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Correlation of Amniotic Fluid Index (Afi) with Maternal and Perinatal Outcome in Antenatal Patients at Term Gestation

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ABSTRACT

To assess the maternal and perinatal outcome with varying levels of Amniotic Fluid Index (AFI) in low risk antenatal women at term gestation.To enumerate the incidence of the Oligohydramnios and Polyhydramnios and evaluate the maternal and fetal outcome in cases with normal and abnormal Amniotic Fluid Index levels. The present study involved a group of 500 antenatal women with low risk at term getting admitted for safe confinement. 87.2 % of pregnant women had normal AFI, 8.8 % of pregnant women had oligohydramnios, 4% of pregnant women had Polyhydramnios. Careful assessment of AFI and close monitoring of the cases with Ooligohydramnios and polyhydramnios will bring down the maternal and perinatal complications, thereby achieving the goal of CSSM.

Keywords: Oligohydramnios, fetal distress, and possibly fetal acidosis

1. INTRODUCTION

Modern obstetrics is concerned with both the mother's and the unborn child's health and well-being. The cornerstones of contemporary perinatal medicine are the recognition of a fetus at risk of death or injury in utero, quantifying the risk, measuring the fetal risk against the risk of neonatal complications due to immaturity, and assessing the best time and mode of intervention [1]. Liquor amnii, a fluid generated by the amnion, a two-layered extra embryonic membrane created by the inner ectoderm and the outer somatic mesoderm, provides a fluid medium for the embryo's early growth, shielding it from concussion, pressure, and dessication, and is suggestive of life's aquatic origins. A sufficient amount of amniotic fluid is needed for the normal development of the fetus since it protects the fetus from various types of pain and agitations. It avoids infection and serves as a main source of fetal nutrients because of its bacteriostatic

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properties.

At 36 weeks of a normal pregnancy, the amount of amniotic fluid rises to around one litre. The volume of amniotic fluid increases gradually during pregnancy until 36 weeks, with the mean amniotic fluid volume remaining comparatively constant at 700-800ml. After 40 weeks, amniotic fluid volume begins to decrease at an 8% weekly rate, with amniotic fluid volume hovering about 400ml at 42 weeks. Variations of amniotic fluid volume (AFV) have been linked to a number of pregnancy conditions, so clinical measurement of AFV is a vital aspect of fetal evaluation. The fetus's growing environment is protected by amniotic fluid, which protects it from mechanical and biological damage. (2), (3). Amniotic fluid quantification is an essential part of the biophysical profile in ultrasound fetal health evaluations, especially in the third trimester [4]. Amniotic fluid volume is used as a primary indicator of prolonged in utero stress in antenatal studies. Since ultrasound is a non-invasive procedure, it is well suited for use on a large scale and can be repeated repeatedly for AFV determination in the event of reported anomalies [3].

After 34 weeks, the prevalence of oligohydramnios was observed to be 2.3 percent where the amniotic fluid index was less than 5cm. Stillbirths, fetal anomalies, unexplained FHR tracings in labour, a rise in cesarean section for fetal pain, and potentially fetal acidosis have all been linked to a reduction in amniotic fluid volume [2]. Around 1 to 3.5 percent of births are complicated by polyhydramnios (amniotic fluid greater than 200 ml). It's known as an amniotic fluid index above the 95th percentile for gestational age or a deepest vertical pool of at least 8 cm. [8–10] Polyhydramnios is also described as having an Amniotic Fluid Index (AFI) of 24 cm or more, or a single deepest pocket (SDP) of more than 8 cm. [nine] Polyhydramnios can be caused by a wide range of developmental, maternal, and placental anomalies. Severe congenital defects, chromosomal aberrations, multiple pregnancies, maternal diabetes, and Rh. isoimmunization are among them. None of these can be found in about 65 percent of the cases (idiopathic polyhydramnios). (nine) Preterm labor, pre-labour, loss of membranes, premature fetal appearance, caesarean section, macrosomia, intrauterine mortality, and neonatal death are all pregnancy complications linked to polyhydramnios. The four-quadrant method, as defined by Phelan et al., was used to quantify amniotic fluid in the current research. [10] to assess AFI, and we wanted to see whether there was a connection between AFI and maternal and perinatal outcomes during term pregnancy.

2. MATERIALS AND METHODS

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The Institutional Ethics Committee (IEC) gave its approval to this prospective report, which was carried out according to protocol. Both research participants gave their informed consent, and the protocol was implemented according to ICH/GCP guidelines. From February to November 2015, a group of 500 antenatal women with low risk at term were admitted for safe confinement at SreeBalaji Medical College and Hospital's Department of Obstetrics and Gynecology.

INCLUSION CRITERIA :
• Antenatal women at term gestation (more than 37weeks) • Age 20-35years • Singletonpregnancy • Women are willing to participate in thestudy
EXCLUSION CRITERIA
• High risk pregnancies like preeclampsia, GDM and medical disorders complicatingpregnancy • Prolongedpregnancy • Antenatal women with rupturedmembrane • Multiplepregnancy • Major fetalanamolies

After signing an informed written consent form, all women who met the inclusion and exclusion requirements were included in the sample. At the start of the research, a detailed medical history was taken and a systematic general physical examination was performed. Past, clinical review, and a dating scan are all used to confirm gestational age. An obstetric scan will be performed, and the AFI will be calculated using the four quadrant methodology. This patients' maternal and perinatal outcomes will be evaluated and analyzed to see whether there is a connection between AFI levels (increased, normal, or reduced) and maternal and perinatal outcomes. The result of the mother and the fetus is then recorded and compared prospectively.

STATISTICAL ANALYSIS

IBM SPSS Version-20 will be used to do the statistical analysis. Real numbers and percentages would be used to represent categorical statistics. The Chi square test would be used to examine categorical variables. Means are used to represent continuous variables (SD). The unpaired t test was used to compare groups of naturally distributed data (e.g., age, BMI,

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blood pressure, and birth weight). The non-parametric Mann-Whitney U test would be used to analyze non-normally distributed data (for example, APGAR Score). A two-tailed likelihood value less than 0.05 would be taken into account for statistical significance.

3. RESULTS

Table 1: Distribution of pregnant women based on AFI.

AFI						
	Normal AFI		Oligohydramnios		Polyhydramnios	
	N	%	N	%	N	%
	436	87.2	44	8.8	20	4

87.2 Percent of pregnant women had normal AFI, 8.8 Percent of pregnant women had oligohydramnios, 4 Percent of pregnant women had Polyhydramnios.

Figure 2: Distribution of age (yrs) between groups

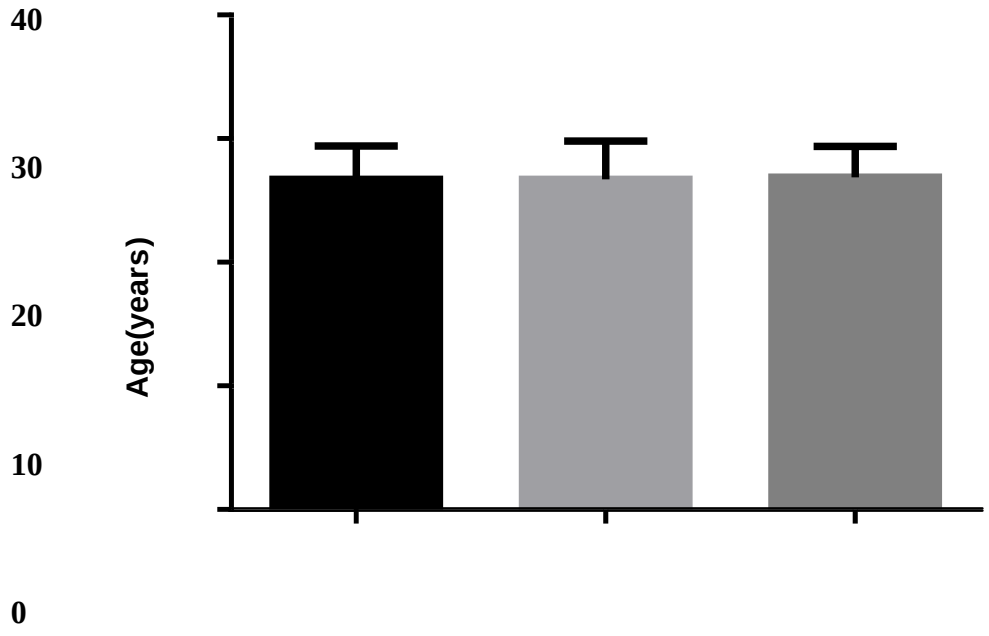

Table 2: Distribution of height and weight of pregnant mothers betweengroups

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	AFI						P Value
	Normal		Oligohydramnios		Polyhydramnios		
	Mean	SD	Mean	SD	Mean	SD	
Height(cm)	155.6	4.1	154.5	4.2	155.9	3.3	0.18
weight(kg)	66.3	4.1	65.4	4.0	67.7	6.0	0.13

The difference in mean height (cm) of pregnant women with normal AFI, oligohydramnios and Polyhydramnios was not statistically significant.(p=0.18)The difference in mean weight (kg) of pregnant women with normal AFI, oligohydramnios and Polyhydramnios was not statistically significant.(p=0.13).

The difference in mean SBP (mmHg) of pregnant women with normal AFI, oligohydramnios and Polyhydramnios was not statistically significant.(p=0.06).The difference in mean DBP (mmHg) of pregnant women with normal AFI, oligohydramnios and Polyhydramnios was not statistically significant.(p=0.63).

Figure 2: Distribution of hemodynamicparameters in pregnant mothers between groups

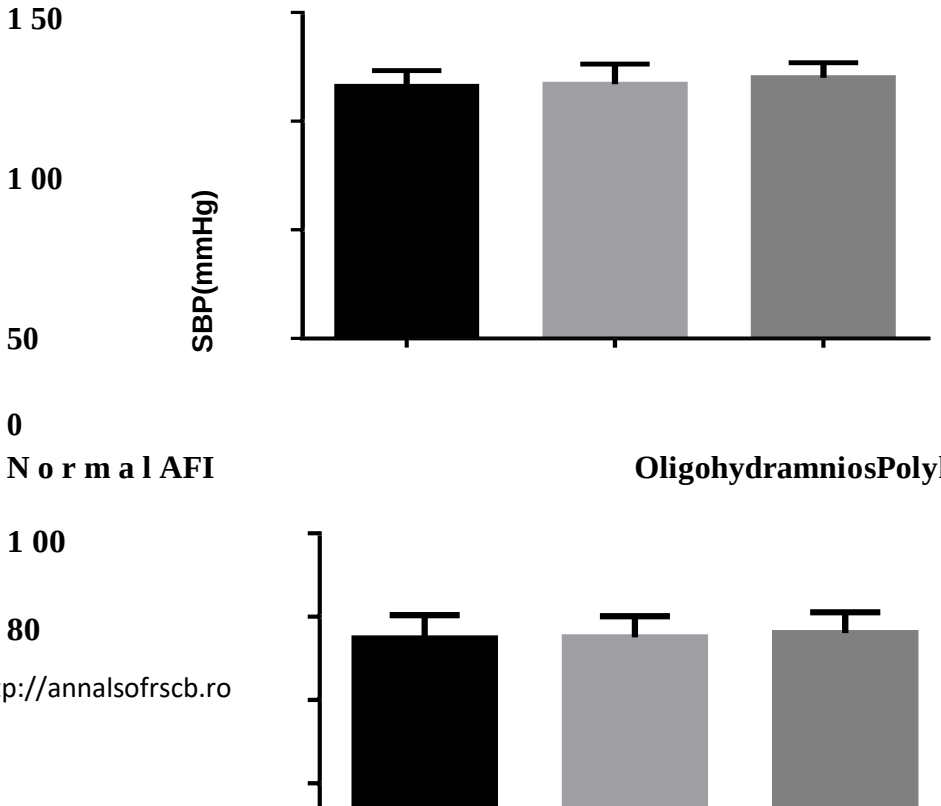

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Figure 3: Mode of delivery in pregnant mothers between groups

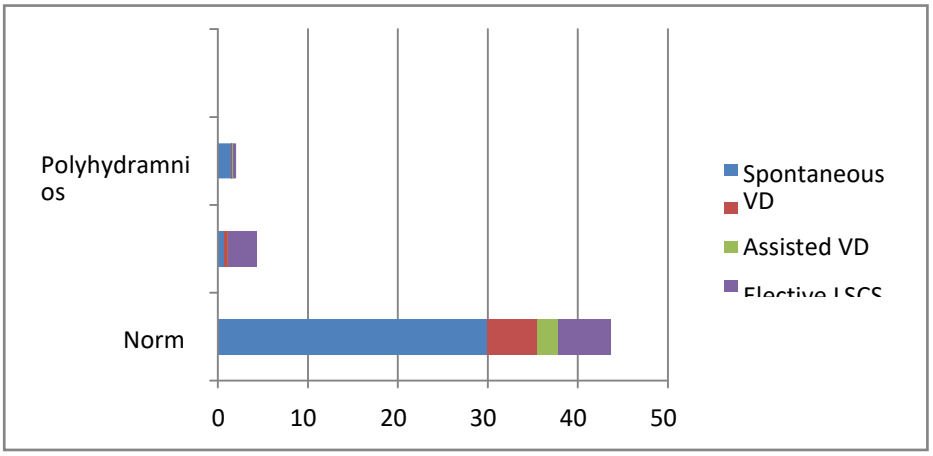

Table 3: Indication for CS in pregnant mothers between group

		AFI					
		Normal(81)		Oligohydramnios(33)		Polyhydramnios(4)	
		n	%	n	%	n	%
Indication for CS	Fetal Distress	41	10.1%	32	75%	0	0.0%
	Breech Presentation	13	3.0%	0	0%	0	0.0%
	PROM	0	0.0%	0	0.0%	2	10.0%

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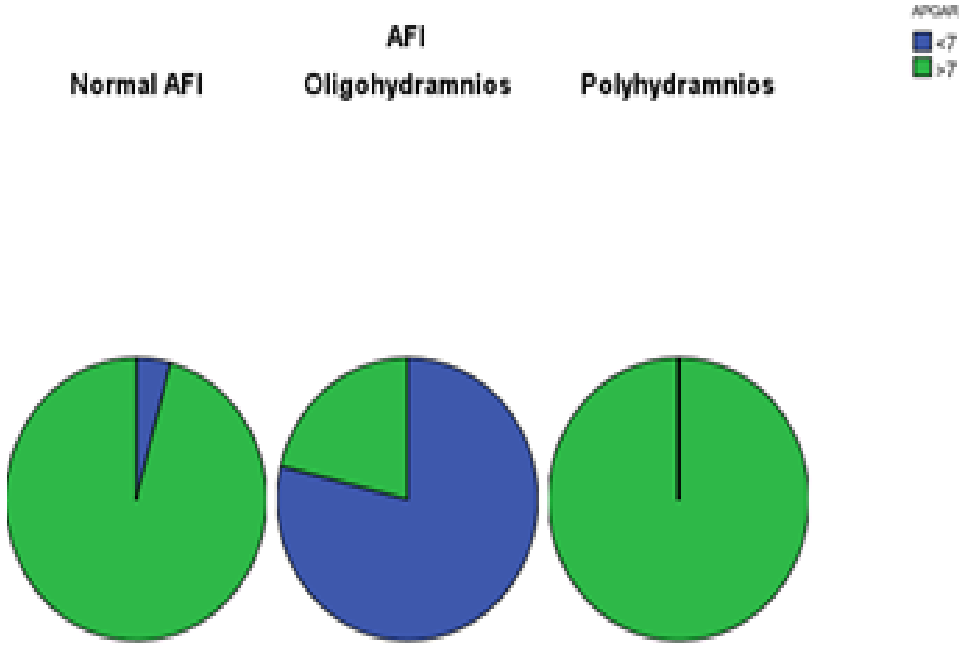
	Previous LSCS	20	4.6%	1	2.3%	0	0.0%
	CPD	7	1.6%	0	0.0%	2	10.0%

Figure 4: Intrapartum findings in pregnant mothers between groups



Indication for CS in pregnant women with normal AFI is as follows- Fetal distress (10%), Breech presentation (3%), Previous LSCS (4.6%) and CPD(1.6%).Indication for CS in pregnant women with oligohydramnios is as follows- Fetal distress (75%), and Previous LSCS (2.3%) .Indication for CS in pregnant women with polyhydramnios is as follows- CPD (10%), and PROM (10%).

Figure 5: Distribution of APGAR score of neonates born to pregnant mothers between groups

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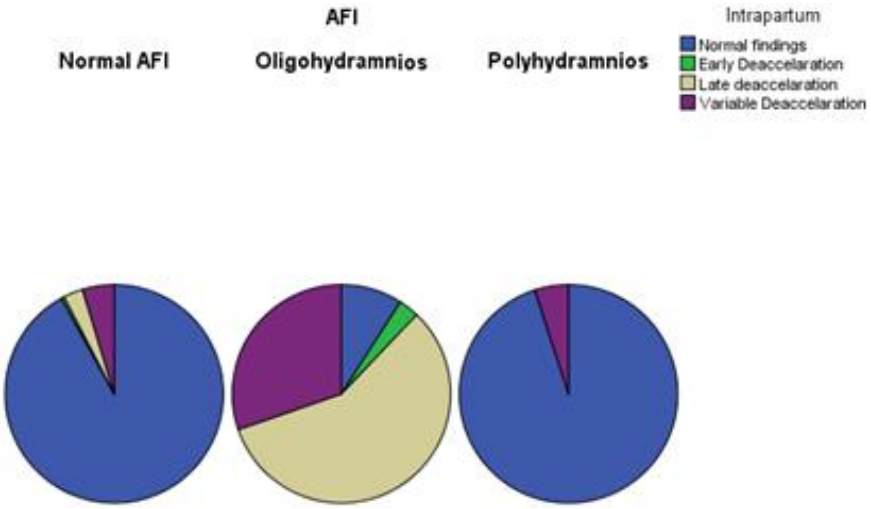

APGAR score was < 7 in 78.8% and >7 in 21.2 % of pregnant women with oligohydramnios.APGAR score was >7 in all pregnant women with Polyhydramnios. The difference was statistically significant.

Table 4: NICU admission of neonates born to pregnant mothers between groups

	AFI						P Value
	Normal(436)		Oligohydramnios(44)		Polyhydramnios(20)		
	n	%	n	%	n	%	<0.0001
NICU admission	10	2.5%	31	70.5%	1	0.5%	

2.5% neonates born to pregnant women with normal AFI, 70.5% neonates born to pregnant women with oligohydramnios and 0.5% neonates born to pregnant women with polyhydramnios had NICU admission. All cases were admitted in NICU because of respiratory distress. The difference was statistically significant.Early neonatal death was seen in 0.2% in neonates born to pregnant women with normal AFI, 4.5% in neonates born to pregnant women with oligohydramnios. The difference was statistically significant.

Figure 6: Incidence of early neonatal death born to pregnant mothers between groups.

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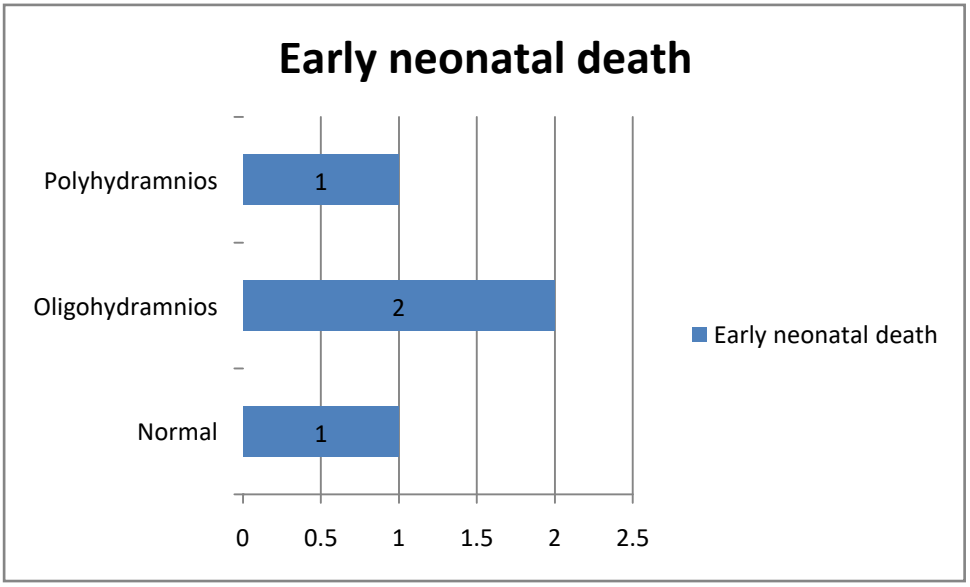

4. DISCUSSION

Assessment of the amniotic fluid is an integral part of an antenatal evaluation for fetal wellbeing. This study was undertaken to assess the impact of abnormalities of liquor volume on perinatal outcomes. Among 500 patients screened for AFI, 434(87.2%) of pregnant women had normal AFI, 44(8.2%) had oligohydramnios and 20(4%) had Polyhydramnios. Incidence is similar to those reported by several studies. [11-14]

The mode of delivery in our study significantly affected by amount of liquor. In low AFI group 33 (75%) patients ended up in cesarean section for fetal distress. While in control group 61(18.3%) patients had caesarean section. Our study documented higher rates of LSCScompared to study conducted by Sriya R et al. In their studycesarean section for fetal distress was documented in 43.05% cases with AFI<5cm. While in control group with AFI>5cm, 12.5% patients had emergency cesarean section [15].Similarly, In a study conducted by Jabeen S et al has also documented a higher incidence of emergency cesarean section for fetal distress, 33.3% patients ended up in cesarean section having AFI<5cm [2]. Locatelli et al has reported a very low incidence of 8.2% cesarean section rate in patients with, AFI<5cm while in control group with normal amniotic fluid index, 3.9% women ended up in cesarean section for fetal distress [16]. Morris JM et al has reported 26% incidence of cesarean with a fetal distress[17] Zhang J et al has reported 10% the incidence of cesarean section for fetal distress in patients with AFI<5cm while in control group it was only 5 %.[18] Results which are inconsistent with our study because of difference in defining In our study fetal distress was diagnosed by the presence of meconium stain liquor and/or fetal heart rate abnormalities detected on intermittent auscultation. While in the reports diagnosis of fetal

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distress was based on continuous electronic fetal heart tracing andfetal scalp pH values. As facilities for fetal scalp pH werenot available therefore our cesarean section rate for fetal distress might be higher than above mentioned studies.

We had a 20% caesarean delivery rate and an 80% vaginal delivery rate. ShamimAkhter et al. [19] had a caesarean delivery rate of 40% and a 60% vaginal delivery rate of 60%. According to Chen et al. [20], 55.2 percent of deliveries were caesarean and 44.2 percent were vaginal. The disparity in outcomes between the two groups, which may be attributed to differences in patient profiles or institutional caesarean delivery protocols. Furthermore, Volante et al. [21] found that patients with idiopathic polyhydramnios had a greater rate of caesarean section.

The high incidence of macrosomia associated with idiopathic polyhydramnios is consistent with results from several previous studies that found a connection between polyhydramnios and wide for gestational age infants.

(#22) In addition to confirming this connection, we discovered that a considerably higher proportion of patients with idiopathic polyhydramnios underwent primary cesarean delivery for the indication of failure to progress and CPD as compared to the control group.

When compared to monitors, patients with idiopathic polyhydramnios have no higher chance of low-birth-weight babies, prematurity, low Apgar scores at 5 minutes, neonatal intensive care unit admissions, or perinatal mortality. The fact that most of the amniotic fluid index values were in the mild polyhydramnios range (>24 cm but 30 cm) can account for the lack of poor outcomes among these patients. They speculated that the lack of poor outcomes may be due to the fact that the majority of the cases in their sample group were moderate polyhydramnios. The findings of our research are similar to those of Panting-kemp et al. [23] Since the majority of the cases were mild, the result may have been different if there had been more serious and extreme cases of idiopathic polyhydramnios. [page 24] Age and obstetric score had little impact on the occurrence of hydramnios. In our research, atonic PPH grew in 0.7 percent of pregnant women with regular AFI, 2.2 percent of pregnant women with Oligohydramnios, and 1% of pregnant women with Polyhydramnios.

5. CONCLUSION

Antenatal patients with abnormal Amniotic Fluid Index values need close monitoring during labourIdentifying abnormal Amniotic Fluid Index values warrants thorough evaluation and careful monitoring as it is associated with increased frequency of both maternal and fetal complications.Recognition of hydramnios is of benefit as it allows identification of

pregnancies that may be at increased risk of adverse outcomes.

Isolated oligohydramnios patients had a higher chance of delivering by LSCS due to fetal distress.LSCS in Isolated polyhydramnios patients were predominantly due to LGA and PROM.Oligohydramnios patients were at increased risk for low-birth-weight infants, low Apgar scores at 5 minutes, neonatal intensive care unit admissions, or perinatal death compared to pregnant women with Polyhydramnios.Mild polyhydramnios is not associated with an increased incidence of pre term delivery, low birth. weight or perinatal death, but studies in the past related moderate and severe cases of idiopathic polyhdramnios to adverse perinatal outcomesCareful assessment of AFI and close monitoring of the cases with Ooligohydramnios and polyhydramnios will bring down the maternal and perinatal complications, thereby achieving the goal of CSSM.

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Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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