

Maternal and Perinatal Outcome of Oligohydramnios at a Tertiary Care Hospital in Shillong, Meghalaya

Dr. Richa Choubey*, Dr. Indrani Roy, Dr. Neelotparna Saikia Gogoi

Nazareth Hospital, Shillong, Meghalaya, India

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*Corresponding author: Dr. Richa Choubey

Abstract

Introduction: Amniotic fluid is necessary for normal musculoskeletal development, gastrointestinal tract and lung development. It protects the fetus from trauma against umbilical cord and infections by bacteriostatic property. Oligohydramnios, a deficiency in the amount of amniotic fluid, occurs in 3.9-5.5% of all pregnancies. Most common cause of oligohydramnios is idiopathic (52%). Second commonest cause is PIH (25%). Oligohydramnios may influence maternal, perinatal outcomes. The Amniotic Fluid Index (AFI) is the more commonly employed technique for assessing adequacy of amniotic fluid volume. The sonographic diagnosis of oligohydramnios is usually based on an AFI \leq 5 cm or on a single deepest pocket of amniotic fluid \leq 2 cm. **Aim:** 1) To study the maternal and perinatal outcome in pregnancies with gestational age 34 weeks and above with AFI less than or equal to 5. 2) To compare the maternal and perinatal outcomes of such pregnancies with pregnancies where AFI is 8 to 24. **Materials and Methods:** The present study was Prospective Analytical hospital-based study conducted at Nazareth Hospital for one-year i.e. (8th September 2017 to 7th September 2018) in the department of Obstetrics & Gynaecology. Patients with AFI less than and equal to 5 was taken as study group (Group I) and AFI 8-24 was taken as comparator group (Group II). This study included 50 number of cases and 100 number of control to compensate for 10% dropouts. **Results:** Among those women diagnosed with oligohydramnios (\leq 5), 44% of patients belonged to primi gravida, most common antepartum complications associated was found to be hypertensive disorder (28%). There was more incidence of induction of labour (65.7%), (64%) underwent caesarean section, fetal distress (65.6%) was most common indication, 8% of patients had babies where APGAR score was below 7, 20% of patient had low birth weight babies, 20% babies was admitted in NICU. **Conclusion:** 1) Amniotic fluid index measurement can be used as a useful adjunct to other fetal surveillance methods, to identify those infants at risk of poor perinatal outcome. 2) AFI \leq 5cm is associated with high incidence of thick meconium stained liquor, fetal distress, operative delivery and caesarean section for fetal distress, poor APGAR score, low birth weight, meconium aspiration and perinatal morbidity. 3) As a result, amniotic fluid assessment as an antepartum mode of fetal monitoring, helps an obstetrician better anticipate likely associated problems and plan a timely and appropriate mode of management.

Keywords: Amniotic fluid index, maternal and perinatal outcome, oligohydramnios.

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INTRODUCTION

Amniotic fluid is necessary for normal musculoskeletal development, gastrointestinal tract and lung development. It protects the fetus from trauma against umbilical cord and infections by bacteriostatic property [1]. Amniotic fluid volume increases from 30ml at 10 weeks to 200ml by 16 weeks and reaches 800ml by mid-third trimester [1]. Oligohydramnios, a deficiency in the amount of amniotic fluid, occurs in 3.9-5.5% of all pregnancies [2]. Most common cause of oligohydramnios is idiopathic (52%). Second

commonest cause is PIH (25%) [3]. Oligohydramnios may influence maternal, perinatal outcomes. The Amniotic Fluid Index (AFI) is the more commonly employed technique for assessing adequacy of amniotic fluid volume. The sonographic diagnosis of oligohydramnios is usually based on an AFI \leq 5 cm or on a single deepest pocket of amniotic fluid \leq 2 cm. The diagnosis also may be based on an AFI below the 5th or 2.5th percentile determined by a gestational-age specific nomogram. Or, it may be based on subjective assessment of decreased amniotic fluid volume. In the

Moore nomogram, a threshold of 5 cm is below the 2.5th percentile throughout the second and third trimesters [4]. An adequate volume of amniotic fluid is critical to allow normal fetal movement and growth, and to cushion the fetus and umbilical cord [5] Oligohydramnios may inhibit these processes and can lead to fetal deformation, umbilical cord compression and death [6]. Reported rates of oligohydramnios are influenced by variations in diagnostic criteria, the population studied (low or high risk, screening or indicated ultrasound examination), the threshold used and the gestational age at the time of the ultrasound examination (preterm, term or post term) [7]. Alfievic and coworkers (1997) randomly assigned 500 women with post-term pregnancies to assessment using either the amniotic fluid index (AFI) or the deepest vertical pocket. They concluded that the AFI overestimated the number of abnormal outcomes in post-term pregnancies [8].

A study of 3050 uncomplicated pregnancies with singleton non-anomalous fetuses between 40 and 41.6 weeks of gestation noted oligohydramnios (defined as AFI less than 5) in 11 percent [9]. The incidence is high in laboring women, largely due to rupture of fetal membranes during or just before labor [10]. A prospective study conducted at University of Texas Southwestern Medical Center showed the incidence of oligohydramnios to be 2.3% [11]. Similar result was obtained in USA among 953 women over a period of 12 months in third trimester.¹² In contrast, a study conducted at University of Milano-Bicocca, Monza, Italy among 3050 women who underwent sonographic assessments of AFI after 40.0 weeks showed oligohydramnios of 11.18% [13].

Generally, oligohydramnios is less prevalent in early pregnancy and at this time it usually is associated with poor prognosis [14]. In uncomplicated pregnancies at 40.0 to 41.6 weeks, oligohydramnios is independently associated with a higher risk of low birth weight per centile [15]. Also in multiple studies oligohydramnios has been correlated with increased risk of abnormal fetal heart rate [16-19], pulmonary hypoplasia [20, 21], increased risk of cesarean delivery [16], intrauterine growth restriction (IUGR) [18, 22], postdate pregnancy, meconium passage, lower Apgar scores [18], intensive care unit (NICU) and neonatal death [19]. Thus, in high risk pregnancies, oligohydramnios is frequently used to identify fetuses at risk of an adverse outcome. The purpose of this study was to evaluate the effect of oligohydramnios on

maternal and perinatal outcome in NAZARETH hospital Shillong.

AIMS AND OBJECTIVES

- To study the maternal and perinatal outcome in pregnancies with gestational age 34 weeks and above with AFI less than or equal to 5
- To compare the maternal and perinatal outcomes of such pregnancies with pregnancies where AFI is 8 to 24.

MATERIALS AND METHODS

The study was conducted with the following research plan.

Study Area

The present study was done in the inpatient setting of the Department of Obstetrics and Gynaecology, Nazareth Hospital, Shillong. The hospital caters to both urban and rural patients belonging to the districts in proximity to Shillong. Nazareth Hospital is an entry level NABH accredited hospital which has more than 400 beds in total and 75 beds in the Department of Obstetrics and Gynaecology. Each year approximately 2,500 deliveries take place in Nazareth hospital. This hospital offers tertiary and referral services to the nearby districts.

Study Design

Prospective Analytical hospital based study

Duration of Study

8th September 2017 to 7th September 2018
(One year)

Sample Size

Sample size has been calculated by using Open Epi version 3, open source calculator-SSPropor For two- sided significance level of 95%, power(% chance of detecting) of 80%, ratio of sample size ,unexposed /exposed ratio 2, percent of unexposed with outcome 16, percent of exposed with outcome 40 and odds ratio 3.5, total sample size is calculated to be 135, with number of cases 45 and number of controls 90, according to Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 & 3.19 for Fleiss with CC(continuity correction). We would include 50 number of cases and 100 number of controls to compensate for 10% dropouts.

Sample Size: X-Sectional, Cohort, & Randomized Clinical Trials			
Two-sided significance level(1-alpha):	95		
Power(1-beta, % chance of detecting):	80		
Ratio of sample size, Unexposed/Exposed:	2		
Percent of Unexposed with Outcome:	16		
Percent of Exposed with Outcome:	40		
Odds Ratio:	3.5		
Risk/Prevalence Ratio:	2.5		
Risk/Prevalence difference:	24		
	Kelsey	Fleiss	Fleiss with CC
Sample Size - Exposed	38	39	45
Sample Size-Nonexposed	75	78	90
Total sample size:	113	117	135

Study Population

All Pregnant female admitted to the Nazareth Hospital in Obstetrics and Gynaecology department and after fulfilling the following criteria were included.

Inclusion Criteria

1. Patient with AFI less than and equal to 5 was be taken as study group (Group I) and AFI 8-24 was be taken as comparator group (Group II).
2. Patient age between 18 years to 35 years of age.
3. Gestational age 34 weeks and above.
4. Singleton pregnancy.
5. All booked and unbooked case.

Exclusion Criteria

1. Premature rupture of membrane.
2. Diabetes Mellitus.

3. Previous LSCS.

4. Foetus with Congenital anomalies.

RESULTS & OBSERVATIONS

The present study was done to analyze the maternal and perinatal outcomes in pregnancies with gestational age 34 weeks and above with AFI less than or equal to 5. Patient with AFI less than and equal to 5 was be taken as study group (Group I) and AFI 8-24 was be taken as comparator group (Group II). This study also analyzed the socio-demographic variables in relation to the outcomes. In the present study group I with AFI ≤ 5 consisted of 50 patients and group II with AFI (8-24) consisted of 100 patients. The observations of the study were discussed below.

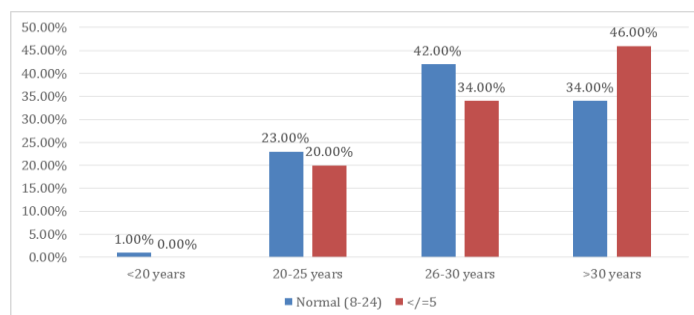


Fig-1: Distribution of study subjects based on the Age and Amniotic fluid index
Chi-square: 2.442, P Value: 0.486, Statistically not Significant

The present study showed that majority of patients with AFI ≤ 5 belonged to the age group > 30 years (46%) as compared to patients with normal AFI

where majority of patients belonged to the age group of 26-30 years (42%) which was not statistically significant.

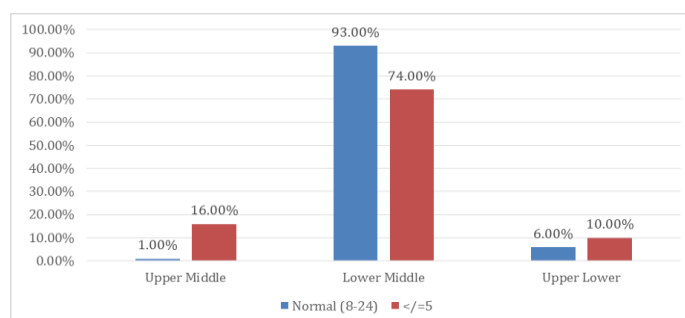


Fig-2: Distribution of study subjects based on the Socio-Economic Status and Amniotic fluid index
Chi-square: 14.616, P Value: 0.001, Statistically Significant

In the socio-economic status analysis, majority of the patients of both the group AFI ≤ 5 and with

normal AFI belonged to lower middle class which was found to be statistically significant.

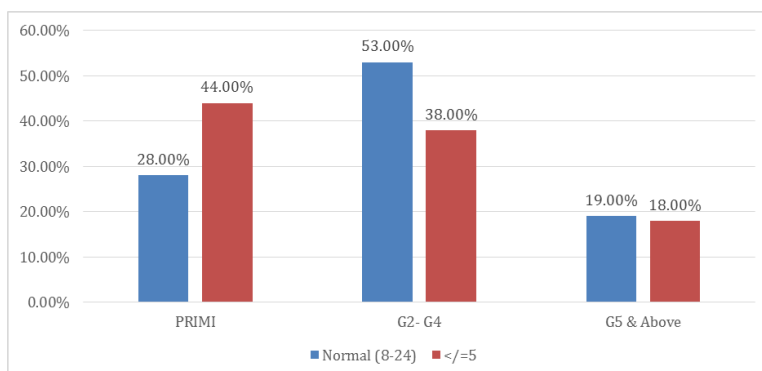


Fig-3: Distribution of study subjects based on the Parity and Amniotic fluid index
Chi-Square: 4.140, P Value: 0.126, Statistically not Significant

The present study showed that 44% of patients with AFI ≤ 5 belonged to primi gravida whilst 53% of

patients with normal AFI were between G2-G4 which had no statistically significance.

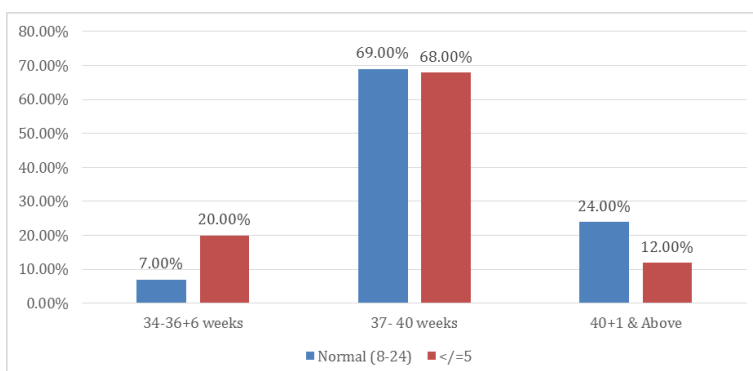


Fig- 4: Distribution of study subjects based on the Gestational Age and Amniotic fluid index
Chi-Square: 7.375, P Value: 0.025, Statistically Significant

The present study showed that majority of the patients belonged to the gestational age 37-40 weeks for both AFI ≤ 5 and in the patients with normal AFI of

which 68% in patients with AFI ≤ 5 and 69% in patients with normal AFI. This was found to be statistically significant.

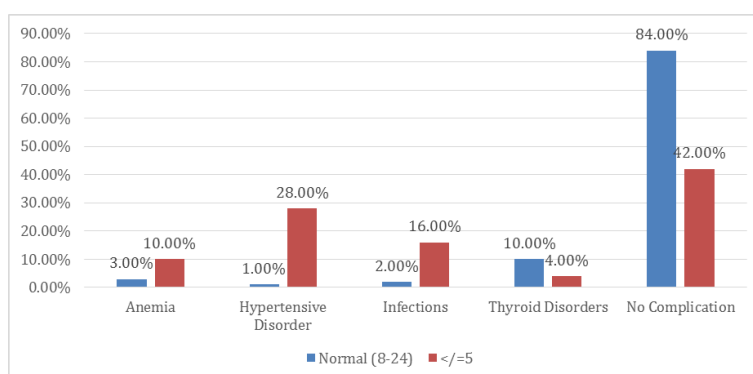


Fig- 5: Distribution of study subjects based on the Antepartum Complications and Amniotic fluid index
Chi-Square: 47.063, P Value: 0.001, Statistically Significant

The present study showed that the most common antepartum complications associated with patients AFI ≤ 5 was found to be hypertensive disorder (28%) while in patients with normal AFI, the most

common complications were found to be thyroid disorders (10%), which was found to be statistically significant. Majority (42%) of patients with AFI ≤ 5 had no associated antepartum complications seen.

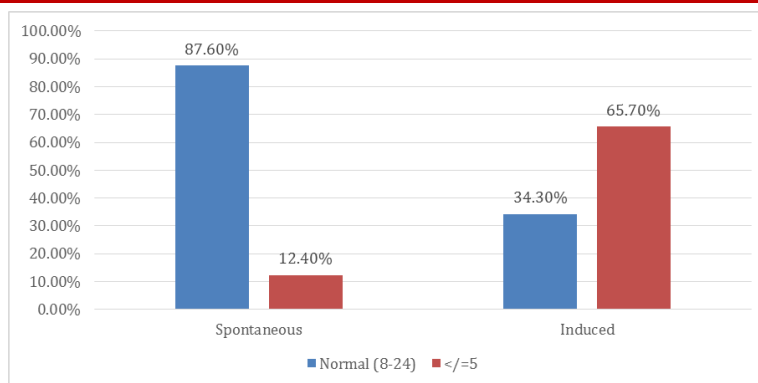


Fig-6: Distribution of study subjects based on the Onset of Labour and Amniotic fluid index
Chi-Square: 37.56, P Value: 0.001, Statistically Significant

The present study showed that patients with AFI ≤ 5 had more incidence of induction of labour (65.7%) as compared to (34.3%) in patients with

normal AFI (8-24) which was found to be statistically significant.

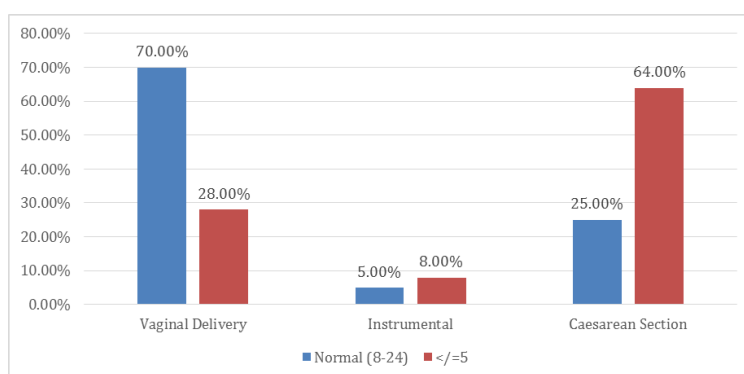


Fig-7: Distribution of study subjects based on the Mode of Delivery and Amniotic fluid index
Chi-Square: 24.342, P Value: 0.001, Statistically Significant

The present study showed that majority (64%) of patients with AFI ≤ 5 underwent Caesarean Section, while in patients with normal AFI 70% had vaginal

delivery. The association between the two groups was found to be statistically significant.

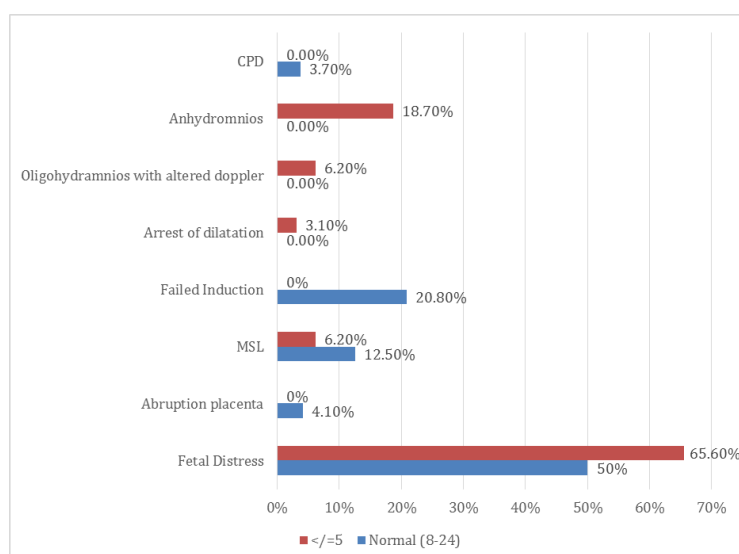


Fig-8: Distribution of study subjects based on the Indication for Caesarean section and Amniotic fluid index
Chi-Square: 32.04, P Value: 0.001, Statistically Significant

In the present study, the most common indication for caesarean section was fetal distress for both AFI ≤ 5 and in the patients with normal AFI, of

which 65.6% were patients with AFI ≤ 5 and 50% were patients with normal AFI. This was found to be Statistically Significant.

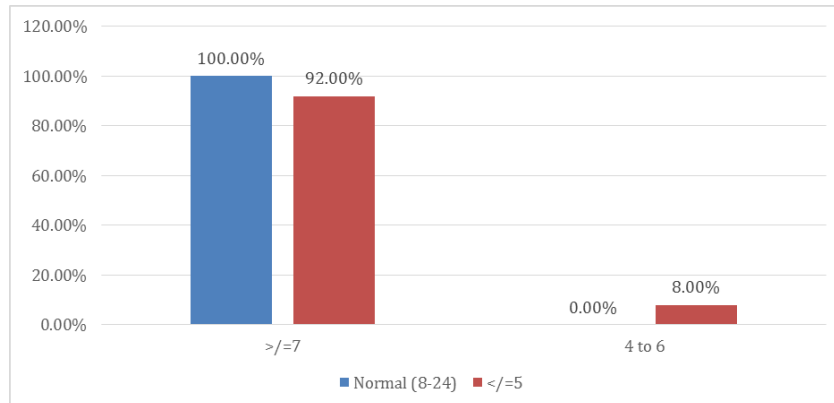


Fig-9: Distribution of study subjects based on the APGAR score and Amniotic fluid index
Chi-Square: 8.219, P Value: 0.011, Statistically Significant

The present study showed that 8% of patients with AFI ≤ 5 had babies where APGAR score was below 7 as compare to the normal AFI where all babies

were born with APGAR score more than 7 which was found to be Statistically significant.

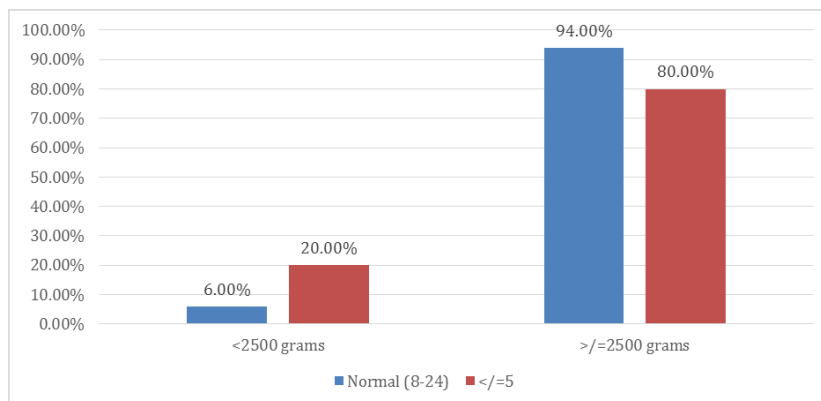


Fig-10: Distribution of study subjects based on the Birth Weight and Amniotic fluid index
Chi-Square: 6.85, P Value: 0.011, Statistically Significant

The present study showed that 20% of patient with AFI ≤ 5 had low birth weight babies as compared

to only 6% in patient with AFI (8-24), which was found to be Statistically significant.

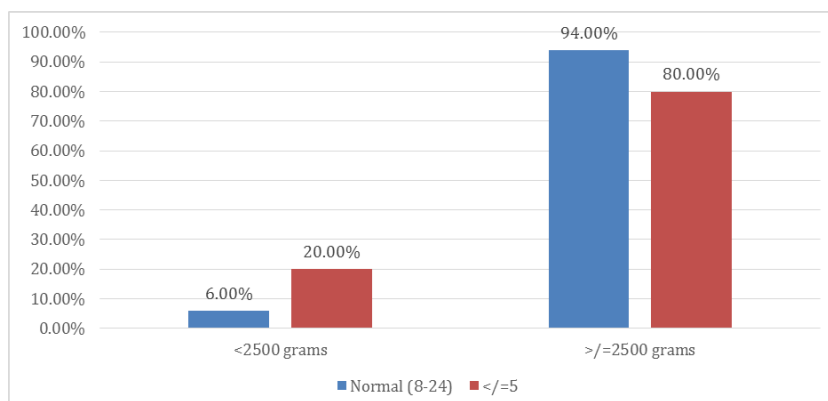


Fig-11: Distribution of study subjects based on the NICU Admission and Amniotic fluid index
Chi-Square: 12.17, P Value: 0.001, Statistically Significant

The present study showed that 20% babies of mother with AFI ≤ 5 was admitted in NICU as compared to only 3% in the group with normal AFI (8-24), which was found to be statistically significant.

DISCUSSION

The aquatic environment of the fetus has long remained enigma to the patient and their obstetricians. Early in developmental life the fetus becomes enclosed by the amnion and is surrounded by amniotic fluid which initially is very similar to extracellular fluid. The importance of amniotic fluid volume as an indicator of fetal status has made the amniotic fluid volume assessment an important part of antenatal fetal surveillance. Oligohydramnios is significantly related to fetal distress, low birth weight infants and caesarean section. Foetal distress during labour is caused due to compression of the umbilical cord. Oligohydramnios is also associated with increased rate of perinatal morbidity and mortality[6]

In the analysis of socioeconomic variables like parity, majority (44%) of the patients with AFI ≤ 5 belonged to Primigravida, followed by patient belonging to G2-G4 (38%), only 9% belonged to Gravida 5 and above. Similar to the present study, Various studies mentioned below, conducted by Banu F *et al.*, [23] Ghimire S *et al.*, [24] Bhat S *et al.*, [25] Jagatia K *et al.*, [26] showed that incidence were more in Primigravida. The present study showed that majority (65.7%) of patients with AFI ≤ 5 , underwent induction of labour, as indicated, followed by 12.4 % of patients who had spontaneous onset of labour. Study conducted by Kumud M *et al.*, [27] showed majority (54%) of the patients underwent induction of labour, incidence was found to be lower than the present study. In contrast, studies done by Kansal R *et al.*, [28] showed 32 % under went for induction of labour. The present study showed that majority (64%) of patients with AFI ≤ 5 underwent emergency LSCS, followed by 28% of vaginal delivery followed by 8% of instrumental delivery. The study found that the most common indication for caesarean section in this study group was fetal distress. Studies conducted by authors like Kumud M *et al.*, [27] Pandey U *et al.*, [29] showed incidence rates for caesarean were 48% and 51% lower than the present study. In contrast to Studies conducted by Ghimire S *et al.*, [24] showed incidence of caesarean section were more as compared to present study. The present study showed that in patients with AFI ≤ 5 , the most common indication for LSCS was fetal distress (77.8%). Frequent use of fetal monitoring (cardiotocography) as a routine labor room procedure helps detect Fetal heart rate changes on CTG, which prompts the obstetrician to expedite delivery. Various studies like Pandey U *et al.*, [29] Rizvi SM *et al.*, [30] Mushtaq E *et al.*, [31] Jagatia K *et al.*, [26] showed the most common indication for caesarean section were fetal distress , incidence were lower than the present study .The present study showed that 8% of patients

with AFI ≤ 5 had APGAR score of 4-6 . Reason could be because of better intrapartum monitoring and early intervention to prevent birth asphyxia. In contrast to studies conducted by Kumud M *et al.*, [27] Rizvi SM *et al.*, [30] Jagatia K *et al.*, [26] Kansal R *et al.*, [28] showed incidence for APGAR Score less than 7 at 1 Min were higher as compared to present study.

Studies conducted by Banu F *et al.*, [23] Mushtaq E *et al.*, [31] showed incidence for APGAR Score less than 7 at 1 Min were similar to our present study. The present study showed that 20% of patients with AFI ≤ 5 had low birth weight babies , Reason behind the low number of low birth wt babies was due to early detection and timely intervention.

Pandey *et al.*, [29] got similar finding as compared to present study. In contrast to, studies conducted by Kumud M *et al.*, [28] Rizvi SM *et al.*, [30] showed higher incidence of low birth weight babies as compared to present study. The present study showed 20% of babies with mothers AFI ≤ 5 was admitted in NICU. The most common indication of NICU Admission was birth asphyxia. In contrast to, studies conducted by Kumud M *et al.*, [27] Bhat S *et al.*, [25] showed NICU Admission were more as compared to present study. Studies conducted by Rizvi SM *et al.*, [30] Kansal R *et al.*, [28] Mushtaq E *et al.*, [31] Ghimire S *et al.*, [24] showed less babies were admitted in NICU as compared to present study. Studies conducted by Rathod S *et al.*, Jagatia K *et al.*, got similar finding as compared to present study.

CONCLUSION

1. Amniotic fluid index measurement can be used as an useful adjunct to other fetal surveillance methods, to identify those infants at risk of poor perinatal outcome.
2. AFI ≤ 5 cm is associated with high incidence of thick meconium stained liquor, fetal distress, operative delivery and caesarean section for fetal distress, poor APGAR score, low birth weight, meconium aspiration and perinatal mortality and morbidity. As a result, amniotic fluid assessment as an antepartum mode of monitoring fetal monitoring, helps an obstetrician better anticipate likely associated problems and plan a timely and appropriate mode of management.

Ethical Approval

The study was approved by the institutional Ethics Committee.

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