

Prevalence of Meconium Stained Amniotic Fluid in Woman who Delivered at Term

Meconium
Stained Amniotic
Fluid at Term

Bushra Begum Ramejo¹, Syed Sohail Abbas², Tehmina Mahar³ and Sanober Soomro¹

ABSTRACT

Objective: To evaluate the incidence of meconium-stained amniotic fluid (MSAF) and associated characteristics in women with term deliveries.

Study Design: A case-control study

Place and Duration of Study: This study was conducted at the Obstetrics and Gynecology, Department unit 2, Kausar hospital Mother & Child Health Care Center, Khairpur, and Khairpur Medical College, Khairpur Mirs between January to August, 2020 for a duration of eight months.

Materials and Methods: During the study period, a total of 73 cases with meconium stained amniotic fluid were recruited and 73 healthy subjects with clear amniotic fluid acted as control. Women with breech presentation, congenital abnormality, twin births, stillbirth or preterm or late-term cases were excluded from the study. All socio demographic and obstetrical data of mothers was fed into an electronic predefined questionnaire via face to face interviews. Women in the case group were divided into 3 grades and sub-stratified according to their sociodemographic and obstetrical characteristics. Data was analyzed using SPSS version 26.

Results: There were seventy-three cases of MSAF during the study period. The mean age and standard deviation of women in the case (MSAF) group was 36.06 years with the range 26 – 42 years. The mean maternal age was significantly lower in the control group (p-value < 0.00001). There were 16 women with Grade I MSAF, 40 women with Grade II, and 17 women with Grade III MSAF. Prolonged labour of greater than 12 hours was more frequently observed in the MSAF group compared to the control healthy subjects with clear amniotic fluid. Out of the 73 women with MSAF, about 59 participants delivered via caesarean section while the rest 11 had spontaneous vaginal delivery. In contrast, a relatively lower number of women in the control group delivered via C-section.

Conclusion: Increased gestational age, delayed or obstructed labor, induced-labor, and cesarean section may be associated with increased risk of development of meconium-stained amniotic fluid. MSAF should be carefully investigated and a mother with MSAF and the fetus during delivery should be regularly and vigilantly monitored.

Key Words: Aspiration, cesarean section, neonatal mortality, meconium-stained amniotic fluid, obstetrician

Citation of article: Ramejo BB, Abbas SS, Mahar T, Soomro S. Prevalence of Meconium Stained Amniotic Fluid in Woman who Delivered at Term. Med Forum 2020;31(11): 155-158.

INTRODUCTION

The Prevalence of meconium-stained amniotic fluid (MSAF) has been associated with the increased risk of poor foetal outcomes and life-threatening complications like the meconium aspiration syndrome and perinatal asphyxia in perinatal and neonatal stages¹⁻². Meconium is a dark, black-green and odourless paste-like material formed in the intestines of a foetus. It first appears

around 12 weeks of gestation in the intestine of the fetus and remains in the fetus colon throughout the gestation period³. Exact etiology of the MSAF is still unclear. From the literature, it has been proven that the MSAF incidence increases with the gestation age.

Research by Rao S, showed that mothers with acute chorioamnionitis/funisitis have higher risk (p<0.05) of MSAF incidence. He also studied that in newborn ICU, the prevalence of respiratory distress, meconium aspiration syndrome, and presumed sepsis is relatively higher in MSAF group (p<0.05)⁴. In another research by Mathews and Warshaw it was shown that the admission of neonates to ICU is confirmed in 98.4% cases of meconium stained AF. Matured neonates were given 37 weeks after gestational age⁵ when the autonomic nervous system was autonomous. Placental insufficiencies, maternal hypertension, pre-eclampsia, oligohydramnios and maternal medication (tobacco or cocaine) are the risk factors that make meconium development in the utero. Meconium aspiration can contribute to meconium aspiration syndrome (MAS),

¹. Department of Gynecology & Obstetrics / Pathology², Khairpur Medical College, Khairpur, Pakistan.

³. Department of Gynecology & Obstetrics, Ghulam Muhammad Mehar Medical college, Sukkur, Pakistan.

Correspondence: Dr. Bushra begum Ramejo Department of Gynecology, Khairpur Medical College, Khairpur Pakistan.

Contact No: 03008981599

Email: bushra_bushra-2009@yahoo.com

Received: September, 2020

Accepted: October, 2020

Printed: November, 2020

the principal cause of foetal death, during intrauterine life⁶.

Pakistan has one of the highest rates of maternal and neonatal morbidity due to low standards of the healthcare system and inaccessibility of healthcare in many areas. Due to scarcity of data from Pakistan, the current study was undertaken. The objective of the present study was to evaluate the frequency of MSAF in women who delivered at term at a tertiary care hospital, Khairpur Mirs, Pakistan and the associated factors.

MATERIALS AND METHODS

The case-control study was conducted at Obstetrics and Gynecology, Department unit 2, Kausar hospital Mother & Child Health Care Center, Khairpur, and Khairpur Medical College, Khairpur Mirs between January to August, 2020. An ethical approval was obtained from the institutional review board. A non-probability convenience sampling technique was used to enroll participants in the study. During the study period, a total of 73 cases with meconium stained amniotic fluid were recruited and 73 healthy subjects with clear amniotic fluid acted as control.

All socio demographic data of mothers was entered into an electronic predefined questionnaire via face to face interview. Those who were not able to understand Urdu language, were interviewed by a translator. Information like maternal age, parity, gravidity, body mass index, gestational age, mode of delivery, and other related data were recruited. Women with breech presentation, congenital abnormality, twin births, stillbirth cases were excluded from the study.

Women in the case group were divided into 3 grades, i) Grade I, thin yellow colour meconium, ii) Grade II, light green coloured meconium, and iii) Grade III, thick pasty meconium. Women in the control group had thin clear amniotic fluid. Fetal and maternal heart rate were regularly monitored for both groups.

Data was analyzed using SPSS version 26. The continuous data was presented as mean and standard deviation, while the non-numerical data was presented as frequency or percentages. The two groups were compared for maternal characteristics and associated factors of MSAF. Chi square tests were applied and a p-value of < 0.05 was set as statistical significance.

RESULTS

There were seventy-three cases of MSAF during the study period. The mean age and standard deviation of women in the case (MSAF) group was 36.06 years with the range 26 - 42 years. The mean maternal age was significantly lower in the control group (p-value < 0.00001). (Table 1).

Table No 1: Age of included patients

Variables	Case	Control	p-value
Mean Age	36.08±8.12	27.41±7.21	0.00001
<30	29(39.73%)	55(75.4%)	
>30	44(60.27%)	18(24.66%)	

There were 16 women with Grade I MSAF, 40 women with Grade II, and 17 women with Grade III MSAF. Prolonged labour of greater than 12 hours was more frequently observed in the MSAF group compared to the control healthy subjects with clear amniotic fluid. (Table 2).

Table No.2: Distribution of MSAF grade

Grade of MSAF	n (%)
Grade I	16(21.92%)
Grade II	40(54.79%)
Grade III	17(23.29%)

Out of the 73 women with MSAF, about 59 participants delivered via caesarean section while the rest 11 had spontaneous vaginal delivery. In contrast, a relatively lower number of women in the control group delivered via C-section.

Table No.3: Mode of delivery in cases and controls

Variables	Case	Control	p-value
Vaginal	11(15.07%)	49(67.12%)	<0.00001
Caesarean	59(80.82%)	13(17.81%)	
Instrumental	3(4.11%)	11(15.07%)	

DISCUSSION

A widely observed phenomenon is meconium stained amniotic fluid (MSAF). Increased incidence of perinatal disease and mortality is correlated with the presence of thick meconium. The current study revealed certain maternal and obstetric traits which had major effects of MSAF in our people. The increasing gestational age, the maternal age at the time of conception, the duration of labour, were some of the factors attributed to the development of MSAF. These findings are in accordance with the existing international and local literature⁸⁻¹⁰.

Addisu et al., recently reported that maternal age, spontaneous onset of labor, incidence of preeclampsia, prolonged or delayed labor, were significantly associated with the occurrence of MSAF⁸. The authors found that MSAF was 5.6 times more likely to occur in mothers with age of greater than thirty [adjusted odds ratio = 5.6, 95% CI = 3.35 - 9.44]. Furthermore, in women with prolonged duration of labor of more than twenty-four hours, MSAF was 7 times more likely to develop [adjusted odds ratio =7.1, 95% CI =1.67 - 29.68]. Another study from Nigeria revealed similar findings⁹. They reported an incidence rate of MSAF 20.4%. The MSAF incidence increased with the rising gestational age. Other factors significantly associated with MSAF were primigravida (p = 0.005), prolonged rupture of fetal membranes (p = 0.0013), and obstructed or delayed labour (p = 0.0000002).

Meconium-stained amniotic fluid (MSAF) can lead to several short and long term fetal complications. It is associated with increased rate of NICU admissions, neonatal resuscitation, neonatal respiratory distress syndrome, poor APGAR score, and certain life-threatening conditions including meconium aspiration syndrome (MAS) and neonatal sepsis. MSAF is a serious indication of neonatal morbidity and mortality, and thick dark green pasty meconium in the amniotic fluid should alarm the obstetricians and a management plan should be established promptly¹⁰⁻¹¹. Studies have shown that there is a risk of cerebral palsy and mental retardation in neonates born to mothers with MSAF¹². Osava et al., evaluated the obstetrical and neonatal risk factors associated with MSAF. It was found that 38.8% of the women who had C-sections also had MSAF. The condition was associated with prim parity, gestational age of more than or equal to 41 weeks, oxytocin induced labour and Apgar scores of less than 7¹³. Neonatal mortality was 1.6/1,000 live births.

Meconium stained amniotic fluid was found in half of the neonatal deaths and it was associated with increased rates of surgical deliveries.

Similarly, in another study meconium stained amniotic fluid was significantly associated with poor neonatal outcome overall. It was revealed that the perinatal mortality raised from two deaths per 1000 births in group with clear amniotic fluid to a striking ten per 1000 live births in the MSAF group ($p < 0.001$)¹⁴. However, in our study the rate of neonatal mortality was not significantly different in the two groups.

Some studies consider MSAF exposure to be protective against certain dermatological infections. For instance, a study explored the role of MSAF in protecting a neonate against dermatitis and other skin-related infections later in life¹⁵. The authors observed that not only the MSAF-exposed group had a lower cumulative hospitalization rate in comparison to the unexposed group ($P < 0.05$) but MSAF was found to be an independent protective factor against dermatitis and skin rash-related infection during childhood ($P = 0.034$). Therefore, the role of MSAF is still unclear and the etiologies need to be further explored.

To the best of the authors' knowledge, the current study yielded more or less similar findings as previously reported by the majority of the international and local literature. Considering the fact that Pakistan has one of the highest rates of neonatal morbidity and mortality, it is important to explore the risk factors associated with the MSAF - a common phenomenon seen in obstetrical practice¹⁶⁻¹⁷. MSAF is a well-established cause of short-term and long-term neonatal complications. Therefore, this study provides a foundation for future studies that may highlight the intervention and management in cases with MSAF among our population.

CONCLUSION

Increased gestational age, delayed or obstructed labor, induced-labor, and cesarean section may be associated with increased risk of development of meconium-stained amniotic fluid. MSAF should be carefully investigated and a mother with MSAF and the fetus during delivery should be regularly and vigilantly monitored. Thick green meconium-stained amniotic fluid is associated with increased neonatal morbidity and mortality. Further large-scale, multi-centre studies should be conducted to evaluate the risk factors and sociodemographic profile of cases with in-utero excretion of meconium.

Author's Contribution:

Concept & Design of Study: Bushra Begum Ramejo
Drafting: Syed Sohail Abbas, Tehmina Mahar

Data Analysis: Sanobar Soomro
Revisiting Critically: Bushra Begum Ramejo, Syed Sohail Abbas

Final Approval of version: Bushra Begum Ramejo

Conflict of Interest: The study has no conflict of interest to declare by any author.

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