shown in table 2.

In terms of birth weight, 155 (89.59%) females had a birth weight of 2500 grams or more, while 18 (10.40%) females had a birth weight of less than 2500 grams. Among the females, 147 (84.97%) had meconium-stained amniotic fluid, 26 (15.02%) did not have meconium-stained amniotic fluid. Regarding NICU admission, 21 (12.13%) females were admitted to the Neonatal Intensive Care Unit (NICU), 152 (87.86%) females were not admitted to the NICU. For the 5th minute Apgar scores, 163 (94.21%) females had an Apgar score of 7 or higher, 10 (5.78%) females had an Apgar score below 7 as shown in table 3. Fetal abnormalities in pregnant women with oligohydramnios like still births 7(4.04%), fetal renal tract anomalies 17(9.82%), fetal distress 13(7.51%), hydrocephalus 4(2.31%), meningocele 3 (1.73%), diaphragmatic anomalies 5 (2.89%) and hernias was noted in 8 (4.62%) females. Lastly, multiple congenital anomalies were identified in 17 cases, making up 9.82% of the dataset as shown in table 4.

Table 1: Demographic details of the included patients

Variables	Characteristics	No. of Patients	Percentage
Age	Mean ± SD	27.8±5.1	-
	19-24	9	5.20%
	25-35	144	83.23%
	36-40	20	11.56%
Occupation	Housewife	73	42.19%
	Self employed	22	12.71%
	Government	68	39.30%
	Unemployed	10	5.78%
Gravidity	I	68	39.30%
	II-IV	82	47.39%
	≥V	23	13.29%
Gestational age	Early term	63	36.41%
	Full term	48	27.74%
	Late term	27	15.60%
	Post term	25	14.45%

Table 2: Mode of delivery of included females (n=173)

Variables	Characteristics	No. of Patients	Percentage
Mode of delivery	Vaginal	58	33.52%
	Cesarean	115	66.47%
Fetal anomalies	Yes	39	22.54%
	No	51	29.47%

Table 3: Perinatal outcomes in oligohydramnios mothers (n=150)

Variables	Characteristics	No. of Patients	Percentage
Birth weight	≥ 2500 gram	155	89.59
	< 2500 gram	18	10.40
Presence of MSAF	Yes	147	84.97
	No	26	15.02
NICU admission	Yes	21	12.13
	No	152	87.86
5th minute Apgar score	≥ 7	163	94.21
	< 7	10	5.78

Table 4: Fetal abnormalities in pregnant women with oligohydramnios

Variables	No. of Patients	Percentage
Fetal renal tract	17	9.82%
Still Births	7	4.04%
Fetal distress	13	7.51%
Musculoskeletal	11	6.35%
Cardiac	05	2.89%
CNS	06	3.46%
Gastrointestinal	13	7.51%
Hydronephrosis	06	3.46%
Hydrocephalus	04	2.31%
Meningocele	03	1.73%
Diaphragmatic	05	2.89%
Hernia	08	4.62%
Multiple congenital	17	9.82%

DISCUSSION

Although oligohydramnios increases the risk to the fetus, there are strategies to improve the mother's chances of having a healthy baby and a successful delivery. The natural history of solitary oligohydramnios is unclear, and so is its potential for harm.^{12,13} The association between AFI and a negative perinatal outcome has been debated due to the complex interplay of numerous pregnancy problems, especially in preterm patients.¹⁴ However, a systematic review and meta-analysis revealed significantly increased rates of cesarean delivery, inductions of labor, and short-term newborn morbidity, such as poor Apgar scores and trips to the neonatal intensive care unit. Some studies have identified an association between oligohydramnios and pregnancies complicated by fetuses with growth restrictions, while others have found no such link.¹⁵

In the present study, 83.23% of cases were in the age group of 20 to 29 years, as compared to other age groups, with the mean maternal age of 27.8±5.1 years. The results of a study conducted by Jun Zhang and colleagues showed that the average maternal age was 23.6±6.5 years, which is comparable to the results of our study.¹⁶ The overall prevalence of oligohydramnios in this study was 3.2%, while the prevalence at term was 2.6%. In a community hospital, oligohydramnios (AFI <5.0 cm) was reported in 12% of cases by Chauhan et al., which is consistent with our findings.¹⁷

Composite unfavorable perinatal outcome occurred in 81 mothers (22.54%). The prevalence of a composite unfavorable outcome was higher than the 9.7 percent found in Israeli studies.¹⁸ The variations in structure explain this phenomenon. While Eshawal et al.'s study was conducted in a well-resourced hospital, we conducted ours in a university hospital without access to sophisticated intrapartum monitoring equipment such electronic fetal monitoring and tracing & pattern interpretation.¹⁹ In our study, anomalies were found in 22.54% of the cases studied. Almost similar incidence of abnormalities was reported to 18.33% by KC Poudel et al. (2019) in his study.²⁰

Renal abnormalities were the most common anomaly we discovered, which is consistent with the results of the study by Shipp TD et al.²¹ Similar to the study of Stroll C et al., musculoskeletal and gastrointestinal abnormalities were also common.²² Studies by Hill LM et al.²³ and Chamberlain PF et al. revealed further defects, including as heart and central nervous system anomalies. According to the research, between 4 and 11 percent of oligohydramnios cases involve some sort of urinary tract abnormality.²⁴

CONCLUSION

This study found that oligohydramnios pregnancies have a significantly higher prevalence of ultrasonographically identifiable foetal abnormalities. Finally, this study confirmed that routine ultrasound examination can detect prenatal defects by measuring amniotic fluid levels.

LIMITATIONS

Study contains a relatively small number of participants.

SUGGESTIONS / RECOMMENDATIONS

Large-scale research should be done in future studies.

CONFLICT OF INTEREST / DISCLOSURE

None.

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