Review article

Antenatal, Intrapartum, and Postnatal Maternal health Care during COVID-19 Pandemic

Lujain Anwar Alkhazrajy*

ABSTRACT

There is limited data and evidence about the effects of COVID-19 on Maternal health, especially when new information is emerging daily, through pregnancy, child birth and post natal period, women are vulnerable to have the infection, this article, aimed to show the suitable measures that should be applied for women at reproductive age who are suspected /confirmed with COVID -19 infection,

During pregnancy it is advisable to continue the antenatal care schedule, although reducing face to face visit is recommended (unless the pregnant condition required that),and prioritize ANC at health facilities for high-risk pregnancy and during second half of pregnancy with adequate infection prevention control measures.

Regarding child birth, positive COVID-19 result without other indications is not an indication to expedite birth, decision for mode of birth not influenced by positive COVID-19 result, it is recommended to support normal labour and if elective caesarean has been planned, epidural anesthesia is highly recommended than general anesthesia. For women with suspected or confirmed COVID-19, Betamimetics: should be avoided as they may exacerbate maternal hypotension, tachycardia and pulmonary edema.

Maternal mental wellbeing should be screened in postnatal period because infected women with COVID -19 are more prone to develop an anxiety than general population because of the demands of the disease like isolation, bereavement, financial difficulties, insecurity and inability to access support systems which are considered as added risk factors to develop mental illnesses

Key words: COVID-19 Pandemic, Antenatal, Intrapartum, Postnatal

* Department of family community medicine - Al-Kindy College of Medicine - University of Baghdad
Corresponding to:
lujainalkhazrajy@kmc.uobaghdad.edu.iq

Received: 22 August 2020
Revised: 5 Septemer 2020
Accepted: 10 September 2020
Published online: 13 September 2020
https://doi.org/10.47723/kcmj.v16isupplement.194

Introduction:

On 31 December 2019, the World Health Organization (WHO) was informed of a cluster of cases of pneumonia of unknown cause detected in Wuhan City, Hubei Province, China. On 12 January 2020 it was announced that a novel corona virus had been identified in samples obtained from cases and that initial analysis of virus genetic sequences suggested that this was the cause of the outbreak. This virus is referred to as SARS-CoV-2, and the associated disease as COVID-19. The overarching goal of the WHO global COVID-19 response strategy1 is for all countries to control the pandemic by slowing down transmission and reducing mortality associated with COVID-19 [(1)]

Already over-stretched health systems in the countries of the MENA region are likely to be further challenged in the context of COVID-19 preparedness and response, causing risk of disruptions in essential health and nutrition services for mothers, newborns, potentially leading to preventable maternal, newborn mortality and morbidity [(2)], considering that it's a new virus and with every day updates in information and facts about its management , hence new recommendation may emerge every now and then . The priorities are:

- The reduction of transmission of COVID-19 to women at reproductive age.
- The provision of safe care to women with suspected/confirmed COVID-19.

Transmission of COVID-19 :Most cases of COVID-19 globally have evidence of human to human transmission (direct, indirect)This virus can be readily isolated from respiratory secretions, faeces and fomites , however pregnant women do not appear more likely to contract the infection than the general population[(3)].Vertical transmission (transmission from woman to her baby antenatally or intra partum), has not been convincingly demonstrated [(4)] , yet three babies reported to have SARS-CoV-2 IgM in serum. As IgM does not cross the placenta, and usually does not appear until 3–7 days after infection, in-utero infection may have occurred [(5,6)]on the other hand no detectable viral DNA was found in amniotic fluid, serum, placenta, breast milk or

vaginal fluid (although few women have been tested) [7-8]

Physiology of pregnancy and COVID-19*:* As a normal physiology, pregnancy itself alters the body's immune system and response to viral infections in general, which can occasionally cause more severe symptoms. This will be the same for COVID-19 were immuno-suppression of pregnancy may impact severity of symptoms [9], on the other hand, Increased oxygen demands of pregnancy may increase risk of respiratory compromise in infected pregnant women, hence when compared with their non-pregnant counterparts, pregnant women with lower respiratory tract infections may experience worse outcomes (e.g. preterm birth, fetal growth restriction and perinatal mortality) [10, 11]

Effect of COVID-19 on the Pregnant:

Most women will experience only mild or moderate cold/flu like symptoms. Cough, fever, shortness of breath, headache and anosmia are other relevant symptoms. severe symptoms (pneumonia and marked hypoxia) This is particularly true towards the end of pregnancy(after28 weeks' gestation) this is due to changes to their immune system during pregnancy, or women with co-morbidities (e.g. obesity, gestational diabetes, pre-eclampsia)[12,13]

Given that pregnancy is known to be a hypercoagulable state, and emerging evidence suggests that individuals admitted to hospital with COVID-19 are also hypercoagulable, it follows that infection with COVID-19 is likely to be associated with an increased risk of maternal venous-thromboembolism. Reduced mobility resulting from self-isolation at home, or hospital admission, is likely to increase the risk further [14, 15] .A single case report has been published in scientific literature of a maternal death and intrauterine fetal death at 30 weeks' gestation. These deaths, which occurred in Iran, were directly attributed to COVID-19. [16]

Effect of COVID-19 on the Fetus:

There are currently no data suggesting an increased risk of miscarriage or early pregnancy loss in relation to COVID-19. Case reports from early pregnancy studies with SARS and MERS do not demonstrate a convincing relationship between infection and increased risk of miscarriage or second trimester loss. There is no evidence currently that the virus is teratogenic. [17, 18]

Objectives:

To show the suitable health care measures that should be applied for women at reproductive age who are suspected /confirmed with COVID -19 infection,

Antenatal Health Care:

Applies to all pregnant women irrespective of COVID-19 status.

Perinatal mental health: Pregnant women and their families are likely to experience heightened anxiety and stress related to the COVID-19 pandemic in the community, Current limitations in the evidence about the effects of the disease in pregnancy and on the newborn are also likely to be significant stressors, This can be assumed irrespective of personal COVID-19 status (negative, suspected, or confirmed), The long-term mental health implications for women may lead to a significant increase in the need for services in the future, awareness should be made towards domestic and family violence which may be increased in association with social distance. [19.20]

Antenatal schedule: The individual circumstances of each woman should be assessed and tailor the number and schedule of antenatal encounters to the essential minimum taking in consideration:

- Reducing the number of face-to-face encounters and substitute telehealth consultations (if clinically safe to do so) To avoid additional visitations, schedule/reschedule face-to-face encounters with multiple health care providers, to occur on the same day
- Reduce the number of face-to-face encounters and substitute tele-health consultations (if clinically safe to do so) home visits
- Prioritize ANC at health facilities for high-risk pregnancy and during second half of pregnancy with adequate IPC measures [21]

Vaccination: Pregnant women should be advised to continue their tetanus toxoid vaccine schedule in addition to vaccinations for whooping cough and influenza. [21]

Vulnerable women: Women with co-morbidities may be at increased risk for severe COVID-19 therefore it's advisable to seek expert clinical advice early in the pregnancy to plan care**,** and later conduct Referral when the severity of symptoms increases

In-hospital Antenatal Maternal Care: Suspected or confirmed COVID-19 alone is not an indication for retrieval or transfer

Clinical Surveillance: In addition to the usual maternal and fetal antenatal observations, monitoring of the following is advisable:

- SpO2 monitoring and maintaining index of suspicion for bacterial pneumonia
- Fetal surveillance as clinically indicated
- Delay investigations/procedures that require the woman to be transported out of isolation whenever it is clinically safe [22]

Medical Imaging: Necessary medical imaging should not be delayed because of concerns about fetal exposure this can be done by applying radiation shield over the gravid uterus [23]

• Ultrasound scan for fetal wellbeing as indicated and after resolution of acute symptoms

• If positive COVID-19 result occurs in first trimester, we should consider a detailed morphology scan at 18–24 weeks, currently no data about the risk of congenital malformation with COVID-19 infection acquired in first or second trimester [24]

Treatment: Currently no proven antiviral treatment however the following is recommended:

- Anti-pyrexic medicines, anti-diarrheal medicines, intensive care unit admission) is directed by signs and symptoms, and severity of illness
- Monitor and maintain fluid and electrolyte balance.
- Minimize maternal hypoxia through Oxygen therapy as indicated to maintain target SpO2 of 92–95%
- Consult with infectious diseases/microbiology regarding empiric antibiotic therapy for superimposed bacterial pneumonia[23]
- Antenatal corticosteroids: Currently insufficient evidence to alter the usual indications/ recommendations when given for fetal lung maturity[22]
- Magnesium sulfate: No evidence to alter usual indications/recommendations .[25]
- Nifidipin may be beneficial in COVID-19 due to similarities between efficacy in treatment of high altitude pulmonary oedema and lung manifestations of COVID-19[25]
- NSAID (e.g. indomethacin) use in setting of COVID-19 has raised concern, however there is no data to suggest use should be altered at this time[26]
- Betamimetics: should be avoided in women with COVID-19 as may exacerbate maternal hypotension, tachycardia and pulmonary oedema [27]
- For women with suspected or confirmed COVID-19, consider venous thrombo embolism prophylaxis (antenatal and postpartum) even in the absence of other risk factors [22]

Intrapartum Health care:

A positive COVID-19 result without other indications is not an indication to expedite birth ,decision for mode of birth not influenced by positive COVID-19 result (unless urgent birth indicated) with the presence of suitable infra structure most health systems and guidelines support the principles of normal birth [28]

Caesarean section: If elective caesarean has been planned, individually assess urgency,

General anesthetic should be avoided unless necessary for standard indications as intubation is an aerosol generating procedure for viral infection therefore epidural anesthesia is highly recommended in these circumstances

Water immersion birth: Water birth not recommended as SARS-COV-2 has been detected in stools and this may pose a risk to the baby in addition to the potential for loss of Personal protective equipment integrity during emergency procedures and/or evacuation from water [28], Electronic fetal monitoring is recommended in all types of labour as fetal distress has been reported [7]

Postnatal Care:

Co-location of well mother and well baby is recommended, this is usually determined by considering for example, disease severity, parental preferences, psychological wellbeing, test results, local capacity, other clinical criteria

Risk minimization strategies**:** should be adapted: [29]

- Provide information and education on strategies to use during usual mother-baby interactions (e.g. skin to skin, holding, cuddling, nappy change, feeding)

Antenatal schedule

If risk of community transmission is low or reduces, consider replacing telehealth with F2F in the third trimester. (e.g. two additional F2F at 30 and 36 weeks or four additional F2F at 30, 36, 38 and 40 weeks)

During every F2F contact
- Perform usual clinical assessments (e.g. BP, fundal height, fetal heart, weight, urinalysis)
- Ask about fetal movements, mental wellbeing, domestic violence

Gestation	Contact type	COVID-19 recommendations for low risk woman
< 12 weeks (or first visit)	F2F	• Recommend influenza vaccination • If high risk for GDM, HbA1c instead of OGTT • Consider dating scan (6–8 weeks) for dates, viability, location • Recommend nuchal scan (11–13 weeks) +/- NIPT (≥ 10 weeks) • Give referral for routine antenatal blood tests ○ Add ferritin with Hb assessment (assume blood stock low)
12–18 weeks	Telehealth	• Plan for hospital booking-in via telehealth/hybrid model • Discuss access to online/virtual antenatal classes • Follow up results of tests via telehealth contact • Recommend morphology scan (18–20 weeks)
20–22 weeks	F2F	• Recommend pertussis vaccination • Give referral for 26–28 week blood tests ○ Refer to updated GDM screening recommendations ○ Add ferritin with Hb assessment (assume blood stock low)
24–26 weeks	Telehealth	• Routine antenatal care
28 weeks	F2F	• If indicated, RhD immunoglobulin (anti-D) • Give referral for 36 week bloods ○ Add ferritin with Hb assessment (assume blood stock low)
31 weeks	Telehealth	• Routine antenatal care
34–37 weeks	One F2F	• If indicated, RhD immunoglobulin (anti-D) • Consider USS for growth and position
	Remainder Telehealth	• Routine antenatal care
38 weeks	Telehealth	• Routine antenatal care
41 weeks	F2F (if required)	• Usual considerations for fetal well-being and birth planning

Queensland Clinical Guideline: Maternity care for mothers and babies during the COVID-19 pandemic

- Discuss risks and benefits of close contact versus postnatal separation with parents (including discharge home of well baby if mother requires continued in-hospital care)
- No evidence to support washing of maternal or baby skin before initial contact or breastfeeding as a risk minimization strategy
- Consult with clinical experts as required

Feeding choice:

- Breastfeeding not contraindicated , No detectable viral DNA found in breast milk to date
- Provide dedicated equipment and follow usual sterilization standards for both breastfeeding equipment (e.g. breast pump) and for infant formula preparation and feeding equipment
- Instruct and support adherence to infection prevention and control measures (Hand hygiene, Equipment cleaning and sterilization ,Wearing of face mask (as risk of transmission is unknown)

Maternal mental wellbeing

This pandemic will inevitably result in an increased amount of anxiety in the general population, and this is likely to be even more so for pregnant women as pregnancy represents an additional period of uncertainty. Specifically, these anxieties are likely to revolve around:

• COVID-19 itself,

• The impact of social isolation resulting in reduced support from wider family and friends,

• The potential of reduced household finances,

• Major changes in antenatal and other NHS care, including appointments being changed from face-to face to telephone contact.

• Isolation, bereavement, financial difficulties, insecurity and inability to access support systems are all widely recognized risk factors for mental ill-health.

• The corona virus epidemic also increases the risk of domestic violence.[30]

Conclusions:
Women with confirmed COVID -19 , should receive a qualified health care services during their antennal, intrapartum and post natal periods , because they are suffering from additional stressors related to their infection which may affect the outcome of their pregnancy in form of maternal and neonatal morbidity and mortality .

Conflict of interest: there is no conflict of interest

Postnatal schedule		
Gestation	Contact type	COVID-19 recommendations for low risk woman
0–6 weeks postpartum	F2F or Telehealth	• Delay GDM follow-up ○ Refer to updated GDM postnatal follow-up recommendations • Perinatal mental health check • Ask about domestic violence • Routine postnatal care
6 weeks	F2F	• Newborn assessment (prioritise growth, eyes, hips, heart) • Vaccinations for newborn • Check completion of routine newborn follow-ups (e.g. NNST, hearing screen)

Queensland Clinical Guideline: Maternity care for mothers and babies during the COVID-19 pandemic

References:

1. WHO Strategic preparedness and response plan for the new corona virus. https://www.who.int/publications-detail/covid-19-strategy-update-13-april-2020
2. UNFPA. Coronavirus Disease (COVID-19) Preparedness and Response. UNFPA interim Technical Brief on Sexual and Reproductive Health and Rights, Maternal and Newborn Health & COVID-19.
3. Wei-jie Guan, Zheng-yi Ni, Yu Hu, Wen-hu: clinical characteristics of novel corona virus [cited 2020 March 23]. Available from: https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/novel-coronavirus-qld-clinicians.
4. Zaigham M, Andersson O. Maternal and perinatal outcomes with COVID-19: a systematic review of 108 pregnancies. Acta Obstetricia et Gynecologica Scandinavica. [Internet]. 2020 [cited 2020 April 10]. Available from: https://doi.org/10.1111/aogs.13867.
5. Zeng H, Xu C, Fan J, Tang Y, Deng Q, Zhang W, et al. Antibodies in infants born to mothers with COVID-19 pneumonia. JAMA 2020.
6. Dong L, Tian J, He S, Zhu C, Wang J, Liu C, et al. Possible vertical transmission of SARS-CoV-2 from an infected mother to her newborn. JAMA. [online]. 2020 March 26 [cited 2020 April 03]; DOI:10.1001/jama.2020.4621.
7.Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. The Lancet. [Internet]. 2020 February 12 [cited 2020 March 16]; DOI:10.1016/S0140-6736(20)30360-3.
8.Qiu L, Liu X, Xiao M, Xie J, Cao W, Liu Z, et al. SARS-CoV-2 is not detectable in the vaginal fluid of women with severe COVID-19 infection. Clinical Infectious Diseases 2020.
9. Liang H, Acharya G. Novel corona virus disease (COVID-19) in pregnancy: What clinical recommendations to follow? Acta Obstet Gynecol Scand 2020;00:1-4.
10. Breslin N, Baptiste C, Gyamfi-Bannerman C, Miller R, Martinez R, Bernstein K, et al. COVID-19 Noelle Breslin 1 , Caitlin Baptiste 1 , Cynthia Gyamfi-Bannerman 1 , Russell Miller 1 , Rebecca Martinez 2 , Kyra Bernstein et,al,:infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals. American Journal of Obstetrics & Gynecology MFM. [Internet]. 2020 April 09 [cited 2020 April 10]. Available from: https://doi.org/10.1016/j.ajogmf.2020.100118.
11. Li N, Han L, Peng M, Lv Y, Ouyang Y, Liu K, et al. Maternal and neonatal outcomes of pregnant women with COVID-19 pneumonia: a case-control study. Clinical Infectious Diseases. 2020 [cited 2020 April 10]. Available from: https://doi.org/10.1093/cid/ciaa352.
12. WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). World Health Organization, 2020.
13. Guan W-j, Ni Z-y, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. New England Journal of Medicine 2020 doi: 10.1056/NEJMoa2002032
14. Royal College of Obstetricians & Gynecologists, ed. Green-top guidelines, 2015.:
Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium. In: 15. Practical guidance for the prevention of thrombosis and management of coagulopathy and disseminated

intravascular coagulation of patients infected with COVID-19.2020 [Available from: https://thrombosisuk.org/covid-19-thrombosis.php] accessed 07 April 2020.
16. Karami P, Naghavi M, Feyzi A, et al. Mortality of a pregnant patient diagnosed with COVID-19: A case report with clinical, radiological, and Histopathological findings. Travel Medicine and Infectious Disease 2020:101665.
doi: https://doi.org/10.1016/j.tmaid.2020.101665
17. Zhang J, Wang Y, Chen L, et al. Clinical analysis of pregnancy in second and third trimesters complicated severe acute respiratory syndrome. Zhonghua Fu Chan Ke Za Zhi 2003;38:516-20.
18.Report of the WHO-China Joint Mission on Corona virus Disease 2019 (COVID-19). World Health Organization, 2020
19. Wu Y-T, Zhang Cea. Perinatal Depression of Women Along with 2019 Novel Coronavirus Breakout in China. [Internet]. 2020 February 17 [cited 2020 March 06]. Available from: https://ssrn.com/abstract=3539359
DOI:http://dx.doi.org/10.2139/ssrn.3539359
20. Black B, Mackay G. Covid-19 and reproductive health: What can we learn from previous epidemics? BMJ opinion. [Internet]. 2020 March 19 [cited 2020 March 25]. Available from: https://blogs.bmj.com/bmj/2020/03/19/covid-19-and reproductive-health-what-can-we-learn-from-previous-epidemics
21. Queensland Clinical Guideline: Maternity care for mothers and babies during the COVID-19 pandemic
22. Royal College of Obstetricians and Gynecologists (RCOG). Guidance for maternal medicine in the evolving corona virus (COVID-19) pandemic V4. [Internet]. 2020 March 30 [cited 2020 April 03]. Available from: https://www.rcog.org.uk.
23. Poon L, Yang H, Lee JCS, Copel J, Leung T, Zhang Y, et al. ISUOG interim guidance on 2019 novel corona virus infection during pregnancy and puerperium: information for healthcare professionals. [Epub ahead of print].Ultrasound Obstet Gynecol 2020 March 11.
24. Dotters-Katz S, Hughes B The Society of Maternal-Fetal Medicine (SMFM),. Coronavirus (COVID-19) and pregnancy: What maternal-fetal medicine subspecialists need to know.[cited 2020 March17].Availablefrom:https://s3.amazonaws.com/cdn.smfm.org/media/2262/COVID19_PDF.pdf
25. Solaimanzadeh I.: Acetazolamide, Nifidipin and Phosphodiesterase Inhibitors: Rationale for Their Utilization as Adjunctive Countermeasures in the Treatment of Coronavirus Disease 2019 (COVID-19). Cureus 2020;12(3):e7343-e.
26. Federal Drug Administration. FDA advises patients on use of non-steroidal anti-inflammatory drugs (NSAIDs) for COVID-19. [Internet]. 2020 March 19 [cited 2020 April 24]. Available from: https://www.fda.gov/drugs/drug-safety-and-availability/fda-advises-patients-use-non-steroidal-anti-inflammatory-drugs-nsaids-covid-19.
27. McIntosh JJ. Corticosteroid guidance for pregnancy during COVID-19 pandemic. Am J Perinatol 2020.
28. The Royal Australian and New Zealand College of Obstetricians and Gynaecologisits (RANZCOG). COVID-19 Statement. [Internet]. 2020 March 23 [cited 2020 March 24]. Available from: https://ranzcog.edu.au.
29. Centers for Disease Control and Prevention (CDC). Interim considerations for infection prevention and control of coronavirus disease 2019 (COVID-19) in inpatient obstetric healthcare. [Internet]. 2020 [cited 2020 March 06]. Available from: https://www.cdc.gov/coronavirus/2019-nCoV/hcp/infection-control.html
30. Fraser E. :Impact of COVID-19 Pandemic on Violence against Women and Girls. 2020.