e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(5); 1373-1378

Original Research Article

A Comparative Study of the Impact of Acute Febrile Illness during Pregnancy

Shradha Jain[1], Shubhangi Soora[2], Kanchan[3], Beeravolu Mounika Reddy[4]

[1]Senior Resident, RDBP Jaipuria Hospital, Jaipur, Rajasthan India
[2]Senior Resident, RDBP Jaipuria Hospital, Jaipur, Rajasthan India
[3]Senior Resident, Fortis Hospital, Jaipur, Rajasthan, India
[4]Senior Resident, Princess Esra Hospital, Hyderabad, Telangana, India

Received: 10-03-2023 / Revised: 08-04-2023 / Accepted: 30-04-2023
Corresponding author: Dr Beeravolu Mounika Reddy
Conflict of interest: Nil

Abstract

Introduction: Fever during pregnancy causes significant maternal and foetal complications. The coexistence of pregnancy may aggravate the risk to maternal life. The most common antenatal complications observed were preterm labour, premature rupture of membranes, oligohydramnios and intrauterine growth restriction.

Material & Methods: Total 160 pregnant women more than 20 weeks of gestation were enrolled in which 80 were acute febrile (fever less than 7 days) and another 80 were afebrile subjects. Patient history, antenatal, Intra-natal, Postnatal and Foetal outcome complications were identified and monitored.

Results: 78.75% had fever in the third trimester. 36.25% of febrile and 20% of non-febrile patients experienced premature labour. 36.25% babies born to febrile moms and 10 % from afebrile mothers required NICU admission.

Conclusion: If the cause of the fever is identified and treated appropriately, the maternal and foetal problems may be prevented.

Keywords: Fever, Pregnancy, Foetal, Outcome, Complications.

Introduction

Fever, also known as pyrexia or the febrile reaction, is the term used to describe having a temperature that is higher than normal as a result of an increase in the body's temperature set point [1,2]. Significant complications for both the mother and the foetus result from fever during pregnancy. Any infectious disease may get worse during pregnancy. Pregnancy-related alterations or compromised immune system functions may render a person more susceptible to infections. Due to limits on antibiotics due to teratogenicity, infection control is impossible [3,4].

Depending on how high the temperature rises, pyrexia can disrupt pregnancy. The presence of cytokines in the umbilical cord blood demonstrates that a foetus exposed to maternal fever is exposed to a variety of inflammatory mediators even in the absence of newborn sepsis being positively identified [3]. There is a strong correlation between maternal cytokine polymorphism and

cerebral palsy in term children and intrapartum fever [3,4].

Hyperthermia inhibits protein synthesis, causes S phase cell death, and postpones the M phase of mitosis thanks to the activity of heat-shock proteins. Vascular interruption and placental infarction are both possible. It may ultimately lead to fatal abnormalities and foetal mortality. Additionally, increased uterine contractility brought on by pyrexia may result in the foetus being expelled at a stage of pregnancy when it is not viable. Depending on the gestational period at which the exposure occurred, the hyperthermia-induced foeto-maternal result will vary [5,6].

Some diseases, such as Listeria monocytogenes, Hepatitis E virus (HEV), Herpes simplex virus, and Plasmodium falciparum, become more common and dangerous during pregnancy. While significantly increasing oxygen demand, a higher brain temperature lowers the threshold for hypoxia-induced damage. Heat raises the risk of hypoxic brain damage in term babies [7,8].

This study was conducted at our tertiary care centre to investigate the maternal and foetal issues brought on by acute febrile illness in pregnancy and to determine the several aetiologies of pyrexia in pregnancy.

Material and Methods

After approval of Ethics Committee, the pregnant women more than 20 weeks of gestation were enrolled in this study. Total 160; 80 acute febrile (fever less than 7 days) and 80 afebrile subjects were enrolled. Patients with chronic febrile illness (TB, HIV, RA and other connective tissue disorder), gestational age less than 20 weeks, pregnancy with Intrauterine foetal death and patients not willing to give consent were excluded from the study. Antenatal, Intranatal, Postnatal and Foetal outcome complications were identified and monitored. Quantitative variables were summarised as mean and standard deviation whereas nominal / categorical variables as proportion (%). Dependent and Independent t test were used for analysis of quantitative variables while nominal/ categorical variables were analysed by using Chi square test / Fisher's exact test and Mc-nemar test. 'p' value < 0.05 was taken as significant. Standard software was used for all statistical calculations.

Results

In this study maximum patients belonged to age group of 26-30 yrs, 55.63% belong to urban area, 64.38% were educated, 75% belong to upper socio economic class and 57.50 % were primigravida. Association between duration of fever and foetal outcome in febrile group were showed in Table 1.

Table 1: Association between duration of fever and fetal outcome in febrile group

Duration of fever	NICU	MSAF	NND	IUGR
<3 days (n=40)	12(30%)	6(15%)	2(5%)	4(10%)
3-7 days (n=31)	11(35.48%)	2 (6.45%)	2 (6.45%)	1(3.23)
>7 days (n=9)	6(66.67%)	0(0)	6(7.5%)	2(22.22%)
Total- 80	29 (36.25%)	8(10%)	6(7.5%)	7(8.75%)
P value	0.296	0.27	1.0	0.357

Maternal and foetal outcome in Afebrile and febrile group showed in table 2.

Table 2: Maternal and foetal outcome in Afebrile and febrile group.

Outcomes		Afebrile	Febrile	P Value
Gestational age at time of Delivery	< 37 week (Preterm	16(20)	29(36.25)	0.035
	> 37 week (term)	64(80)	51(63.75)	
PROM		5(6.25)	3(3.75)	0.717
PPROM		2(2.5)	8(10)	0.102
ICU Admission		2(2.5)	6(7.5)	0.277
Blood & Blood product transfusion		4(5)	19(23.75)	0.002
Oligo hydramnios		7(8.75)	10(12.5)	0.608
Medical complications	Anemia	14(17.5)	21(26.25)	0.251
	Thrombocytopenia	6(7.5)	9(11.25)	0.588
	Hypoglycemia	3(3.75)	0(0)	0.244
Foetal Outcome	NICU admission	8(10)	29(36.25)	<0.001
	MSAF	1(1.25)	8(10)	0.04
	Baby weight < 2kg	4(5)	14(17.5)	0.025
	Baby weight 2- 2.499 kg=LBW)	16(20)	19(23.75)	
	Baby weight >2.5 Kg	60(75)	47(58.75)	
	Neonatal death	0(0)	6(7.50)	0.037
	IUGR	3(3.75)	7(8.75)	0.327
	Fresh still birth	1(1.25)	2(2.50)	1.00

PROM: Premature rupture of membrane; PPROM- premature prelabour rupture of membranes; MSAF: Meconium stained amniotic fluid; IUGR: Intrauterine growth retardation

Discussion

The circulation of uteroplacental tissue and heat exchange at the amniotic fluid-tissue interface play a major role in regulating the foetal body temperature during pregnancy. These few pathways for heat transfer from the mother keep the temperature of the foetus between 0.5°C and 0.75°C higher than that of the mother [9]. Pregnant patients' immune systems are comparatively suppressed throughout this time. Pregnant patients will also be more at risk due to physiological changes that occur throughout pregnancy, which will increase the likelihood of negative consequences [10,11].

The majority of patients in this study (57.5%) were primigravida, which was similar to studies by Nath *et al*. (47.6% primigravida) and Anuradha *et al*. (58.3% primigravida) but different from More *et al*. (45% primigravida) [12-14]. According to earlier research, parous women were less likely than nulliparous women to experience intrapartum fever [15-17]. This could be explained by the idea that nulliparous women experience greater metabolic demands than parous mothers, which causes contractions in the uterine and skeletal muscles [18].

The majority of patients (78.75%) had fevers when in the third trimester. In the More *et al*. study, the third trimester (78%) had the highest prevalence of fever, followed by the first trimester (12%). Most women (72.95%) who presented with fever in a study by Kachare *et al*. were in their third trimester at the time [14,19]. In the current study, 12.5% of patients who had not fever and 18.75% of those who had fever also had burning urination. In the Chansamouth *et al*. study, more than 60% of patients also reported fever associated with headache, myalgia, back pain, and arthralgia [20]. In a different investigation conducted by Anuradha *et al*

47.2% of patients had a fever-only presentation, 19.4% had myalgia, 13.8% had a haemorrhagic manifestation, 11.1% had a headache, and 8.3% had a rash in addition to their fever [13]. The most prevalent symptoms at presentation in the Shah *et al*. study were cough (61.6% of patients), fever (46.4%), sore throat (13.6%), myalgia or arthralgia (10.4%), and dyspnoea (8%), whereas 38.4% of cases were asymptomatic [21].

In the study, 36.25% of febrile patients and 20% of non-febrile patients experienced premature labour. In the More *et al*. study, it was found that 13% of study group patients experienced preterm labour, compared to 6% of control group patients [14] Preterm labour, oligohydramnios, IUGR, and foetal distress were more common in the study group than in the control group, but other problems were equivalent. In our study 10 % patients in febrile group had PPROM as compared to 2.5% patients in afebrile group while 6.25% afebrile patients had PROM as compared to 3.75% febrile patients. The results were similar to study performed by More *et al* and Bhardwaj *et al* [14,22].

In the trial, 7.5% of patients in the febrile group and 2.5% of patients in the afebrile group required ICU care. In the Anuradha *et al*. study, 44.4% of dengue patients needed admission to the NICU. blood transfusions were required in both groups [13]. In our study, 23.75% of patients in the febrile group and 5% of patients in the afebrile group needed blood component transfusions. The difference was statistically significant, and it was similar to a research by Anuradha *et al* in which 66.7% of patients needed transfusions of different blood components while 33.3% did not [13]. In our study, 12.50% of febrile patients and 8.75% of afebrile patients had oligohydramnios. In the febrile group, anaemia was observed in 26.25% of cases, compared to 17.50% of cases in the afebrile group. 9.38% of patients had thrombocytopenia (11.25% in the febrile group and 7.50% in the afebrile group), and 3% had hypoglycaemia. In the More *et al*. trial, individuals in the study group experienced anaemia at a rate of 4%, compared to 5% in the control group [14]. Pleural effusion, pneumonia, severe anaemia, diarrhoea, hypoglycaemia, convulsions, jaundice, and abrupt renal failure were complications that were frequently seen in the study. The most frequent side effects were diarrhoea, hypoglycaemia, and jaundice. In 7.6% of cases, anaemia was detected.

PPH was observed in the study in 5% of febrile patients as opposed to 3.75% of individuals in the afebrile group. 6.25% of patients in the febrile group had DIC complications, compared to 2.5% of the female patients in the afebrile group. In the febrile group, septic shock and renal failure were observed in 5% and 3.75% of cases, respectively, whereas 2.5% of patients in the afebrile group experienced septic shock and DIC, respectively. While no such complication was observed in the afebrile group, approximately 2.5% of patients in the febrile group experienced wound infection and pleural effusion. Anuradha *et al*.'s study on febrile patients found that 5.5% had adult respiratory distress syndrome (ARDS), 11.1% had diffuse intravascular coagulation (DIC), and 38.88% had postpartum haemorrhage (PPH) [13].

In our study, babies born to febrile moms required NICU admission in 36.25% of cases, whereas babies born to afebrile mothers required NICU admission in 10% of cases. In the More *et al*. study, only 23% of babies born to afebrile moms required NICU admission, compared to 37% of babies delivered by feverish mothers [14]. The research group had a 1.6 fold increased relative risk of NICU admission. In a different study by Kachare *et al*, only 80.27 percent of neonates born to feverish moms

required NICU admission, compared to 19.73 percent of those who did [19].

In the study, 10% of patients in the febrile group and 1.25 % of individuals in the afebrile group had MSAF. 41.25% of patients in the febrile group and 25% of patients in the afebrile group had LBW, respectively. According to More *et al*. 49% of patients in the study group and 35% of cases in the control group were LBW (weight 2.5 kg) [14]. The relative risk of LBW in the study group was significantly 40% greater than in the control group.

Six neonates born to febrile mothers died in total, with the causes being severe prematurity in three of them (two of whom died on day 2 of life and one of whom died on day 3), meconium aspiration syndrome in one of them (who died on day 3), and severe sepsis in two of them (one of whom died on day 3 and the other on day 4), while no neonatal deaths were noted in the group of mothers who were not febrile. Foetal acidosis may have developed sooner due to impaired circulation from infection-related vasculitis and greater metabolic needs in a feverish state [23]. In the More *et al*. trial, there were no newborn deaths in the control group while there were 1% neonatal deaths in the study group [14]. In a different study by Kachare *et al*., febrile patients had a 17.24% infant death rate [19].

Conclusion

Due to immunosuppression during pregnancy, patients are more vulnerable to acquired infections and rapid illness progression that may proceed to fulminant problems endangering the lives of both the mother and the foetus. If the cause of the fever is identified and treated appropriately, the maternal and foetal problems may be prevented. The maternal morbidity and mortality rate has decreased with good newborn outcomes thanks to the availability of good knowledge and sophisticated technologies. With improved newborn outcomes, maternal morbidity and death have decreased due to the availability of good knowledge and sophisticated technology.

References

1. Kasper DL, Fauci AS, Hauser SL, Longo DL, Jameson JL, Loscalzo J. Harrison's Principles of Internal Medicine. 19th ed. New York: McGraw Hill Education; 2015; 122.
2. Chamber CD, Johnson KA, Dick LM, Felix RJ, Jones KL. Maternal fever and birth outcome: A prospective study. Teratol. 1998; 58:251-7.
3. Goetzl L, Evans T, Rivers J, Suresh MS, Lieberman E. Elevated maternal & fetal serum interleukin -6 levels are associated with epidural fever. Am J obstet. Gynecol. 2002; 187:834-8.
4. Cunningham F, Leveno K, Bloom S, Spong CY, Dashe J. Williams obstetrics. 24th ed. New York: McGraw Hill Education; 2014; 1239-64.
5. Chaiworapongsa T, Romero R, Kim JC, Kim YM, Blackwell SC, Yoon BH *et al*. Evidence for fetal involvement in the pathologic process of clinical chorioamnionitis. Am J Obstet Gynecol. 2002; 186:1178-82.
6. Simhan HN, Krohn MA, Zeevi A, Daftary A, Harger G, Caritis SN. Tumor necrosis factor-α promoter gene polymorphism-308 and chorioamnionitis. Obstet Gynecol. 2003; 102:162-6.
7. Carroll D. Pregnancy and the Tropics: Physiology, Environment and Infectious Disease. Trop Med Surg. 2014; 2:173.
8. Yager J, Towfighi J, Vannucci RC. Influence of mild hypothermia on hypoxic ischemic brain damage in the immature rat. Pediatr Res. 1993; 34:525-9.
9. Walker DW, Wood C. Temperature relationship of the mother and fetus

during labour. Am J Obstet Gynecol. 1970; 107:83-7.
10. Silasi M, Cardenas I, Racicot K, Kwon JY, Aldo P, Mor G. Viral infection during pregnancy. Am J Reprod Immunol. 2015; 73:199-213.
11. Mor G, Cardenas I.The immune system in pregnancy: a unique complexity. Am J Reprod Immunol. 2010; 63:425-33.
12. Nath J, Mahajan S. A clinical study on pyrexia in pregnancy with special emphasis on fetomaternal outcome. Int J Sci Res. 2015; 4:2071-4.
13. Anuradha G, Sandya MR, George S. Spectrum of dengue morbidity in pregnancy and its impact on maternal and perinatal outcome. Int J Reprod Contracept Obstet Gynecol. 2019; 8:1511-6.
14. More VS. Fever in pregnancy and its maternal and fetal outcomes. Int J Reprod Contrecept Obstet Gynecol. 2017; 6:5523-7
15. Herbst A, Wolner -Hanssen P, Ingemarsson I. Risk factors for fever in labour. Obstet Gynecol. 1995; 86:790-4.
16. Alexander JM, McIntire DM, Leveno KJ. Chorioamnionitis and the prognosis for term infants. Obstet Gynecol. 1999; 94:274-8.
17. Sturchler D, Menegoz F, Daling J. Reproductive history and intrapartum fever. Gynecol Obstet Invest. 1986; 21:182-6.
18. Marx GF, Loew DA. Tympanic temperature during labour and parturition. Br J Anesth. 1975; 47: 600-2.
19. Kachare SD, Sontakke A, Ramteke S. Effect of maternal fever on fetal outcome. MedPulse Int J Gynaecol. 2019; 12: 22-5.
20. Chansamouth V, Thammasack S, Phetsouvanh R, Keoluangkot V, Moore CE, Blacksell SD *et al*. The aetiologies and impact of fever in pregnant inpatients in Vientiane, Laos. Plos Negl Trop Dis. 2016; 10: e0004577.
21. Schwartz DA. An analysis of 38 pregnant women with COVID-19, their newborn infants, and maternal-fetal transmission of SARS-CoV-2: maternal coronavirus infections and pregnancy outcomes. Arch Pathol Lab Med. 2020; 144:799–805.
22. Bhardwaj D, Chawla S, Sahoo I, Rathore P, Sharma A, Siddique N. Dengue in pregnancy. Med J Patil Vidyapeeth. 2020; 13:264-7.
23. Biswas J, Banerjee K, Sanyal P, Datta M, Choudhury S, Dasgupta S *et al*. Fetomaternal Outcome of Pyrexia in Pregnancy: A Prospective Study. Int J Women's Health Rep Sci. 2015; 3:132-5