

## EVALUATION OF MATERNAL AND PERINATAL OUTCOME IN WOMEN WITH BORDERLINE AFI AND OLIGOHYDRAMNIOS IN THIRD TRIMESTER: A TERTIARY CARE HOSPITAL-BASED STUDY

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Received: 08 February 2024, Revised and Accepted: 19 March 2024

### ABSTRACT

**Objectives:** Objectives of our study were (1) to study and compare obstetric outcome in women with oligohydramnios, borderline amniotic fluid index (AFI), and normal AFI in terms of (a) type of labor (spontaneous/induced) and (b) mode of delivery-C-section or vaginal delivery and (2) to study and compare perinatal outcome in women with oligohydramnios, borderline AFI, and normal AFI in terms of (a) prematurity, (b) APGAR score at 1 and 5 min, (c) fetal distress, (d) low birth weight, (e) weight for gestational age, (f) neonatal intensive care unit (NICU) admission, (g) cause of NICU admission, and (h) neonatal deaths.

**Methods:** This prospective and comparative study was conducted in Rajindra Hospital Patiala, over a period of 1 year. Women with  $\geq 34$  weeks POG were subjected to ultrasonography. They were then divided into following three groups of 50 women each depending upon AFI: Group A – oligohydramnios (AFI  $< 5$  cm), Group B – borderline AFI (AFI 5–8 cm), and Group C – normal AFI (AFI  $> 8$ –25 cm). Patients were followed up to 40 weeks POG or till delivery occurred or decision for C-section was taken.

**Results:** Perinatal outcome was adversely affected by decrease in AFI in terms of increase in rate of preterm delivery, small for gestational age babies, low birth weight babies, and neonatal deaths.

**Conclusion:** Measurement of AFI is an important tool for prediction of adverse neonatal outcome.

**Keywords:** Amniotic fluid index, Oligohydramnios, Borderline amniotic fluid index, Prematurity.

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### INTRODUCTION

Assessment of amniotic fluid is an essential part of the antenatal evaluation of pregnancies at risk for an adverse pregnancy outcome, especially in the third trimester [1,2]. An increase in the amniotic fluid volume (AFV) occurs from 10 to 22-week gestation. AFV remains stable from 22 to 39-week gestation (averaging 777 mL) and then declines slowly. Beyond 40 weeks, amniotic fluid decreases at a rate of 8% per week and decreases to 400–450 mL on an average at the end of 42 weeks. Monitoring of AFV can be done by non-invasive modality of ultrasonography. AFV can be determined by measuring single deepest pocket (also called maximum vertical pocket) or by measuring amniotic fluid index (AFI). The transducer is placed perpendicular to the floor and parallel to the long axis of pregnant female. In sagittal plane, the largest vertical pocket is recognized. AFI can be classified as: (a) normal AFI –  $> 8$ –25 cm, (b) hydramnios - AFI  $> 25$  cm, (c) oligohydramnios - AFI  $< 5$  cm, and (d) borderline AFI - 5–8 cm [3]. Oligohydramnios does not directly cause maternal complications but may cause them indirectly due to increased rates of malpresentation, induction of labor, prolonged labor due to inertia, and increased operative interference due to manipulation. Fetal complications include fetal pulmonary hypoplasia (may be cause or effect), deformity due to compression (including altered shape of the skull, wry neck, club foot, or even amputation of limb), cord compression, fetal growth restriction, increased rates of neonatal intensive care unit (NICU) admissions, and fetal death [4].

### Aims and objectives

1. To study and compare obstetric outcome in women with oligohydramnios, borderline AFI, and normal AFI in terms of (a) type

of labor (spontaneous/induced) and (b) mode of delivery – C-section or vaginal delivery

2. To study and compare perinatal outcome in women with oligohydramnios, borderline AFI, and normal AFI in terms of (a) prematurity, (b) APGAR score at 1 and 5 min, (c) fetal distress, (d) low birth weight, (e) weight for gestational age, (f) NICU admission, (g) cause of NICU admission, and (h) neonatal deaths.

### METHODS

#### Inclusion criteria

Included women with Singleton pregnancy with  $\geq 34$ -week period of gestation attending outpatient department, admitted in wards or labor room, willing to participate in study, were included in this study.

#### Exclusion criteria

Included period of gestation  $< 34$  weeks, polyhydramnios, multiple pregnancy, placenta previa, congenital abnormality of fetus, congenital malformations of uterus, ruptured membranes, intrauterine death, and postdated pregnancy.

#### Method of collection of data

This prospective and comparative study was conducted in the department of Obstetrics and Gynaecology, in collaboration with Department of Pediatrics, Rajindra Hospital Patiala (Punjab), over a period of 1 year (from 2017 to 2018). Women with  $\geq 34$ -weeks POG were subjected to ultrasonography and divided into three groups depending upon AFI –

- Group A - 50 women with oligohydramnios (AFI  $< 5$  cm)
- Group B - 50 women with borderline AFI (AFI 5–8 cm)
- Group C - 50 women with normal AFI (AFI  $> 8$ –25 cm).

Table 1: Association of maternal age with AFI

Groups on basis of AFI	Obs	Total	Mean	Var	Standard Deviation	Min	25%	Median	75%	Max	Mode
Oligohydramnios	50	1242	24.84	15.61	3.95	19	22	24.5	27	35	24
Borderline	50	1300	26	19.51	4.42	19	23	25	28	37	23
Normal	50	1295	25.9	16.05	4.01	19	23	25.5	28	35	26

Kruskal–Wallis Test  $P > 0.05$ , The age of subjects varied between 19 years and 37 years and the mean age of all study participants was 25.28 years. The group-wise mean age increased from 24.84 years in oligohydramnios group to 25.9 years in normal AFI group to 26 years in borderline AFI group. There was no statistical difference between mean age in all three groups ( $p > 0.05$ ). AFI: Amniotic fluid index

Table 2: Association of parity with AFI

Groups on basis of AFI	Oligohydramnios	Borderline	Normal	Total
Multipara	22	26	28	76
	28.95%	34.21%	36.84%	100.00%
	44.00%	52.00%	56.00%	50.67%
Nullipara	28	24	22	74
	37.84%	32.43%	29.73%	100.00%
	56.00%	48.00%	44.00%	49.33%
Total	50	50	50	150
	33.33%	33.33%	100.00%	100.00%
	100.00%	100.00%	100.00%	100.00%
<b>Chi-square</b>	<b>Df</b>	<b>Probability</b>		
1.4936	2	0.4739		

The percentage of nulliparous women was maximum in the oligohydramnios group i.e., 37.84% followed by 32.43% in the borderline AFI group, followed by 29.73% in the normal AFI group. There was no statistically significant difference between three groups in terms of parity ( $p = 0.4739$ ). AFI: Amniotic fluid index

Study was conducted after taking clearance from the ethical committee of the college. Patients were enrolled after taking written consent from them and examined as per the protocol. Patients were followed up to 40-week POG or till delivery occurred or decision for C-section was taken. Subjects with borderline AFI and oligohydramnios were monitored with biweekly BPP-NST and weekly color Doppler. Data were collected and analyzed using Microsoft Word Excel 2019 version 1911 and Epi Info (CDC Atlanta) 7.23.1. Statistical analysis was done using Chi-square, ANOVA test, Fisher's Exact test.

## RESULTS AND DISCUSSION

### Association of overweight with body mass index

The percentage of overweight subjects increased from 28.57% in both oligohydramnios and normal AFI group to 42.86% in borderline AFI group. However, the difference was not statistically significant ( $p = 0.3939$ ).

### Association of mean of gestational age at time of delivery with AFI

Mean gestational age at time of delivery increased from 37.42 weeks in oligohydramnios group to 38 weeks in borderline AFI group to 38.49 weeks in normal AFI group. This difference was statistically significant ( $p = 0.0132$ ).

Mean maternal age in the present study was 25.28 years (Table 1). Our all three groups were comparable in terms of maternal age. Our results were comparable to results of studies conducted by Giri *et al.* [5] and Gaikwad *et al.* [6].

Nulliparous subjects in the present study were 49.33% and all three groups were comparable in terms of parity (Table 2). Percentage of nulliparous subjects in normal and borderline AFI groups in the present study was similar to the study conducted by Suvarna and Reddy [7]. As compared to the present study, percentage of nulliparous subjects was higher in the study conducted by Gaikwad *et al.* [6]. However, in study conducted by Gaikwad *et al.* [6], there was no statistically significant

difference between oligohydramnios and borderline AFI groups in terms of parity. No association was established between parity and amount of amniotic fluid in our study.

In the present study, hypertension (preeclampsia/gestational hypertension) was present in 19.33% subjects. Gestational hypertension was present in 16% subjects and 3.33% had preeclampsia. There was no statistically significant difference between three groups in terms of incidence of hypertension (preeclampsia/gestational hypertension) ( $p = 0.9418$ ). Hypertension was more prevalent in oligohydramnios group as compared to borderline AFI group in studies conducted by Gaikwad *et al.* [6] and Puri and Sharma [8]; but the incidence of hypertension was more in borderline AFI group as compared to oligohydramnios group in the present study. Although hypertension has been associated with decrease in amount of amniotic fluid, this association could not be found in our study. Most common etiology of oligohydramnios inferred from our study was idiopathic.

Gestational diabetes mellitus (GDM) was present in 5 (3.33%) patients. Number of subjects with GDM was 2 (40%) in normal AFI group and 3 (60%) in borderline AFI groups. None of subjects in oligohydramnios group had GDM. There was no statistically significant difference between three groups in terms of incidence of GDM ( $p > 0.05$ ). No association between GDM and AFI could be inferred from our study. Incidence of GDM was lower in the present study as compared to studies conducted by Asgharnia *et al.* [9].

Mean AFI was 2.538 cm in oligohydramnios group, 6.5 cm in borderline AFI group, and 12.55 cm in normal AFI group in the present study. Mean AFI in present study in normal AFI group was similar to the study conducted by Bachhav and Waikar [10] and in borderline AFI group was similar to the study conducted by Gaikwad *et al.* [6].

Labor was induced in 24% subjects in present study (Table 4). Rate of induction of labor increased from 22.22% in normal AFI group to 33.33% in borderline AFI group to 44.44% in oligohydramnios. However, there was no statistically significant difference between three groups in terms of rate of induction of labor ( $p = 0.173$ ). Rate of induction has also been found to be higher in oligohydramnios group as compared to borderline AFI or normal AFI groups in studies conducted by Asgharnia *et al.* [9], Gaikwad *et al.* [6], and Ghimire *et al.* [11]. In our study, no patient was induced solely because of borderline AFI or oligohydramnios. Co-existing medical conditions such as gestational hypertension or preeclampsia or term pregnancy were the common indications for induction of labor. Hence, rate of induction did not differ significantly among the three groups of this study.

Rate of cesarean section was 38.00% in normal AFI group followed by 42.86% in oligohydramnios group followed by 56% in borderline AFI group (Table 5). There was no statistically significant difference between three groups in the present study in terms of rate of cesarean section ( $p = 0.1744$ ). Rate of C-section was higher in oligohydramnios group as compared to borderline AFI group in studies conducted by Gaikwad *et al.* [6] and Puri and Sharma [8] but in our study, rate of C-section was higher in borderline AFI group as compared to oligohydramnios group. Oligohydramnios and borderline AFI were not considered as direct indications for C-section in our study. Most common indications for C-section in present study were fetal distress, failed induction, previous

**Table 3: Association of mean of diagnosis-delivery interval (in weeks) with AFI**

Diagnosis-delivery interval* Grouping on the basis of AFI detail	Obs	Total	Mean	Var	Standard Deviation	Min	25%	Median	75%	Max	Mode
Oligohydramnios	50	23.21	0.46	0.61	0.78	0	0.1	0.2	0.4	4.4	0.1
Borderline	50	46.93	0.94	1.39	1.18	0	0.1	0.3	1.5	4.4	0.1
Normal	50	70.48	1.41	2.17	1.47	0	0.2	1	2.2	5	0.1
Kruskal-Wallis H	12.4858										
Degrees of freedom	2										
p-value	0.0019										

Diagnosis-delivery interval is the time elapsed from performing ultrasound to determine AFI to delivery. Mean diagnosis delivery interval increased from 0.46 weeks in oligohydramnios group to 0.94 weeks in borderline AFI group to 1.41 weeks in normal AFI group. This difference was statistically significant (p=0.0019). AFI: Amniotic fluid index (Table 3)

**Table 4: Association of AFI with induction of labor**

Groups on basis of AFI	Induced	Spontaneous	Total
Oligohydramnios	16	34	50
	44.44%	29.82%	33.33%
	32.00%	68.00%	100.00%
Borderline	12	38	50
	33.33%	33.33%	33.33%
	24.00%	76.00%	100.00%
Normal	8	42	50
	22.22%	36.84%	33.33%
	16.00%	84.00%	100.00%
Total	36	114	150
	100.00%	100.00%	100.00%
	24.00%	76.00%	100.00%

  

Chi-square	Df	Probability
1.8634	2	0.3939

The rate of induction of labor was maximum in the oligohydramnios group (44.44%), followed by the borderline AFI group (33.33%), followed by the normal AFI group (22.22%). However, there was no statistically significant difference between the three groups in terms of rate of induction of labor (p=0.173). Most patients went into spontaneous labor. Induction of labor was only done for coexisting medical conditions (e.g. hypertensive disorders of pregnancy). AFI: Amniotic fluid index

**Table 5: Association of AFI with mode of delivery**

Groups on basis of AFI	LSCS	Vaginal delivery	Total
Oligohydramnios	21	28	49
	42.86%	57.14%	100.00%
	30.88%	34.57%	32.89%
Borderline	28	22	50
	56.00%	44.00%	100.00%
	41.18%	27.16%	33.56%
Normal	19	31	50
	38.00%	62.00%	100.00%
	27.94%	38.27%	33.56%
Total	68	81	149
	45.64%	54.36%	100.00%
	100.00%	100.00%	100.00%

  

Chi-square	df	Probability
3.4924	2	0.1744

The rate of caesarean section was maximum in the borderline AFI group (56%), followed by the oligohydramnios group (42.86%), followed by the normal AFI group (38%). However, there was no statistically significant difference between the three groups in the terms of rate of caesarean section (p=0.1744). AFI: Amniotic fluid index, LSCS: Lower segment cesarean section

cesarean section not willing for trial of labor after cesarean. A decrease in AFI did not lead to significant increase in C-section rate in our study.

C-section due to fetal distress was done in 11.33% subjects in the present study. Incidence of C-section due to fetal distress increased

**Table 6: Association of AFI with prematurity**

Groups on basis of AFI	Preterm	Term	Total
Oligohydramnios	23	27	50
	46.00%	54.00%	100.00%
	48.94%	26.21%	33.33%
Borderline	15	35	50
	30.00%	70.00%	100.00%
	31.91%	33.98%	33.33%
Normal	9	41	50
	18.00%	82.00%	100.00%
	19.15%	39.81%	33.33%
Total	47	103	150
	31.33%	68.67%	100.00%
	100.00%	100.00%	100.00%

  

Chi-square	df	Probability
9.1717	2	0.0102

The percentage of subjects who delivered before 37-week period of gestation (preterm birth) was 46% in the oligohydramnios group, followed by 30% subjects in the borderline AFI group, followed by 18% subjects in the normal AFI group. This difference was found to be statistically significant (p=0.0102). AFI: Amniotic fluid index

**Table 7: Association of AFI with LBW**

Groups on basis of AFI	LBW	Not LBW	Total
Oligohydramnios	26	24	50
	52.00%	48.00%	100.00%
	44.07%	26.37%	33.33%
Borderline	23	27	50
	46.00%	54.00%	100.00%
	38.98%	29.67%	33.33%
Normal	10	40	50
	20.00%	80.00%	100.00%
	16.95%	43.96%	33.33%
Total	59	91	150
	39.33%	60.67%	100.00%
	100.00%	100.00%	100.00%

  

Chi-square	df	Probability
12.1252	2	0.0023

Incidence of low birth weight was maximum in the oligohydramnios group, i.e., 52% neonates followed by 46% neonates in borderline AFI group, followed by 20% neonates in normal AFI group. This difference in the incidence of low birth weight was found to be statistically significant (p=0.0023). AFI: Amniotic fluid index, LBW: Low birth weight

from 18% in normal AFI group and borderline AFI group to 22% in oligohydramnios group. This difference was not statistically significant (p=0.5074). In this study, decrease in AFI did not cause significant increase in rate of C-sections due to fetal distress. Rate of C-section due to fetal distress was higher in oligohydramnios group than borderline AFI or normal AFI groups in studies conducted by Bachhav and

Table 8: Association of AFI with weight for gestational age

Groups on basis of AFI	Large for gestational age	Appropriate for gestational age	Small for gestational age	Total
Oligohydramnios	0 0.00%	25 50.00%	25 50.00%	50 100.00%
Borderline	0 0.00%	38 76.00%	12 24.00%	50 100.00%
Normal	1 2.00%	41 82.00%	8 16.00%	50 100.00%
Total	1 0.67%	104 69.33%	45 30.00%	150 100.00%
	100.00%	100.00%	100.00%	100.00%
Test	Probability			
Fisher's Exact	0.0008			

Incidence of small for gestational age (SGA) babies was maximum in the oligohydramnios group, i.e., 50%, followed by 24% neonates in the borderline AFI group, followed by 16% neonates in the normal AFI group. This difference in the incidence of SGA newborns was found to be statistically significant ( $p=0.0008$ ). AFI: Amniotic fluid index

Table 9: Association of AFI (normal and borderline AFI groups combined vs. oligohydramnios) with neonatal death

Normal and borderline versus oligohydramnios	Neonatal death		Total
	Yes	No	
Oligohydramnios	3 6.00%	47 94%	50 100.00%
Normal and Borderline	0 0.00%	100 100.00%	100 100.00%
Total	3 2.00%	147 98.00%	150 100.00%
	100.00%	100.00%	100.00%

## Statistical tests

Fisher exact test  $p=0.035$

When normal and borderline AFI groups were combined, then the difference in the incidence of neonatal deaths between this combined group and the oligohydramnios group was found to be statistically significant (Fisher exact  $P=0.035$ ). AFI: Amniotic fluid index

Waikar [10], Giri *et al.* [5], Ghimire *et al.* [11], Gaikwad *et al.* [6], Indira and Devi [12], and Suvarna and Reddy [7].

Preterm delivery occurred in 31.33% subjects in the present study (Table 6). Percentage of preterm deliveries was 18% in normal AFI group, followed by 30% in borderline AFI group, followed by 46% in oligohydramnios group. This difference was found to be statistically significant ( $p=0.0102$ ). Also in study conducted by Petrozella *et al.* [13], rate of prematurity was highest in oligohydramnios group, followed by borderline AFI group, followed by normal AFI group and difference was statistically significant ( $p<0.001$ ). Many of our outcomes were not similar to study conducted by Petrozella *et al.* [13] as the latter included pregnancies with period of gestation between 24 and 34 weeks and also included pregnancies with malformed fetuses. However, higher rate of preterm delivery in oligohydramnios and borderline AFI group was not due to induction of labor, but most subjects in these two groups had spontaneous onset of labor. Hence, a decrease in AFI was associated with decrease in gestational age at time of delivery in our study.

Fetal distress occurred in 19.33% subjects. Incidence of fetal distress decreased from 22% in oligohydramnios group to 18% each in borderline AFI group and normal AFI group. However, this difference in incidence of fetal distress was not statistically significant ( $p=0.8428$ ). In our study, decrease in AFI did not cause significant increase in incidence

of fetal distress. Fetal heart rate abnormalities were present in 15.33% subjects. Out of the 15.33% subjects having FHR abnormalities, 12.67% had meconium stained liquor along with FHR abnormalities. FHR abnormalities without MSL were present in 2.67% subjects. Occurrence of FHR abnormalities in the present study was lower than that of study conducted by Gaikwad *et al.* [6].

Meconium stained liquor was present in 16.67% subjects. Meconium-stained liquor was found in 18% subjects each in oligohydramnios group and normal AFI group, followed by 14% subjects in borderline AFI group. This difference in incidence of meconium-stained liquor was not statistically significant ( $p=0.8253$ ). There was not any significant increase in incidence of meconium stained liquor, with decrease in AFI in this study.

An APGAR score at 1 min  $\leq 7$  was seen in 8% newborns. Percentage of newborns with APGAR score at 1 min  $\leq 7$  increased from 4% subjects each in borderline and normal AFI group to 16% in oligohydramnios group. However, this difference was not statistically significant ( $p=0.0564$ ). Occurrence of 1 min APGAR score  $\leq 7$  in all three groups in the present study was lower than that of study conducted by Suvarna and Reddy [7]. Strict intrapartum monitoring in our study and timely intervention in the form of cesarean section in case of fetal distress lowered the incidence of APGAR score  $\leq 7$ .

In present study, 39.33% newborns were low birth weight (Table 7). Incidence of low birth weight decreased from 52% in oligohydramnios group to 46% in borderline AFI group to 20% in normal AFI group. This difference in incidence of low birth weight was found to be statistically significant ( $p=0.0023$ ). In study by Asgharnia *et al.* [9], rate of low birth was higher in borderline AFI group than normal AFI group and this difference was statistically significant ( $p=0.0001$ ). A decrease in AFI significantly decreased birth weight in our study. Higher rates of low birth weight in oligohydramnios and borderline AFI groups in the present study could be due to higher rates of preterm delivery and higher incidence of fetal growth restriction in these two groups as compared to normal AFI group.

Small for gestational age (SGA) newborns were 30% (Table 8). The incidence of SGA babies was 16% in normal AFI group, 24% in borderline AFI group, and 50% in oligohydramnios group. This difference in incidence of SGA newborns in three groups was found to be statistically significant ( $p=0.0008$ ). A decrease in AFI significantly increased the incidence of SGA babies in this study. In study conducted by Petrozella *et al.* [13], incidence of SGA neonates in normal AFI, borderline AFI, and oligohydramnios group was 12%, 43%, and 53%, respectively, and the difference in incidence was statistically significant ( $p<0.001$ ).

Number of newborns admitted to NICU was 23 and 3 neonates were kept in ward (by mother's side) for special care (due to low birth weight and/or prematurity). The incidence of NICU admission and special care increased from 10% in normal AFI group to 16% in borderline AFI group to 26% in oligohydramnios group. This difference in the incidence of NICU admission and special care was found to be statistically insignificant ( $p=0.1023$ ). In the present study, the incidence of NICU admission in normal AFI group was comparable to study performed by Bachhav and Waikar [10], in borderline AFI group was comparable to study performed by Giri *et al.* [5] and Gaikwad *et al.* [6], and in oligohydramnios group was comparable to study performed by Gaikwad *et al.* [6]. NICU admissions were not significantly increased with decrease in AFI in our study. Higher rates of NICU admission in oligohydramnios and borderline AFI groups in our study could be due to higher incidence of low birth weight, SGA, and preterm babies in these two groups as compared to normal AFI group.

The number of neonatal deaths was 3 (2%) in the present study (Table 9). All 3 neonatal deaths occurred in oligohydramnios group. This difference was not statistically significant ( $p=0.1067$ ). However, when the normal and the borderline AFI groups were combined, then the difference in the incidence of neonatal deaths between this combined group and oligohydramnios group was found to be statistically significant ( $p=0.035$ ). All three neonates who died in present study were SGA and had low birth weight. In study conducted by Giri *et al.* [5], the difference in incidence of neonatal deaths between normal AFI and oligohydramnios group was statistically significant ( $p=0.037$ ). There were no neonatal deaths in normal AFI group in the present study and this finding was comparable to studies conducted by Petrozella *et al.* [13], Bachhav and Waikar [10], and Giri *et al.* [5].

## CONCLUSION

Perinatal outcome was adversely affected by decrease in AFI in terms of increase in rate of preterm delivery, SGA babies, low birth weight babies, and neonatal deaths. The most common cause of oligohydramnios was found to be idiopathic. Subjects with borderline AFI and oligohydramnios were monitored with biweekly BPP-NST and weekly color Doppler. No elective C-section was done because of oligohydramnios. Decrease in AFI did not have a significant adverse effect on maternal outcome. The study groups did not differ significantly in terms of rate of induction of labor, rate of C-section, APGAR score at 1 and 5 min, fetal distress, NICU admission, and neonatal deaths. Measurement of AFI is thus an important tool for prediction of adverse neonatal outcome.

## ACKNOWLEDGMENT

We are thankful to all the study subjects as they consented to participate in this study, which helped us to draw valuable conclusions.

## AUTHORS CONTRIBUTION

Arshdeep kaur- Data curation, writing original draft. Manjit Kaur Mohi- Conceptualization, manuscript revision. Puneet

Gambhir- Research methodology, statistical analysis, manuscript revision. Manjeet Kaur- Supervision, manuscript revision. Gurtej Singh- Manuscript editing.

## CONFLICTS OF INTERESTS

The authors declare that they have no conflicts of interest.

## AUTHORS FUNDING

The authors did not receive any funding from any organization for the submitted work.

## REFERENCES

- Magann EF, Chauhan SP, Bofill JA, Martin JN. Comparability of the amniotic fluid index and single deepest pocket measurements in clinical practice. *Aust N Z J Obstet Gynaecol.* 2003;43(1):75-7. doi: 10.1046/j.0004-8666.2003.00002.x, PMID 12755354
- Kofinas A, Kofinas G. Differences in amniotic fluid patterns and fetal biometric parameters in third trimester pregnancies with and without diabetes. *J Matern Fetal Neonatal Med.* 2006;19(10):633-8. doi: 10.1080/14767050600822547, PMID 17118737
- Chetani M, Deepika, Khajotia S, Kocharhajotia S, Kochar S. A clinical study of amniotic fluid index at or beyond 28 weeks of gestation and its relation to perinatal outcome. *Int J Reprod Contracept Obstet Gynecol.* 2017;6(8):3280-86. doi: 10.18203/2320-1770.ijrcog20173083
- Casey BM, McIntire DD, Bloom SL, Lucas MJ, Santos R, Twickler DM, *et al.* Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks' gestation. *Am J Obstet Gynecol.* 2000;182(4):909-12. doi: 10.1016/s0002-9378(00)70345-0, PMID 10764472
- Giri A, Srivastav VR, Tuladhar AS, Sharma B. Perinatal outcome of term pregnancies with borderline amniotic fluid index at Nepal Medical College and Teaching Hospital. *Nepal Med Coll J.* 2015;17(1-2):63-66.
- Gaikwad PR, Oswal MS, Gandhewar MR, Bhatiyani BR. Perinatal outcome in oligohydramnios and borderline amniotic fluid index: A comparative study. *Int J Reprod Contracept Obstet Gynecol.* 2016;5(6):1964-8. doi: 10.18203/2320-1770.ijrcog20161699
- Suvarna V, Reddy MN. The impact of intrapartum amniotic fluid index on perinatal outcome. *Int Arch Integr Med.* 2018;5(9):74-82.
- Puri M, Sharma K. Low amniotic fluid index and intranatal and perinatal outcome in term pregnancy. *Int J Med Health Res.* 2017;3(11):129-34.
- Asghamia M, Faraji R, Salamat F, Ashrafkhani B, Dalil Heirati SF, Naimian S. Perinatal outcomes of pregnancies with borderline versus normal amniotic fluid index. *Iran J Reprod Med.* 2013;11(9):705-10. PMID 24639809
- Bachhav AA, Waikar M. Low amniotic fluid index at term as a predictor of adverse perinatal outcome. *J Obstet Gynaecol India.* 2014;64(2):120-3. doi: 10.1007/s13224-013-0489-9, PMID 24757340
- Ghimire S, Ghimire A, Chapagain S, Paudel S. Pregnancy outcome in cases of oligohydramnios after 28 weeks of gestation. *Int J Adv Med Health Res.* 2016;3(2):68. doi: 10.4103/2349-4220.195939
- Indira K, Devi LA. Mode of delivery and perinatal outcome in oligohydramnios. *J Dent Med Sci.* 2017;16(11):22-6.
- Petrozella LN, Dashe JS, McIntire DD, Leveno KJ. Clinical significance of borderline amniotic fluid index and oligohydramnios in preterm pregnancy. *Obstet Gynecol.* 2011;117(2 Pt 1):338-42. doi: 10.1097/AOG.0b013e3182056766, PMID 21252747