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**ORIGINAL ARTICLE**

# Incidence of Puerperal Pyrexia in Women with Meconium-Stained Amniotic Fluid

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## ABSTRACT

**Background**: Puerperal pyrexia is a common postpartum complication that can lead to severe health risks for mothers. One of the contributing factors is meconium-stained amniotic fluid (MSAF), which is associated with various complications, including puerperal pyrexia. Despite its clinical importance, the relationship between MSAF and puerperal pyrexia remains under-researched.

**Objectives**: This study aimed to investigate the incidence of puerperal pyrexia in women with MSAF, examine the impact of the severity of meconium staining, and identify associated risk factors in a cohort of postpartum women.

**Study Design & Setting**: A retrospective observational study was conducted at Obstetrics and Gynaecology Dr Akbar Niazi Teaching Hospital Islamabad from January 2023 to June 2023. The study included 120 women who delivered at the facility and had MSAF. Demographic, clinical, and obstetric data were collected.

**Methodology**: The severity of MSAF was classified into three categories: Grade I (thin), Grade II (moderate), and Grade III (thick). The incidence of puerperal pyrexia was monitored during the postpartum period. Statistical analysis was performed to assess the relationship between MSAF severity, mode of delivery, and the development of puerperal pyrexia.

**Results**: Of 120 women, 23 (19.2%) developed puerperal pyrexia. The incidence was significantly higher in women with Grade III MSAF (38.2%) compared to those with Grade I (8.3%) and Grade II (14%). Cesarean delivery was also associated with a higher incidence of puerperal pyrexia (26.9%).

**Clinical Implication**: Identifying MSAF severity and mode of delivery as risk factors can help healthcare providers in early detection and management of puerperal pyrexia.

**Conclusion**: The study found a significant association between the severity of MSAF, mode of delivery, and puerperal pyrexia, suggesting the importance of close monitoring in at-risk patients.

**Keywords**: Cesarean section, meconium-stained amniotic fluid, puerperal pyrexia, postpartum complications, vaginal delivery.

## INTRODUCTION

Puerperal pyrexia, or postpartum fever, is a common clinical condition that occurs after childbirth, typically defined as a temperature of 100.4°F (38°C) or higher within the first 6-12 hours postpartum.[1,2] It is an important sign that indicates the presence of an infection or inflammation in the body and can be associated with various complications that may affect both the mother and the newborn.[3] The condition can arise from several etiologies, including infections like endometritis, urinary tract infections, and mastitis, among others.[4] However, one of the more specific risk factors for puerperal pyrexia is the presence of meconium-stained amniotic fluid (MSAF), a common obstetric complication.[5]

Meconium-stained amniotic fluid occurs when the fetus passes its first stool (meconium) into the amniotic sac before or during labor. This event is typically observed in about 10-20% of all deliveries, with higher rates seen in post-term pregnancies, fetal distress, and certain maternal conditions such as diabetes.[6,7] Meconium staining of the amniotic fluid can range from a light yellowish-green color to dark green, depending on the amount of meconium present.[8] While meconium-stained amniotic fluid itself may not necessarily lead to immediate adverse outcomes, its presence has been associated with an increased risk of complications such as meconium aspiration syndrome (MAS), neonatal infection, and, more importantly for this study, puerperal pyrexia in the mother.[9]

The release of meconium into the amniotic fluid may serve as a source of bacterial contamination, especially when meconium is stained and is present in large quantities. This bacterial contamination could increase the risk of infection in the postpartum period, leading to a febrile response in the mother. Additionally, the inflammatory response to meconium passage may alter the uterine environment, predisposing women to endometritis, one of the leading causes of puerperal pyrexia.[10,11]

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Several studies have investigated the relationship between MSAF and puerperal pyrexia, with mixed findings regarding its true incidence and clinical significance. Some studies have found that women with MSAF are at an increased risk of developing puerperal pyrexia, while others suggest that the association may not be as strong as previously thought. Given the potential clinical consequences of both puerperal pyrexia and meconium-stained amniotic fluid, understanding this link is critical for optimizing care during labor and the postpartum period. This study aims to examine the incidence of puerperal pyrexia in women with meconium-stained amniotic fluid, identify potential risk factors, and explore the impact of early intervention strategies on maternal outcomes. By better understanding this association, healthcare providers can improve management strategies, enhance maternal care, and potentially reduce the incidence of puerperal pyrexia in this high-risk population.

## MATERIALS AND METHODS

The research was carried out at Obstetrics and Gynaecology Dr Akbar Niazi Teaching Hospital Islamabad from January 2023 to June 2023. A total of 120 patients who delivered at the hospital during the study period were included in the sample. Inclusion criteria consisted of women who had spontaneous or induced vaginal deliveries or cesarean sections and who had meconium-stained amniotic fluid at the time of labor. Women with pre-existing conditions such as fever or infections prior to delivery, as well as those with multiple pregnancies or major obstetric complications (such as preeclampsia or placental abruption), were excluded from the study. A sample size of 120 patients was calculated based on an anticipated incidence of puerperal pyrexia of 15% in women with MSAF, with a 95% confidence interval and a 5% margin of error.

Upon admission, each patient's obstetric history, demographic information, and clinical presentation were

documented. The presence and degree of meconium-stained amniotic fluid were noted by the attending obstetrician at the time of delivery, and meconium-stained fluid was categorized as light, moderate, or heavy based on its color and consistency. The patients were then monitored for the development of puerperal pyrexia, defined as a body temperature greater than 100.4°F (38°C) within the first 48 hours postpartum. Postpartum temperature measurements were taken at regular intervals, and any fever episodes were documented along with the time of onset.

The primary outcome of interest was the incidence of puerperal pyrexia, while secondary outcomes included the association between the severity of meconium staining and the development of fever. The patients who developed puerperal pyrexia were further evaluated for possible underlying causes, including infections such as endometritis, urinary tract infections, and mastitis. Diagnostic tests, such as blood cultures, urine cultures, and vaginal swabs, were performed when necessary to confirm the source of infection.

Data were analyzed using descriptive statistics. The incidence of puerperal pyrexia was calculated as the number of patients who developed fever divided by the total number of patients in the study sample. The relationship between the severity of meconium staining and the occurrence of puerperal pyrexia was also assessed using chi-square tests and logistic regression analysis to adjust for potential confounding factors such as maternal age, parity, and mode of delivery.

## RESULTS

The mean age of the participants was 28.5 ± 4.3 years. Among the total, 50 (41.7%) were primiparous and 70 (58.3%) were multiparous. Vaginal delivery was observed in 90 (75%) cases, while 30 (25%) underwent cesarean section. The mean gestational age was 39.2 ± 1.5 weeks. Hypertension was noted in 12 (10%) participants and diabetes in 8 (6.7%) as shown in table 1. Out of 120 women, 36 (30.0%) had Grade I (thin) meconium-stained amniotic fluid, 50 (41.7%) had Grade II (moderate), and 34 (28.3%) had Grade III (thick) meconium-stained amniotic fluid given in table 2.

Out of 120 women, 23 (19.2%) developed puerperal pyrexia, while 97 (80.8%) did not experience this complication as given in table 3. Among 36 women with Grade I MSAF, 3 (8.3%) developed puerperal pyrexia. In Grade II MSAF, 7 (14.0%) out of 50 cases were affected, while 13 (38.2%) out of 34 women with Grade III MSAF developed puerperal pyrexia. The association between the grade of MSAF and puerperal pyrexia was statistically significant (p = 0.007) as given in table 4.

Table 1: Demographic Characteristics of Participants

| Demographic Characteristic | Category | Value (%) |
|---|---|---|
| Age | (Mean ± SD) | 28.5 ± 4.3 years |
| Parity | Primiparous | 50 (41.7%) |
| | Multiparous | 70 (58.3%) |
| Mode of Delivery | Vaginal | 90 (75%) |
| | Cesarean | 30 (25%) |
| Gestational Age | Mean ± SD | 39.2 ± 1.5 weeks |
| Maternal Comorbidities | Hypertension | 12 (10%) |
| | Diabetes | 8 (6.7%) |

Table 2: Grades of Meconium-Stained Amniotic Fluid

| Grade of MSAF | Frequency (n) | Percentage (%) |
|---|---|---|
| Grade I (Thin) | 36 | 30.0 |
| Grade II (Moderate) | 50 | 41.7 |
| Grade III (Thick) | 34 | 28.3 |
| Total | 120 | 100.0 |

Table 3: Incidence of Puerperal Pyrexia

| Puerperal Pyrexia | Frequency (n) | Percentage (%) |
|---|---|---|
| Yes | 23 | 19.2 |
| No | 97 | 80.8 |
| Total | 120 | 100.0 |

Out of 68 women who had vaginal delivery, 9 (13.2%) developed puerperal pyrexia, whereas 14 (26.9%) out of 52 women who underwent cesarean section experienced puerperal pyrexia. This association between mode of delivery and puerperal pyrexia was found to be statistically significant (p = 0.047) as given in table 5.

Table 4: Association of Puerperal Pyrexia with Grade of MSAF

| Grade of MSAF | Total Cases (n) | Puerperal Pyrexia (n) | Percentage (%) | p-value |
|---|---|---|---|---|
| Grade I | 36 | 3 | 8.3 | 0.007 |
| Grade II | 50 | 7 | 14.0 | |
| Grade III | 34 | 13 | 38.2 | |
| Total | 120 | 23 | 19.2 | |

Table 5: Association of Puerperal Pyrexia with Mode of Delivery

| Mode of Delivery | Total Cases (n) | Puerperal Pyrexia (n) | Percentage (%) | p-value |
|---|---|---|---|---|
| Vaginal Delivery | 68 | 9 | 13.2 | 0.047 |
| Cesarean Section | 52 | 14 | 26.9 | |
| Total | 120 | 23 | 19.2 | |

## DISCUSSION

Puerperal pyrexia is a common postpartum complication that significantly affects maternal morbidity and mortality. Meconium-stained amniotic fluid (MSAF) is frequently encountered during labor and is associated with fetal distress and adverse maternal outcomes.[12,13] The presence of meconium in the amniotic fluid may increase the risk of infection, leading to puerperal pyrexia. Understanding the incidence and risk factors related to MSAF is crucial for improving maternal care.[14] Despite advances in obstetric management, puerperal pyrexia remains a challenge, especially in settings with limited resources. This study aims to determine the incidence of puerperal pyrexia in women with MSAF to inform better clinical protocols.

Firstly, our study's mean maternal age of 28.5 ± 4.3 years aligns closely with the findings of Sultana et al. (2023), who reported a mean age of 29.5 ± 2.5 years in the MSAF group. Both studies found a similar mean gestational age, with Sultana et al. reporting 39.1 ± 1.0 weeks, and our study showing 39.2 ± 1.5 weeks. These consistent findings suggest that maternal age and gestational age do not differ significantly between studies focusing on MSAF. Regarding the incidence of puerperal pyrexia, our study observed a 19.2% incidence, which is lower than the 45.5% seen in Sultana et al. (2023) among MSAF patients.[15] This discrepancy may be due to differences in study settings, sample size, or the broader range of factors contributing to puerperal pyrexia. Our study also found that the severity of MSAF was significantly associated with the development of puerperal pyrexia, with 38.2% of women with Grade III MSAF developing the condition, similar to Addisu et al. (2023), who noted higher complication rates among those with thick meconium.[18]

Our findings regarding the mode of delivery align with those of Ali et al. (2014), where cesarean section was more common in women with MSAF.[16] In our study, 26.9% of women who underwent cesarean section developed puerperal pyrexia, while only 13.2% of women who had vaginal deliveries experienced this complication. This is consistent with Gul et al. (2023), who noted a higher incidence of adverse fetal outcomes and complications in women with thick MSAF, which may also correlate with the increased need for operative delivery.[19] In terms of neonatal outcomes, our study did not directly investigate meconium aspiration syndrome (MAS) or fetal distress, but Abbas et al. (2020) and Gul et al. (2023) both found a strong association between thick MSAF and worse neonatal outcomes, such as MAS, neonatal sepsis, and asphyxia.[19] This supports the theory that thick meconium is a risk factor for more severe complications, both for the mother and the neonate.[17]

Finally, the statistical significance of our results (p = 0.007 for the association between MSAF severity and puerperal pyrexia, and p = 0.047 for the association with the mode of delivery) further corroborates findings from Ramejo et al. (2020), who also found significant associations between MSAF and adverse maternal and neonatal outcomes. Our study's p-values further emphasize the robustness of these associations.[20]

This study benefits from a well-defined sample size and systematic data collection, enhancing the reliability of the results. The inclusion of detailed grading of MSAF allowed for precise analysis of its association with puerperal pyrexia. However, the single-center design may limit the generalizability of the findings. Potential confounding factors such as intrapartum antibiotic use were not controlled. The study's observational nature precludes establishing causality. Finally, some data might be subject to reporting bias, impacting result accuracy.

## CONCLUSION

The incidence of puerperal pyrexia is significantly higher in women with thick meconium-stained amniotic fluid and those undergoing cesarean section. Early identification and close monitoring of these high-risk groups are essential to reduce maternal morbidity. Implementing targeted interventions could improve postpartum outcomes in this population.

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