

Original Research Article

# A Prospective Clinical Study of Babies Born with Meconium Stained Liquor Delivered by Caesarean and Pervaginal Delivery

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## ABSTRACT

**Introduction:** Meconium staining of the amniotic fluid (MSAF) is a common problem occurring in 11-22% of all deliveries. Yoder et al documented a decline in the incidence of MAS from 5.8% to 1.5% over the period 1990 to 1997, which they attributed to 33% reduction in the incidence of births at more than 41 weeks gestation. MAS remains a serious problem in developing and newly industrialized countries, MAS accounts for about 10% of all cases of respiratory failure with 39% mortality rate. It has been attempted to identify antepartum, intrapartum or postpartum factors that may increase the risk for MAS. Over the years various recommendations also have been made based on these studies to identify and anticipate the occurrence of MAS in neonates born through MSAF, so that early intervention can be done

**Aims:** To study the etiology, clinical presentation, risk factor, complication and outcome of babies born with meconium stained liquor.

**Materials and methods:** Present prospective Observational study was conducted in NICU of Chhatrapati Pramila Raje hospital, Kolhapur in study population consisting of newborns delivered through meconium stained amniotic fluid satisfying the inclusion criteria. Period of data collection for study was from 1<sup>st</sup> Jan 2015 to 31<sup>st</sup> March 2016. Sample size was 712 newborns satisfying inclusion criteria. Data regarding the antenatal factors were collected from the obstetric records. Maternal characteristics like age, parity, antenatal checkups, gestational age (in weeks) and maternal risk factor were studied. Gestational age assessment in the antenatal period was done. Intrapartum characteristics were also abstracted from the mother's medical records. Deliveries of all babies born through MSAF were attended by a Pediatric resident and subjected to care as per the clinical condition of the baby. Neonatal medical records were reviewed and the following data were collected: mode of delivery, sex, gestational age, birth weight. Parameters such as Apgar scores at one and five minutes were also studied. NICU admission and outcomes such as MAS, PPHN, HIE, Ventilator requirement and mortality were also noted. The babies were observed for the outcome only during their hospital stay. The babies requiring Neonatal Intensive Care Unit (NICU) care were managed as per the protocol followed in NICU.

**Results:** During this study period, total numbers of deliveries were 7246 out of which 712 (9.82%) had meconium stained liquor. 62.78% babies were born through thin meconium stained amniotic fluid and 37.21% babies were born through thick meconium stained amniotic fluid. 7.16% were preterm deliveries, 44.24% deliveries were of term gestational and majority 48.60% of the deliveries were post term deliveries. 24.9% babies born through thick meconium stained liquor had fetal distress during intrapartum monitoring and 7.38% babies in the thin category had fetal distress. Apgar score of  $\leq 7$  at 5 min was found in 21.89% of babies born through thick MSAF. 52.53% babies were normal, 47.47% babies were admitted in NICU, Respiratory distress was present in 47.47% babies, 37.07% had transient respiratory distress, MAS was diagnosed in 10.53% babies. 3.37% babies were diagnosed MAS+HIE (hypoxic ischemic encephalopathy), 2.38% babies were diagnosed MAS+PPHN (persistent pulmonary hypertension),

Ventilator support was required in 4.92%. The mortality 4.63%, the cause of death was MAS and with its complication.

**Conclusions:** Incidence of MSAF (meconium stained amniotic fluid) was more in post term delivery, Complications were more common with the thick meconium category neonates. Fetal distress was more with thick me conium group. MAS (meconium aspiration syndrome) and its complication was the major cause of death in neonate born with MSAF.

**Key words:** post-term newborn, meconium stained amniotic fluid, meconium aspiration syndrome, fetal distress, HIE(hypoxic ischemic encephalopathy), persistent pulmonary hypertension.

## INTRODUCTION

Me conium staining of amniotic fluid (MSAF) is a common problem that most pediatricians and obstetricians encounter in the delivery room. Me conium aspiration syndrome (MAS), a life threatening neonatal respiratory disorder that results from the aspiration of me conium into the lungs.

A study done by Chaturvedi P and Yadav B in Wardha in 1988 on 1109 live births, reported an incidence of me conium staining of amniotic fluid of 16.5%. 18.7% of these neonates developed MAS. Of these, incidence of MAS through thick MSL was 18.6% and incidence of MAS through thin MSL was 1.8%. [1] In a study by Narang A et al (1990) 238 cases of MSAF were studied. MAS was observed in 26 babies (10.5%) 22 babies born through thick MSAF and 4 through thin MSAF. The frequency of occurrence of MAS was higher with thick me conium. There were 11/26 babies (42.5%) developed HIE, 1 baby with PPHN (3.8%), 4 (15.4%) babies required ventilation and 2(7.7%) neonatal deaths due to air leak and PPHN. It was also concluded that consistency of me conium had a direct bearing on the neonatal outcome.56% of babies had thin me conium, but MAS was seen in only 2.9% of them, whereas thick me conium was found 44% of babies and 21% of them developed symptoms. [2]

### Mechanisms of Injury in Mas:

1. Mechanical Obstruction
2. Pneumonitis
3. Pulmonary Vasoconstriction
4. Surfactant Inactivation

### Diagnosis

MAS must be considered in any infant born through MSAF who develops symptoms of respiratory distress. The classic roentgen graphic findings in MAS are diffuse, asymmetric patchy infiltrates. Frequently over aeration is present, which may lead to air leak syndromes such as pneumothorax, pneumomediastinum or pulmonary interstitial emphysema

Some risk factors are: consistency of MSAF (Moderate and thick MSAF significantly increases the risk for the need for oxygen support and MAS), [3] non reassuring fetal heart rate tracing, me conium below the vocal cords and low apgar scores. [4,5] An anticipated low one minute apgar score and the presence of me conium in the trachea yielded a sensitivity of 88% and specificity of 79% for MAS in one study. [6]

## MANAGEMENT

### Intrapartum Suctioning:

Intrapartum suctioning was considered a standard procedure for more than 25 Years.

A recent large multicenter randomized trial found that intrapartum suctioning of meconium does not reduce the incidence of MAS. [7] Routine intrapartum oropharyngeal and nasopharyngeal suction Current neonatal resuscitation guidelines define an infant as vigorous if he or she has

1. Strong Respiratory Efforts
2. Good Muscle Tone
3. Heart rate more than 100 Beats/min.

When this is the case, there is no need for suction and the pediatrician may proceed with routine management.ing for infants born with MSAF is no longer recommended.

Infants at risk for MAS who show signs of respiratory distress must be transferred to the Neonatal Intensive Care Unit (NICU). The amount of ventilator support depends on the amount of respiratory distress. Almost 30-50% of MAS babies required assisted Ventilation; either CPAP and/or mechanical ventilation. [8]

High frequency ventilators may slow the progression of me conium down the tracheobronchial tree and allow more time for me conium removal. High frequency ventilators minimize barotraumas and may reduce air leak syndrome in MAS. Infants with MAS make up approximately 35% of the infant population who requires ECMO. [9]

A 3 year review was done by Yong YP et al (1993), to find out the incidence of morbidity and mortality due to MAS. Complications associated with MAS were metabolic acidosis (52%), air leak syndrome (2%), persistent pulmonary hypertension (2%) and HIE (0.5%). Mortality rate of babies with MAS was 2%. [10]

## **MATERIALS AND METHODS**

Present prospective Observational study was conducted in Chhatrapati Pramila Raje hospital, Kolhapur in study population consisting of newborns delivered through me conium stained amniotic fluid satisfying the inclusion criteria. Period of data collection for study was from 1<sup>st</sup> Jan 2015 to 31<sup>st</sup> March 2016. Sample size was 712 newborns satisfying inclusion criteria.

### **Inclusion criteria**

Live newborns delivered through Me conium stained amniotic fluid both LSCS and Per-vaginal

### **Exclusion criteria**

Babies who were not fulfilling the inclusion criteria are excluded.

### **Definitions**

Thin me conium stained liquor - very light green staining of amniotic fluid. [11]

Thick me conium stained liquor - Thick greenish me conium with particulate matter in amniotic fluid. [11]

Me conium Aspiration Syndrome - Development of respiratory distress soon after birth with radiological evidence of aspiration pneumonitis (atelectasis or hyperinflation) in presence of me conium staining of the liquor or staining of nails or umbilical cord or skin, in the absence of any other causative factors for the same. [11]

## **METHODOLOGY**

- The study was undertaken after obtaining Ethical clearance from the Ethics Committee. A written informed consent was sought from the parents if the inclusion criteria were satisfied. Babies born through me conium stained amniotic fluid (MSAF) admitted in NICU of Chatrapati Pramile Raje hospital Kolhapur satisfying the inclusion criteria were included in the study.
- Data regarding the antenatal factors were collected from the obstetric records. Maternal characteristics like age, parity, antenatal checkups, gestational age (in weeks) and maternal risk factor were studied. Gestational age assessment in the antenatal period was done according to the last menstrual period and ultra sonographic examination. Intrapartum characteristics were also abstracted from the mother's medical records: these included mode of onset of labor, mode of rupture of membranes, colour of liquor at rupture of membranes, use of oxytocin, any signs of fetal distress in intrapartum period (documented as fetal heart variations or Non reactive non stress test (NST)), consistency of me conium. Non reactive NST is characterized by fetal bradycardia (<120 beats per minute) fetal tachycardia (>160 beats per minute) moderate to severe variable decelerations; late decelerations, loss of beat to beat variability or prolonged fetal bradycardia).
- Deliveries of all babies born through MSAF were attended by a Pediatric

resident and subjected to care as per the clinical condition of the baby.

- Neonatal medical records were reviewed and the following data were collected: mode of delivery, sex, gestational age (measured by New Ballard score), birth weight and fetal growth category assessed by Lubchenco Colorado growth chart (Appropriate for gestational age (AGA)(birth weight between 10th and 90th centile), Small for gestational age (SGA)(birth weight <10th percentile) or Large for gestational age(LGA)(birth weight >90th percentile). Parameters such as Apgar scores at one and five minutes were also studied. NICU admission and outcomes such as MAS, PPHN, HIE, Ventilator requirement and mortality were also noted. Details of antenatal history, obstetrical records, intrapartum data and neonatal outcome were entered in a structured proforma.
- Those babies who required resuscitation were subjected to resuscitation as per current recommendations of the American Academy of Pediatrics and American Heart Association through the Neonatal Resuscitation Program and Pediatric Working Group of the International Liaison Committee on Resuscitation (ILCOR).
- An infant was defined as vigorous if he or she had 1) strong respiratory efforts 2) good muscle tone 3) heart rate more than 100 beats/min. Regardless of whether the meconium is thick or thin, if the infant was not vigorous (had absent or depressed respirations, had decreased muscle tone, or had a heart rate less than 100 beats / min), oral and nasal suctioning was done before performing other resuscitation steps.

The babies were observed for the outcome only during their hospital stay. The babies requiring Neonatal Intensive Care Unit (NICU) care were managed as per the protocol followed in NICU, Chatrapati Pramila Raje Hospital Kolhapur.

To study the significance of variables associated with consistency of meconium,

the subjects were divided into 2 groups-those born through thin consistency meconium and those born through thick consistency meconium.

#### Statistical methods:

Statistical analysis was done using the independent unpaired t test. Chi square was used for the non parametric data. A *p* value of < 0.05 was considered significant. Statistical package SPSS version 15.0 was used for the analysis.

### OBSERVATIONS AND RESULTS

During this study period, total numbers of deliveries were 7246 out of which 712 (9.82%) had meconium stained liquor. From total deliveries 3236 were delivered by cesarean section, 3921 were delivered by vaginal route and 89 were delivered by forceps.

TABLE 1: Frequency Distribution of Mode of delivery in MSAF.

Mode of deliveries	FREQUENCY	PERCENTAGE
LSCS	405	56.88
VAGINAL	258	36.23
ASSISTED (Forceps)	49	6.88

In our study,447(62.78%) babies were born through thin meconium stained amniotic fluid and 265(37.21%) babies were born through thick meconium stained amniotic fluid.

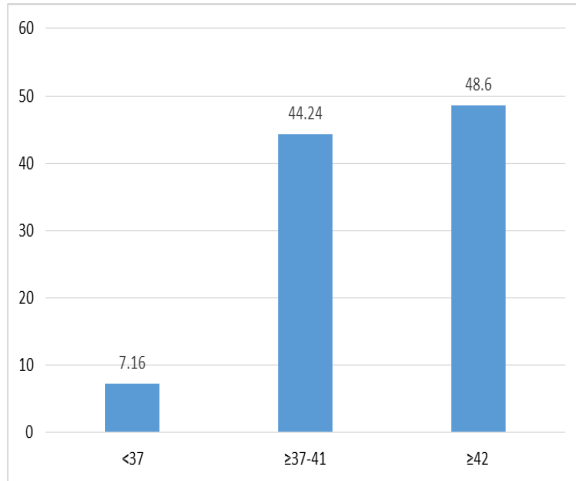
TABLE 2: Consistency of meconium distribution

Consistency of meconium	FREQUENCY	PERCENTAGE
Thick	265	37.21
Thin	447	62.78

In my study, 51/712(7.16%) were preterm deliveries, 315/712(44.24%) deliveries were of term gestational and majority 346/712(48.60%) of the deliveries were post term deliveries.

TABLE 3: Gestational Age (Assessment done in antenatal period) Distribution.

GESTATIONAL AGE (Weeks)	FREQUENCY	PERCENTAGE
<37	51	7.16
≥37-41	315	44.24
≥42	346	48.60



Graph 1: Graph Showing Gestational Age (Assessment done in antenatal period) Distribution.

Table 4: Maternal Risk factors (in antenatal period) with MSAF

RISK FACTORS IN MOTHER	FREQUENCY	PERCENTAGE
PIH	190	26.68
Anemia	148	20.79
Oligohydramnios	133	18.68
Previous LSCS	98	13.76
Eclampsia	74	10.39
Obstructed Labour	69	9.69

It was observed that pregnancy induced hypertension (PIH) 190/712(26.68) was the common antenatal risk factor associated with MSAF. It was observed that 99/712(13.9%) babies had fetal distress

Table 5: Frequency Distribution of Fetal distress in MSAF

Fetal Distress	FREQUENCY	PERCENTAGE
YES	99	13.9
NO	613	86.1

It was observed that 66 of 265(24.9%) babies born through thick meconium stained liquor had fetal distress during intrapartum monitoring and 33 of 447(7.38%) babies in the thin category had fetal distress. Fetal distress was significantly more in the thick meconium group.

Table 6: Fetal distress (during intrapartum monitoring) and Consistency of meconium

FETAL DISTRESS		CONSISTENCY		TOTAL
		THIN	THICK	
YES	Count	33	66	99
	%	7.38	24.9	
NO	Count	414	199	613
	%	92.61	75.1	

$\chi^2 = 6.75$  P= 0. 023 S

It was observed that 174/712(24.44%) babies born were depressed at birth and

538/712(75.56%) babies born were vigorous at birth.

Table 7: Frequency Distribution of Depressed and Vigorous baby in MSAF deliveries

	FREQUENCY	PERCENTAGE
Depressed	174	24.44
Vigorous	538	75.56

It was observed that 62/174(35.63%) babies remain depressed even after oropharyngeal suction and they required advanced resuscitation

Table 8: Frequency of depressed baby who required advanced resuscitation

	FREQUENCY	PERCENTAGE
YES	62	35.63
NO	112	64.37

It was observed that 174/712(24.44%) babies had apgar score  $\leq 7$  at 1min and 90/712(12.64%) babies had apgar score  $\leq 7$  at 5min.

Table 9: Table showing apgar score  $\leq 7$  in 1 min and 5 min in MSAF deliveries

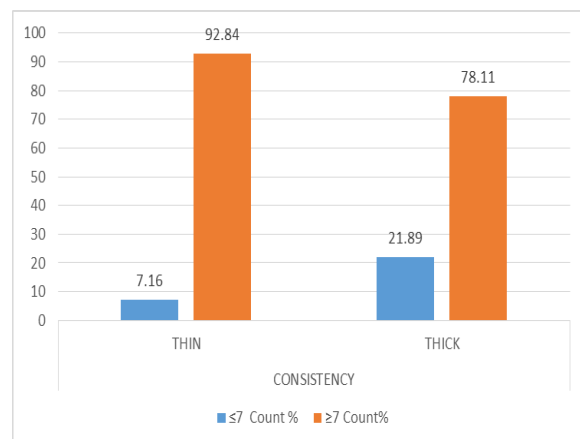
		FREQUENCY	PERCENTAGE
Apgar at 1mt	$\leq 7$	174	24.44
Apgar at 5mt	$\leq 7$	90	12.64

Apgar score of  $\leq 7$  at 5 min was found in 58/265(21.89%) of babies born through thick MSAF. The result was statistically significant.

Table 10: Apgar at 5 Minute vs Consistency of meconium

Apgar at 5 Minute		CONSISTENCY		TOTAL
		THIN	THICK	
$\leq 7$	Count	32	58	90
	%	7.16	21.89	
$\geq 7$	Count	415	207	622
	%	92.84	78.11	

$\chi^2 = 5.18$ , P= 0.0228 S



Graph 2: Multiple Bar diagram showing distribution of Apgar score  $\leq 7$  at 5 Min Vs Meconium Consistency

**Table 11: Outcomes in Neonates born through MSAF**

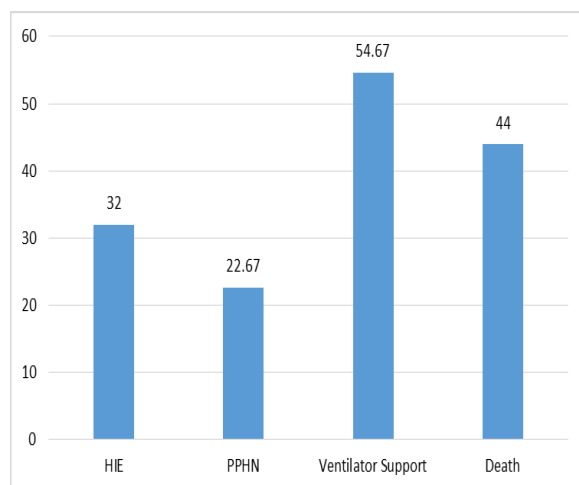
		frequency	percentage
NORMAL BABIES		374	52.53
NICU ADMISSION		338	47.47
RESPIRATION DISTRESS		338	47.47
Neonatal Complications	TTN	264	37.07
	MAS	75	10.53
	MAS+HIE	24	3.37
	MAS+PPHN	17	2.38
	Ventilated	35	4.92
	Death	33	4.63

In my study, 374/712(52.53%) babies were normal, 338/712(47.47%) babies were admitted in NICU, Respiratory distress was present in 338/712(47.47%) babies, 264/712(37.07%) had transient respiratory distress, MAS was diagnosed in 75/712(10.53%) babies.24/712(3.37%) babies were diagnosed MAS+HIE, 17/712(2.38%) babies were diagnosed MAS+PPHN, Ventilator support was required in 35/712 (4.92%). The mortality was 33/712(4.63%), the cause of death was MAS and with its complication.

**Table 12: Neonatal Complications in MAS Neonates**

NEONATAL COMPLICATIONS IN MAS NEONATES (N=75)	FREQUENCY	PERCENTAGE
HIE	24	32
PPHN	17	22.67
Ventilator Support	41	54.67
Death	33	44

In the MAS group, the common outcome observed was the occurrence of HIE 24/75(32%). The mortality rate was 44%.

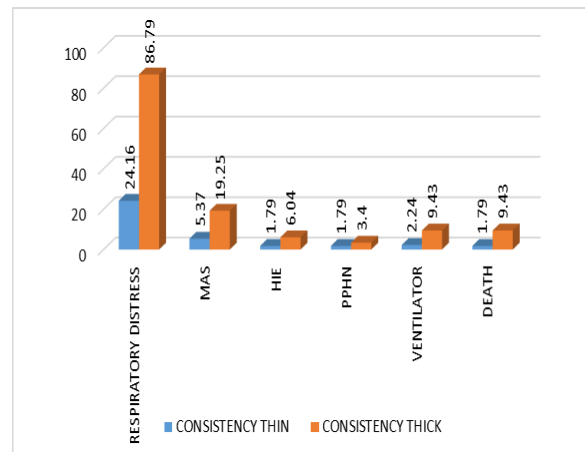


**Graph 3: Graph Showing Distribution of Neonatal complications by MAS (in Percentage)**

**Table 13: Outcome in Neonates vs Consistency of meconium**

OUTCOME	CONSISTENCY		TOTAL
	THIN	THICK	
RESPIRATORY DISTRESS	108(24.16%)	230(86.79%)	338(47.47%)
MAS	24(5.37%)	51(19.25%)	75(10.53%)
HIE	08(1.79%)	16(6.04%)	24(3.37%)
PPHN	08(1.79%)	09(3.40%)	17(2.38%)
VENTILATOR	10(2.24%)	25(9.43%)	35(4.92%)
DEATH	08(1.79%)	25(9.43%)	33(4.68%)

It was found that Thick meconium category had more adverse neonatal outcome when compared to the thin meconium.



**Graph 4: Graph showing distribution of outcomes in neonates Vs Consistency of meconium**

**Table 14: Consistency of Meconium vs MAS**

CONSISTENCY OF MECONIUM		MAS		TOTAL
		YES	NO	
Thin	Count	24	423	447
	%	32	66.4	
Thick	Count	51	214	265
	%	68	33.6	
Total		75	637	713

$\chi^2=5.27, P= 0.0217 S$

It was found that 51(68%) Of MAS babies were born through thick MSAF. Statistical significance was present between the consistency of meconium and occurrence of MAS in babies.

## DISCUSSION

Incidence of meconium stained deliveries in this study was 712/7246(9.83%). Clearly and well. [12] Reported the range to be in between 5.6% to 24.6% (median 14%). Manjulata Sharma et al reported incidence of 9.79% [13] and Ziadeh SM et al reported incidence of 10.13% The incidence in our study falls within these parameters.

In our study MSAF is significantly greater in post term deliveries (48.6%).

In our study, Out of 712 Meconium stained deliveries 346 were post term deliveries. Similar observations were found in other studies.

Manjulata Sharma et al observed that higher percentage meconium stained neonates (33.04%) were found from  $\geq 42$  week of gestation. Gupta et al. [14] found 55% of meconium stained neonates were post term. Sankhya Naveen et al found this incidence as 29.6%.

The risk of passage of meconium increases significantly with increase in gestational age being less than 2% at 37 weeks and after 42 weeks of gestation it is nearly 44%. [15]

In our study it was observed that 405/712 (56.88%) were caesarean deliveries, 258/712 (36.23%) were vaginal deliveries & 49/712 (6.88%) were assisted (forceps) deliveries. LSCS is the main mode of deliveries. Similar observations were found in other studies.

Narang et al observed that 129/238 (54.2%) were delivered by caesarean delivery, 88/238 (11.8%) was forceps delivery and 73/238 (30.7%) was vaginal delivery. Sasikala et al observed that 61/150 (40.6%) were delivered by caesarean deliveries, 31/150 (20.6%) was instrumental deliveries and 58/150 (38.6%) was vaginal deliveries.

Hosna Ara Khatun et al. [16] observed that mode of delivery was significantly influenced by the presence of meconium. There was only 20/80 (25%) vaginal deliveries and 60/80 (75%) was caesarean deliveries.

In present study it could have been due to the early resortment to caesarean deliveries as soon as MSAF is detected to avoid inadvertent complication. In our study it was observed that out of 712 MSAF deliveries, in 265/712 (37.21%) thick meconium was present and in 447/712 (62.78%) thin meconium was present.

**Table 15: In various studies consistency of meconium in MSAF**

STUDY	% OF THICK	% OF THIN
our study	37.21	62.78
C Fischer et al [17]	11.2	33.7

Our hospital is tertiary hospital therefore most of meconium stained deliveries were referred from the periphery.

It was observed that Pregnancy induced Hypertension (PIH) 26.68% was the common antenatal risk factor associated with MSAF, followed by anemia and Oligohydramnios. This similar observation was found in study by Gupta V et al.

In Sasikala et al the common risk factor were anemia (39%) followed by PIH (26.6%). In this study it was observed that 99/712 (13.9%) had fetal distress, 66 (24.90%) out of 265 babies born through thick meconium stained liquor had fetal distress during intrapartum monitoring and only 33 (7.38%) out of 447 babies in the thin category had fetal distress

**Table 16: Percentage of Fetal distress in Thick MSAF**

STUDY	% of Fetal distress in Thick MSAF
Our study	24.9
Sankhya Naveen et al [18]	29.6

In our study it was observed that fetal distress was significantly more in the thick meconium group. Thick meconium is more of a concern than thin meconium, because it can cause problems if it gets into baby's airways, it is more likely to pass further into distal airways and cause MAS. In this study 174/712 (24.44%) of the neonate born through meconium stained liquor were depressed at birth. Similar observation was found in Gupta et al i.e. 24.5% of neonates born through MSAF were depressed at birth. In our study it was observed that after doing oropharyngeal suction in depressed baby, 62/174 (35.63%) babies were required advanced resuscitation, even after suctioning babies were depressed then we had to intubate the babies and start IPPV, Gupta et al & Falciglia HS et al i.e. meconium aspiration is predominantly an intrauterine event which occurs in response to continued fetal gasping in a hypoxic environment and tracheal suctioning at birth cannot completely eliminate development of

MAS. In our study it was observed that 90/712(12.64%) deliveries had Apgar score of  $\leq 7$  at 5 minutes. Apgar score of  $\leq 7$  at 5 minutes was found in 58/265(21.89%) babies born through thick MSAF. The apgar score  $\leq 7$  at 5min was lower in the babies with thick me conium. Similar observation is seen in study by S M Ziadeh et al i.e. thick me conium had a significantly greater risk of low apgar at 5min.

In our present study 374/712(52.53%) neonate born through MSAF were normal, 338/712(47.47%) babies were required NICU admission, similar observation was found in study by Erum Majid Shaikh et al. [19] (63%) neonates, in me conium stained group were needed NICU care.

Respiratory distress was present in 338/712(47.47%) neonates; from that 264/712(37.07%) neonate had transient respiratory distress & MAS was diagnosed in 75/712(10.53%). Similar finding is seen in various study, Urbaniak KJ et al observed that 39.8%(no MAS) babies born through MSAF had transient respiratory distress, Coltart TM et al observed in his study i.e. those neonates born through MSAF Grade 2 & 3 who developed tachypnoea in the absence of infection, had neither evidence of me conium in the trachea at the birth nor a positive chest radiograph, they were called the subclinical MAS group. Fleischer et al. [20] reviewed a series of 11500 term gestation infants and found those born through MSAF to be 100 times more likely to develop respiratory distress than babies born through clear amniotic fluid In our study it was found that 24/712(3.37%) babies were diagnosed MAS+HIE, 17/712(2.38%) babies were diagnosed MAS+PPHN, Ventilator support was required in 35/712(4.92%). The mortality was 33/714(4.63%)

Table 17: Study showing % of MAS in babies born through MSAF

STUDY	% OF MAS
Our Study	10.53
Narang et al	10.5

In the MAS group (n=75), 17/75(22.67%) had PPHN, 24/75(32%) had HIE. PPHN due to increased pulmonary vascular resistance may accompany MAS. In a study by Hsieh TK et al. [21] it was found that acute intrapulmonary me conium contamination induces a concentration dependent pulmonary hypertensive response, with 15 to 20% of infants with MAS demonstrating PPHN.

In the MAS group (n=75), 35/75 neonates (46.67%) required ventilator support and 33/75 (44%) neonates died. The cause of death for 4 neonates was MAS and its complications. Reported mortality due to MAS is variable ranging from 0-40% in different studies. Rossi et al in his study observed that 44% of neonates born through thick MSAF who developed MAS required mechanical ventilation. 4/16(25%) neonates died due to severe MAS with PPHN.

Table 18: showing % of mortality due to MAS in various study

STUDY	% of MORTALITY
Our STUDY	44
Falcigila Hs et al [22]	46
Chistv AC and Iftikhar et al [23]	27

The present study observed that all complications, respiratory distress 230/265(86.79%), MAS 51/265(19.25%), HIE 16/265(6.04%), PPHN 9/265(3.4%), Ventilator support 25/265(9.43%), Death 25/265(9.43%) were more common in the thick me conium category neonates as compare to thin me conium category. Similar observation was found in earlier studies like Usta IM et al Berkus MD et al, [24] that thick me conium increased the risk for adverse outcome more than threefold.

Also as per Narang et al forty-one per cent of the babies with thick me conium stained amniotic fluid had significant asphyxia and 42% of them developed hypoxic ischemic encephalopathy.

## CONCLUSION

From the present study we come to the following conclusion:-.



- Incidence of MSAF was more in post term delivery
- Pregnancy induce hypertension is the commonest antenatal risk factor which is followed by anemia, Oligohydramnios associated with MSAF.
- Fetal distress was more with thick meconium group
- Most of the babies born through MSAF were normal.
- Respiratory distress syndrome followed by MAS was common presentation in MSAF Deliveries.
- Complications were more common with the thick meconium category neonates.
- MAS and its complication was the major cause of death in neonate born with MSAF.

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