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THE EFFECT OF AMNIOTIC FLUID CHANGES IN LATE PREGNANCY ON MATERNAL AND FETUS OUTCOMES

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ABSTRACT

The amniotic sac contains a protective liquid known as amniotic fluid. Two different types of amniotic fluid changes have been identified. The first is oligohydramnios, and the second is polyhydramnios. This study aimed to examine the effect of amniotic fluid changes on pregnancy outcomes and the fetus. A cross-sectional study was conducted by simple random sampling for, Four hundred fifty women from November 1st, 2021, until February28th 2022, in Duhok hospital for Obstetrics and Gynecology.

The study revealed that the greatest rates of polyhydramnios were associated with gestational hypertension (22.7%) and gestational diabetes (19.3%). The most prevalent mode of delivery in all groups was cesarean section. Hypoglycemia had the greats incidence in polyhydramnios at (11.3%). There was a statistically significant association between amniotic fluid volume and baby gender, with males being more prevalent in oligohydramnios (58.7%) and polyhydramnios (57.3%) compared to normal amniotic fluid volume.

Moreover, polyhydramnios had more effects on maternal and baby poor outcomes than oligohydramnios. Thyroid disease, diabetes mellitus, and hypertension were the most common types of chronic illnesses in polyhydramnios group compared with oligohydramnios group and normal amniotic fluid group. Apgar score, birth weight, congenital anomalies, hypoglycemia, asphyxia, and respiratory distress syndrome were statistically significant with oligohydramnios, polyhydramnios and normal amniotic fluid volume.

***KEYWORDS*:** Amniotic Fluid, Amniotic Fluid Volume, Oligohydramnios, Polyhydramnios

INTRODUCTION

Amniotic Fluid (AF) is the protective liquid in the amniotic sac. It is mostly water and solids, like proteins, carbohydrates, lipids, phospholipids, enzymes, hormones, and chemical substances like urea, uric acid, creatinine, and electrolytes. It is made from the membrane plasma as the fetus grows and acts as a cushion to protect the growing fetus (Bakhsh *et al.,* 2021). In addition, it has antibacterial properties that keep the growing fetus from getting sick. It also makes sharing nutrients, water, and biochemical waste easier for the mother and fetus to share (Fitzsimmons and Bajaj, 2022). There are also different types of fetal cells, such as skin, respiratory, intestinal, urinary tract, stem cells, hair, and blood cells. All these cells help the fetus grow (Bakhsh *et al.,* 2021). It is constantly changing and is closely linked to both the mother and the fetus (Whittington and Magann, 2021).

The quantity of AF varies according to Gestational Age (GA). The average amniotic fluid volume (AFV) in the third trimester is 700-800 ml, 400 ml at 20 weeks, and 50 ml at 12 weeks of pregnancy (Sathyapriya *et al.,* 2019). To determine the AFV, its volume is classified as low, normal, or high based on the Single Deepest Pocket (SDP) or the Amniotic Fluid Index (AFI). Thresholds: based on SDP "oligohydramnios (SDP<2cm), normal (SDP≥2 and <8cm), and polyhydramnios (SDP≥8cm)" are the thresholds. Patients are classified according to the estimated volume based on the AFI as follows:" oligohydramnios (AFI<5 cm), normal (AFI≥5 and <24cm), and polyhydramnios (AFI≥24cm)" (Crimmins *et al.,* 2018; Mousavi *et al.,* 2018; Rochelson *et al.,* 2018; Hughes *et al.,* 2019). In several low- and low-middle-income countries, AF fluctuations and the related effects are mostly unknown. The incidence of oligohydramnios or polyhydramnios fluid is unknown since

ultrasonography equipment is not commonly utilized (Figueroa *et al.,* 2020).

AF changes have two types. The first refers to oligohydramnios, and the second includes polyhydramnios (Bakhsh *et al.,* 2021). Oligohydramnios is a kind of AF changes defined by an unusually low AFV compared to GA. It can be caused by various maternal, fetal, or placental complications, or it might be idiopathic (Hesson and Langen, 2018; Keilman and Shanks, 2021). Pregnancies with isolated oligohydramnios are associated with an increased risk of fetal distress, meconium-stained liquor, cesarean delivery, Neonatal Intensive Care Unit (NICU) hospitalization, and low birth weight (Cunningham *et al.,* 2018; Ahmed and Hasan, 2022). Prenatal AFV screening, prenatal treatment, and patient lifestyle modifications assist in reducing maternal risk factors and improving fetal outcomes (Sathyapriya *et al.,* 2019). In areas where ultrasound usage is common, incidences of oligohydramnios among pregnant women have been observed between 0.5% and 8% (Han and Platt, 2018). In Nasiriya, Iraq, the incidence of oligohydramnios is 2% (Nasir and Abdul-Jabbar, 2020).

Polyhydramnios is a condition characterized by increased AFV during pregnancy. It is associated with higher maternal and neonatal morbidity and death (Lord *et al.,* 2022). it may be caused by idiopathic, maternal, or fetal factors (Aref and Napolitano, 2021). In polyhydramnios-affected pregnancies, abnormal fetal lie or presentation occur more commonly. Therefore, they should be associated with poor pregnancy outcomes, such as an increased risk of intrauterine fetal mortality, placental abruption, labor induction, Cesarean Section (CS), delayed first stage of labor, and shoulder dystocia (Matěcha & Nováčková, 2020). It is estimated that 1%–2% of all singleton pregnancies are affected (Dashe *et al.,* 2018; Mangels *et al.,* 2020). it is more prevalent in twin pregnancies and is mostly caused by problems of monochorionic placentation (Dashe *et al.,* 2018). The incidence of polyhydramnios in Iraq (Nasiriya) was 1.1% (Nasir and Abdul-Jabbar, 2020).

This study aimed to examine the effect of AF changes on pregnancy outcomes and the fetus. A few studies have been conducted in Iraq and Kurdistan region. This study is the first study on AF changes in late pregnancy on maternal and fetus outcomes in Duhok province Kurdistan, Iraq.

PATIENTAND METHODS

A. Study population

A cross- sectional study was conducted From November 1st, 2021, until February 28t^{h}, 2022, in in Duhok hospital for Obstetrics and Gynecology in Duhok city, Kurdistan region Iraq. The study's population consisted of pregnant women who were admitted to hospital accepting the researcher questionnaire, had sonography, and GA more than 36 weeks based on sonography.

B. Sampling procedure

The sample size was calculated by using the Cochran equation (Qualtrics, 2018). The sample size was based on 18000 deliveries of all types in one year, according to hospital data. Therefore, the sample size was equal to 377 samples. The sample size increased to 450 to increase representativeness, control bias, and non-response.

$$n_0 = \frac{z^2 \rho q}{e^2}$$

They measured the effects of physical AF changes on maternal and fetus outcomes. The AFV was evaluated by ultrasound, measuring a modified biophysical profile SDP. It was the available technique in this hospital. They were classified into three groups: 150 samples oligohydramnios (SDP <2cm), 150 samples normal AF (SDP≥2 and <8cm), and 150 samples polyhydramnios (SDP≥8cm).

Data was collected through a self-structured questionnaire prepared by the researcher and peer reviewed. Moreover, using Kobo Toolbox collected samples by filling out the online form researcher and conducting face-to-face (direct interviews) with patients; before establishing each interview, the researcher got permission from the patients, then the researcher explained each question in Kurdish languages (as the questionnaire was written in English). Furthermore, if needed, use Arabic languages with some patients. Link of kobo Toolbox form https://ee.kobotoolbox.org/x/aLOQF9rn, and it consists of:

Maternal demographic data: Age (years), Level of education, Smoking, Occupation, and Number of Antenatal Care (ANC) visits.

Obstetrics information: Gravida, parity, history of abortion.

Maternal outcomes: Mode of delivery, Gestational Diabetes Mellites (GDM),

Gestational Hypertension (GH), Psychological state (who uses medication), and chronic medical illness.

Baby outcome: Gender, Baby outcome (Alive, Stillbirth, early neonatal deaths, NICU), 1-minute APGAR (< 7), 5-minutes APGAR (< 7), Birth weight, Baby term, Neonatal jaundice in first 24 hours(H), Meconium, Congenital anomalies, Twins, Hypoglycemia, Asphyxia, and respiratory distress syndrome (RDS).

A pilot study was run to test the preliminary prepared questionnaire. It was conducted at the beginning of October 2021 in Duhok maternity hospital. The researcher selected a sample of 25 pregnant women. After performing the pilot study, the questionnaire was modified. The enrolled samples were excluded from the original sample of the study.

The Microsoft Excel database and the Statistical Packaging for a Social Sciences (SPSS) version 24used descriptive and inferential statistics. The Chi-square test and Fisher exact test were used to determine the significant relationships between the variables. The P-value ≤ 0.05 is considered statistically significant.

Ethical consideration, the Duhok Health Directory and the ethical research committee of Duhok Polytechnic University approved this project.

RESULTS

During the current study among 450 pregnant women: Age, level of education, and occupation were significantly associated with three groups of AFV. And there was no statistically significant between smoking and ANC visits with AFV in Table 1.

Table (1): Maternal demographic data with amniotic fluid volume (SDP)

		Amniotic fluid Volume (SDP)			P. Value
		Oligo-hydramnios	Normal	Poly-hydramnios	
Age	15-24	50(33.3%)	43(28.7%)	22(14.7%)	<0.001*
	25-34	76(50.7%)	79(52.7%)	80(53.3%)	
	35-44	24(16.0%)	28 (18.7%)	48(32.0%)	
Level of education	Illiterate	49(32.7%)	29(19.3%)	49(32.7%)	0.048*
	Read and write	0(0.0%)	0(0.0%)	5(3.3%)	
	Primary	36(24.0%)	45(30.0%)	37(24.7%)	
	Intermediate school	24(16.0%)	28(18.7%)	24(10.0%)	
	Secondary	18(12.0%)	18(12.0%)	12(8.0%)	
	Institute	11(7.3%)	14(9.3%)	9(6.0%)	
	College and higher	12(8.0%)	16(10.7%)	14(9.3%)	
Occupation	Housewife	133(88.7%)	137(91.3%)	123(82.0%)	0.027**
	Government employment	16(10.7%)	12(8.0%)	19(12.7%)	
	Private employment	1(0.7%)	1(0.7%)	8(5.3%)	
Smoking	Not smoker	42(28.0%)	43(28.7%)	48(32.0%)	0.161**
	Smoking < 20 cigarettes/day	2(1.3%)	1(0.7%)	7(4.7%)	
	Second Hand Smoker	106(70.7%)	106(70.7%)	95(63.3%)	
ANC Visits	Less than 3 visits	11(7.3%)	9(6.0%)	16(10.7%)	0.308*
	3 visits and more	139(92.7%)	141(94.0%)	134(89.3%)	

* Chi square ** Fisher exact test

Gravida, para, and history of abortion were highly significant in three groups of AFV. Prime gravida 14% was the lowest percentages in polyhydramnios. On the other hand, the major of 55.3%with multi-Para was the polyhydramnios compare to oligohydramnios and normal AF.Finally, in (no abortion, abortion, recurrent abortion) in (oligohydramnios and normal AFV), the number of samples was almost close in Table 2.

Table (2): Obstetrical variables with amniotic fluid volume (SDP)

		Amniotic fluid volume (SDP)			P. Value
		Oligo-hydramnios	Normal	Poly-hydramnios	
Gravida	Prime Gravida	45(30.0%)	38(25.3%)	21(14.0%)	<0.001*
	Multi gravida	64(42.7%)	80(53.3%)	67(44.7%)	
	Grand multi	41(27.3%)	32(21.3%)	62(41.3%)	
Para	Prime para	53(35.3%)	51(34.0%)	33(22.0%)	0.021*
	Multi para	67(44.7%)	80(53.3%)	83(55.3%)	
	Grand multi para	30(20.0%)	19(12.7%)	34(22.7%)	
History of abortion	No abortion	99(66.0%)	100(66.7%)	74(49.3%)	0.015*
	Abortion	43(28.7%)	42(28.0%)	62(41.3%)	
	Recurrent abortion	8(503%)	8(5.3%)	14(9.3%)	

* Chi square test

There were highly significant between GDM and AFV. Moreover, GH and mode of delivery were not significant with AFV. However, the mode of delivery C/S was the highest percentages 54.0%in polyhydramnios. Most ordinary women's psychological states were normal in Table 3.

Table (3): Maternal variables with amniotic fluid volume (SDP)

		Amniotic fluid volume (SDP)			P. Value
		Oligo-hydramnios	Normal	Poly-Hydramnios	
Mode of delivery	Episiotomy	7(4.7%)	7(4.7%)	6(4.0%)	0.648*
	Vaginal delivery	38(25.3%)	44(29.3%)	34(22.7%)	
	Cesarean section	70(46.7%)	64(42.7%)	81(54.0%)	
	Emergency C/S	35(23.3%)	35(23.3%)	29(19.3%)	
Gestational diabetes mellitus (GDM)	No	146 (97.3%)	146(97.3%)	121(80.7%)	<0.001*
	Yes	4(2.7%)	4(2.7%)	29(19.3%)	
Gestational Hypertension (GH)	No	125(83.3%)	124(82.7%)	116(77.3%)	0.347*
	Yes	25(16.7%)	26(17.3%)	34(22.7%)	
Psychological state (who use medication)	No	146(97.3%)	144(96.0%)	137(91.3%)	0.046*
	Yes	4(2.7%)	6(4.0%)	13(8.7%)	

* Chi square test

Thyroid disease, diabetes mellitus (DM), and hypertension were highly significant, and renal disease, heart disease, and others were not significantly with AFV. Hypertension and thyroid disease were the highest number of chronic illnesses in polyhydramnios in Table 4 .

Table (4): Chronic Illnesses with amniotic fluid volume (SDP)

	Amniotic fluid volume (SDP)			P. Value
	Oligo-hydramnios	Normal	Poly-hydramnios	
Renal disease	1(0.7%)	1(0.7%)	1(0.7%)	1.000**
Thyroid disease	7(4.7%)	2(1.3%)	17(11.3%)	0.001*
Bronchial asthma	0(0.0%)	0(0.0%)	4(2.7%)	0.036**
Diabetes mellitus	4(2.7%)	2(1.3%)	13(8.7%)	0.003*
Heart disease	1(0.7%)	1(0.7%)	2(1.3%)	1.000**
Hypertension	9(6.0%)	2(1.3%)	18(12.0%)	0.001*
Other	2(1.3%)	3(2.0%)	2(1.3%)	1.000**

* Chi square ** Fisher exact test

RDS, Hypoglycemia, Asphyxia, Congenital anomalies, Birth weight, APGAR score, and Baby outcomes (Alive, NICU, Stillbirth, early neonatal deaths) were highly statistically significant, and twins, meconium, and baby term were not statistically significantly with AFV in Table 5.

Table (5): Baby outcomes with amniotic fluid volume (SDP)

		Amniotic fluid volume (SDP)			P. Value
		Oligo-hydramnios	Normal	Poly-hydramnios	
Gender	Male	88(58.7%)	62(41.3%)	86(57.3%)	0.004*
	Female	62(41.3%)	88(58.7%)	64(42.7%)	
Baby outcome	Alive	116(77.3%)	129(86.0%)	89(59.3%)	<0.001**
	NICU	25(16.7%)	18(12.0%)	51(34.0%)	
	Stillbirth	7(4.7%)	2(1.3%)	4(2.7%)	
	Early neonatal deaths	2(1.3)	1(0.7%)	6(4.0%)	
1-minute APGAR (< 7)	No	141(94.0%)	141(94.0%)	126(84.0%)	0.003*
	Yes	9(6.0%)	9(6.0%)	24(16.0%)	
5-minutes APGAR (< 7)	No	141(94.0%)	142(94.7%)	125(83.3%)	0.001*
	Yes	9(6.0%)	8(5.3%)	25(16.7%)	
Birth weight	Extreme LBW	0(0.0%)	1(0.7%)	1(0.7%)	<0.001**
	Very LBW	3(2.0%)	2(1.3%)	1(0.7%)	
	LBW	31(20.7%)	16(10.7%)	17(11.3%)	
	Normal BW	115(76.7%)	127(84.7%)	117(78.0%)	
	Macrosomia	1(0.7%)	4(2.7%)	14(9.3%)	
Baby	Preterm	42(28.0%)	29(19.3%)	39(26.0%)	0.054**
	Full-term	107(71.3%)	120(80.0%)	105(70.0%)	
	Post-term	1(0.7%)	1(0.7%)	6(4.0%)	
Neonatal Jaundice in first 24 hr.	No	150(100.0%)	149(99.3%)	143(95.3%)	0.007**
	Yes	0(0.0%)	1(0.7%)	7(4.7%)	
Meconium	No	138(92.0%	140(93.3%)	129(86.0%)	0.071*
	Yes	12(8.0%)	10(6.7%)	21(14.0%)	
Congenital anomalies	No	145(96.7%)	147(98.0%)	132(88.0%)	<0.001*
	Yes	5(3.3%)	3(2.0\%)	18(12.0%)	
Twins	No	146(97.3%)	147(98.0%)	140(93.3%)	0.072*
	Yes	4(2.7%)	3(2.0%)	10(6.7%)	
Hypoglycemia	No	150(100.0%)	150(100.0%)	133(88.7%)	<0.001*
	Yes	0(0.0%)	0(0.0%)	17(11.3%)	
Asphyxia	No	144(96.0%)	147(98.0%)	131(87.3%)	<0.001*
	Yes	6(4.0%)	3(2.0%)	19(12.7%)	
Respiratory distress syndrome (RDS)	No	134(89.0%)	132(88.0%)	105(70.0%)	<0.001*
	Yes	16(10.7%)	18(12.0%)	45(30.0%)	

* Chi square ** Fisher exact test

DISCUSSION

AFV is becoming recognized as a vital indication of the health of the mother and fetus. Consequently, it is essential to estimate AFV to prevent adverse pregnancy outcomes (Bauserman *et al.,* 2019).

This study found statistically significant differences between AFV and the mother's age. Moreover, the age group 25-34 years was the highest proportion of the three groups of AFV. Majeed and Shamdeen, (2019), in Duhok highest proportion 37.6 % of oligohydramnios was in the age group 21-25 years. The study in Erbil disagreed with the current study. There were no statistically significant between mothers' age and AFV. They had the highest percentages in age groups 20-24 years (Anis *et al*., 2020). Bauserman *et al.,* (2019) agreed with the current study that there was a statistically significant difference between maternal age and polyhydramnios. Age groups 20-35 years was the highest percentages in polyhydramnios 78% and normal AF 74%.

Furthermore, the level of education and occupation were statistically significant in the three groups of AFV. The proportion of housewife was the highest in all groups: oligohydramnios 88.7%, normal AF 91.3%, and polyhydramnios 82.0%. A Study by Bajracharya *et al.,* (2020) disagreed with the current study and found that occupation status and education were not statistically significant with AFV. Bauserman *et al,*. (2019), the primary was major at 42% in polyhydramnios, in normal AF, secondary education was major at 45%, and a housewife was the highest percentage of oligohydramnios 63.4% (Teka *et al.,* 2020). A study in Iran disagrees with the current study on maternal occupation, and AFV was not statistically significant; housewife was the highest percentage of normal AF 96.66% and polyhydramnios 94.44% (Vanda *et al*., 2022).

Smoking with AFV was not statistically significant in this study. Among all groups of AFV, secondhand smoke was the highest percentage; in oligohydramnios and normal AF, the percentage was the same at 70.7%; however, in polyhydramnios, the percentage was 63.3%. Study in Turkey agree with the current study statistically insignificant between AFV and smoking, and this might be because Turkey is a neighbor of Kurdistan, and the lifestyle them is close together. In oligohydramnios, the smoker was 10.7%. At the same time, in normal AF, it was 9.7% (Yenigul, 2019). 0.6% of mothers with polyhydramnios were smokers (Hodyl *et al.,* 2014).

The study indicates no statistically significant difference between AFV and ANC visits. Pregnant women with three or more ANC visits had the highest percentages in all groups. In oligohydramnios was 92.7%, normal AFV was 94.0 %, and polyhydramnios was 89.3%. The study in Erbil disagrees with the current study on statistically significant differences between ANC visits and AFV (Noori and Saeed, 2021). This might be because there is a difference in sample size. A study was done by Saxena *et al.,* (2020) and coincided with this study that's not statistically significant between AFV and ANC visits. The lowest percentage 15% had not had ANC visits in oligohydramnios (Teka *et al.,* 2020).

Regarding obstetric information, there was a highly significant statistically between gravida and AFV in the present study. Moreover, studies by Majeed and Shamdeen (2019) in Duhok, in Saudi Arabia by Tripathi *et al.,* (2019), and in India by Bakhsh *et al.,* (2021) disagree with the result of the current study, maybe because of the different sample size, design of studies. And in the present study, multigravida was the highest percentage of oligohydramnios at 42.7%, normal AF at 53.3%, and Polyhydramnios at 44.7%. Another study observed that 63% of women with oligohydramnios were Primigravida (Chetani *et al.,* 2017). A study in Saudia Arabia agree with the current study regarding multigravida was the highest percentage in normal AF 75.3%, Polyhydramnios 78.6%, and oligohydramnios 72.4% (Bakhsh *et al*., 2021). In India, oligohydramnios and normal AF were the same proportion in Primigravida, 15%, and multigravida, 85% (Tripathi *et al*., 2019).

Regarding this research about para, there were highly statistically significant with AFV. Two studies in Erbil agree with the current study that's statistically significant between para and AFV, maybe because of the same environment and lifestyle (Ibrahim and Zween, 2020; Noori and Saeed, 2021). Regarding the result of this study, multipara was the highest percentage in normal AF at 53.3% and polyhydramnios at 55.3%, and oligohydramnios multi para was 44.7%. Anis Shaker *et al.,* (2020) in Erbil concur with this study that 72% multipara was the highest percentage of polyhydramnios, normal AF 64%, and oligohydramnios 55 %. In Erbil, multipara was the highest proportion, 54% in

normal AF, and primipara was the highest proportion, 42.7%, in oligohydramnios (Ibrahim and Zween, 2020).

In the current study, there was no statistically significant between the mode of delivery and AFV. CS was the primary type in all groups: in oligohydramnios, 46.7%, normal AFV 42.7%, and in polyhydramnios, 54.0% was the highest percentage, which may be because of suspected macrosomia. Studies in Erbil and India disagree with the current study, a statistically significant study between mode of delivery and AFV. In Erbil, vaginal delivery was the most common type of delivery in all groups: in oligohydramnios, 57% and polyhydramnios, 53%, and normal AFV, CS was the highest proportion, 61% (Anis Shaker *et al.,* 2020). In India rate of CS is higher in oligohydramnios at 61%, compared with normal AF at 38% and polyhydramnios at 43% (Minwuye, 2019). Yefet and Daniel-Spiegel, (2016) CS was higher in polyhydramnios than in normal AF.

In a recent study on GDM, the association between AFV and GDM was highly statistically significant. mother with oligohydramnios and normal AFV who have not had GDM had the same proportions was 97.3%. Furthermore, 80.7% polyhydramnios cases did not have GDM. Another study corresponds with the current study that found a statistically significant association between AFV and GDM (Hou *et al.,* 2018). A study by Pachuau *et al*., (2021) found that GDM in polyhydramnios was 7.2%.

The current study showed no statistically significant difference between GH and AFV. Moreover, GH was the highest proportion, at 22.7% in polyhydramnios, in oligohydramnios at 16.7%, and normal AF at 17.3%. The study was done by Aviram *et al.,* (2015) agrees with the current study; statistically was not significant between GH and AFV, and GH in normal AF was 0.6% and in polyhydramnios was 0.9%. On the other hand, in a study mentioned by Panda *et al.*, (2017), GH was 10% in oligohydramnios.

In the present study, statistically significant between psychological status and AFV. The highest proportion of pregnant women did not use any psychological medication. A study by Uguz *et al.,* (2016) agrees with the present study on statistically significant differences between AFV and psychological status. Major depression in oligohydramnios was 24.5%, and in normal AF was 6.2%. Generalize anxiety disorder in oligohydramnios was 30.1%, and in normal AF was 3.8%.

A study found that there were statistically significant between (thyroid disease, bronchial asthma, DM, HTN) and AFV. Moreover, (renal disease and heart disease) were not statistically significant with AFV. And DM was the highest percentage 8.7% of polyhydramnios compared with oligohydramnios and normal AF. This reason back to that the most notable maternal risk factor behind polyhydramnios was DM (Dulay, 2020; Aref and Napolitano, 2021).

In, Saudi Arabia disagree with the current study; there was no statistically significant between DM and hypothyroidism with AFV. DM was the most common type of chronic illness in polyhydramnios, 14.3%. Hypothyroidism was the most common type of chronic illness in normal AFV at 8.9% and oligohydramnios at 10.3% (Bakhsh *et al.,* 2021). In India study agree with the current study that HTN with AFV was highly significant. HTN in oligohydramnios was 31.03%, and in normal AFV, 3.45% (Sonkhya *et al.,* 2017). In India, DM in polyhydramnios was 11.9%, and hypothyroidism was 6.7% (Choudhary and Yadav, 2020).

In the present study, baby gender with AFV was statistically significant. Hou *et al.,* (2018) dispute with the result of the present study that gender with AFV was not statistically significant. Aviram *et al*., (2015) disagree with the current study statistically not significant gender with AFV, Male 54.4%in polyhydramnios, male 51.1% in normal AFV. The study disagrees with the present study statistically no significant between baby gender and AFV; Male in normal AF was 62.8%, polyhydramnios was 60.0%, female in normal AF was 37.2%, and polyhydramnios was 40% (Depla *et al.,* 2017).

In this study, highly significant statistically between baby outcomes and AFV. Other studies correspond to the current study, which was highly statistically significant between AFV and baby outcomes (Chetani et al., 2017; Asadi et al., 2018).

A study in Erbil disagrees with this research; it was not statistically significant between AFV and NICU admission. 16% in oligohydramnios,18% in polyhydramnios, and the highest percentage in normal AFV, 29% were admitted to NICU (Anis *et al.,* 2020). Furthermore, another study agreed with the study in Erbil and disagreed with a current study that was not statistically significant between AFV and admitted newborns to NICU. The rate

of admission to NICU is higher in oligohydramnios compared to normal and polyhydramnios which is 29% (Kapoor *et al.,* 2018). This discrepancy was because there was a contrast in the sample size, type of study, and criteria excluded. In Iran proportion admitted to NICU in normal AFV was 5.3%, and polyhydramnios was the highest proportion, 38.6%0. Neonatal death was 21.1% in polyhydramnios highest proportion and normal AFV at 0% (Asadi *et al.*, 2018).

Highly significance between APGAR score and AFV. Studies in Erbil and Iran correspond with the study highly significant between AFV and APGAR scores (Asadi *et al.,* 2018; Ibrahim and Zween, 2020). Furthermore, another study in Erbil corresponded with the current study regarding the first minute Apgar score with AF. However, they disagreed that the fifth-minute Apgar score was not statistically significant with AF (Anis *et al.,* 2020). may be because most of them will improve after 5 min; another study found the same results (Kapoor *et al.,* 2018). Moreover, two studies in the same year, in 2017, disagree with the current study; there were no statistical differences between Apgar score and AFV (Khan and Donnelly, 2017; Rathod and Samal, 2017).

According to the findings of this study, polyhydramnios had the highest 1-minute APGAR (<7) percentage at 16 %. In contrast, oligohydramnios and normal AFV had the lowest percentage at 6.0%. Additionally, polyhydramnios had the highest 5-minute APGAR (<7) score at 16.7%, followed by oligohydramnios at 6.0%, and normal AF had the lowest score at 5.3%. The lowest proportion of negative Apgar scores in Duhok was 1.2 %, while the highest percentage of excellent scores was 98.8 % (Majeed and Shamdeen, 2019). Anis *et al.*, (2020) Oligohydramnios, polyhydramnios, and normal AFV had the greatest percentages of 1-minute APGAR (<7) in Erbil (8 %, 16 %, and 27 %, respectively). Additionally, 5-minute APGAR (<7) in oligohydramnios 1%, and polyhydramnios with normal AFV were associated with the greatest percentages 3 %. In other research conducted in Erbil, the APGAR in the 1-minute (<7) was 10% in normal AFV and 24.7% maximum in oligohydramnios. APGAR in the typical AFV and oligohydramnios (0%) in the 5-minute APGAR (7) (Ibrahim and Zween, 2020).

Neonatal birth weight was highly significant with AFV in the present study. Studies in Erbil, Iran, and Saudi Arabia corresponded with a current study that's highly statistically significant between AFV and birth weight (Asadi *et al.,* 2018; Ibrahim and Zween, 2020; Bakhsh *et al.,* 2021). Moreover, another study was done by Tripathi *et al.,* (2019) that disagreed with the present study and statistically showed no significance between birth weight and AFV.

Normal birth weight was major in oligohydramnios at 76.7%, normal AF at 84.7%, and polyhydramnios at 78.0%. In the current research, oligohydramnios had the lowest rate of extremely low birth weight, 0%, whereas polyhydramnios and normal AFV had equal percentages of 0.7%. Additionally, polyhydramnios had the greatest percentage of macrosomia, 9.3 %. In Iran, the highest percentages were the normal birth weight in polyhydramnios 58.8% and normal AFV 94.7%. Macrosomia was the highest percentage in polyhydramnios, 6.1% (Asadi *et al.,* 2018). In Saudi Arabia, normal birth weight was the highest in normal AFV at 86%, polyhydramnios at 85.7%, and oligohydramnios at 65.5%. Extreme low birth weight in normal AFV was 0.9%, in oligohydramnios was 1.7%, and in polyhydramnios was 0% (Bakhsh *et al.*, 2021).

Statistically, the baby's term with AFV was not significant. Full-term was highest in all groups of AFV: oligohydramnios was 71.3%, normal AFV was 80.0%, and polyhydramnios was 70.0 %. The percentages of post-term were at their largest in polyhydramnios at 4.0% and their lowest and exact in oligohydramnios and normal AFV at 0.7 %. In another study, there was no statistically significant difference between term and AFV, which agrees with the current study. Preterm in polyhydramnios was 11.8%, and in normal AFV was 7.6% (Khan and Donnelly, 2017). Preterm was 10.1%, full-term 51.1%, and late-term 38.7% in oligohydramnios (Minwuye, 2019).

In this study, neonatal jaundice in the first 24 H, Meconium and twins was statistically insignificant with AFV. Moreover, congenital anomalies, Hypoglycemia, asphyxia, and RDS were highly statistically significant with AFV. Neonatal jaundice in first 24 H 4.7%, meconium 14.0%, congenital anomalies 12.0%, twins 6.7%, hypoglycemia 11.3%, asphyxia 12.7%, and RDS 30.0% were highest percentages in polyhydramnios. Aviram *et al.,* (2015) agree with the current study that neonatal jaundice was statistically not significant with AFV neonatal

jaundice in polyhydramnios was 9.3% and in normal AF was 8.6%. Disagree with the current study that hypoglycemia and asphyxia with AFV were statistically insignificant; hypoglycemia in polyhydramnios was 1.9%, and normal AF was 0.8%. Asphyxia in polyhydramnios 2.8% in normal AF was 1.4%. Agree with the present study RDS was highly statistically significant with AF, RDS in polyhydramnios 0.5%, in normal AF 0.03%.

Meconium was 4% the same percentage, and meconium in normal AF was 0%. RDS in oligohydramnios was 6%, in normal AF 2% (Nancy *et al.*, 2019). In India, meconium 4% in oligohydramnios, in normal AFV 0%. RDS in oligohydramnios was 32%, and in normal AFV 18.6% (Sathyapriya et a.l, 2019). In Pakistan, 26.67% was meconium in oligohydramnios (Sharif and Qasim, 2021). Polyhydramnios was associated with an increased risk for congenital malformations 19%, without a statistically significant increase in the rate of major malformations (Yefet and Daniel-Spiegel, 2016).

CONCLUSIONS

This study demonstrated that polyhydramnios had a greater impact on adverse maternal and newborn outcomes than oligohydramnios. The three groups with the highest percentages were secondhand smoking, multigravida, and multi para. In addition, this study showed there was a correlation between AFV changes and newborn gender, with a male being more affected than a female. The premature baby had the highest incidence of oligohydramnios. The incidence of hypoglycemia was zero percent in oligohydramnios and normal AFV.

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