Pregnancy with COVID 19 Infection: Etiopathogenesis, Diagnosis and its Management

Rajshree Dayanand Katke1* and Shreya S Chinchoriya2

1Professor and Head of the Department, Department of OBGY, Grant Govt Medical College and SIR JJ Group of Hospitals, Mumbai, India
2Senior Resident, Department of OBGY, Grant Govt Medical College and SIR JJ Group of Hospitals, Mumbai, India

*Corresponding Author: Rajshree Dayanand Katke, Professor and Head of the Department, Department of OBGY, Grant Govt Medical College and SIR JJ Group of Hospitals, Mumbai, India.

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Abstract

COVID 19 is the most challenging pandemic in the world's history with huge and intense impact on health system, on mental health and financial system. Day by day, it has shown varied change in its clinical scenario, hence the management was a very great challenge in front of world’s medical field. In pregnancy, it has shown to have its effects in different ways in both the first and the second wave of the COVID 19 pandemic. The pregnant women itself is susceptible to such infections, so it needs complete knowledge of etiopathogenesis, diagnosis, investigations and antepartum, intra partum and post-partum period management. In severe cases, higher rate of mortality has been seen.

Keywords: COVID 19 Infection; Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2); World Health Organization (WHO)

Introduction

COVID 19 infection is known to be caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) The first case of COVID-19 (coronavirus disease) was reported to the World Health Organization (WHO) on December 31, 2019, from Wuhan, Hubei Province of the People’s Republic of China [1].

On January 30, 2020 it was declared as Public Health Emergency of International Concern. On March 11, 2020, COVID 19 was declared as Pandemic by WHO.

Effect of COVID-19 on pregnancy

Pregnancy causes alteration in the immune system that leads to a change in the management of viral infection and response to it, this stands true for COVID 19 infection. Pregnant women with suspected or confirmed COVID-19 are mostly asymptomatic, but if they progress to severe disease they are more likely to need intensive care admission than non-pregnant women with COVID-19 (WHO 12 March 2021).

The at-risk groups within the obstetric population that have more propensity to develop COVID 19 infection include:

1. Specific co-morbidities to assess women for include the following:
Risks for newborn babies and women

There is a high chance that newborn delivered by a COVID 19 women has a high rate of intensive care unit admission. Also, a smaller data suggests that there is an increased incidence of neonatal death and still births.

Effect of COVID 19 on foetus

Increased likelihood of

1. Preterm births (UKOSS 27%, Living Systematic Review 17%, Kannur 8%).
2. Still births.
3. Pre-eclampsia like syndromes Knight 2020.

Updates on medications for COVID-19

REGN-COV2

REGN-COV2 is a mixture of two monoclonal antibodies imdevimab (REGN10987) and (mAbs; casirivimab (REGN10933) that targets the non-overlapping epitopes on the SARS-CoV-2 spike protein.

REGN-COV2 is not yet licensed monoclonal Antibody; and whilst the target for the monoclonal antibodies are unique to viral proteins and therefore less likely to affect fetal development, but the data on pregnant women is lacking.

Arbidol and arbidol mesylate were effective in suppressing the proliferation of SARS-CoV-1 in vitro.

In Russia, arbidol was given to pregnant women with influenza and has been tested in COVID 19 positive women as well. However, its safety in pregnancy requires further testing.

Etiopathogenesis

- The pathogenesis is caused by a single-stranded 80- to 120-nm-sized, enveloped RNA beta coronavirus.
• Its incubation period ranges between 2 - 14 days.

• The following are stages of disease.

Stage 1 (Early infection)

It comprises of viremia with symptoms including mild constitutional symptoms like fever > 99.6 degrees Fahrenheit, dry cough, diarrhea, headache, myalgia etc. The inflammatory markers like d-Dimer can be mildly elevated with deranged LDH, Pro thrombin time, lymphopenia.

Stage II (Pulmonary phase)

This phase is characterized by onset of inflammatory response by host. The symptoms include shortness of breath, hypoxia PaO₂/FiO₂ < 300 mmHg. There may be changes noted in chest radiogram with Low - normal procalcitonin levels.

Stage III (Hyperinflammation phase)

It includes hyper-inflammatory response by host to the viremia, with Acute Respiratory Distress Syndrome, SRS/ shock or Cardiac Failure. The inflammatory markers like Sr Ferritin, D Dimer, CRP, IL6, LDH, Troponin, NT ProBNP.

COVID-19 transmission

The transmission of the disease is mainly through respiratory secretions and contact with the surfaces as the virus can survive on surfaces for several hours.

Is COVID 19 infection is vertically transmitted?

There is a high probability that the infection is transmitted vertically but it needs further evidence based studies to prove it. The presence of cord blood Ig M is direct evidence of vertical transmission.

At present, there are only a marginal reports of vertical transmission of COVID-19 infection are known. Six (2.5%) babies tested positive for SARS-CoV-2 during the first 12 hours after birth; three of these were in babies born by pre-labor caesarean section (UKOSS, RCOG...
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24.7.2020). Emerging evidence now advocates that vertical transmission is probable, although confirmation of this requires study on a larger scale (ICMR 3rd December 2020):

- There is no evidence at present that the virus is teratogenic.
- Also, COVID-19 infection in early trimester is presently not an indication for Medical Termination of Pregnancy.

Women meeting criteria for testing should be tested and should be treated like a COVID positive until the results are obtained.

Elective procedures like induction of labour for indications that are not strictly necessary to be delayed.

Routine growth scan unless for strict indication and routine antenatal visits to be minimised.

Obstetric management considerations (ICMR 2020)

Medical history

For all pregnant women the following information is to be obtained:

- A detailed travel history.
- History of exposure to individual with symptoms of COVID-19.
- Any manifestations of COVID-19.
- Travelling from hot spot area.
- Immunocompromised hosts.

Information to be shared with pregnant women

Pregnant women should be informed as follows.

Figure 2
Antenatal care during COVID-19 pandemic

Women should be advised to attend routine antenatal care at 12, 20, 28 and 36 weeks of gestation so as to reduce the risk of exposure. However, in case of any complaints, they have to report to the obstetrician immediately.

Patients placement one meter apart in the waiting area.

I trimester: 12 weeks- Screen for medical disorders, investigations, first dose TT, NT SCAN, biochemical screening of trisomy.

II trimester: 18 - 20 weeks -Cong anomaly scan, BP, HB, Urine protein, cervical length, haematinics, calcium, OGTT 24 weeks.

III trimester

- **28 weeks**: DFKC, mental health, BP, Hb, urine protein, ANTI D Prophylaxis.

- **32 - 34 weeks**: Fetal wellbeing, Growth scan, Doppler, Birthing route, Isolation, Tdap vaccine.

Drugs during pregnancy recommendations

- **Aspirin**: No change in recommendations. Low dose aspirin can be given as medically indicated.

- **Magnesium for seizure prophylaxis**: Single dose 4g bolus dose of MgSO4 should be given in setting of mild respiratory distress.

- **Approach to antenatal women**: Travelled to another country within 14 days or close contact with a confirmed case of COVID-19.

Clinical examination + RT PCR on deep nasopharyngeal or pharyngeal samples

- **SARS COVID negative.**

- Stop monitoring.

- Asymptomatic.

- No isolation rooms.

- Monitoring at home.

SARS CoV positive

- Isolation at home for 14 days.

- USG growth + doppler/2 weeks.

- Symptomatic - fever and temp; 100.4 degrees Fahrenheit or respiratory symptoms, monitoring at hospital and Isolated room with prefer negative pressure.

- PPE for visitors/ health care worker.

- If patient is SARS CoV positive.
Hospitalisation in a tertiary care centre.

Maternal surveillance-T, HR, BP, RR /3 - 4 hrly, High resolution CT OR Chest Xray.

Fetal surveillance, FHS /1X, Inj Betamethasone until 36 to 37 weeks, Iv antibiotics.

Criteria for ICU admission

1. Respiratory rate > 30/min.
2. SpO₂ < 93% on room air.
3. Patients with > 50% lesions progressing within 24 to 48 hours on lung imaging.
4. qSOFA can be good adjunct.

Modified goals of mechanical ventilation

- Do not delay if it is required.
- The main goal is oxygenation to prevent hypoxia.
- A saturation of 85 - 90% is required to provide enough tissue oxygenation. A higher concentration if provided may be deteriorating.
- The modification made is to keep an oxygen saturation to 90% with minimum FiO₂ that is permissive hypoxia.
- Also, it is suggested to implement spontaneous breathing early during mechanical ventilation using newer modes like PSV.

Precautions to be taken during caesarean delivery include:

- All team - obstetricians, anaesthetists, paediatrician, OT staff to be in PPE.
- Visibility is a major challenge.
- Amniotic fluid/blood spill is to be avoided.
- Cautery use should be minimised.

Investigations of patients with COVID-19 admitted to critical care

Biochemical investigations

- CBC- lymphopenia, thrombocytopenia.
- Neutrophil: Lymphocyte > 3.
- RBS, LFT, RFT, LDH, PT Appt, d-dimer.
- Procalcitonin, ESR, CRP, IL-6.
- Ferritin > 500 mcg/L.
- Troponins.
- ABG.

**Radiological investigations**

- Chest Xray - Bilateral peripheral opacities. Mostly in lower lobes.
- Abdominal shielding can be used while doing x-ray in antenatal women.
- HRCT- CO-RADS level and CT severity score.
- Ultrasound.

![CO-RADS Table](image)

**Figure 3**

**6 minute walk test**

- The patient is asked to walk for 6 minutes and the oxygen saturation is monitored on pulse oximetry. If the saturation falls to 94% or to 3% below the baseline, then it is an indication for high risk.

- Such patients are at high risk of requiring ICU/nasal O₂/steroids should be considered for such patients.
Management of patients with COVID-19 admitted to critical care

- In severe disease such as hypoxia (SpO₂ ≤ 90%), tachypnea (respiratory rate of > 30/min), and pneumonia with > 50% lung involvement on computerized scan a critical care unit management is advisable.

- Titrate oxygen to maintain saturations above 94%.

- Hourly respiratory rate looking for the rate and trends.

- Start antibiotics if the white blood cell count is raised.

- Apply caution with IV fluid management.

- If urgent delivery is indicated for foetal reasons, birth should be expedited as normal, as long as the maternal condition is stable.

- The pregnant woman should be kept in left lateral position and mechanical ventilation as per patient’s requirement.

Intrapartum care

- Delivery should be at tertiary care centre at a designated covid centre whenever possible.

- Maternal observations including temperature, respiratory rate and SpO₂.

- A continuous electronic foetal monitoring using cardiotocograph (CTG).

- oxygen saturation during labour should be monitored on hourly basis.

- Mode of delivery-There is presently no indication to favour one mode of birth over another.

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Role of anaesthesia

- Epidural analgesia should therefore be recommended in labour to women with suspected/confirmed COVID-19 to minimise the need for general anaesthesia in case of emergency caesarean section.

Measures to be taken while doing a caesarean birth

- General anaesthesia (GA) and intubation of patient is an aerosol-generating procedure (AGP).
- Regional anaesthesia (spinal, epidural or CSE) is safe relatively.
- For the minority of caesarean births where GA is planned from the outset, everyone should don and wear a full PPE.

Care in labour

- Goal is to keep oxygen saturation > 94% and titrating oxygen therapy as per the requirement.
- If the woman has signs of sepsis consider COVID 19 infection to be a possible differential diagnosis
- Continuous electronic foetal monitoring during labour is suggested.

Figure 5
• In case of worsening of the woman’s symptoms, make an individual assessment regarding the advantages and disadvantages of continuing the labour against emergency caesarean birth. A subjective analysis for the indication of caesarean section is important if it is helpful in resuscitating the mother.

• If the parturient is becoming hypoxic or has become exhausted that can lead to deterioration of her condition, then a shortening of second stage of labour should be considered.

General advice for obstetric/emergency gynaecology theatre

• Elective obstetric procedures like doing a cervical cerclage should be scheduled at the end of the operating list.

• If possible, the emergency obstetric surgeries are to be carried out in a different obstetric operation theatre.

Postnatal management

• It is not yet confirmed whether new-borns with COVID-19 are at increased risk for severe complications. Transmission after birth via contact with infectious respiratory secretions is possible and hence there should be provision of temporary separation of newborn from an infected person if possible.

Postnatal appointments

1. On your first full day at home.

2. Day 5.


Considerations below for temporary separation

• The importance of temporary separation of the mother from her baby should be discussed with the mother by the healthcare team.

• The decision to discontinue temporary separation of the mother from her baby should be subjective and after discussing with the health experts.

• If colocation (sometimes referred to as “rooming in”) of the new-born has been done as per the mothers choice, then necessary measures are to be taken to prevent the infection to the neonate.

• Consider use of physical barriers (e.g. a curtain) and keeping the new-born at least for 6 feet away from the ill mother.

• A COVID positive mother should use a face mask and do proper hand sanitisation every time she comes in contact with her baby, if a healthy care taker is not available.

Breastfeeding

During temporary separation, mothers can consider expressed breast milk use and a dedicated breast pump should be given. The breast pump should be properly sanitised. This expressed breast milk should be nursed to the new-born by a healthy caregiver.
Care of a newborn

<table>
<thead>
<tr>
<th>Drug</th>
<th>Mechanism of action</th>
<th>Current status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azithromycin</td>
<td>Bacteriostatic</td>
<td>Azithromycin is assigned as FDA category B</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Bactericidal</td>
<td>Amoxicillin belongs to FDA category B</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>Bactericidal</td>
<td>Ceftriaxone belongs to FDA category B</td>
</tr>
<tr>
<td>Interferon-1</td>
<td>Blocks replication of virus</td>
<td>IFN type I belongs to class C by FDA</td>
</tr>
<tr>
<td>Hydroxychloroquine</td>
<td>Prevents pH-dependent coronavirus replication, impedes penetration of virus, has immunomodulatory effects</td>
<td>Not designated any FDA category. Can be used in pregnancy. 400 mg BD DAY 1 f/b 200 mg BD 4 DAYS</td>
</tr>
<tr>
<td>Lopinavir/ritonavir</td>
<td>Their combination reduces viral replication</td>
<td>Lopinavir is not designated any FDA category, but ritonavir is included in B category 400 mg-BD for 14 days</td>
</tr>
</tbody>
</table>

Drugs used in management of COVID-19 in pregnancy

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Description</th>
<th>Can be given in pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corticosteroids</td>
<td>Analogues of steroid hormones</td>
<td>Yes</td>
</tr>
<tr>
<td>Ritonavir+Lopinavir</td>
<td>Protease inhibitors</td>
<td>Yes</td>
</tr>
<tr>
<td>Favipiravir</td>
<td>RNA polymerase inhibitor</td>
<td>No (teratogenic)</td>
</tr>
<tr>
<td>Convalescent plasma</td>
<td>Polyclonal human antibodies</td>
<td>Yes</td>
</tr>
<tr>
<td>Remdesivir</td>
<td>RNA polymerase inhibitor</td>
<td>Yes</td>
</tr>
<tr>
<td>Tocilizumab</td>
<td>Anti IL-6 monoclonal Ab</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Role of plasmapheresis and remdesivir**

- Convalescent plasma therapy neutralizes virus directly but is not designated any FDA category.
- As per the recovery trial, convalescent plasma has not shown to have much role. However, in early moderate cases (preferably within 3 days of symptom onset) it may be used if availability is no issue on empathetic grounds.

**Figure 7**

In recovery no confirmation that high-titre convalescent plasma had improved survival. Whether convalescent plasma would benefit other patient groups is anonymous and requires further studies [6]:

- Remdesivir decreases viral replication in the host cells by blocking RNA-dependent RNA polymerase but is not approved in pregnancy.
- Remdesivir (EUA) may be deliberated only in patients with
  - Moderate to severe disease (needful supplemental oxygen), and
  - No renal or hepatic dysfunction (Not an absolute contradiction), and
  - Who are within 10 days of onset of symptom/s.
  - Recommended dose: 200 mg IV on day 1 f/b 100 mg IV OD for following 4 days.
  - Remdesivir can be given in pregnancy if the benefits outweigh the potential risks.
  - Remdesivir has shown to have no mortality benefit as of now. It is to be used only for moderate to severe cases requiring ventilator of oxygen supplementation with no renal or hepatic dysfunction.
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- It is to be given only with in first 10 days of symptoms.
- NSAIDS in COVID 19 when clinically indicated, the lowest effective dose is used, ideally for less than 48 hours and guided by gestational age – related potential toxicity (ACOG, WHO).

Steroids

- Indication - those needing oxygen supplementation and ventilatory support (Recovery trial criteria).
- Recovery trial protocol for pregnancy endorses prednisolone 40mg orally once daily, and, in women incapable of taking oral medicine, hydrocortisone 80mg intravenously twice daily instead of dexamethasone treatment.
- For fetal lung maturity, 6 mg 12 hourly 4 doses f/b for 10 days or
- Dexamethasone - 6 mg / daily for 10 days or until discharge (whichever comes first).
- Recent guidelines from the Royal College of Obstetricians and Gynecologists suggest the use of intravenous hydrocortisone or oral prednisolone in women who are pregnant or breastfeeding.

Role of low molecular weight heparin

- Consider heparin for patients with SpO₂ - less than 94%.
- Enoxaparin/dalteparin/unfractionated heparin or LMWH (if delivery is not imminent).

<table>
<thead>
<tr>
<th>Dose</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prophylactic</strong></td>
<td></td>
</tr>
<tr>
<td>Dalteparin 5000 IU OD</td>
<td>Less than 80 kg</td>
</tr>
<tr>
<td>Enoxaparin 40 mg OD</td>
<td></td>
</tr>
<tr>
<td>Dalteparin 7500 IU OD</td>
<td>More than 80 kg</td>
</tr>
<tr>
<td>Enoxaparin 60 mg OD</td>
<td></td>
</tr>
<tr>
<td><strong>Therapeutic</strong></td>
<td></td>
</tr>
<tr>
<td>Dalteparin 7500 IU BD</td>
<td>Less than 80 kg</td>
</tr>
<tr>
<td>Enoxaparin 1mg/kg OD</td>
<td></td>
</tr>
<tr>
<td>Dalteparin 1000 IU BD</td>
<td>More than 80 kg</td>
</tr>
<tr>
<td>Enoxaparin 1mg/kg OD</td>
<td></td>
</tr>
</tbody>
</table>

Dose can be decided as per D dimer levels:

- 40 mg od if < 500
- 40 mg bd if between 500 - 3000
- 1 mg/kg if more than 3000.
- If anti thrombotic therapy is prearranged during antenatal period, and diagnosis of COVID-19, this therapy should be continued.
Tocilizumab (Off-label) may be considered when all of the below criteria are met:

- Occurrence of severe disease (preferably within 24 to 48 hours of commencement of severe disease/ICU admission).
- Suggestively raised inflammatory markers (CRP &/or IL-6) may be noted.
- No improvement if seen consider use of steroids.
- Recommended single dose: 4 to 6 mg/kg.
- AIIMS /ICMR treatment protocol - 17 May 2021.

Mild disease

- Defined as Upper respiratory tract symptoms (and/or fever) without shortness of breath or hypoxia.
- Home isolation should be advocated.
- Contact and droplet precautions, strict hand hygiene, patient and family members to wear mask.
- Symptomatic management (hydration, anti-pyretics, antitussives).
- Stay in contact with treating physician.
- Seek immediate medical attention if:
  - Difficulty in breathing/RR ≥ 24/min/SpO₂ < 94%.
  - High grade fever/severe cough particularly afar 5 days of symptoms onset.

Moderate disease

It is defined as any one of:

- Respiratory rate > 24/min, breathlessness.
- SpO₂ < 93% on room air.

Admission in ward should be considered. Oxygenation with a target SPO₂ of 92 to 96% (88 - 92% for COPD), use of a non rebreathing face mask is preferable. Awake proning fortified in all patients requiring supplemental oxygen therapy.

Anti-inflammatory or immunomodulatory therapy

- Inj. Methylprednisolone 0.5 to 1 mg/kg in 2 divided doses usually for a duration of 5 to 10 days.

Anticoagulation

- Conventional anticoagulant dose as mentioned above should be considered.
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Monitoring

- Clinical Monitoring: breathing efforts, Hemodynamic instability, Change in oxygen necessity.
- Serial Chest Xray; HRCT chest to be considered only if there is deteriorating.
- Lab monitoring: CRP and D-dimer 48 to 72 hourly; CBC, KFT, LFT 24 to 48 hourly; IL-6 levels to be done if deterioration is suspected.

Severe disease

Any one of the following:

- Respiratory rate > 30/min, breathlessness.
- SpO₂ < 90% on room air.
- Such cases should be managed in critical care unit.

Respiratory support

- Consider use of NIV (Helmet or face mask interface depending on availability).
- Use of HFNC will be beneficial in patients with increasing oxygen requirement.
- Intubation should be prioritized in patients with more oxygen requirement.
- Use conventional ARDS net protocol for ventilatory management.

Anti-inflammatory or immunomodulatory therapy

- Inj Methylprednisolone 1 to 2 mg/kg IV in 2 divided doses is to be considered.

Anticoagulation

- Weight based intermediate dose prophylactic anticoagulants are given.

Supportive measures

- Maintain normovolemia.
- If sepsis/septic shock, consider antibiotics as per sensitivity.

Monitoring

- Serial Chest Xray; HRCT chest to be done ONLY if there is deteriorating.
- Lab monitoring: CRP and D-dimer 24 - 48 hourly; CBC, KFT, LFT daily; IL-6 to be done if worsening is noted and depending on availability.

Role of vitamin D, zinc and Vit C

- Vitamin D, zinc (40 mg OD), B complex and Vit C supplementation is recommended to all women during pregnancy to strengthen the immunity.
- Low levels of vitamin D predisposes to serious respiratory complications if they develop coronavirus.

Mental health

- Isolation, bereavement, financial problems and inability to access to support systems are risk factors for mental ill-health.
- World Health Organization, ICMR and FOGSI also lay the importance and the need of psychological support to pregnant women with COVID-19 due to increased incidences of anxiety and mental disorders in them as reported in various studies.
- A higher incidence of perinatal anxiety, depression and domestic violence is seen.
- Keep disinfecting the fomite surfaces.
- Avoid non essential travel.
- Avoid 7 month gathering and such celebration.
- ASHA and ANM Have important role in scrutiny of covid antenatal women.
- Women who have symptoms or have crossed their EDD should be referred immediately to suitable centres.
- The coronavirus epidemic increases the risk of perinatal anxiety and depression, as well as domestic violence.
- Even if a woman has previously tested negative for COVID-19, if she presents with symptoms again, COVID-19 infection is to be suspected.
- If required visit health center, should take own transport or call 108 after informing the ambulance staff about her status.
- Delaying accessing the antenatal ultrasound services for foetal growth surveillance is recommended after 14 days following the resolution of acute illness (ICMR 2020).

Vaccination in Pregnancy

23.02.2021

FIGO (International Federation Gynaecology and Obstetrics) 2 March 2021

Empowering women to make informed choices after consulting their obstetrician is necessary. Significant considerations when proposing the vaccine should include the:

- Level of activity of the virus in the local community.
- Efficacy of the vaccine available.
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- Lack of safety data specific to its use in pregnancy.
- Risk and potential severity of maternal disease, including the possible effects of the disease on the fetus (preterm birth) and newborn.
- Side effects from the vaccine are common.
- These do not affect pregnancy, but may include:
  - Injection site reactions (sore arm) fatigue.
  - Headache.
  - Muscle pain.
  - Fever.
  - Chills.
  - Joint pain.

Timing of vaccination during pregnancy

There is currently no preference for the usage of a particular COVID-19 vaccine, but pregnant women who agree to be vaccinated should be advised to complete the schedule.

It is advisable that a COVID-19 vaccine should be scheduled without any other vaccine, with a minimum interval of 14 days before or after administration of any other vaccine. Henceforward, vaccines including Tdap (tetanus toxoid, reduced diphtheria toxoid and acellular pertussis) and influenza, which are regularly and safely offered during pregnancy, should be postponed for 14 days from the administration of COVID-19 vaccines.

Routine testing for pregnancy before COVID-19 vaccination is not compulsory. Also, the conception need not be delayed if a women is planning conception and has been vaccinated.

Now it is advisable in India for the breast feeding women to get vaccinated against COVID 19 with effect from 19th May 2021.

SARS COV 2 RNA detected in breast milk (Lancet 2020).

Vaginal delivery seems to increase the neonatal infection (1.39).

Data from the UKOSS study of 427 pregnant women in May 2020 most of the cases were in third trimester of pregnancy, laying the importance of social distancing and regular hand washing from 28 weeks of pregnancy (RCOG 2020).

AJOG study published on 25 March 2021.

COVID-19 mRNA vaccines generated vigorous humoral immunity in pregnant and lactating women, with immunogenicity and reactogenicity similar to that seen in non-pregnant women.
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Vaccine-induced immune responses were significantly greater than that seen by natural infection. Also, the immunity is said to get transferred by breast milk and placenta.

**Contraception and family planning**

It has been studied that there is a huge unmet need of contraception available. Hence a proper mitigation of family planning is of utmost demand, although restraining of COVID 19 pandemic is also important [7].

**Conclusion**

Managing a COVID 19 pandemic requires a complete and a detailed study of the disease in order to tackle the possible foeto-maternal complications that may occur if the antenatal women contracts with the infection. The best method of avoiding these complications is to take proper measures to prevent acquiring the infection and this can be done by wearing masks, proper hand sanitisation, maintaining social distancing and use of vaccination.

The COVID 19 infection in pregnancy, although 75-90% of the cases are in mild category, but the remaining cases are in severe category, which require multi-disciplinary approach in a COVID Designated Hospital with Intensive Care unit Facilities available.

World literature shows increased incidence of preterm labour; Pre-labour Rupture of Membranes, Fetal Growth Restriction. Increased incidence of complications were noted in cases with co-morbidites like diabetes mellitus, hypertension, etc. that landed up in life threatening conditions like eclampsia like syndromes, worsening of metabolic disorders like diabetes, post partum hemorrhage, septic shock, Acute Renal Failure, Disseminated intravascular coagulation (DIC), etc.

COVID itself is associated with so much of fear, anxiety and mood disorders like depression; involved, including the financial disasters. The role of family members is of immense importance as they are always being helpful to counsel such patient for being in the happy mood, alleviating anxiety, coming out of depression phase, encouragement for taking treatment and cherishing their hobbies like listening to music, singing, reading articles, being optimistic, that helps in a faster recovery of the patients.

In such condition, pregnant women need tremendous moral support from the family and family member to remain in positive state of mood so that there is less morbidity and mortality out of fear and anxiety.

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