



## MATERNAL AND FETAL OUTCOME OF DENGUE FEVER IN PREGNANCY: AN OBSERVATIONAL STUDY

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### ABSTRACT

Dengue is a mosquito-transmitted viral infection, which is a threat to health services. Concern regarding pregnant women becoming infected with dengue is on rise. They seem to be more likely present with severe forms of infection. During the epidemic in our region we found out that only few studies has mentioned the association of dengue with oligohydramnios. Also association of low birth weight is due to shorter period of gestation and not due to growth restriction. With this background, we conducted the study using two groups, group I with dengue fever and group II uncomplicated. Dengue infection resulted in premature birth, low birth weight, fetal distress, neonatal ICU admissions. Severe thrombocytopenia was one of the striking features, which had led to multiple platelet transfusions. ICU admissions and coagulation abnormalities were very high in dengue complicated group. Oligohydramnios seen during dengue fever was transient and had no impact on pregnancy on follow up. Fetal distress was the major indication for emergency C-Section. Patients, who reported late, had more complications and prolonged hospital stay. This increased the burden on our health services. So our recommendations are early diagnosis, hydration and symptomatic treatment. Our study results will be used to create awareness among the antenatal patients, during antenatal classes and stressing on the morbidity of the disease, because always prevention is better than cure.

**KEYWORDS :** Dengue fever, pregnancy, fetal outcome, maternal outcome

### INTRODUCTION

Dengue is the most rapidly spreading mosquito-borne viral disease of mankind, with a 30 fold increase in global incidence over the last five decades.<sup>1</sup> It is a major public health concern throughout the tropical and subtropical regions of the world.<sup>2</sup> According to World Health Organization (WHO), about 50–100 million new dengue infections are estimated to occur annually.<sup>3</sup> Dengue infection was caused by 4 serotypes of dengue virus (DENV) and primarily transmitted by *Aedes aegypti* or *Aedes albopictus*.<sup>4</sup> For confirmation of dengue infection Government of India recommends the use of ELISA –based antigen detection test NS1 for diagnosing the cases from the first day onwards and antibody detection test - IgM capture ELISA for diagnosing the cases after fifth day of onset of disease.<sup>5</sup> Reported pregnancy specific risks include fetal distress (which may be related to persistent pyrexia), oligohydramnios, preterm birth, caesarean section and maternal haemorrhage. Thrombocytopenia associated with DF may be exacerbated by pregnancy. Statistical analysis is made upon the data and outcomes are measured. Keralites are a health care seeking population, so people usually report early with fever, thereby early diagnosis with prompt intervention and management is possible. We expect that the results from our hospital will create a better awareness on need for prevention of dengue fever among all our antenatal women. Also early detection and access to proper medical care reduces fatality.

### AIMS AND OBJECTIVES:

#### Aim

To assess the clinical profile, maternal and fetal outcome of dengue fever during pregnancy and to compare it with uncomplicated pregnancy.

### OBJECTIVES

#### Primary Objective:

To study any adverse effects on fetus due to dengue fever during pregnancy specifically premature birth, low birth

weight, fetal distress, birth asphyxia, admissions to NICU and to compare with fetus of uncomplicated pregnancy.

#### Secondary Objective:

- To study any adverse effects on mother due to dengue fever during pregnancy and to compare with uncomplicated pregnancy -
- miscarriage, preterm labor, intrapartum and postpartum complications, indication for LSCS.
- thrombocytopenia and bleeding manifestations, platelets transfused during pregnancy and postpartum.
- any other abnormal blood parameters specifically indicating DIC, ARF, liver injury, ICU admissions, and maternal mortality.
- the effect of oligohydramnios due to dengue fever on pregnancy.
- obstetrical and medical complications in late reporting or diagnosis of dengue fever.

### MATERIAL & METHODS

#### Study Area

The study was conducted in the Department of Obstetrics and Gynaecology, at Kerala Institute of Medical Sciences Health, Trivandrum.

#### Study Population

Group I: All antenatal patients with dengue fever in pregnancy irrespective of period of gestation of contracting the disease.

Group II: Equal number of uncomplicated antenatal patients with same gestational age attending antenatal check-ups in the Department of Obstetrics, next to the last dengue positive antenatal patient, irrespective of maternal age and parity. Both were followed up from their antepartum, intrapartum and till their postpartum period in the hospital.

#### Inclusion Criteria:

- All antenatal women with laboratory confirmed dengue virus infection, irrespective of their gestational age.

- Uncomplicated antenatal patient with same gestational age attending antenatal check-ups in the Department of Obstetrics, next to the previous dengue positive antenatal women irrespective of maternal age and parity.
- Women who give consent for the study.
- Exclusion criteria
- All pregnant women with dengue positive, who does not report for follow up.
- Women who refuses for the study.
- Those cases from medical records with any missing data for study proforma.

**OBSERVATION AND RESULTS**

Total number of dengue virus positive patients admitted in our hospital during our study period was 3674 patients. Out of which 47 patients [1.2%] were antenatal. Of which 6 patients had lost follow up and were excluded.

A total number of 82 antenatal patients were included in our study. Total number of deliveries during our study period were 3078, out of which 41 patients were dengue virus positive [1.3%].

Group I included 41 patients who were dengue virus positive.

Group II included 41 uncomplicated antenatal patients, who were selected according to inclusion and exclusion criteria.

**A. Epidemiology**

Out of 41 patients in group I, 7 patients [17%] were in I trimester, 10 patients [24%] in II trimester and 24 patients [59%] in III trimester. Same distribution of patients were taken in group II also, but irrespective of maternal age and parity. Out of 41 cases, maximum number of patients is between 20 to 29 years, 83% [n= 34patients], the Mean ± SD of women was 26.07 ± 3.78 years, the youngest being 19 years and the oldest being 35 years.

Out of these 82 patients, 81 patients delivered. But 1 patient [1.3%] had early pregnancy loss at 9 weeks of gestation. So 82 patients had 81 babies [98.7%]. In group I, 41 patients [100%], 40 delivered [97.58%] and 1 early pregnancy loss [2.4%] and in group II, all 41 [100%] delivered. So total of 81 babies [98.7%].

**B. Clinical Profile Of Dengue Fever During Pregnancy**

**1. Symptoms:**

Of the 41 patients in group I, all patients [100%] had fever. 21 patients presented with fever [51.2%] only, 1 patient [2.4%] presented with rash along with fever, 1 with malena [2.4%], 10 patients with myalgia [24.4%], 8 patients [19.5%] had fever with headache.

**2. Days Of Fever:**

Of these 30 patients [73.2%] presented with fever at <= 5 days and 11 patients [26.8%] presented after 5 days with Mean ± SD, 3.9 ± 1.7.

**3. Diagnosis Of Patients In Group I:**

Of the 41 patients, based on WHO classification 2 patients [5%] were diagnosed as dengue fever [DF], 37 patients [90%] had dengue haemorrhagic fever [DHF] and 2 patients were diagnosed with dengue shock syndrome [5%].

**4. Platelets In Both Group:**

Of which 39 patients belonging to group I [95%] had thrombocytopenia, with 25 patients [59.5%] having severe thrombocytopenia with platelet count less than 50,000. And 14 patients [33.33%] with moderate thrombocytopenia and also only 1 patient [2.4%] belongs to Group II had moderate thrombocytopenia.

**Table-1: Thrombocytopenia Among Both Groups:**

Thrombocytopenia	Group I		Group II		Total		p value
	N	%	N	%	N	%	
< 1 lakh	39	95	1	2	40		<0.001*
< 1 lakh	2	5	40	98	42	51	
Total	41	100	41	100	82	100	

\*statistically significant at 5% level

Comparing thrombocytopenia in both groups, there is statistically significance with p value < 0.001 (Table.1).

**5. Hospital Stay In Both Groups.**

Of the hospital stay among Group I and II, mean days of 9.7 days with SD of 3.4, in Group I and mean days of 3.8 and SD of 1.2 among Group II. This is statistically significance with p value of < 0.001 (Table.2).

**Table-2: Comparison Of Hospital Stay In Both Groups:**

Hospital stay	Group I		Group II	
	Count	Percent	Count	Percent
<5	1	2.4	36	87.8
5-10	22	53.7	5	12.2
10-15	14	34.1	0	0
15-20	4	9.8	0	0
Mean +/- SD	9.7 +/- 3.4		3.8 +/- 1.2	

P < 0.01, statistically significant

**C. Comparison Of Fetal Outcome Of Dengue Fever During Pregnancy With Group Ii (table. 3).**

In Group I, 32 term delivery [80%] and 8 preterm delivery [20%] and in Group II, 39 term delivery [95%] and 2 preterm delivery [5%], with p value of 0.083. Out of 81 babies, 1 baby [2.4%], very low birth weight baby. Majority of the babies were between the range 2.5 – 3.5 kilogram, with Mean ± SD in group II, 2.8 ± 0.5 and in group I, 3 ± 0.4 kilogram.

**Fetal Complications:**

Out of 81 babies, 14 babies [35%] had various foetal complications in group I, but only 2 babies [4.8%] among Group II had complications, with p value <0.01. Among various fetal complications, Fetal distress in group I, contributes to 37.5% [n =6]. Out of 40 babies in Group I, 13 Babies [33%] got admitted in NICU and 2 babies from Group II, which is statistically significant at 5% level. Of the 40 babies in group I, 2 babies [5%] had birth asphyxia, where no babies were asphyxiated among group II, which is not statistically significant when compared, with p value of < 0.463.

**Table- 3: Overall primary outcome among group I and group II**

Outcome	Group I		Group II		Total		P value
	N	%	N	%	N	%	
<b>Birth</b>							
Preterm birth	8	20	2	5	10	12	0.083
Term	32	80	39	95	71	88	
<b>Birth weight</b>							
<2.5	9	22.5	1	2	10	12	
>2.5	31	77.5	40	98	71	88	0.016*
<b>NICU Admission</b>							
Yes	13	33	2	5	15	18.5	0.003*
No	27	67	39	95	66	81.4	
<b>Fetal complications</b>							
Yes	14	35	2	4.8	16	20	<0.01*
No	26	65	39	95.2	65	80	
<b>Birth asphyxia</b>							
Yes	2	5	41	100	43	53	0.463
No	38	95	0	0	38	47	

\*statistically significant at 5% level

**D. Maternal Outcome Of Dengue Fever During Pregnancy.**

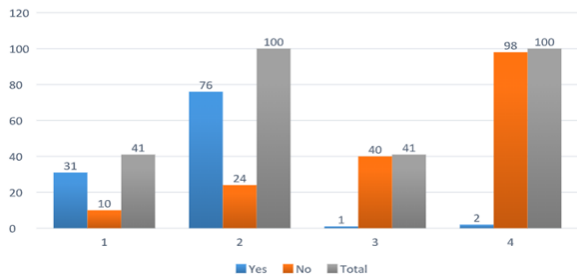
Of the 41 patients in Group I, 19 patients [46%] had no coagulation abnormality, but 22 patients [54%] had

coagulation abnormality. Of the 41 patients in Group I, 25 patients [61%] had ICU admission, but 16 patients [39%] were admitted in wards. Of the 41 patients in Group I, 21 patients [51%] had platelet transfusion, but 20 patients [49%] had no transfusion. Among the cases 4 patients [10%] had hepatomegaly, 9 patients [22%] had hepatomegaly with ascites, and 7 patients [17%] had ascites. 21 patients [51%] had no ultra-sonogram findings. 31% [n =13] had hepatomegaly and 39% [n=16] had ascites. Out of 41 patients in Group I, 31 patients [76%] had various complications, whereas only 1 patient [2%] had complication in Group II, which is statistically significant, p value < 0.001 (Table. 4)

**Table-4: Frequency of maternal complications in both groups**

Maternal complications	Group I		Group II		Total		P value
	N	%	N	%	N	%	
Yes	31	76	1	2	32	39	<0.001*
No	10	24	40	98	50	61	
Total	41	100	41	100	82	100	

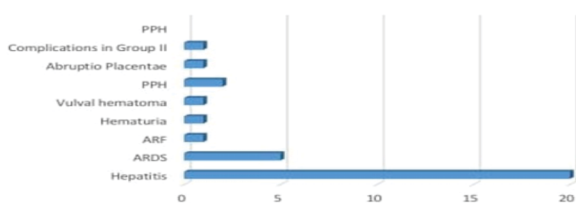
**MATERNAL COMPLICATIONS**



**Figure-1: Frequency of maternal complications**

Of the various complications dengue hepatitis contributes to 62.5% [n=20], next is Acute Respiratory Distress Syndrome contributing to 15.65% [n=5] (Figure. 2)

**MATERNAL COMPLICATIONS**



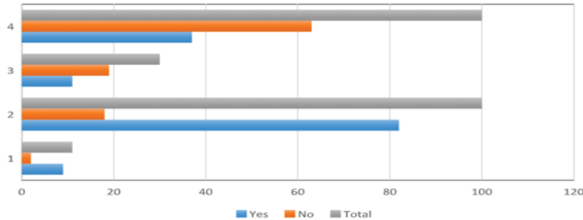
**Figure. 2 Various maternal complications in both groups**

From the Table- 5, 11 patients [37%] had complications who presented within 5 days and 9 patients [82%] had complications who presented after 5 days, with p value 0.027.

**Table- 5: Complications with respect to presentation on fever days**

Complicatons	Group I		Group II		Total		P value
	N	%	N	%	N	%	
Yes	9	82	11	37	20	49	0.027*
No	2	18	19	63	21	51	
Total	11	100	30	100	41	100	

**FEVER - COMPLICATIONS**



**Figure- 3: Complications with respect to presentation on fever day**

Obstetric complication in group I, 19 patients [46%]. In group I, preterm labour accounts for 21% [n=4] and oligamnios accounts for 36.8% [n= 7], PPH in 2 patients [10.5%] and 1 patient [5.2%] had APH. While in Group II, PROM accounts for majority, 40% [n=4] and breech 20% [n=2]. In group I, C-section rate [36.5%] and in group II, C- section rate [24.3%]. Of which foetal distress forms the major indication with n= 9 [36%].

**DISCUSSION**

Dengue in pregnancy requires early diagnosis and treatment.<sup>6</sup> Total number of dengue virus positive patients admitted in our hospital during our study period was 3674 patients, out of which 47 patients [1.2%] were antenatal. Total number of deliveries during our study period were 3078, out of which 41 patients were dengue virus positive [1.3%].

**Epidemiology -**

Our study included 41 confirmed cases of dengue fever and 41 cases of uncomplicated patients. Majority of our patients 24 patients [59%] were in III trimester, similar to the study by Kanakalatha et al.<sup>7</sup> Our study had only 1 early pregnancy loss [13%] in a patient with dengue fever where majority of other studies showed more number of early pregnancy losses. 38 We had 2 cases with Dengue Shock Syndrome [5%]. Also our study had 37 patients [90%] with Dengue hemorrhagic fever, compared to the study by Lalitha et al<sup>8</sup>, 32 patients [78%].

**Clinical Profile -**

In our study the presentation was mostly fever alone [51.2%], similar to the study by Lalitha et al<sup>8</sup> where fever alone was the presenting complaint [83%], whereas in majority of other studies patient's major presentation was with fever and myalgia. One women, in our study presented with malena along with fever. Majority of our patients presented before 5 days from the onset of fever, [73.2%]. We also looked into whether early reporting reduced the overall complications. In those who presented after 5 days, 82% [n=9] had complications, whereas only 37% patients [n =11] had complications when presented within 5 days of fever. None of the other studies compared the complications with respect to fever days. Kanakalatha et al<sup>7</sup> carried out a prospective observational study where thrombocytopenia was found in 86.3% patients, of which 2.7% patients had Platelet counts below 20,000 cells/mm<sup>3</sup> and 4.1% patients required platelet transfusions.

In our study 25 patients [59.5%] among group I, had severe thrombocytopenia, of which 1 patient had platelet count less than 5000cu.mm. The study by Chitra TV et al 45 thrombocytopenia was the most striking feature, [44%]. Only one patient from group II had platelet less than 1 lakh. There were no studies to compare the hospital stay. In our study mean days of hospital stay was 9.7 days. 22 of our patients [54%] had coagulation abnormality. All those patients had severe thrombocytopenia with raised partial thromboplastin time; with hematuria in one patient. She presented at 38 weeks, with platelet count of 6000 cells per mm<sup>3</sup>. She was transfused with 4 SDPs and 16 RDPs were given and took her for emergency LSCS due to obstetric indication.

In group I, 21 patients [51%] were transfused with platelets, compared to Lalitha et al<sup>8</sup> [30%]. In our study, platelet transfusion requirements were higher. Because, 18 of our patients had platelets < 20,000 cu.mm, compared to only 5 and 7 patients in the study by Kanakalatha et al<sup>7</sup> and Chitra TV et al<sup>9</sup> respectively. Our study analysed the number of ICU admissions. In view of pregnancy, severe thrombocytopenia and platelet transfusions, 25 patients [61%] got admitted in the ICU which further increased the morbidity of the disease. But none of the patients in study by Lalitha et al<sup>8</sup> had ICU admissions.

**Maternal Complications -**

Maternal complications in our study were severe compared to other studies. Overall number of patients with maternal complications in group I was 31/41, [76%], while 1 patient [2.4%] in group II had complication. Among the complications, Dengue hepatitis was the most common [62.5%], followed by ARDS in 5 patients [16.1%], which consisted of 2 patients with pulmonary oedema, 2 patients with pleural effusion and 1 patient with pneumonia. 1 patient [3.7%] had acute renal failure due to hypotension. Supportive management were given for the patient with renal shutdown.

None of the patients in group II required platelet transfusions, had coagulation abnormality or ICU admissions except one patient with platelet < 1 lakh, who was diagnosed as Gestational Thrombocytopenia but pregnancy was otherwise uneventful. She was enrolled at 24 weeks as an uncomplicated antenatal women. From 36 weeks there was a gradual fall in her platelet count.

She was evaluated and diagnosed as gestational thrombocytopenia. At 39 weeks her platelet count was 96,000 cells/ mm<sup>3</sup>. Her intrapartum and postpartum period were uneventful. She had a full term vaginal delivery. Delivered a full term baby of weight 3 kg. Another study by Basurko C et al<sup>10</sup>, the principal maternal consequences were: premature labour (41%), premature birth (9.6%), haemorrhage during labour (9.3%: 5 cases) and retro-placental haematoma (1.9%: 1 case).

In our study among the various obstetric complications that is 46% patients [n=19] in group I, among the complications, preterm labour was seen in 21% and oligamnios 36.8% were more common. A total of 7 patients [36.8%] had oligamnios, of which 4 patients [56.4%] in group I had transient oligohydramnios on follow up scan and it had no impact on pregnancy. In group II, 1 patient had oligamnios, but she was taken immediately for C- section in view of severe IUGR and oligamnios. Other complications were PPH in 2 patients [10.5%], in group I and were managed by Bakri balloon. In group II, 1 patient [5.2%], with PPH was medically managed. In group I, 1 patient [5.2%] had APH – Grade II Abruptio and she was taken for emergency C- section.

In group II, among the obstetric complications, 1 patient [10%] had PPH, 4 patients [40%] had pre-labour rupture of membranes, compared with 5.8% of patients with PROM in group I.

All the emergency LSCS in group I were done on patients presented with dengue fever in III trimester, with the major indication being fetal distress [67%] increasing the CS rate in group I to 37.5%.

**Fetal Complications -**

In our study we had 30% preterm birth, of which, 8 patients [20%] in group I, [Kanakalatha et al<sup>7</sup> - 22% preterm birth]. Low birth weight in our study group were 10 new-born, out of which 9 [22.5%] were in group I [Kanakalatha et al<sup>7</sup> - 27.3% patients]. The average birth weight of babies in group I was 2.8kg and group II was 3kg. The infants in our study who had low birthweight were preterm, suggesting that these infants were low birth weight due to a shorter duration of gestation, rather than impaired fetal growth in utero.

Total NICU admissions were 15, with 13 babies representing group I [33%], whereas in the Kanakalatha et al<sup>7</sup>, it was 19 new- borns [28.7%]. In our study 16 babies had various fetal complications, out of which 14 babies were in group I. 6 fetuses [37.5%] had fetal distress during dengue fever and MSAF in 5 patients. In the study by Kanakalatha et al<sup>7</sup> 11 patients had MSAF. Our study had 2 birth asphyxia. No neonatal deaths.

**CONCLUSION****Primary Outcome**

1. Dengue infection resulted in premature birth, low birth weight, fetal distress, significant number of various fetal complications and neonatal ICU admissions, when compared to uncomplicated group.

**Secondary Outcome**

1. Severe thrombocytopenia was one of the striking features, which had led to multiple platelet transfusions. ICU admissions and coagulation abnormalities were also very high in dengue complicated group.
2. Maternal and obstetric complications were significantly high when compared to the uncomplicated group.
3. Oligohydramnios seen during dengue fever was transient and it had no impact on pregnancy on follow up.
4. Fetal distress was the major indication for emergency C- Section during dengue fever.
5. Patients, who reported late, had more complications and prolonged hospital stay. This increased the burden on our health services and economies.

**Recommendations**

1. Early diagnosis and maintenance of hydration and symptomatic treatment will avoid haemorrhagic complications.
2. Availability of platelets and blood products is very essential for treating complications of dengue fever.
3. Dengue fever is a preventable disease. So preventive measures should be taken to avoid the morbidity and the mortality.
4. Our study results will be used to create awareness among all the antenatal patients, during antenatal classes and stressing on the morbidity of the disease, always prevention is better than cure.

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