



“TO STUDY MATERNAL RISK FACTORS & PERINATAL OUTCOME IN MECONIUM STAINED AMNIOTIC FLUID”

Obstetrics & Gynaecology

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ABSTRACT

Introduction: Meconium is a sterile, thick, black - green, odourless material that results from accumulation of debris in fetal intestine during the third month of gestation. In the fetus, passage of meconium occurs physiologically yearly in gestation, when it contributes to alka linephosphatase in amniotic fluid but diminishes after 16 weeks and ceases by 20 weeks, concurrent with innervation of the anal sphincter and the rectum appears to be filled with meconium. The risk factors for meconium-stained amniotic fluid (MSAF) are both maternal and fetal. **Materials & Methods:** This prospective, Observational, Single group and cross-sectional study was conducted in the Department of Obstetrics and Gynaecology in collaboration with the Department of Pediatrics at VIMS Ballari. After considering all the obstetrical conditions, the mode of delivery of the patients were noted down. Maternal risk factors were noted down. MSAF was further divided into three grades: grade I was thin yellow color meconium with no particulate matter, grade II was light green color with few particulate matters, and grade III was thick paste-like dark green-colored meconium with excess particulate matter. The condition of neonates, i.e., birth weight, Apgar score, general condition, need for admission in neonatal ICU, and neonatal complications and outcome was also be recorded. **Results:** The analysis of the age groups of the patients having meconium stained amniotic fluid showed that the most commonly affected age group was between 21-25 years (68%) followed by 26-30 years (18%) and 20 years or below (7%). The analysis of risk factors showed that 23 (23%) women had Hypertensive disorders of pregnancy risk factors are most common followed by Oligohydramnios (6%). The most common mode of delivery in meconium stained amniotic fluid was by LSCS (47%) followed by Full-Term Vaginal Delivery (41%) and Pre-Term Vaginal Delivery (12%). The analysis of the birth weights in the study showed that in that group <2 kg (6%) neonates while 27 (27%) babies were between 2.0-2.5 kg weight. While normal birth weight was seen in 2.6-3.0 kg (56%) neonates and 11 (11%) babies were >3.1 kg weight. Thick meconium stained liquor was more commonly associated with lower APGAR scores at 1 as well as 5 minutes than thin meconium stained liquor. The difference was found to be statistically significant ($P < 0.05$). **Conclusion:** Meconium stained amniotic fluid is worrisome as it is associated with increased frequency of operative delivery, birth asphyxia, neonatal sepsis, and neonatal intensive care unit admissions compared to clear amniotic fluid which was seen in the current study.

KEYWORDS

Meconium stained amniotic fluid, Maternal risk factors, Perinatal outcome.

INTRODUCTION

Meconium is a sterile, thick, black-green, odourless material that results from accumulation of debris in fetal intestine during the third month of gestation.^[1] In the fetus, passage of meconium occurs physiologically early in gestation, when it contributes to alka line phosphatase in amniotic fluid but diminishes after 16 weeks and ceases by 20 weeks, concurrent with inner vation of the anal sphincter and the rectum appears to be filled with meconium.^[2] Meconium passage inutero and its relationship to fetal and neonatal compromise are matters of great concern in maternal-fetal medicine and neonatology. The passage of meconium by the fetus occurs in 10-15% of all deliveries whereas the meconium aspiration syndrome occurs in 10% to 30% of all meconium stained infants and 1-3% of all live born infants.^[3] This can result in severe respiratory distress, meconium aspiration syndrome; 30% require mechanical ventilation and 3-5% die.^[4]

The risk factors for meconium-stained amniotic fluid (MSAF) are both maternal and fetal.^[5] A number of maternal factors have been shown to be attribut able to MSAF and thus perinatal morbidity and mortality in developed countries.^[6] The maternal factors implicated are maternal age >30, primigravida, post-term pregnancy, anaemia, chorioamnionitis, prolonged labour, hypertension, gestational diabetes mellitus (GDM), smoking, maternal chronic respiratory or cardiovascular diseases.^[7] Aspiration of meconium by the fetus remains relatively common cause of perinatal morbidity and mortality because it is difficult to prevent.^[8]

MSAF is associated with higher rate of caesarean delivery, increased need for neonatal resuscitation and meconium aspiration syndrome.^[9] The objective of this study was to identify them ateral risk factors associated within utero passage of meconium. Meconium stained amniotic fluid is associated with prolonged hospital stay and adverse

outcome in fetus and as there were no significant data in our country, this observational study was undertaken so that such expecting mothers can be screen ed at an early stage and prompt intervention can be done to minimize neonatal morbidity and mortality.

MATERIALS & METHODS

This prospective, Observational, Single group and cross-sectional study was conducted in the Department of Obstetrics and Gynecology in collaboration with the Department of Pediatrics at VIMS Ballari.

Inclusion Criteria

- Singleton pregnancy
- Cephalic presentation
- Above 34 weeks of gestation
- Presence of MSAF during labour

Exclusion Criteria

- Congenital fetal anomalies
- Still births
- Breech presentation

Method Of Collection Of Data (Including Sampling Procedure, If Any)

All demographic details of the patients were recorded. Patients were examined thoroughly, and the findings were noted down in a proforma. Regular fetal heart rate (FHR) monitoring was conducted. After considering all the obstetrical conditions, the mode of delivery of the patients were noted down. Maternal risk factors were noted down. MSAF was further divided into three grades: grade I was thin yellow color meconium with no particulate matter, grade II was light green color with few particulate matters, and grade III was thick paste-like dark green-colored meconium with excess particulate matter. The condition of neonates, i.e., birth weight, Apgar score, general

condition, need for admission in neonatal ICU, and neonatal complications and outcome was also recorded. Data was recorded on an MS Excel spreadsheet.

Mention Sample Size with details

Sample Size = $Z\alpha^2$
 $Z\alpha^2$ = Std normal variate 1.96
P= proportion of labor induction success
d= Absolute error

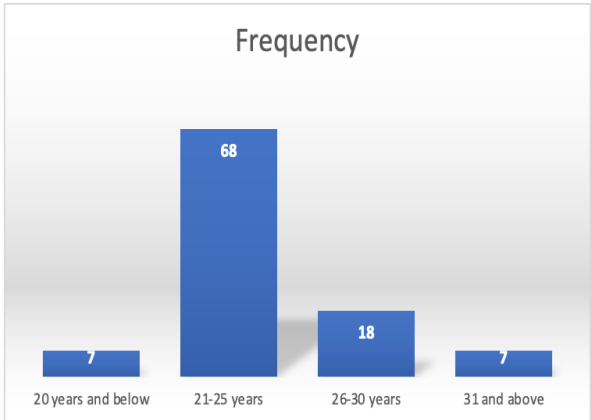
Prevalence of mortality in MSAF affected babies is 6% reported in the study by Sadia Parween, Dipali Prasad, Poonam Poonam. Considering 6% prevalence of mortality in MSAF babies with 5% margin of error sample needed to conduct this study is 73 cases. 100 cases were selected.

RESULTS

Table 1: Distribution Of Age

Age Group	Frequency	Percentage
20 years and below	7	7
21-25 years	68	68
26-30 years	18	18
31 and above	7	7
Total	100	100

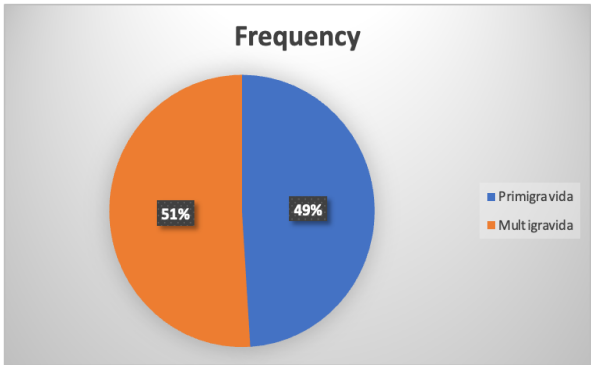
The analysis of the age groups of the patients having meconium stained amniotic fluid showed that the most commonly affected age group was between 21-25 years (68%) followed by 26-30 years (18%) and 20 years or below (7%). There was no statistically significant difference in age groups of cases and control (p=0.54) in table 1.



Graph 1: Distribution Of Age

Table 2: Distribution Of Based On Gravida

Gravida	Frequency	Percentage
Primigravida	49	
Multigravida	51	
Total	100	



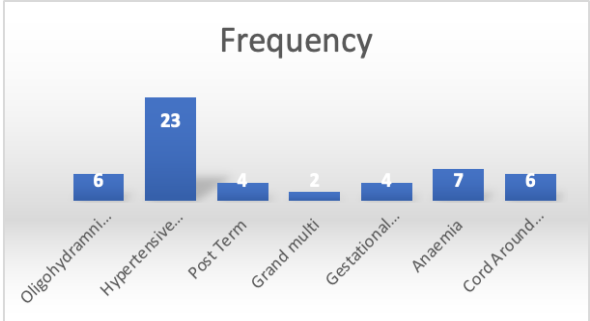
Graph 2: Distribution Of Based On Gravida

Table 3: Distribution Of Risk Factors

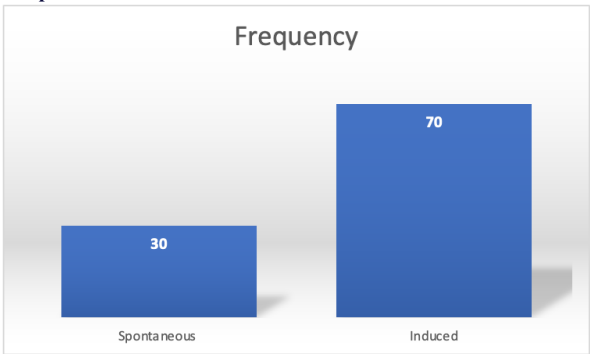
Risk Factors	Frequency	Percentage
Oligohydramnios	6	11.53
Hypertensive disorders of pregnancy	23	44.23
Post Term	4	7.69

Grand multi	2	3.84
Gestational diabetes mellitus	4	7.69
Anaemia	7	13.46
Cord Around Neck	6	11.53
Total	52	100

The analysis of risk factors showed that 23 (23%) women had Hypertensive disorders of pregnancy risk factors are most common followed by Oligohydramnios (6%) in Table 4.



Graph 3: Distribution Of Risk Factors

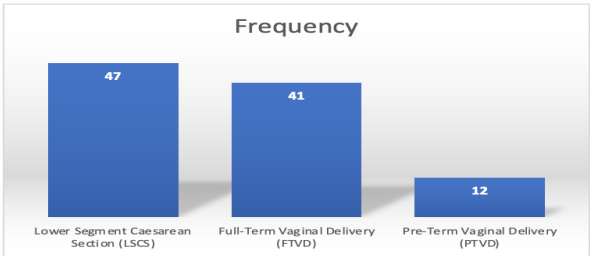


Graph 4: Distribution Of Delivery

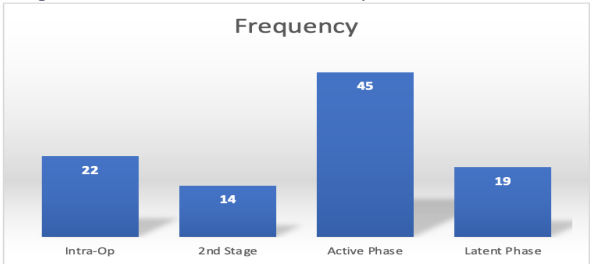
Table 5: Distribution Of Mode Of Delivery

Mode of Delivery	Frequency	Percentage
Lower Segment Caesarean Section (LSCS)	47	47
Full-Term Vaginal Delivery (FTVD)	41	41
Pre-Term Vaginal Delivery (PTVD)	12	12
Total	100	100

The most common mode of delivery in meconium stained amniotic fluid was by LSCS (47%) followed by Full-Term Vaginal Delivery (41%) and Pre-Term Vaginal Delivery (12%) in Table 6.



Graph 5: Distribution Of Mode Of Delivery

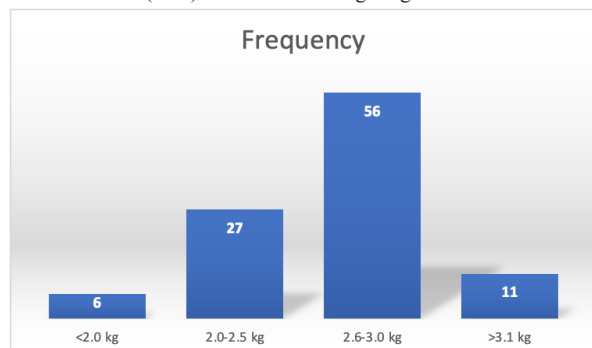
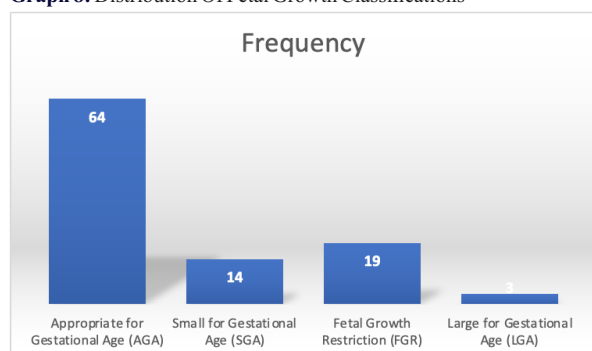


Graph 6: Distribution Of Stage Of Labor

Table 7: Distribution Of Birth Weights

Birth Weights	Frequency	Percentage
<2.0 kg	6	6
2.0-2.5 kg	27	27
2.6-3.0 kg	56	56
>3.1 kg	11	11

The analysis of the birth weights in the study showed that in that group <2 kg (6%) neonates while 27 (27%) babies were between 2.0-2.5 kg weight. While normal birth weight was seen in 2.6-3.0 kg (56%) neonates and 11 (11%) babies were >3.1 kg weight in Table 8.

**Graph 8: Distribution Of Fetal Growth Classifications****Table 9: Distribution Of Resuscitation Methods**

Resuscitation Methods	Frequency	Percentage
No Resuscitation Needed	55	55
Stimulation	15	15
Bag and Mask	11	11
Suction	11	11
Intubated	7	7
Dead	1	1

Table 10: Distribution Of Meconium Grades

Meconium Grades	Frequency	Percentage
Grade 1	16	16
Grade 2	63	63
Grade 3	21	21

Table 11: APGAR Score At 1 And 5 Minute In The Neonates

Amniotic fluid	APGAR score at 1 minute		APGAR score at 5 minutes	
	< 6	≥ 6	< 6	≥ 6
Thin	28	52	9	49
Thick	7	13	26	16
Total MSAF	31 (31%)	59 (59%)	34 (34%)	66 (66%)

Table 12: NICU Admission

NICU Admission	Frequency	Percentage
Yes	61	61
No	39	39
Total	100	100

Table 13: Perinatal Outcomes

Perinatal Outcomes	Frequency	Percentage
Healthy	65	65
Early Neonatal Death	17	17
Neonatal Intensive Care Unit	13	13
Dead	3	3
Term 2 Early Neonatal Death	2	2

Table 14: Final Diagnoses

Final Diagnoses	Frequency	Percentage
Pneumonia	4	4
Hypoxic-Ischemic Encephalopathy (HIE)	2	2
Birth Asphyxia	2	2
Meconium Aspiration Syndrome (MAS)	4	4
Respiratory Distress Syndrome (RDS)	3	3
Jaundice	3	3

DISCUSSION

The present study was carried to identify the maternal risk factors associated and perinatal outcome in deliveries complicated with meconium stained amniotic fluid. Maternal risk factors are described as per pre-designed proforma based on antenatal complications requiring an antepartum fetal surveillance. Risk factors and perinatal outcome are compared with different grades of meconium. The booking status and socioeconomic status of the patients does not show much difference among grades of meconium. Majority of the cases belong to below poverty line category. This can be due to the fact that present institution caters to the need of the low privileged strata of the society.

In our study incidence of MSAF among 100 deliveries conducted during the study period among which 63% cases were grade 2 meconium stained, 21% were grade 3 meconium stained and 16% grade 1 meconium stained liquor. In a study by Shaikh EM in 2007 incidence of meconium stained amniotic fluid in past dated pregnancies was 16%.^[10] In this study, the incidence of past date is 15.3% comparable to the other studies.^[11] In this study 23% cases were complicated with hypertensive disorders. It is comparable to Sundaram R study where incidence of hypertension was 14%.^[12] Also, 4% had GDM and Post term disorder. The frequency of MSAF increased with advanced gestational age at delivery.

In past date 15.3% was meconium stained liquor in labour. Naveen et al conducted a study on 1500 deliveries to identify the predictors of MSAF and observed that past date was one of the significant risk factors.^[13] However, 56.2% had induced labour, but the association between mechanism of labour and incidence of meconium stained liquor was not statistically significant. Similar relation was found by Galal M et al where induced labour was statistically significant (p=0.01) in meconium group and the relation.^[14]

Furthermore, 47% delivered by Lower Segment Caesarean Section, 41% delivered Full-Term Vaginal Delivery and 12% had Pre-Term Vaginal Delivery. Study by Sharma et al 56% delivered by Caesarean section, 20 % delivered normally and 24 % had instrumental delivery.^[15] In this study Final Diagnosis was 18, 2 due to birth asphyxia, 2 cases due to HIE and 3 case due to respiratory distress and respiratory failure and 4 due to meconium aspiration syndrome. In a study by Mundhra et al perinatal mortality was 15, 8 due to birth asphyxia, 4 cases due to HIE and 2 cases due to respiratory distress and respiratory failure and 1 due to septicemia following meconium aspiration syndrome.^[16]

Apgar score at 5 minutes was significantly lower in babies born through meconium stained liquor which is comparable to Pariente Get et al study.^[17] In a study by Bansal N et al, 20% babies had low Apgar score and the association was significant (p=0.0002).^[18] On the other hand, Babies with MSAF had lower Apgar scores and in the present study had NICU admission which is comparable to Qadir Set al where the incidence was 21.2%. Yurdakok Metal found an incidence of 18.8% for MAS in the thick meconium group and 28.4% in a study.^[19,20] Thus, it is clear that the consistency of meconium have a significant effect on perinatal outcome. Grade 3 meconium group babies have lower Apgar scores, high association with meconium aspiration and perinatal mortality.

CONCLUSION

Meconium stained amniotic fluid is worrisome as it is associated with increased frequency of operative delivery, birth asphyxia, neonatal sepsis, and neonatal intensive care unit admissions compared to clear amniotic fluid which was seen in the current study. Therefore, management requires appropriate intrapartum care with a continuous or strict one to one fetal heartbeat follow up. Furthermore, knowing the high risk of early neonatal death we advise early postnatal follow up should be considered for infants born to mothers with thick MSAF. Finally, we recommend well-controlled studies comparing the perinatal outcome of thick and thin stained amniotic fluid to stratify

management accordingly.

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