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Impact of Dengue Fever on Pregnancy Outcomes: A Prospective Observational Study

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ABSTRACT

Dengue in pregnancy has a profound negative impact on both maternal and fetal outcomes, leading to increased maternal and neonatal mortality. **Objective:** To evaluate the maternal and fetal outcomes in pregnant women affected by dengue fever. **Methods:** A prospective observational study was carried out at Niazi Welfare Foundation Teaching Hospital, Sargodha. Non probability convenient sampling technique was used to collect data from 36 pregnant women enrolled after confirming dengue infection through NS-1 and IgM/IgG tests. Maternal and fetal outcomes were monitored throughout pregnancy, labor, and the postpartum period. Data was analyzed using SPSS version 26.0 and presented in frequency and percentages. **Results:** Fetal complications observed in this study were, preterm delivery in 16 cases (44.4%), term delivery in 14 cases (39%), fetal growth restriction in 8 cases (22%), and intrauterine death in 6 cases (16.6%). Maternal outcomes included, postpartum hemorrhage in 6 cases (16.6%), 7 infected women (19.4%) were admitted to the ICU, and two mothers (5.5%) died. The frequency of neonatal admission to the NICU was 30.5%. **Conclusions:** Dengue infection in pregnancy is linked to heightened risk of maternal and perinatal morbidity and mortality. Timely clinical interventions are necessary to avoid devastating consequences.

INTRODUCTION

Dengue is a highly prevalent viral vector-borne disease globally, affecting nearly 390 million people annually, with approximately 96 million cases being symptomatic [1]. The dengue virus (DENV) is primarily transmitted by female mosquitoes of the Aedes aegypti species, Aedes albopictus play a secondary role in its transmission [2]. Pregnancy, being an immune-compromised state heightens the risk of dengue fever, particularly in highly endemic regions [3]. Dengue in pregnancy is associated with an increased risk of preterm delivery, low birth weight, and hemorrhage affecting both the mother and fetus [4]. However, timely and adequate rehydration therapy, administered either orally or intravenously, alongside blood and blood product transfusions, has been shown to significantly improve maternal outcomes [5]. Dengue during pregnancy has a profound negative impact on both maternal and fetal outcomes, with maternal mortality rates reaching as high as 15.9% [6]. Complications such as preterm labor and postpartum hemorrhage contribute significantly to maternal and neonatal morbidity [7]. To mitigate these risks, effective vector control strategies should be prioritized [8]. In dengue fever a rapid decline in platelet count is common, active intervention are necessary if the patient is in labor or experiencing a bleeding disorder [9]. Existing literature indicates a higher incidence of preterm deliveries, low birth weight infants,

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preeclampsia, and increased rates of cesarean sections in cases of dengue fever during pregnancy [10]. A study reported early delivery in 23.5% of cases and postpartum hemorrhage in 17.8% [11]. Among pregnant women infected with the dengue virus, premature birth occurred in approximately 10% of pregnancies, and low birth weight was observed in 18% of cases [12]. Perinatal complications included six neonatal intensive care unit admissions and one neonatal death [13]. Given these poor obstetric outcomes, early admission and prompt management of dengue in pregnancy are essential to mitigate risks [14]. To expand our understanding of the clinical profile, as well as maternal and fetal outcomes of dengue fever in pregnancy, and to investigate these issues in greater depth, a descriptive observational study was conducted.

Dengue fever, affecting approximately 390 million people annually worldwide, poses a disproportionately severe threat to pregnant women due to the inherent immunosuppression of pregnancy, which heightens susceptibility to viral infection and amplifies the risk of devastating maternal and fetal complications including preterm delivery, hemorrhage, fetal growth restriction, and death. Pakistan, situated in a highly endemic dengue region with recurrent seasonal outbreaks, faces a particularly acute burden of dengue in pregnancy, yet obstetric-specific data from local hospital settings documenting the full spectrum of maternal and fetal outcomes remain sparse and methodologically limited. While international literature reports maternal mortality rates as high as 15.9% and substantial neonatal morbidity associated with dengue in pregnancy, locally contextualized evidence from Pakistani tertiary care centers is insufficient to guide clinical protocols, risk stratification, or public health interventions. This study therefore aimed to prospectively evaluate the maternal and fetal outcomes in dengue-confirmed pregnant women presenting to a teaching hospital in Sargodha, covering complications from early pregnancy through the postpartum period.

METHODS

A prospective observational study was conducted at Niazi Welfare Foundation Teaching Hospital, Sargodha, from September 2023 to November 2024. Sample size for study was calculated on open Epi software based on Intrauterine fetal mortality (4%) from a previous research [16] at 95% confidence interval and 6.4% margin of error. Ethical approval for the study was obtained from the Institutional Review Board under approval number NM&DC-IRB-54 and Letter Ref No: IRB/NM&DC/586. A written informed consent was taken from all participants and they were informed about all the risk and benefits. Non probability consecutive sampling technique was used in this study. During study duration, all pregnant women presenting to the OPD, Emergency, and Labor Room with fever were screened for dengue. Those exhibiting dengue symptoms and testing positive through laboratory investigations for dengue NS1(non-structural protein), IgM, or IgG antibodies were enrolled in the study. Relevant information was collected and documented in a structured Performa and Excel sheet. Symptoms of dengue including fever, myalgia, arthralgia, headache, retro-orbital pain, nausea, vomiting, and abdominal pain were recorded in Performa. Dengue-related parameters, including thrombocytopenia, hemoglobin levels (Hb%), total leukocyte count (TLC), and elevated ALT and AST levels, were recorded for analysis. Maternal outcomes observed included miscarriages, preterm birth, fetal growth restriction, placental abruption, stillbirth, mode of delivery (SVD/LSCS), postpartum hemorrhage (PPH), and the need for blood and platelet transfusions. Additional data such as age, parity, and gestational age were also documented. Pregnant women with known cases of ITP or fever caused by COVID-19, malaria, typhoid, or other infections were excluded from the study. Data were compiled in an Excel sheet and analyzed using SPSS version 26.0 and presented as frequency and percentage.

RESULTS

During the study period, a total of 36 pregnant women diagnosed as dengue positive through either Non-Structural Antigen 1 (NS-1 Ag) or dengue IgM and IgG tests were included. The mean age of the women was 24 ± 5.3 years, with an age range of 18 to 39 years. The majority of the pregnant patients with dengue were multiparous (24 cases) while 12 cases were primigravida. Regarding gestational age, 2 women (5.4%) were in their first trimester, 2 women (5.4%) were in the second trimester, and 32 women (86.4%) presented in the third trimester. The majority of the cases tested positive for dengue NS-1, IgM, and IgG (Table 1).

Table 1: Maternal Characteristics of Dengue Infected Pregnancy

Age	24 ± 5.3 (18-39) Years
Parity	
Primigravida	12 (33%)
Multigravida	24 (67%)
Gestational Age	
1st Trimester	2 (5.4%)
2nd Trimester	2 (5.4%)
3rd Trimester	32 (86.4%)
Dengue serology	
Dengue IgM +VE	27 (75%)
Dengue IgM -VE	9 (25%)
Dengue IgE +VE	31 (86%)
Dengue IgE -VE	5 (14%)

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NS-1 Positive	19 (53%)
NS-1 Negative	12 (33.3%)
NS-1 Not Checked	5 (13.7%)

The clinical presentations in dengue patients included fever (92%), myalgia (53%), headache (69%), exanthem/rash (22%), nausea (25%), and vomiting (19.4%). Thrombocytopenia was observed in 30.5% of the pregnant women infected with dengue (Table 2).

Table 2: Clinical Manifestations of Dengue Fever in Pregnant Women

Clinical Manifestations	Frequency (%age)
Fever	33 (92%)
Myalgia	19 (53%)
Headache	25 (69%)
Exanthems	8 (22%)
Vomiting	7 (19.4%)
Nausea	9 (25%)
Conjunctivitis	5 (14%)
Arthritis	4 (11%)
Leucopenia	2 (5.5%)
Thrombocytopenia	11 (30.5%)
Retro-orbital pain	2 (5.5%)

The feto-maternal outcomes recorded in the study were as follows: preterm delivery in 16 cases (44.4%), term delivery in 14 cases (39%), fetal growth restriction in 8 cases (22%), and intrauterine death in 6 cases (16.6%). Regarding the mode of delivery, 8 women (22%) had a vaginal birth, while 14 women (39%) underwent a cesarean section (LSCS). Postpartum hemorrhage occurred in 6 cases (16.6%), which was managed with blood transfusions and fresh frozen plasma. Platelet concentrate was administered to those with a platelet count below 50,000/mm^3. 1 pregnant woman with dengue underwent obstetric hysterectomy. Additionally, 7 infected women (19.4%) were admitted to the ICU, and two mothers (5.5%) died. The frequency of neonatal admission to the NICU was 30.5% (Table 3).

Table 3: Feto-Maternal Outcomes in Pregnant Women with Dengue

Variables	Frequency (%)
Preterm Delivery	16 (44.4%)
Term Delivery	14 (39%)
Fetal growth restriction	8 (22%)
Fetal distress	7 (19.4%)
Intra uterine death	16 (16.6%)
SVDs	8 (22%)
LSCS	14 (39%)
Miscarriages	2 (5.5 %)
Ectopic pregnancy	2 (5.5 %)
Postpartum hemorrhage	6 (16.6%)
Obstetric hysterectomy	1 (2.7%)
Maternal admission to ICU	7 (19.4%)
Neonatal admission to NICU	1 (30.5%)
Maternal death	2 (5.5%)

DISCUSSION

Dengue fever and other infections can easily affect pregnant women at any stage of pregnancy, as pregnancy is an immunosuppressive state, making it a significant risk factor for dengue. In this study, 36 pregnant females were diagnosed with dengue, average age of patients in current study was 24 ± 5.3 years, with a range from 18 to 39 years. This age range was lower than that observed in the study [15], but comparable to many studies in the literature, reflecting variations in the age of marriage and childbearing across different countries due to sociocultural and developmental factors. The period of dengue infection during pregnancy plays a crucial role in determining the type and severity of complications. If dengue fever occurs during the first trimester, there is an increased risk of abortion. In contrast, if dengue infection occurs in the third trimester, it is associated with a higher risk of low birth weight, preterm labor, and vertical transmission of the virus. In current study, the frequency of dengue infection was 5.4% in the first trimester, 5.4% in the second trimester, and 86.4% in the third trimester, which is consistent with previous studies [16]. However, some studies have reported a higher frequency of infection in the first trimester [17]. Additionally, another study found a 40.9% dengue infection rate in the second trimester [18]. In present study, the maternal and fetal outcomes of pregnant women suffering from dengue were examined. Preterm delivery occurred in 44.4% (16) of cases, term delivery in 39% (14), fetal growth restriction in 22% (8), fetal distress in 19.4% (7), and intrauterine death in 16.6% of patients. A high frequency of threatened preterm labor was also observed, with similar findings in other studies [19]. Impaired placental circulation, endothelial damage, and increased vascular permeability may contribute to intrauterine death (IUD) and fetal growth restriction. Early diagnosis of dengue infection, along with specific management, especially in the third trimester, can improve outcomes. Timely intervention may help prevent preterm labor, fetal growth restriction, and intrauterine death, ultimately improving maternal and fetal health. Among the 36 pregnant women in the study, 8 (22%) had a vaginal birth, and 14 (39%) underwent a cesarean section. The increased cesarean section rate may be attributed to fetal distress and the acute phase of infection, which aligns with findings from various studies in the literature [20]. In current study, postpartum hemorrhage (PPH) occurred in 16.6% of cases (6 women), with 1case requiring obstetric hysterectomy due to severe PPH. Critical conditions in mothers led to ICU admissions for 7 (19.4%) women, and 2 (5.4%) maternal

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deaths were recorded. In comparison, the study reported ICU admissions for 32% of mothers and a maternal mortality rate of 14% [16]. A systematic review and meta-analysis found that dengue virus infection in pregnant women was associated with increased maternal mortality and neonatal deaths when compared to pregnant women without dengue [21]. A research study reported perinatal complications, including six nursery admissions and one neonatal death [15], highlighting the need for early admission and prompt management due to poor obstetric outcomes. In current study, most pregnant patients required clinical management during the third trimester and benefited from multidisciplinary care. Similar observations were made in other studies [22]. Current study provides valuable insights for clinical implications because timely intervention along-with proper fluid management and careful monitoring of the disease can significantly enhance maternal and fetal outcomes in pregnancy. Implementation of vector control strategies is crucial to reduce maternal and fetal morbidity and mortality. This was a single center observational study. There is need for large scale studies in other regions to enhance generalizability.

This study was constrained by its small sample size of only 36 dengue-positive pregnant women, single-center design at a tertiary care hospital in Sargodha, and relatively short observation window, all of which substantially limit the statistical power and geographic generalizability of findings across Pakistan's diverse dengue-endemic regions. The use of non-probability consecutive sampling and the exclusion of women with co-infections or immune thrombocytopenia may have introduced selection bias and limited the representativeness of the study population. Additionally, the absence of a control group of dengue-negative pregnant women precluded direct comparative analysis of outcome risks attributable specifically to dengue infection. Future research should employ multicenter, prospective cohort designs with larger sample sizes spanning multiple dengue seasons across both urban and rural settings in Pakistan, incorporating matched non-infected comparison groups to enable robust risk quantification. Longitudinal neonatal follow-up to assess long-term developmental outcomes, alongside investigation of trimester-specific disease severity and the impact of early multidisciplinary intervention protocols, would provide the comprehensive evidence base needed to develop nationally standardized dengue-in-pregnancy management guidelines.

CONCLUSIONS

Dengue fever during pregnancy is linked to adverse outcomes, including stillbirth, preterm delivery, fetal growth restriction, postpartum hemorrhage, maternal ICU admission, and increased maternal and neonatal mortality. Therefore, it is regarded as a high-risk condition requiring specialized management, timely intervention, and vigilant monitoring to prevent complications and achieve better outcomes. Emphasis on early detection and timely management is critical in reducing the morbidity and mortality associated with dengue fever for both mother and fetus.

Authors' Contribution

Conceptualization: MZ
Methodology: MZ, RAK, DES
Formal analysis: SA, MKM, SA
Writing and Drafting: MKM, MZ, RAK, DES
Review and Editing: MKM, MZ, RAK, DES

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

The authors declare no conflict of interest.

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