

Dengue and Pregnancy: Epidemiological, Clinical, Therapeutic and Prognostic Aspects at the University Regional Hospital Center of Ouahigouya (URHC/OHG) from July 1 to December 31, 2023

Ouédraogo Issa^{1*}, Kientoré Sibraogo², Sib Sansan Rodrigue¹, Sawadogo Yobi Alexis², Sanogo Moussa², Yiho Wendpasamdé Tychique¹, Millogo Traore François Danielle²

¹Department of Obstetrics and Gynecology, Université Lédéa Bernard Ouédraogo, Mèra, Burkina Faso

²Department of Obstetrics and Gynecology, Joseph Ki Zerbo University, Ouagadougou, Burkina Faso

Email: oued_issa2002@yahoo.fr

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Abstract

Objective: To describe the epidemiological, clinical, therapeutic and prognostic aspects of dengue occurring during pregnancy at the University Regional Hospital Center of Ouahigouya from July 1 to December 31, 2023. **Methodology:** This was a retrospective, cross-sectional, descriptive study from July 1, 2023 to December 31, 2023. Pregnant women with positive dengue serology were included in the study by the rapid diagnostic test detecting non-structural antigen 1 (Ag NS1) and immunoglobulins M and G (IgM, IgG) during the study period. **Results:** A total of 51 cases were identified. The mean age was 25.78 ± 7.57 years, with extremes of 16 and 43 years. Patients were educated in 50.98% of cases and housewives in 80.39%. However, pregnancies in the 3rd trimester accounted for 43.14%, and those presumed to be full term for 25.49% of cases. Patients were multigestational, multiparous in 58.82% and 37.25% of cases respectively. IPT was performed in 82.35% of cases. Twenty-eight (28) patients presented with very early infection, six (06) with primary dengue and seven (07) with secondary dengue. The proportion of group A dengue was 47.06%, group B and group C 37.25% and 15.69% respectively. All patients presented with fever. The major maternal complications were anemia, premature delivery, hemorrhage and maternal death in 17.65%, 7.84%, 5.88% and 5.88% respectively. Dengue caused induced prematurity and fetal death in 15.69% and 3.92% respectively. **Conclusion:** Dengue remains a reality in

pregnant women. It is responsible for maternal-fetal complications that can be extremely serious and life-threatening.

Keywords

Dengue-Pregnancy-Evolution-Prognosis-(URHC/OHG)

1. Introduction

Dengue fever is widespread in all tropical and subtropical regions. It is a significant public health problem, with around one hundred million cases each year responsible for tens of thousands of deaths worldwide [1].

Dengue during pregnancy is thought to be responsible for high perinatal mortality and morbidity [2]. It carries a risk of haemorrhage for the mother and premature delivery, contributing to maternal morbidity and mortality [3]. It is also often responsible for complications such as abortion, malformations and fetal death [4].

In French Guiana, Carles *et al.* recorded 172 pregnant women who presented with a dengue-like syndrome, including 35 in the first trimester, 62 in the second and 75 in the third. Of these, 38 cases of dengue were biologically confirmed. The maternal consequences observed were a threat of premature delivery in 55% of cases, a case of severe haemorrhagic complication during Caesarean section, and the occurrence of a retroplacental haematoma. Fetal consequences included prematurity in 22% of cases, 5 cases of fetal death in utero, 4 cases of acute fetal distress during pregnancy and 2 cases of maternal-fetal transmission [2].

In Burkina Faso, several cases of dengue fever have been reported in 1925, 1980, 2000, 2013, and recently, an outbreak in 2016, 2017, and 2023. In 2013, 113 suspected cases of dengue fever were reported, including 33 probable cases and 22 confirmed cases. In 2016, 2526 suspected cases, including 1561 probable cases, and 72 confirmed cases, were reported. However, very few studies have focused on dengue fever and pregnancy. Lompo *et al.* found 56 cases of dengue and pregnancy using the rapid diagnostic test. According to the WHO classification, 38% of cases were in group B, 32% in group A and 30% in group C [5]. Fetal complications were: 12.5% fetal death in utero, 8.9% abortion, 7.1% acute fetal distress, 5.35% fetal malformations, 5.35% low birth weight, 5.35% prematurity, 1.78% intrauterine growth retardation, 17.85% mother-to-child transmission.

No study has been conducted on the subject at the University Regional Hospital Center of Ouahigouya. This justified the present study, which aimed to describe the epidemiological, clinical, therapeutic, and prognostic aspects of dengue during pregnancy to improve the quality of its management.

2. Methodology

This was a retrospective descriptive study with retrospective data collection from

July 1 to December 31, 2023. Pregnant women with positive dengue serology were included in the study by the rapid diagnostic test detecting non-structural antigen 1 (Ag NS1) and immunoglobulins M and G (IgM, IgG) during the study period. The combination of NS1 and IGM in the RDT achieves a sensitivity of 78.4% and a specificity of 97.1%.

Virus detection by viral culture or by genome detection using molecular biology techniques (RT-PCR) is not available in our facility. This technique is only done in research laboratories.

Patients with the following criteria were not included in the study: inoperable records; pregnant women with another hemorrhagic fever; and women with another pathology.

The study variables were:

- sociodemographic variables (age, gender/parity, occupation, marital status, level of education);
- clinical variables (history, reason for consultation, risk factors, physical examination results);
- paraclinical variables (RDT for dengue AgNS1-IgM/IgG, dengue RT-PCR);
- therapeutic data (administration of analgesics, antipyretics, vitamin therapy, blood transfusion, hemodialysis);
- evolutionary and prognostic variables (maternal, fetal and perinatal complications).

Data were collected from the patients' medical records, using forms containing the various study headings.

Data were entered and analyzed on a microcomputer using Microsoft WORD 2019® and EPI-INFO® version 7.2.5.0. Graphics were produced using Microsoft EXCEL® 2019.

The study respected the rules of medical ethics and deontology. The study received approval from the hospital's ethics committee. Each patient involved was treated confidentially and anonymously.

3. Results

A total of 51 cases of dengue fever were collected during our study period.

3.1. Socio-Demographic Characteristics

Table 1 shows the various socio-demographic characteristics.

Table 1. Distribution by socio-demographic characteristics (n = 51).

Characteristics	Number	Percent
Years old		
< 20 years old	14	27.4
[20-30]	21	41.2
[30-40]	13	25.5

Continued

≥ 40 years old	03	05.9
Marital status		
Married	49	96.1
Single	02	03.9
Residence		
Urban	35	68.6
Rural	16	31.4
Level of education		
No schooling	25	49
Primary school	07	13.7
Secondary school	19	37.3
Profession		
Housewife	41	80.4
Trader	4	7.8
Public servant	2	3.9
Pupil	2	3.9
Others	2	3.9

3.2. Obstetrical History

The various patient obstetrical histories are shown in **Table 2**.

Table 2. Distribution of patients by history (n = 51).

Characteristics	Number	Percent
Gestite		
Primigeste	12	23.5
Paucigeste	06	11.8
Multigeste	30	58.8
Large multigeste	03	05.9
Prenatal care		
< 4 Prenatal care	33	64.7
≥ 4 Prenatal care	18	35.3
Care received during prenatal care		
tetanus serum/tetanus vaccine	42	82.4
intermittent preventive treatment	40	78.4
Folic acid iron supplementation	39	76.5
Parasite prophylaxis	20	39.2
long-lasting impregnated mosquito net	06	11.8

Continued

Pregnancy trimester		
1st trimester	10	19.6
2nd trimester	19	37.3
3rd trimester	22	43.1
Term of pregnancy		
Not full term	32	62.7
Full term	19	37.3

3.3. Clinical and Biological Aspects

The main reasons for consultation were: fever (94%); headache (84.3%); anorexia (51%); and a severe allergic reaction (51%).

These different clinical and paraclinical manifestations are reported in **Table 3**.

Table 3. Distribution of patients by clinical and laboratory characteristics (n = 51).

Characteristics	Number	Percent
Clinic signs		
Recent fever	48	94.1
Headache	43	84.3
Anorexia	26	51
Myalgias/arthralgias	22	43.1
Bleeding	18	35.3
Asthenia/lethargy	15	29.4
State of shock	6	11.8
Respiratory distress	5	09.8
Disturbed consciousness/convulsions	4	07.8
Oligoanuria	3	05.9
Biological signs		
Thrombocytopenia	20	39.2
Severe anemia	11	21.6
High hematocrit	2	03.9

Serological profile of patients

Early dengue fever was found in 54.90% of cases (28/51), primary dengue fever in 11.76% (6/51) and secondary dengue fever in 13.76% (7/51).

Table 4 shows the distribution of patients by serological profile.

Table 4. Distribution of patients by serological profile (n = 51).

Serology	Number	Percent
Only AgNS1 +	28	54.9

Continued

Only AgNS1 + and IgM+	5	9.8
Only AgNS1 + et IgG+	3	5.9
AgNS1+ IgM+ IgG+	2	3.9
Only IgM +	6	11.8
Only IgM+ and IgG+	3	5.9
Only IgG+	4	7.8

3.4. Diagnosis

Dengue without warning signs was selected in 47.1% (24/51) of cases, with warning signs in 37.2% (19/51) and severe dengue in 15.7% (8/51).

3.5 Therapeutic Information

Rest and oral rehydration were recommended for all patients diagnosed with dengue without warning signs, with observation for at least 48 hours.

Hospitalization and rehydration were indicated in all patients diagnosed with dengue fever with warning signs. Symptomatic treatment with antispasmodics, antianemics, vitamin C, hemostats and nasal tamponade was associated with most patients.

Hospitalization, vascular filling and blood transfusion (based on RGC alone or combined with FFP) were indicated for patients diagnosed with severe dengue fever. In addition, 3 patients underwent hemodialysis.

3.6 Evolution/Prognosis

Maternal complications such as anemia, premature delivery and hemorrhage were reported in 17.7%, 7.8% and 5.9% respectively. Three cases of maternal death were recorded, representing a case-fatality rate of 5.9%.

As for fetal complications, induced prematurity was observed in 15.69% (8/51) of cases, and fetal death in 3.92% (2/51).

4. Discussion

Our retrospective study has several limitations and biases: missing data, small sample size, short duration of the epidemic, difficulty in determining cause and effect.

We collected 51 cases of dengue fever in our study. Basurko *et al.* [6] reported 38 cases in French Guiana in their series, while Carles *et al.* [2] reported 27 cases in Martinique. In 2023, Lompo YD *et al.* reported 56 patients in this study based on the rapid diagnostic test.

These figures reflect the variation in incidence between endemic regions, influenced by climatic and socio-economic factors.

The mean age was 25.78 ± 7.57 years, with extremes of 16 and 43 years. In their study, Suresh *et al.* [7] reported a mean age of 24.8 years, while Sharma *et al.* [8]

observed a mean age of 27 years. The youthfulness of our population would explain this average age in our study and correspond to the peak of fertility in our regions.

Most women lived in urban areas, accounting for 68.63% of cases. Shah *et al.* [9] found that 72% of pregnant women lived in urban areas in a study in India. This indicates that dengue transmission is mainly urban, probably due to population density and conditions conducive to the proliferation of *Aedes aegypti*, the dengue vector. This population density has been exacerbated by the insecurity linked to armed groups in our area and the massive influx of internally displaced people.

In the series, the patients were educated in 50.98% of cases, with 37.25% having a secondary level of education. In a Brazilian study, Ximenes *et al.* [10] reported that 65% of pregnant women with dengue fever had secondary education.

The lower school enrolment rate in our study could be explained by the low rate of access to education for young girls in our context. The level of education would also influence the understanding of preventive measures against dengue fever, increasing the high frequency among the unschooled.

Forty-six (46) women received antenatal care, representing 90.2% of cases. The average number of SPNs performed was 3, with extremes of 1 and 7 SPNs. Sharma *et al.* [8] found that 85% of patients received antenatal care. Rigorous antenatal care appears to correlate with better health outcomes, which may explain the relatively successful case management in the study.

Pregnancies in the 3rd trimester predominated in 43.14% of cases. Carles *et al.* [3] reported a predominance of third-trimester infections in their study. Dengue fever in the third trimester is of particular concern as it is associated with a higher risk of obstetric complications, including preterm labor and hemorrhage.

39.21% of cases had co-infection with malaria and dengue fever. Singh *et al.* [11] found a dengue-malaria co-infection rate of 55% in a study in sub-Saharan Africa. Malaria-dengue co-infection can exacerbate clinical symptoms and complicate treatment, underscoring the importance of close surveillance in endemic regions.

In our study, fever, headache, anorexia, and myalgia accounted for 94.1%, 84.3%, 51%, and 43.1%, respectively. Indeed, several studies have also found fever, nausea and vomiting, headache, and myalgia to be the majority of symptoms. In Guyana, Carles [3] reported fever in all patients in his series; headache and myalgia were found in 81.5% and 78.9% of cases, respectively.

The study found haemorrhagic signs in 18 cases, *i.e.* 35.3% of cases. Our results were inferior to those of Sharma [8], who found 50% of patients with hemorrhagic signs. Haemorrhage in dengue fever is a significant concern, as it can be life-threatening for the mother and foetus.

Biological tests revealed AgNS1 and IgM positivity in 74.5% and 31.4% of cases respectively. Rahman F *et al.* [12] also found high positivity for AgNS1 (56.8%) and IgM (43.1%) in their study of dengue in pregnancy. In contrast, Lompo YD *et al.* found that in Ouagadougou in 2023, 91% of patients were in the viremia phase, characterized by at least NS1 antigen positivity. This corresponds to early

consultations by pregnant women facing unusual fevers and indicates the precocity of infection or the acute phase (between D0 and D7).

Dengue without warning signs (group A), with warning signs (group B) and severe dengue (group C) were selected in 47.06%, 37.25% and 15.69% of cases. Lompo YD *et al.* found different results, with 32%, 38% and 30% respectively for groups A, B and C. A study in Thailand reported that almost 50% of pregnant women had group A dengue [13]. According to Halstead *et al.* [14], the proportion of severe dengue cases (group C) can vary considerably depending on the geographical region, the patient's immune system, and climatic factors. Another study by Malavige *et al.* [15] reported that the proportion of dengue with warning signs (group B) was higher in high-risk populations, such as pregnant women. This high frequency of dengue fever without signs of severity confirms the hypothesis that pregnancy is not a factor of seriousness.

Complications such as anemia were found in 17.6% of cases in our study. Carles *et al.* in French Guiana [2] reported anemia in 15% of pregnant women with dengue fever. As observed in other studies, anemia may be explained by hemoconcentration secondary to plasma leakage or destruction of red blood cells caused by viral infection [6].

Preterm delivery was reported in 7.8% of cases in our study. This result is slightly lower than that of Paixao ES *et al.* in Brazil, who reported a preterm delivery rate of 11% - 12% in pregnant women with dengue fever [16] in their study. Possible mechanisms include physiological stress due to dengue and treatments administered, such as fluid resuscitation, which may affect pregnancy stability.

5. Fetal complications

Induced prematurity was observed in 15.69% of cases in our study. This figure is similar to the results of a study by Pouliot *et al.* [16], who observed prematurity rates varying between 10% and 20% depending on the severity of dengue in pregnant women. Induced prematurity could be linked to the need to terminate the pregnancy in the event of serious complications such as hemodynamic shock or hemorrhage, which are frequent in patients with severe forms of dengue fever [17].

A maternal death rate of 5.88% (3/8) was found in our study. This rate is significantly higher than that of Brar R *et al.* in India (15.9%) [18]. Tien Dat T *et al.* [19] reported no such deaths. On the other hand, Paixao ES *et al.* in Brazil reported a case-fatality rate of 0.3%, arguing that dengue during pregnancy tripled the risk of maternal death from 0.1% to 0.3% [16]. This could correspond to early and effective management linked to care recommendations in each context.

6. Conclusions

Dengue fever is a reality in pregnant women. The profile of these women is one: young, uneducated, housewife, multigestate, multiparous and living in an urban area. Our study has shown that dengue fever during pregnancy is responsible for

maternal and perinatal complications, some of which are extremely serious. Anemia, premature delivery and haemorrhage were the most frequently encountered in parturients. Prematurity and fetal death were the major fetal complications.

Personal protective measures, such as using LLIN-type mosquito nets, environmental sanitation, and vaccination of women of childbearing age, remain the best options for preventing dengue fever during pregnancy.

Therefore, a prospective and analytical study could provide a clearer picture of the problem of dengue during pregnancy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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