

Impact of the Second Wave of COVID 19 on Maternal and Fetal Outcome in Tertiary Care Centre and its Comparison with the First Wave – Observational Study

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Abstract

Introduction: The emergence of the COVID-19 pandemic in 2020, have similar effect on pregnant women as influenza or other coronavirus infections. The impact of the COVID-19 pandemic is likely to be context specific and differ depending on a variety of country-specific factors. A global pandemic is likely to only reveal its consequences after significant time passes, and literature published before or immediately after policies are implemented may not capture all relevant outcomes.

Material and Methods: The study was conducted in the Department of Obstetrics and Gynaecology, Gandhi Medical College, Bhopal. It included all antenatal COVID 19 patients which reported to the hospital during April 2020 to May 2021, 1st wave from April 2020 to December 2020 and second wave from Jan 2021 to May 2021 after taking due informed consent. The detailed history and full clinical and general examination were performed using a predesigned proforma. The antenatal patients were categorized into mild, moderate and severe COVID. Data on clinical manifestations, laboratory tests, maternal and perinatal outcomes were extracted and analysed. The comparisons of 1st wave and second wave was done.

Results: There were 210 confirmed pregnant women with coronavirus disease (COVID-19). 26 maternal deaths occurred from these confirmed cases. Compared to pregnant women without COVID-19, pregnant women with a confirmed COVID-19 diagnosis had an increased risk of maternal complications and caesarean section. In initial months (April 20 to December 20) there were 89 confirmed cases of covid 19 and 4 maternal mortality and from January 21 to May 21 there were 121 cases and 22 maternal deaths. The second wave has taken greater toll on life of pregnant women.

Conclusion: In the second wave, pregnant women with severe or critical coronavirus disease were admitted to the ICU, intubated if they require mechanical ventilation, and were at increased risk of composite morbidity. Thus, the second wave affected the pregnant women in a much serious way and the maternal as well as fetal outcome were very poor.

Keywords: Coronavirus, Proforma, Maternal Mortality, Ventilation, Pregnant Women

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Introduction

The emergence of the COVID-19 pandemic in 2020, have similar effects on pregnant women as influenza or other coronavirus infections. During 2009, H1N1 influenza pandemic, influenza mortality in pregnant women in the USA was 4.3% [1]. In global analyses [2,3] maternal deaths from severe acute respiratory syndrome or Middle East respiratory syndrome have been reported in 13% (n=24) and 40% (n=10) of published case reports, respectively. Reassuringly, US data [4] from the first wave of the COVID-19 pandemic (from January to June, 2020) show that death from COVID-19 during pregnancy was low (0.19%) and consistent with that of non-pregnant women of childbearing age (0.25%). However, by September, 2020, findings from a systematic review and meta-analysis of global data [5] suggested that pregnancy is a significant risk factor for hospitalisation and more severe illness, with a critical care admission odds ratio for pregnant women with COVID-19 compared with infected women of childbearing age of 2.13 (95% CI 1.53–2.95) and an invasive ventilation odds ratio of 2.59 (2.28–2.94). Since September, 2020, a second wave in the UK appears to have had a more marked impact on pregnant women. Similarly, in India the second wave appeared during March 2021 to May 2021. The impact was devastating this time and took away a heavy death toll. Finally, the impact of the COVID-19 pandemic is likely to be context specific and differ depending on a variety of country-specific factors. A global pandemic is likely to only reveal its consequences after significant time passes, and literature published before or immediately after policies are implemented may not capture all relevant outcomes.

Material and Methods

The study was conducted in the Department Of Obstetrics And Gynaecology, Gandhi Medical College, Bhopal. It included all antenatal COVID 19 patients from April 2020 to May 2021, the 1st wave was from April 2020 to December 2020 and second wave from Jan 2021 to May 2021 after taking due informed consent. The detailed history and full clinical and general examination was performed using a predesigned proforma. The antenatal patients were categorized into mild, moderate and severe. Data on clinical manifestations, laboratory tests, maternal and perinatal outcomes were extracted and analyzed. The 1st wave and second wave comparison was done

Results

There were 210 confirmed COVID 19 positive women reported to our facility. 26 deaths occurred from these confirmed cases. Compared to the pregnant women with confirmed COVID-19 infection had an increased risk of maternal complications and cesarean section than the pregnant non-covid patients. During (April 2020 to December 2020) 1st wave, there were 89 confirmed obstetrics cases of COVID 19 and 4 maternal mortality as compared to 2nd wave in which, there were 121 cases and 22 deaths. There was marked increase in number of cases as well as mortalities during the second wave.

Table 1 shows the demographic features among COVID 19 cases and the variation among them in 1st and 2nd wave. Table 2 shows the distribution of disease according to severity. There was total 210 patients out of them 89 patients in 1st wave and 2nd wave 121 patients. Amongst them there was 1.4% and 11% mortality during 1st and second wave. There was increased death toll during the 2nd

wave. Due to fear of Covid, a lot of pregnant women do not go to hospitals for regular check-ups. The patients were reluctant in visiting hospitals during COVID 19 pandemic. The fetal outcome of Covid infection was grave, there were more neonates with fetal hypoxia, premature delivery and intrauterine fetal death especially in mothers with decreased oxygen saturation and pneumonitis.

In the first wave, fetal distress was the commonest indication of LSCS also in second wave fetal distress followed by maternal distress (SARI) is the commonest indication for LSCS. Table 3 and table 4 shows the varied presentation of symptoms and indications of LSCS.

Fever was the commonest chief complaint followed by breathlessness and sore throat in both the waves. In 2nd wave only 1 patient was asymptomatic as compared to 1st wave in which 6 patients were asymptomatic. Thus, it can be inferred that during the second wave almost all patients were symptomatic this indicates the severity of infection.

Table 5 shows fetal outcome in Covid infection was poor in the second wave. There were 18 preterm births in second wave as compared to 2 in 1st wave. Table 6 and 7 shows the baby weight in both waves and the covid status of fetus. During the first wave 6 neonates came positive, while in the second wave no newborn came positive.

Table 1: Shows the demographic results of first and second wave

| S.No. | Baseline Varibale | 1 st Wave | 2 nd Wave |
|-------|---------------------------|----------------------|----------------------|
| 1. | Age | (89) | (121) |
| | <25 Years | 38 | 22 |
| | 25-35 Years | 45 | 94 |
| | >35 Years | 4 | 5 |
| 2. | Education | | |
| | Illiterate | 46 | 76 |
| | Primary | 5 | 12 |
| | Middle | 1 | 2 |
| | High School | 5 | 4 |
| | High Secondary | 27 | 24 |
| | Graduate | 3 | 3 |
| 3. | Socio-Economic Status | | |
| | Lower | 44 | 74 |
| | Upper Lower | 12 | 32 |
| | Lower Middle | 25 | 7 |
| | Upper Middle | 6 | 8 |
| 4. | Gestational Age | | |
| | 1 st Trimester | 6 | 3 |
| | 2 nd Trimester | 16 | 30 |
| | 3 rd Trimester | 66 | 90 |
| 5. | Gravida | | |
| | 1 | 39 | 74 |
| | 2 | 26 | 31 |
| | 3 | 13 | 15 |
| | >4 | 10 | 3 |

Table 2: Shows the maternal outcome after covid 19 infections.

| Maternal Outcome | | | | | |
|------------------------|------------|------------|-------|-------|--------|
| | | | WAVE | | Total |
| | | | 1 | 2 | |
| Maternal Outcome Range | Discharged | Count | 86 | 98 | 184 |
| | | % of Total | 40.9% | 46.7% | 87.6% |
| | Mortality | Count | 4 | 22 | 26 |
| | | % of Total | 1.4% | 11.0% | 12.4% |
| Total | | Count | 89 | 121 | 210 |
| | | % of Total | 42.4% | 57.6% | 100.0% |

p - Value 0.000 after applying Chi-square test

Table 3: Shows the clinical presentation of covid 19 infection in pregnancy

| Symptoms | 1 st Wave | 2 nd Wave |
|----------------|----------------------|----------------------|
| Fever | 49 | 87 |
| Breathlessness | 27 | 56 |
| Sore throat | 4 | 4 |
| Cough | 3 | 2 |
| Gastritis | 1 | 0 |
| Asymptomatic | 6 | 1 |

Table 4: Indication of LSCS

| | | | Wave | | Total |
|---------------------|-------------------|------------|------|-------|-------|
| | | | 1 | 2 | |
| Indications of LSCS | Abnormal Lie | Count | 5 | 3 | 8 |
| | | % of Total | 2.4% | 1.4% | 3.8% |
| | Contracted Pelvis | Count | 3 | 3 | 6 |
| | | % of Total | 1.4% | 1.4% | 2.9% |
| | Ectopic pregnancy | Count | 0 | 4 | 4 |
| | | % of Total | 0.0% | 1.9% | 1.9% |
| | Fetal Distress | Count | 18 | 28 | 46 |
| | | % of Total | 8.6% | 13.3% | 21.9% |
| | Maternal Distress | Count | 0 | 13 | 13 |
| | | % of Total | 0.0% | 6.2% | 6.2% |
| | PIH | Count | 0 | 3 | 3 |
| | | % of Total | 0.0% | 1.4% | 1.4% |
| | APH | Count | 0 | 3 | 3 |
| | | Count | 18 | 28 | 46 |

Table 5: Shows the fetal outcome due to covid 19 infections

| | | | Wave | | Total |
|---|---------------|------------|------|------|-------|
| | | | 1 | 2 | |
| Foetal Outcome Range (1=Abortion, 2=Iufd/ Still Birth, 3= Preterm Alive, 4= Term Alive, 5=Na, 6= Others) | Abortion | Count | 3 | 2 | 5 |
| | | % Of Total | 1.4% | 1.0% | 2.4% |
| | IUFd/ SB | Count | 5 | 4 | 9 |
| | | % Of Total | 2.4% | 1.9% | 4.3% |
| | Preterm Alive | Count | 2 | 18 | 20 |
| | | % Of Total | 1.0% | 8.6% | 9.5% |
| | Term Alive | Count | 43 | 65 | 108 |

P value 0.000 –highly significant

Table 6: Shows the distribution of baby weight in 1st and 2nd wave

| | | | Wave | | Total |
|---|----------------|------------|-------|-------|-------|
| | | | 1 | 2 | |
| BW Range (1= <1.5 Kgs, 2= 1.5 to <2.5 Kgs, 3= ≥2.5 Kgs, 4=NA) | <1.5 Kg | Count | 1 | 6 | 7 |
| | | % of Total | 0.5% | 2.9% | 3.3% |
| | ≥2.5 Kg | Count | 33 | 55 | 88 |
| | | % of Total | 15.7% | 26.2% | 41.9% |
| | 1.5 to <2.5 Kg | Count | 19 | 30 | 49 |
| | | % of Total | 9.0% | 14.3% | 23.3% |

p Value-0.015

Table 7: Fetal covid 19 status

| | 1 st Wave | 2 nd Wave | Total |
|----------|----------------------|----------------------|-------|
| Negative | 48 | 95 | 143 |
| Positive | 6 | 0 | 6 |

P value 0.0000 highly significant

Discussion

Demographic results

During both first and second wave, nearly 50% of pregnant women affected belong to 25-35 years of age group. Among them in first wave 51.6% were illiterate and 62.5% were illiterate in the second wave. Also, there were 49.5% pregnant women belong to lower socio-economic status in first wave and 61.3% in second wave.

Maternal Outcome

22 Covid positive pregnant women died in the second wave as they reached the hospital late with complications having oxygen levels below 70%. In the first wave, 4 patients had

died due to covid infection. Early the diagnosis of covid infection would have prevented the grave maternal and fetal complications. In pregnant women with severe symptoms, the fetal outcome was poor. Since the second wave was highly infectious and virulent compared to the first, pregnant women bore the brunt of it. In the second wave, pregnant and peripartum women have experienced severe illness of Covid than the first wave. There have been 10 times more ICU admissions and mechanical ventilation requirements than in the first wave. During the second wave, affected pregnancies were in second trimester or early third trimester, whereas in the first wave, these were mostly

in 3rd trimester. Patients reported late to hospital have prolonged recovery time and these hospitalised patients also manifested with myocarditis and acute renal failure, which was a rare during the first wave among admitted patients. This observation was statistically significant.

Clinical Presentation of COVID 19 in Pregnancy: In the present study, fever and breathlessness were the most common clinical presentation with which the patients reported to the facility. Patients first have mild symptoms such as fever, cough, diarrhoea and then breathlessness. They reported to the hospital when they developed breathlessness. They should have reported to the facility when they became symptomatic because when there is breathlessness, ARDS has already set in and oxygen saturation falls rapidly and it is difficult to save patients or their recovery time is prolonged with multiple complications such as septicaemia, pneumothorax, myocarditis, acute renal failure requiring dialysis, and thromboembolism. This observation was statistically significant with p-value of 0.000.

Indications of LSCS: In the present study, fetal distress was the most common indication for caesarean sections in both the waves followed by maternal distress which was 6.2% in the second wave. Due to fear of Covid, a lot of pregnant women do not go to hospitals for regular check-ups. The patients were reluctant in visiting hospitals during COVID 19 pandemic.

Fetal Outcome: In the present study, there were term healthy new-borns along with preterm, stillbirth and abortions. There were total 53 newborns in the first wave and 92 newborns in second wave. Among them, there were 19 and 49 low birth weight newborns in the first and second wave respectively. It was observed that the mother who underwent caesarean section for maternal distress have poor fetal outcomes. There were 13 patients in the second wave who have

underwent LSCS for maternal distress and newborns were either premature or stillborn. The fetal outcome were grave due to decreased oxygen saturation and pneumonitis. This observation was statistically significant.

Conclusion

In the first wave, pregnant individuals with COVID-19 does not display the severe disease symptoms than non-pregnant individuals. Most cases among pregnant people were asymptomatic or mildly symptomatic [6]. For symptomatic cases, the most common clinical presentations included fever, cough, and dyspnea [7–11]. Laboratory findings consistently included lymphopenia, leukopenia, thrombocytopenia, and elevated levels of C-reactive protein and transaminases [7-14]. Others reported an increased D-dimer level and neutrophil/lymphocyte ratio and a decreased white blood cell count [8,9]. Chest computed tomography (CT) scans revealed abnormal imaging features, namely ground-glass opacities, in the lungs of pregnant individuals with COVID-19 [7-15] but the clinical significance of these imaging findings and the laboratory parameters were not clear. Adverse outcomes resulting from maternal infection with SARS-CoV-2 during pregnancy are infrequent. Most cases of COVID-19 among pregnant individuals documented during surveillance in the United States did not progress to severe disease, and intensive care unit (ICU) admission involving mechanical ventilation was seldom required. However, in the second wave pregnant women admitted with severe or critical coronavirus disease and were admitted to the ICU, intubated, require mechanical ventilation, and were at increased risk of composite morbidity [16]. Thus, the second wave hit pregnant women gravely and the maternal as well as fetal outcome were deleterious.

References

1. WHO Coronavirus Disease (COVID-19) Dashboard | WHO Coronavirus Disease (COVID-19) Dashboard. (n.d.). Retrieved December 29, 2020, <https://covid19.who.int/table>
2. Muralidar S, Ambi SV, Sekaran S, Krishnan UM. The emergence of COVID-19 as a global pandemic: Understanding the epidemiology, immune response and potential therapeutic targets of SARSCoV-2. *Biochimie*. 2020; 179:85–100.
3. Pradhan A, Olsson P-E. Sex differences in severity and mortality from COVID-19: are males more vulnerable? *Biol Sex Difer*. 2020.
4. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8(1):19–32
5. Braun V, Clarke V. What can thematic analysis offer health and wellbeing researchers? *Int J Qual Stud Health Well-Being*. 2014.
6. Wu C, Yang W, Wu X, Zhang T, Zhao Y, Ren W, Xia J. Clinical manifestation and laboratory characteristics of SARS-CoV-2 infection in pregnant women. *Virologica Sinica*. 2020;35(3):305–10.
7. Xu L, Yang Q, Shi H, Lei S, Liu X, Zhu Y, Wu Q, Ding X, Tian Y, Hu Q, Chen F, *et al*. Clinical presentations and outcomes of SARS-CoV-2 infected pneumonia in pregnant women and health status of their neonates. *Sci Bull*. 2020.
8. Smith V, Seo D, Warty R, Payne O, Salih M, Chin KL, Ofori-Asenso R, *et al*. Maternal and Neonatal Outcomes Associated with COVID-19 Infection: a Systematic Review. *PLoS ONE*. 2020;5(6):e0234187.
9. Knight M, Bunch K, Vousden N, Morris E, Simpson N, Gale C, O'Brien P, Quigley M, Brocklehurst P, Kurinczuk JJ. Characteristics and Outcomes of Pregnant Women Admitted to Hospital with Confirmed SARSCoV-2 Infection in UK: National Population Based Cohort Study. *BMJ*.2020;369:2107.
10. Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, Debenham L, Llavall AC, Dixit A, Zhou D, Balaji R, Lee SI, Qiu X, Yuan M, Coomar D, van Wely M, van Leeuwen E, Kostova E, Kunst H. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. *BMJ*. 2020.
11. Pereira A, Cruz-Melguizo S, Adrien M, Fuentes L, Marin E, Perez-Medina T. Clinical Course of Coronavirus Disease-2019 in Pregnancy. *Acta Obstetrica et Gynecologica Scandinavica*. 2020; 99(7): 839–47.
12. Blitz MJ, Rochelson B, Meirowitz N, Prasannan L, Rafael TJ, *et al*. Maternal mortality among women with coronavirus disease 2019. *Am J Obstet Gynecol*. 2019.
13. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, Li J, Zhao D, Xu D, Gong Q, Liao J, *et al*. Clinical characteristics and intrauterine vertical transmission potential of COVID19 infection in nine pregnant women: a retrospective review of medical records. *Lancet*. 2020;395(10226):809–15.
14. Yang H, Sun G, Tang F, Peng M, Gao Y, Peng J, Xie H, Zhao Y, Jin Z. Clinical features and outcomes of pregnant women suspected of coronavirus disease 2019. *J Infect*.2020;81(1):e40-44.
15. DeBolt CA, Bianco A, Limaye MA, Silverstein J, Penfeld CA, Roman AS, Rosenberg HM, Ferrara L, Lambert C, Khoury R, Bernstein PS. Pregnant women with severe or critical coronavirus disease 2019 have increased composite morbidity compared with nonpregnant matched controls. *Am J Obst Gynecol*. 2019.