

# A Prospective Observational Study of Spectrum of Tropical Infections in Pregnancy in a Tertiary Care Hospital in Mumbai, Maharashtra

GAURAV SHARMA\*, NEELAM N REDKAR<sup>†</sup>, PRAKASH RELWANI<sup>‡</sup>, SAMEER S YADAV<sup>#</sup>, SHEELA PANDEY<sup>‡</sup>

## ABSTRACT

**Background and aims:** Pregnancy is associated with several hormonal and mechanical changes in the body. The tropical infections that most commonly affect pregnant females are malaria, dengue, leptospirosis and typhoid. These tropical infections cause many medical complications in pregnancy by causing anemia, thrombocytopenia, bleeding and inflammatory reactions. Therefore, we conducted a study to evaluate the clinical presentation, complications and outcome of tropical infections in pregnancy. **Material and methods:** The present study was conducted at a tertiary care hospital in Mumbai, Maharashtra over a period of 1½ year (January 2018 to June 2019) after getting approval from Institutional Ethics Committee. In this study, 250 pregnant patients admitted in medicine ward, obstetrics and gynecology ward, and ICU with symptoms and signs of tropical infections and age more than 18 years, who gave written informed consent, were included. **Results:** The most common age group amongst the study population was 20 to 24 years (41.6%), followed by 25 to 29 years (40%) and 30 to 35 years (18.4%). Most of the study population had gestational age of 1 to 12 weeks (61.6%), followed by 13 to 28 weeks (31.6%) and more than 28 weeks (6.8%). Most of the study population had parity 2 (46.8%), followed by parity 1 (43.2%), parity 3 (6.8%) and parity 4 (3.2%). The most common clinical features amongst the study population was fever (62%), followed by headache (32.8%), nausea (30.8%), pain in abdomen (26.4%) and petechiae (26%). The most common infections amongst the study population were malaria (11.2%), dengue (8%), leptospirosis (6%) and enteric fever (5.2%). The most common medical complications were bleeding due to thrombocytopenia (TCP) (6.8%), followed by serositis (5.2%), ARDS (4.4%), meningitis (2.8%), subconjunctival hemorrhage (2.8%) and encephalitis (1.4%). Complicated infections were seen in 30% of the study population. **Conclusion:** All pregnant women must be evaluated at primary care centers properly in their antenatal visits for their parity status and any associated risk factors and diseases. By doing this, we can reduce many tropical infections, complications and maternal mortality in early stage of pregnancy.

**Keywords:** Pregnancy, tropical infections, malaria, dengue, leptospirosis, thrombocytopenia

Pregnancy is associated with several hormonal and mechanical changes in the body.<sup>1,2</sup> The tropical infections that most commonly affect pregnant females are malaria, dengue, leptospirosis and typhoid. These tropical infections cause many medical complications in pregnancy by causing anemia, thrombocytopenia, bleeding and inflammatory reactions. In places where malaria transmission is

high, pregnant women may present with only a few symptoms or are asymptomatic during infection, thus making diagnosis a challenge. Primigravida have a high risk of infection and adverse pregnancy outcomes as they do not have immunity to the pregnancy-specific variants of *Plasmodium falciparum* that accumulate in the placental intervillous space, causing placental malaria and occult placental malaria. The parasitized red blood cells infiltrating the placenta have been shown to be functionally and antigenically different from those seen in nonpregnant individuals. Placental parasite isolates express variable surface antigens on the parasitized red blood cell surface, thus conferring a distinctive adhesive phenotype which enables them to sequester in the placenta. Nearly all nonplacental isolates of *P. falciparum* bind to CD36; however, placental isolates bind to glycosaminoglycans such as chondroitin sulfate A expressed on placental syncytiotrophoblast, and do

\*Junior Resident (3rd Year)

<sup>†</sup>Professor and HOD

<sup>‡</sup>Assistant Professor

<sup>#</sup>Associate Professor

Dept. of General Medicine, HBT Medical College, Mumbai, Maharashtra

**Address for correspondence**

Dr Gaurav Sharma

34, Prabhat Colony, Vijay Bari, Path no. 7, Sikar Road, Jaipur, Rajasthan - 302039

E-mail: gauravsharma1280@gmail.com

not bind to CD36.<sup>3,4</sup> Immunity to placental malaria is acquired during later pregnancies as women develop antibodies to prevent *P. falciparum* sequestration and enhance opsonic clearance of the parasitized cells.<sup>3-5</sup> Immunocompromised women, such as those with human immunodeficiency virus (HIV), do not develop the protective immunity and hence women of all gravidae can develop malaria. *Plasmodium vivax* does not accumulate in the placenta to the same extent as *P. falciparum*. However, studies suggest that it can adhere to placental glycosaminoglycans and does cause maternal anemia and fever, which contribute to both preterm delivery and fetal growth restriction.<sup>6,7</sup>

Pregnant patients of dengue usually have a typical presentation of fever with headache, retro-orbital pain, muscle ache and thrombocytopenia. Case reports have also reported epigastric pain, bleeding and petechiae hemorrhage among pregnant women with dengue fever.<sup>8,9</sup> Leptospirosis in pregnant patients may present with fever, thrombocytopenia, nausea, vomiting and abdominal pain.<sup>10</sup>

## MATERIAL AND METHODS

The present study was conducted at a tertiary care hospital in Mumbai, Maharashtra, over a period of 1½ year (January 2018 to June 2019) after getting approval from Institutional Ethics Committee. In this study, 250 pregnant patients admitted in medicine ward, obstetrics and gynecology ward, and ICU, with symptoms and signs of tropical infections and age more than 18 years who gave written informed consent, were included. Those who expired before the presence or absence of infection in them would have been established were excluded.

## RESULTS

This prospective observational study was conducted on 250 pregnant women with signs and symptoms of tropical infections.

Table 1 shows that the most common age group amongst the study population was 20 to 24 years (41.6%), followed by 25 to 29 years (40%) and 30 to 35 years (18.4%).

As seen in Table 2, most of the study population had gestational age of 1 to 12 weeks (61.6%), followed by 13 to 28 weeks (31.6%) and more than 28 weeks (6.8%).

Table 3 shows that most of the study population had parity 2 (46.8%), followed by parity 1 (43.2%), parity 3 (6.8%) and parity 4 (3.2%).

**Table 1.** Age Distribution Amongst Study Population

Age group	Frequency of infection	Percentage (%)
20-24 years	104	41.6
25-29 years	100	40
30-35 years	46	18.4
<b>Total</b>	<b>250</b>	<b>100</b>

**Table 2.** Gestational Age Amongst Study Population

Gestational age	Frequency of infection	Percentage (%)
1-12 weeks	154	61.6
13-28 weeks	79	31.6
>28 weeks	17	6.8
<b>Total</b>	<b>250</b>	<b>100</b>

**Table 3.** Parity Status Amongst Study Population

Parity	Frequency of infection	Percentage (%)
1	108	43.2
2	117	46.8
3	17	6.8
4	8	3.2
<b>Total</b>	<b>250</b>	<b>100</b>

As seen in Table 4, the most common clinical feature amongst the study population was fever (62%), followed by headache (32.8%), nausea (30.8%), pain in abdomen (26.4%) and petechiae (26%).

As seen in Table 5, the most common type of infections amongst study population were malaria (11.2%), dengue (8%), leptospirosis (6%) and enteric fever (5.2%).

Table 6 shows that the most common medical complication amongst the study population was bleeding due to thrombocytopenia (TCP; 6.8%), followed by serositis (5.2%), acute respiratory distress syndrome or ARDS (4.4%), meningitis (2.8%) and subconjunctival hemorrhages (2.8%).

As seen in Table 7, complicated infections occurred in 30% of the population, out of which death occurred in 2 cases and no death in patients with uncomplicated infections.

**Table 4.** Clinical Features Amongst Study Population

Clinical features	Frequency	Percentage (%)
Fever	155	62
Vomiting	45	18
Nausea	77	30.8
Pain in abdomen	66	26.4
Arthralgia	41	16.4
Petechiae	65	26
Headache	82	32.8
Itching/pruritis	55	22
Difficulty in breathing	49	19.6
Abdominal distension	39	15.6
Hematemesis	4	1.6
Malena	15	6
Altered sensorium	7	2.8
Hemoptysis	18	7.2

**Table 5.** Type of Infections Amongst Study Population

Infections	Frequency	Percentage (%)
Dengue	20	8
Malaria	28	11.2
Leptospirosis	15	6
Enteric fever	13	5.2

**Table 6.** Medical Complications Amongst Study Population

Medical complications	Frequency	Percentage (%)
Serositis	13	5.2
Bleeding due to TCP	17	6.8
ARDS	11	4.4
MODS	5	2.0
Myocarditis	5	2.0
Meningitis	7	2.8
Encephalitis	3	1.2
Subconjunctival hemorrhages	7	2.8

**Table 7.** Comparison of Complication and Outcome Amongst Study Population

Complication	Frequency (%)	Survived (%)	Death (%)
Complicated infections	75 (30)	73 (97)	2 (3)
Uncomplicated infections	175 (70)	175 (100)	0 (0)
<b>Total</b>	<b>250</b>	<b>248</b>	<b>2</b>

## DISCUSSION

In the present study, the most common age group amongst the study population was 20 to 24 years (41.6%), followed by 25 to 29 years (40%) and 30 to 35 years (18.4%). This finding is in line with a study by Chandrashekar et al which evaluated the incidence and severity of malarial anemia and associated risk factors among pregnant women. Of the 71 infected women, most (38%) were in the age group of 21 to 25 years.<sup>11</sup>

Most of the study population in our study had gestational age of 1 to 12 weeks (61.6%), followed by 13 to 28 weeks (31.6%) and more than 28 weeks (6.8%). Most of the study population had parity 2 (46.8%). The most common clinical features were fever (62%), headache (32.8%), nausea (30.8%), pain in abdomen (26.4%) and petechiae (26%), and most common type of infections were malaria (11.2%), dengue (8%), leptospirosis (6%) and enteric fever (5.2%). The risk of severe malaria among pregnant women is threefold higher than that among nonpregnant women. Moreover, a median maternal mortality of 39% has been noted in studies in Asia-Pacific.<sup>12</sup>

Most common medical complications amongst study population were bleeding due to TCP (6.8%), serositis (5.2%), ARDS (4.4%), meningitis (2.8%), subconjunctival hemorrhages (2.8%) and encephalitis (1.2%). Similarly, in the study conducted by Mousumi, complication like excessive bleeding was reported in about 87% of pregnant women in India in 2007-2008.<sup>13</sup>

## CONCLUSION

Fever followed by headache were the most common manifestations of pregnant women with tropical infections. The most common type of infections were malaria, dengue, leptospirosis and enteric fever. The most common medical complications were bleeding due to TCP, followed by serositis, ARDS, meningitis, subconjunctival hemorrhage and encephalitis. Complicated infections were seen in 30%

हेमेटिनिक डेक्सॉरेंज with traditional root



बोचपायुड इतय त्रुड to तेड चोपुडइ

### Rx in Anaemia associated with

\* Pregnancy & Lactation

\* Menorrhagia

\* Nutritional & Iron Deficiency

\* Chronic Gastrointestinal Blood Loss

\* General Weakness

\* Chemotherapy-induced anaemia

\* Lack of Appetite

\* Chronic Kidney Disease



FRANCO-INDIAN  
PHARMACEUTICALS PVT. LTD.  
20, Dr. E. Moses Road, Mumbai 400 011.

of pregnant women in the tertiary care hospital in Mumbai, Maharashtra. Most of the study population had good recovery. Pregnancy is a condition in which immunity of the mother decreases with progression of pregnancy and with increasing maternal age and associated comorbidities. This immune status declines progressively, so the mother becomes more vulnerable to infections and diseases. So, all pregnant women must be evaluated at primary care centers properly in their antenatal visits for their parity status and any associated risk factors and diseases. By doing this, we can reduce many tropical infections, complications and maternal mortality in early stage of pregnancy.

## REFERENCES

- Schnarr J, Smail F. Asymptomatic bacteriuria and symptomatic urinary tract infections in pregnancy. *Eur J Clin Invest.* 2008;38 Suppl 2:50-7.
- Jeyabalan A, Lain KY. Anatomic and functional changes of the upper urinary tract during pregnancy. *Urol Clin North Am.* 2007;34(1):1-6.
- Fried M, Nosten F, Brockman A, Brabin BJ, Duffy PE. Maternal antibodies block malaria. *Nature.* 1998;395(6705):851-2.
- Ricke CH, Staaloe T, Koram K, Akanmori BD, Riley EM, Theander TG, et al. Plasma antibodies from malaria-exposed pregnant women recognize variant surface antigens on *Plasmodium falciparum*-infected erythrocytes in a parity-dependent manner and block parasite adhesion to chondroitin sulfate A. *J Immunol.* 2000;165(6):3309-16.
- Keen J, Serghides L, Ayi K, Patel SN, Ayisi J, van Eijk A, et al. HIV impairs opsonic phagocytic clearance of pregnancy-associated malaria parasites. *PLoS Med.* 2007;4(5):e181.
- Chotivanich K, Udomsangpetch R, Suwanarusk R, Pukrittayakamee S, Wilairatana P, Beeson JG, et al. *Plasmodium vivax* adherence to placental glycosaminoglycans. *PLoS One.* 2012;7(4):e34509.
- Poespoprodjo JR, Fobia W, Kenangalem E, Lampah DA, Warikar N, Seal A, et al. Adverse pregnancy outcomes in an area where multidrug-resistant *Plasmodium vivax* and *Plasmodium falciparum* infections are endemic. *Clin Infect Dis.* 2008;46(9):1374-81.
- Carroll ID, Toovey S, Van Gompel A. Dengue fever and pregnancy - a review and comment. *Travel Med Infect Dis.* 2007;5(3):183-8.
- Phupong V. Dengue fever in pregnancy: a case report. *BMC Pregnancy Childbirth.* 2001;1(1):7.
- Tong C, Mathur M. Leptospirosis in pregnancy: a rare condition mimicking HELLP syndrome. *J Med Cases.* 2018;9(7):198-200.
- Chandrashekar VN, Punath K, Dayanad KK, Achur RN, Kakkilaya SB, Jayadev P, et al. Malarial anemia among pregnant women in the south-western coastal city of Mangaluru in India. *Informat Med Unlocked.* 2019;15.
- Kourtis AP, Read JS, Jamieson DJ. Pregnancy and infection. *N Engl J Med.* 2014;370(23):2211-8.
- Mousumi G. Pregnancy complications and birth outcome: do health care services make a difference? *Int Res J Soc Sci.* 2015;4(3):27-35.



## Erratum

In the article titled "Pyrogenic Cytokines Mediated Pathophysiology of Fever and Role of Mefenamic Acid in Pediatric Practice;" Published in the *Indian Journal of Clinical Practice.* 2021;32(4):229-36; there are 3 errors:

- In the Fifth sentence of the Abstract "However, of late, there is a trend of increased use of mefenamic acid as antipyretic." The sentence should read "However, of late, there is a trend of increased prescription use of mefenamic acid as an antipyretic."
- In the Ninth sentence of the Abstract "Its probable action in inflammatory fever and febrile seizure due to its inhibitory action on the NLRP3 inflammasome and potential antiviral actions in viral infections are also highlighted, respectively;" the word respectively is deleted. The sentence should read "Its probable action in inflammatory fever and febrile seizure due to its inhibitory action on the NLRP3 inflammasome and potential antiviral actions in viral infections are also highlighted."
- In the 7th line under Heading **Mefenamic Acid vs. Other Antipyretics** "There have been some reports of failure of antipyretic drugs such as paracetamol in controlling fever, giving rise to use of mefenamic acid as an antipyretic;" the word 'prescription' is added. The sentence should read "There have been some reports of failure of antipyretic drugs such as paracetamol in controlling fever, giving rise to prescription use of mefenamic acid as an antipyretic."

We regret the error.