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Original research article

FETO-MATERNAL OUTCOMES IN MECONIUM-STAINED LIQUOR IN WOMEN WITH POSTDATE PREGNANCY

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Abstract: *Meconium-stained amniotic fluid (MSAF) during labor is associated with an increased risk of adverse maternal and fetal outcomes, particularly in postdate pregnancies. Prompt recognition and management are crucial to reducing complications.* ***Objective:*** *This study aimed to assess the maternal and fetal outcomes in women with meconium-stained amniotic fluid (MSAF) during postdate pregnancies.* ***Methodology:*** *A cross-sectional study was conducted at the Department of Obstetrics and Gynecology from May 2024 to November 2024, with 118 women aged 18 to 40 years. The inclusion criteria were women with postdate pregnancies (gestational age > 40 weeks), singleton cephalic presentations, and the presence of meconium-stained amniotic fluid during labor. Fetal and maternal outcomes were examined.* ***Results:*** *Perinatal asphyxia occurred in 11.0%, NICU admission in 19.5%, meconium aspiration syndrome in 6.8%, neonatal sepsis in 8.5%, and neonatal death in 3.4%. Maternal outcomes included cesarean section in 26.3%, puerperal sepsis in 16.1%, and chorioamnionitis in 4.2%. These outcomes suggest a higher incidence of complications in both mothers and neonates with MSAF.* ***Conclusion:*** *This study highlights the increased risk of perinatal asphyxia, NICU admission, meconium aspiration syndrome, neonatal sepsis, and early neonatal death in neonates with meconium-stained amniotic fluid. Maternal outcomes also show higher rates of cesarean sections and puerperal sepsis, emphasizing the need for careful monitoring and intervention.*

Keywords: Meconium-stained amniotic fluid, postdate pregnancy, fetal outcomes, maternal outcomes, cesarean section, neonatal sepsis, meconium aspiration syndrome.

Introduction

Meconium refers to the first stool produced by a newborn, consisting of desquamated cells, vernix caseosa, adipose tissue, and digestive excretions (1). Meconium starts to develop in the fetal gut approximately at week 12 and accumulates in the fetal bowel throughout pregnancy. It is often observed in the labor and delivery unit for various reasons, and its presence can lead to confusion among healthcare professionals. It may happen physiologically due to the maturation of the gastrointestinal tract or pathologically as a consequence of either acute or ongoing hypoxia. (2-5)

Meconium typically is expelled within the initial 24 to 48 hours after delivery. Meconium may be expelled during labor due to several factors. Factors contributing to the passage of meconium include obstructed labor, maternal old age, oligohydramnios, anemia, an extended labor duration, the use of uterotonic agents during labor, and hypertensive conditions of pregnancy. (6, 7) The occurrence of meconium-stained amniotic fluid during labor in full-term pregnancies differs by region, with rates varying between 7% and 22%. The rate may rise to 40% within post-term conceptions. (8, 9)

Meconium-stained amniotic fluid (MSAF) markedly elevates the likelihood of adverse birth outcomes. (10) In resource-limited countries, adverse outcomes deteriorate due to multiple structural factors and healthcare quality. (10) Through meticulous monitoring of intrapartum and postpartum conditions, along with the implementation of evidence-based strategies for avoiding and taking care of meconium-associated complications, it is possible to mitigate adverse maternal and perinatal outcomes. (11)

This study aims to inform clinical decision-making and enhance management strategies for postdate pregnancies characterized by meconium-stained amniotic fluid, with the ultimate goal of minimizing adverse outcomes for both the mother and the child.

Methodology

This cross-sectional study was carried out at the Department of Obstetrics and Gynecology between May 2024 and November 2024 at Lady Reading Hospital Peshawar following the acquisition of ethical approval from the hospital. A total of one hundred and eighteen patients were involved in the study, all presenting with meconium-stained liquor. The ages of the participants varied from 18 to 40 years, and they all had a confirmed diagnosis of postdate pregnancy, which is defined as pregnancies that have extended beyond 40 weeks of gestation. Every participant experienced a singleton pregnancy, presented in a cephalic position, and did not have any significant pre-existing maternal conditions like hypertension, diabetes, or notable obstetric complications that might interfere with the analysis of the results. Participants who could not give informed consent or had insufficient medical documentation were omitted from the study.

Information regarding demographics, such as age, socioeconomic status, educational attainment, and occupation, was collected from patient records.

Furthermore, information was collected concerning the occurrence of meconium-stained amniotic fluid, characteristics of labor, method of delivery, as well as maternal and fetal outcomes. The detection of meconium in the amniotic fluid occurred during labor, either at the moment of membrane rupture or through ongoing observation thereafter.

The main results for newborns encompassed the occurrence of perinatal asphyxia, meconium aspiration syndrome, neonatal sepsis, NICU admission, and early neonatal mortality. The variables were established according to established clinical standards, incorporating Apgar scores and evaluations of newborns following delivery. The investigation focused on maternal outcomes, analyzing the frequencies of cesarean deliveries, puerperal infections, and chorioamnionitis. Identifying each condition was established via clinical assessment and, when required, laboratory evaluations.

After gathering the data, statistical analysis was conducted with SPSS 24. The study employed descriptive statistics, encompassing means and standard deviations for continuous variables like age and BMI and frequency distributions for categorical variables such as fetal and maternal outcomes.

Results

The study examined a group of 118 participants, with an average age of 28.34 ± 7.48 years. The participants' body mass index (BMI) ranged from 23 to 28 kg/m², with a mean of 25.28 ± 1.374 kg/m².

Regarding the socio-economic status of the participants, 37 (31.4%) were classified as low, 59 (50.0%) as middle, and 22 (18.6%) as high. As for educational status, 63 (53.4%) were literate, while 55 (46.6%) were illiterate. Regarding occupation, 49 (41.5%) of participants were employed, and 69 (58.5%) were unemployed.

The study also reported several fetal outcomes. Perinatal asphyxia was observed in 13 (11.0%) neonates, with 105 (89.0%) of neonates not experiencing this condition. Neonatal intensive care unit (NICU) admission occurred in 23 (19.5%) neonates, while 95 (80.5%) did not require NICU care. Meconium aspiration syndrome (MAS) was present in 8 (6.8%) cases, with 110 (93.2%) not affected. Neonatal sepsis was observed in 10 (8.5%) neonates and 108 (91.5%) did not develop this condition. Furthermore, neonatal death occurred in 4 (3.4%) cases, while 114 (96.6%) of neonates survived.

In terms of maternal outcomes, 31 (26.3%) women underwent cesarean sections, whereas 87 (73.7%) had vaginal deliveries. Puerperal sepsis was observed in 19 (16.1%) of the mothers, with 99 (83.9%) remaining unaffected by this condition. Chorioamnionitis was noted in 5 (4.2%) of the cases, while 113 (95.8%) did not experience this complication.

Table 1: Demographics of the patients

Demographics		Frequency	Percentage
Socioeconomic status	Low	37	31.4%
	Middle	59	50.0%
	High	22	18.6%
Education status	Literate	63	53.4%
	Illiterate	55	46.6%
Occupation status	Employed	49	41.5%
	Unemployed	69	58.5%

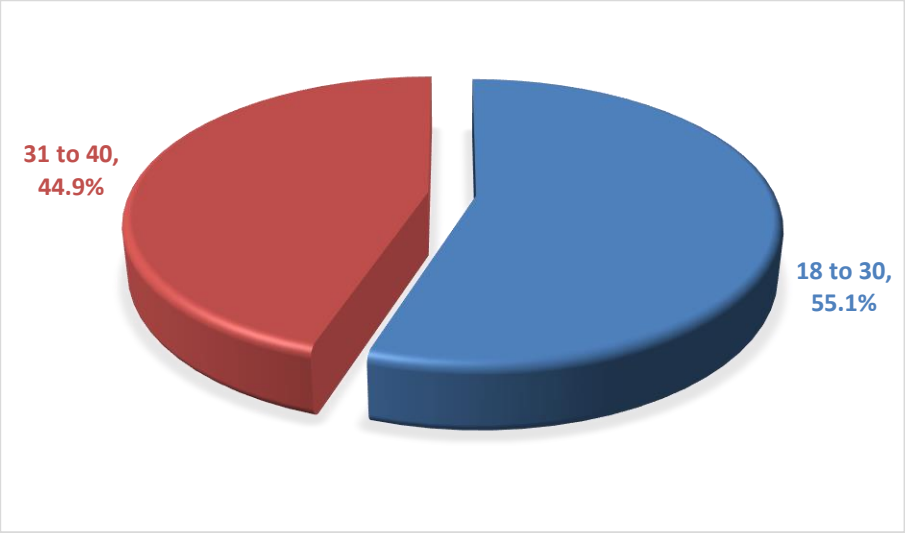

Figure 1: Age distribution of the patients (Years)

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Table 2: Fetal outcomes

Fetal outcomes		Frequency	Percentage
Perinatal Asphyxia	Yes	13	11.0%
	No	105	89.0%
NICU Admission	Yes	23	19.5%
	No	95	80.5%
Meconium Aspiration Syndrome	Yes	8	6.8%
	No	110	93.2%
Neonatal Sepsis	Yes	10	8.5%
	No	108	91.5%
Neonatal death	Yes	4	3.4%
	No	114	96.6%

Table 3: Maternal outcomes

Maternal outcomes		Frequency	Percentage
Cesarean section	Yes	31	26.3%
	No	87	73.7%
Puerperal Sepsis	Yes	19	16.1%
	No	99	83.9%
Chorioamnionitis	Yes	5	4.2%
	No	113	95.8%

Discussion

The prevalence of perinatal asphyxia in this study was found to be 11.0% (13 cases), which is relatively lower compared to Addisu D et al., which reported a higher incidence of perinatal asphyxia in meconium-exposed neonates, with rates reaching up to 22.8%. (12) This variation could be attributed to differences in sample size, geographical settings, and access to healthcare services, which may influence the detection and management of perinatal asphyxia. The presence of meconium is often linked to an increased risk of fetal distress, which is a precursor to asphyxia.

Another significant fetal outcome observed in this study was the need for neonatal intensive care unit (NICU) admission, which was reported in 19.5% (23 cases) of neonates. This finding aligns with the results of previous studies, such as that of Parween S et al., who also noted a higher rate of NICU admissions among neonates with MSAF, which was attributed to respiratory distress and the need for close monitoring. (13) The NICU admission rate in this study was lower than the 23.4% found in the study by Addisu D et al. in Ethiopia. (12) These findings highlight the considerable neonatal morbidity associated with MSAF, as neonates born under these conditions often require immediate respiratory support and monitoring for other potential complications.

Meconium aspiration syndrome (MAS) was observed in 6.8% (8 cases) of the neonates in this study. This is consistent with the findings from other studies, such as Vaghela and HP et al., who reported MAS in 5% of cases in a cohort of women with MSAF. (14) However, the rate of MAS is still relatively low compared to the more severe complications, such as neonatal sepsis and perinatal death, which were less frequently observed in the present study. MAS is typically more common in cases of thick meconium or when the fetus experiences significant distress, which aligns with the findings in this and other studies. Although MAS remains a serious neonatal complication, advances in neonatal care have helped reduce its severity and improve survival rates. (14)

Neonatal sepsis occurred in 8.5% (10 cases) of the neonates in the present study, which is similar to the rates reported in other studies. For example, Addisu D et al. observed a rate of neonatal sepsis of 9.0% in meconium-exposed neonates. (12) Neonatal sepsis remains a serious concern in MSAF cases, as it is often a consequence of intrauterine infection or aspiration of meconium into the lungs during delivery. The lower incidence of neonatal sepsis in this study than others might indicate differences in the management of infections during labor or the hospital protocols followed in different settings.

As for maternal outcomes, the rate of cesarean section in this study was 26.3% (31 cases), which aligns with findings from Haq et al., which reported an increased likelihood of cesarean section in women with postdate pregnancies. (15) The study by Suliman AA et al. in Sudan found that cesarean sections were required in 33.3% of cases where meconium-stained liquor was present in women with postdated pregnancies, often due to fetal distress or failure to progress in labor. (16) Similarly, Vaghela, HP et al. observed a higher cesarean delivery rate of 68% among women with meconium-stained amniotic fluid. (14) This higher rate in other studies could be due to more frequent cases of fetal distress, which often necessitate emergency cesarean sections.

Puerperal sepsis was another maternal complication observed in this study, with 16.1% (19 cases) of the women affected. This is consistent with findings by Addisu D et al., where puerperal sepsis rates were higher among women with MSAF due to the increased risk of infection associated with prolonged labor and meconium passage. (12) Vaghela HP et al. also found that puerperal infections were more common in women with meconium-stained amniotic fluid, further supporting the association between MSAF and postpartum complications. (14) The relatively lower percentage in this study than others might indicate a difference in post-delivery care and the timely

administration of antibiotics or other infection prevention measures.

Conclusion

In conclusion, this research underscores the important maternal and fetal implications linked to meconium-stained amniotic fluid in postdated pregnancies. The results suggest that neonates exposed to meconium face an increased likelihood of perinatal asphyxia, requiring NICU admission, along with other complications like meconium aspiration syndrome and neonatal sepsis. In a similar vein, maternal outcomes indicated higher occurrences of cesarean deliveries and puerperal sepsis among women presenting with meconium-stained amniotic fluid. The findings highlight the importance of careful observation and intervention during labor to reduce risks and enhance results for mothers and their newborns.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department concerned. (IRBEC-MIT-0399/23)
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

Authors Contribution

Khawaja Fawad Parvez (Assistant professor)
Data Analysis, Concept & Design of Study
Nadia (Consultant)
Revisiting Critically, Final Approval of version & Drafting

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