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

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**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 strategy is for all countries to control the pandemic by slowing down transmission and reducing mortality associated with COVID-19

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, 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. Vertical transmission (transmission from woman to her baby antenatally or intra partum), has not been convincingly demonstrated , 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 on the other hand no detectable viral DNA was found in amniotic fluid, serum, placenta, breast milk or

**ABSTRACT**
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) is particularly true towards the end of pregnancy (after 28 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

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
- 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

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
- Antenatal corticosteroids: Currently insufficient evidence to alter the usual indications/recommendations when given for fetal lung maturity
- Magnesium sulfate: No evidence to alter usual indications/recommendations

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

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

Betamimetics: should be avoided in women with COVID-19 as may exacerbate maternal hypotension, tachycardia and pulmonary oedema

For women with suspected or confirmed COVID-19, consider venous thromboembolism prophylaxis (antenatal and postpartum) even in the absence of other risk factors

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 infrastructure most health systems and guidelines support the principles of normal birth

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. Electronic fetal monitoring is recommended in all types of labour as fetal distress has been reported

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:

- Provide information and education on strategies to use during usual mother-baby interactions (e.g. skin to skin, holding, cuddling, nappy change, feeding)
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.
Conclusions:
Women with confirmed COVID-19, should receive a qualified health care services during their antenatal, 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

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