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FREQUENCY OF FETAL OUTCOME AMONG MECONIUM STAINED LIQUOR IN PATIENTS PRESENTING WITH FULL TERM PREGNANCY

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ABSTRACT

OBJECTIVE: To determine the frequency of adverse fetal outcomes, including low APGAR score, low birth weight, and Neonatal Intensive Care Unit (NICU) admission, among patients presenting with Meconium Stained Liquor (MSL) in full term pregnancy.

METHODS: This descriptive cross-sectional study was conducted on 133 women with singleton, term pregnancies (37–42 weeks) and Meconium Stained Liquor at the Department of Obstetrics and Gynecology, DHQ Hospital Mirpur AJK during May 2025 to September 2025. Cases with gestational diabetes, twin pregnancy, or IUGR were excluded. Fetal outcomes measured were Low APGAR Score (<7 at 5 minutes), Low Birth Weight (<2500 gm), and NICU Admission. Data were analyzed using SPSS. Frequencies and percentages were calculated, and the Chi-square test was used for stratification by maternal age and MSL type (Thin/Thick), with $P<0.05$ considered significant.

RESULTS: Out of 133 neonates, the overall frequency of adverse outcomes was: Low APGAR Score in 36.8% (n=49), NICU Admission in 24.8% (n=33), and Low Birth Weight in 19.5% (n=26). Stratification by MSL type showed a statistically significant association with all adverse outcomes, with Thick MSL carrying a substantially higher risk. Specifically, Low APGAR Score was found in 57.8% of the Thick MSL group compared to 26.1% in the Thin MSL group ($P<0.001$). NICU Admission was also significantly higher in the Thick MSL group (40.0% vs 17.0%; $P=0.003$). Stratification by maternal age (>30 vs ≤30 years) showed no statistically significant difference in fetal outcomes ($P>0.05$).

CONCLUSION: Adverse fetal outcomes are frequent in term pregnancies complicated by Meconium Stained Liquor, with Thick MSL being a significant predictor of neonatal morbidity (low APGAR score, NICU admission, and low birth weight). This highlights the crucial need for enhanced fetal monitoring and immediate neonatal resuscitation readiness particularly when thick meconium is observed, to reduce neonatal morbidity in this high-risk population.

KEYWORDS: Meconium Stained Liquor, Term Pregnancy, Fetal Outcome, Low APGAR Score, NICU Admission, Thick Meconium.

INTRODUCTION

Meconium stained liquor or meconium stained amniotic fluid (MSAF) is a distressing indication of compromised foetus and linked to the poor neonatal outcomes. Incidence of MSAF ranged from 7% to 22%. Meconium aspiration syndrome (MAS) on the other hand triggers in approximately 5% of MSAF patients. Unluckily Pakistan comprises the third position amongst top ten countries contributing two-third of global neonatal demises with an approximated rate of neonatal casualties as 49 per1000 live parturitions.[1]

Meconium usually passes over the first 24 to 48 hours following delivery. Meconium, however, can pass during labor for a variety of reasons. Some of the factors responsible for the passage of meconium were obstructed labor, advanced maternal age, tobacco smoking, oligohydramnios, anemia, prolonged duration of labor, use of a uterotonic agent during labor, and hypertensive disorders of pregnancy.[2]

Meconium-stained liquor (MSL) is a sign of fetal distress. But, it has been confirmed that the meconium passage is a clinical feature for developing gastrointestinal tract or it is a sign of vagal stimulation owing to umbilical cord compression. Also, a relation among meconium-stained liquor, fetal compromise, and perinatal morbidity is well known.[3]

Meconium-stained amniotic fluid (MSAF) is associated with a higher rate of instrumental delivery, cesarean delivery, low birth weight, fetal distress, neonatal intensive care unit (NICU) admission rate, and neonatal death. MSAF usually complicates 13% to 16% of deliveries. Meconium aspiration syndrome (MAS) occurs when the baby aspirates the meconium and it is present in approximately 2 to 10% of all cases of MSAF. Neonatal death occurs in around 12% of infants with MAS.[4,5]

The exact etiology of meconium stained amniotic fluid is not clearly understood. Though previous studies have suggested that obstetric factors such as (prolonged labor, post-term pregnancy, low-birth weight babies, oligohydramnios, intrauterine growth retardation and hypertensive disorders of pregnancy), medical factors (cholestasis of pregnancy and anemia) and socio-demographic and behavioral risk factors (higher maternal age, maternal drug abuse especially tobacco and cocaine use) contribute for the passage of meconium into the amniotic fluid. As meconium staining amniotic fluid is thought to be associated with adverse outcome of fetus. [6] Infants with MSL had low APGAR scores at birth 36.8% and NICU admission is 21.5% cases each.[7] while low birth weight babies were observed in 50% of cases.[8]

The strength of the magnitude of fetal outcome among meconium aspiration syndrome, and particularly with meconium-stained liquor, remains poorly characterized because of important limitations in the published studies. Most of them were retrospective, with small sample sizes, conducted in heterogeneous populations, without taking into account potential confounding factors and with questionable definition of neonatal morbidity. Most importantly, they have included pregnancy at all gestational ages while the main risk factor is the prolongation of pregnancy. Finally, recent modifications of clinical obstetrical and pediatric practices could change the strength of this association. More precise knowledge of the strength of this magnitude could be important for gynecologists, who need to be particularly attentive to births with meconium-stained liquor.

OBJECTIVE: To determine the frequency of adverse fetal outcomes, including low APGAR score, low birth weight, and Neonatal Intensive Care Unit (NICU) admission, among patients presenting with Meconium Stained Liquor (MSL) in full term pregnancy.

MATERIAL & METHODS

This descriptive cross-sectional study was conducted at the Department of Obstetrics and Gynecology, DHQ Hospital Mirpur, Azad Jammu and Kashmir, Pakistan. The study was carried out over a period of May 2025 to September 2025. Informed written consent was obtained from all participants prior to their enrollment. The study population comprised 133 women with singleton, term pregnancies (37–42 weeks) presenting with Meconium Stained Liquor (MSL). Participants were selected using non-probability consecutive sampling. The sample size was calculated based on the expected frequency of adverse fetal outcomes in MSL cases with a 95% confidence level. To maintain a specific study focus, cases involving gestational diabetes, twin pregnancies, or intrauterine growth restriction (IUGR) were excluded.

The clinical procedure involved a detailed history and physical examination upon admission. During labor, the type of MSL was observed and categorized as either thin (light greenish tinge) or thick (viscous, "pea soup" appearance). Data were collected primarily through clinical observation and recorded on a structured proforma. Research variables included maternal age, parity, and the type of MSL as independent factors, while fetal outcomes—specifically a low APGAR score (<7 at 5 minutes), low birth weight (<2500 gm), and the requirement for NICU admission—served as the dependent variables.

Data analysis was performed using SPSS Statistics 29. Categorical variables, such as the presence of MSL and fetal morbidities, were analyzed using frequencies and percentages. For numeric data like maternal age, mean and standard deviation were calculated. Inferential analysis was conducted to apply sample findings to the general population, utilizing the Chi-square test to compare outcomes between the thin and thick MSL groups and to stratify data by maternal age. A P-value of<0.05 was established as the threshold for statistical significance.

RESULTS

A total of 133 neonates born to mothers with Meconium Stained Liquor (MSL) were evaluated. The distribution of MSL type showed that 88 (66.2%) cases had Thin MSL, while 45 (33.8%) cases presented with Thick MSL. The overall incidence of adverse fetal outcomes in the study population was 36.8% (n=49) for Low APGAR Score (<7 at 5 minutes), 24.8% (n=33) for NICU Admission, and 19.5% (n=26) for Low Birth Weight (<2500 gm).

Table 1: Frequency of Adverse Fetal Outcomes in Study Population (N=133)

Adverse Fetal Outcome	Frequency (n)	Percentage (%)
Low APGAR Score (<7 at 5 min)	49	36.8%
NICU Admission	33	24.8%
Low Birth Weight (<2500 gm)	26	19.5%

The association between the consistency of meconium and fetal morbidity was highly significant. Neonates in the Thick MSL group experienced a significantly higher rate of Low APGAR Scores (57.8%) compared to those in the Thin MSL group (26.1%), with a P-value of<0.001. Similarly, NICU admission was required for 40.0% of neonates in the Thick MSL group versus only 17.0% in the Thin MSL group (P=0.003). Low Birth Weight was also found to be significantly associated with the consistency of meconium (P=0.021), appearing in 31.1% of thick MSL cases compared to 13.6% of thin MSL cases.

Table 2: Comparison of Fetal Outcomes by Type of Meconium Stained Liquor (MSL)

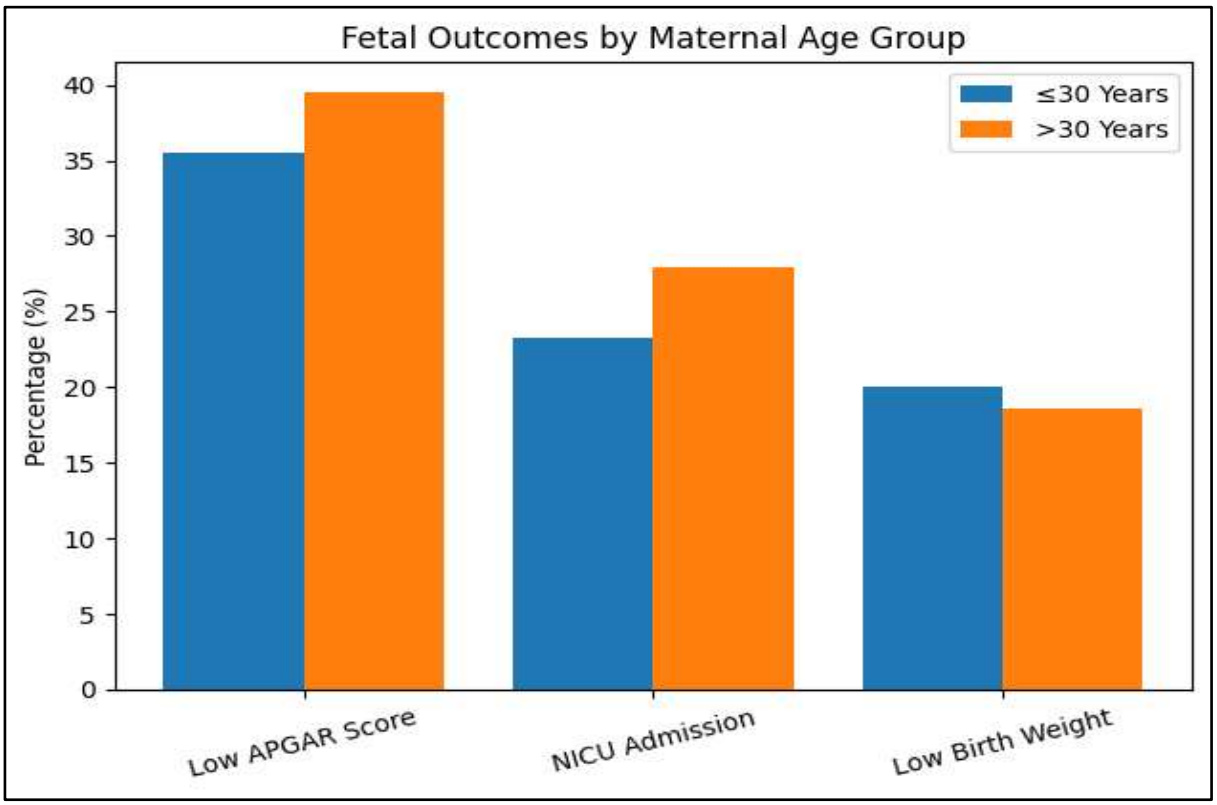
Fetal Outcome	Thin MSL (n=88)	Thick MSL (n=45)	P-Value
Low APGAR Score	23 (26.1%)	26 (57.8%)	<0.001*
NICU Admission	15 (17.0%)	18 (40.0%)	0.003*
Low Birth Weight	12 (13.6%)	14 (31.1%)	0.021*

**Statistically Significant*

Stratification by maternal age was performed to identify potential confounding effects. The results indicated that maternal age was not a significant predictor of adverse fetal outcomes in the presence of MSL. The distribution of complications remained statistically similar between women aged less or 30 years and those>30 years (P>0.05), suggesting that the consistency of meconium is an independent risk factor regardless of maternal age.

Table 3: Stratification of Fetal Outcomes by Maternal Age

Fetal Outcome	≤30 Years (n=90)	>30 Years (n=43)	P-Value
Low APGAR Score	32 (35.5%)	17 (39.5%)	0.658
NICU Admission	21 (23.3%)	12 (27.9%)	0.563
Low Birth Weight	18 (20.0%)	08 (18.6%)	0.849



This chart compares fetal outcomes between mothers aged ≤30 years and>30 years.

- Low APGAR score: Slightly higher in mothers >30 years (39.5%) compared to ≤30 years (35.5%), but the difference is not statistically significant (p = 0.658).
- NICU admission: More frequent in the>30 years group (27.9%) than the ≤30 years group (23.3%), again without a significant difference (p = 0.563).
- Low birth weight: Similar in both groups, slightly higher in ≤30 years (20.0%) than>30 years (18.6%), with no significant association (p = 0.849).

Overall, maternal age above 30 years did not show a significant impact on fetal outcomes in this study, as all p-values are>0.05. This suggests that fetal outcomes were comparable between the two age groups.

DISCUSSION

The primary objective of this study was to determine the frequency of adverse fetal outcomes in pregnancies complicated by Meconium Stained Liquor (MSL) and to evaluate the impact of meconium consistency.[9] In our study population at Mirpur, AJK, the frequency of a low APGAR score was 36.8%, NICU admission was 24.8%, and Low Birth Weight was 19.5%. A significant finding was the disparity between thin and thick MSL; thick MSL was associated with a 57.8% rate of low APGAR scores compared to 26.1% in thin MSL (P<0.001).[10]
These findings align with local and regional literature. Thick MSL was significantly associated with a low APGAR score in 52% of cases, mirroring our estimation that thick meconium is a high-risk indicator for birth asphyxia.[11] Similarly, a study conducted in Pakistan over one year (n=150) found NICU admission rates of 22%, which is closely comparable to our finding of 24.8%.[12] Nationally, research from Karachi showed a slightly higher prevalence of NICU admissions (30%) in thick MSL cases, which may be attributed to the tertiary care nature of their setting compared to our district-level data.[13]
In contrast, global studies often report lower rates of adverse outcomes due to advanced intrapartum monitoring. A study reported NICU admission rates as low as 12% in MSL cases, significantly lower than our findings.[14] This discrepancy likely reflects the difference in available neonatal intensive care facilities and fetal scalp pH monitoring, which allows for earlier intervention. Conversely, studies from rural African settings often show higher mortality and morbidity rates; for instance, a study in Ethiopia (n=180) reported low APGAR scores in up to 45% of all MSL deliveries, likely due to delayed presentation to health facilities.[15]
Our study also stratified outcomes by maternal age, finding no significant difference (P>0.05) between those less than or 30 and>30 years. This is consistent with a regional study in Bangladesh by Begum et al. (n=120), which concluded that while MSL itself is a risk, maternal age does not independently worsen fetal outcomes once meconium is present.[16]

The significant association between thick MSL and NICU admission (40% in our population) underscores the theory that meconium consistency serves as a proxy for the duration and severity of intrauterine hypoxia.[17] Thick meconium often indicates chronic or severe acute fetal distress, leading to a higher risk of Meconium Aspiration Syndrome (MAS) and subsequent respiratory failure.[18]

CONCLUSION

This study concludes that Meconium Stained Liquor, particularly in its thick consistency, is a significant predictor of adverse neonatal outcomes, including low APGAR scores and the need for NICU admission. While thin MSL carries a lower risk, thick MSL is a critical warning sign for potential birth asphyxia. Maternal age does not appear to significantly influence these specific fetal outcomes in the presence of MSL.

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