Review Article

Redesigning routine antenatal care in low resource setting during COVID-19 pandemic

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Abstract

Obstetric population because of its unique and varying needs specific for different gestations justifies for distinctive considerations in times of pandemic like COVID-19. Healthcare facilities providing obstetric care need to develop contingency plans for minimizing antenatal visits to limit exposure of both healthy pregnant women and care providers from ill people. However, to mitigate any potential adverse effects of reduced antenatal visits, intelligent and smart use of evolving telemedicine capabilities can provide the continuum of care despite overwhelming burden due to pandemic. A collaborative work-model involving health workers in the community and the regional levels of health centres also has the potential to prevent the catastrophic collapse of obstetric care services during any pandemic like COVID-19.

Keywords: Antenatal care, COVID-19, obstetrics, pandemic, telemedicine

Introduction

COVID-19 has unfurled to pandemic proportions in a short period recognizing no boundaries of geography, economy, or religion. The aptness of our health system, which is historically built on in-person interaction between patients and healthcare providers, is severely affected as the global pandemic grips the globe. Pregnant women, as a result of the physiological alterations in immune and cardiorespiratory systems, may be at increased risk of severe disease if infected with the respiratory virus. Besides the risk of contracting the infection from infected pregnant women poses unique challenges to obstetricians in providing antenatal care. It has become extremely difficult to achieve the goal of positive pregnancy experience for all pregnant women in times of COVID-19 pandemic.

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The traditional prenatal care schedule is based on the World Health Organization 2016 recommendations that prioritize person-centred healthcare for positive perinatal and maternal outcomes by increasing the number of contacts of a pregnant woman with health providers from four to eight. Pregnant women make the first contact in the first trimester with subsequent two contacts at 20, 26 weeks, and next five contacts in the third trimester at 30, 34, 36, 38, and 40 weeks' gestation. The interventions recommended for improving the quality of antenatal care are nutrition education, assessment of mother and foetus, preventive measures, management of common physiologic pregnancy symptoms, and health system–level interventions.[1,2] However, in the current scenario of a global pandemic that has placed unprecedented demands on our health system, all health facilities and workforce can get entirely inundated by a plethora of activities related to controlling the pandemic. Hence, non-emergency, yet essential health services, like antenatal services, may get compromised. Furthermore, the fear of getting infected as well as the countrywide lockdown with travel restrictions and social distancing norms may deter pregnant women from seeking health care.

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ANC during a pandemic Some important considerations

During this COVID-19 pandemic, it is imperative to reorganize the antenatal visits not only to reduce the possibility of exposure of a healthy pregnant woman to infected individuals but also to minimize healthcare workers' exposure to prenatal patients that may be infected but are asymptomatic. Such reorganization may be helpful in creating the capacity to provide face-to-face consultations for high-risk patients who require more visits and also prove to be beneficial for all maternity care providers offering care, given the potential for reduced healthcare workers as the pandemic affects all members of the community.[3]

Routine antenatal OPDs may be closed due to lockdown during the pandemic, and most of the government hospitals are reorganized for the management of patients affected by the pandemic. This may prevent pregnant women from approaching hospitals due to fear of getting infected. Even if they visit the hospitals, they may not be able to communicate properly with an unfamiliar healthcare provider in unfamiliar surroundings.

Routine laboratories and sonography services may be adjourned during a pandemic, further affecting the regular antenatal care. This may delay the recognition of high risks like anemia, diabetes, asymptomatic bacteriuria, and also timely interventions based on these tests. Absence of sonography services presents challenges in early diagnosis and dating of pregnancy as well as ensuring fetal wellbeing.

Screening for genetic disease also becomes difficult in these times as it may be considered non-essential. This may, however, have a serious impact on the outcome of pregnancies which have been previously affected by any genetic or metabolic disorder. Because of the extensive reorganization of the health system and resources, invasive fetal diagnostic procedures may not be performed routinely further jeopardizing the obstetric services. Even fetal therapeutic procedures like intrauterine transfusions get affected as routine fetal monitoring is kept on hold.

Antenatal visits allow physical examination which helps detect complications like preeclampsia (by checking blood pressure/presence of swelling of feet or generalized edema), anemia or jaundice (by the presence of pallor or icterus), intrauterine growth restriction (by abdominal examination), weight gain, any breast problems, or any worsening of underlying medical disorder like heart disease. The abdominal examination for the lie, presentation, and liquor at term also helps in making an individualized care plan for any patient. The nationwide lockdown can have severe implications on maternal and perinatal health if alternative ways for providing antenatal care is not evolved.

Assessment of mental wellbeing can also be difficult in the absence of face–to-face consultations. Opportunities for health education (regarding nutrition, breastfeeding, contraception), promoting healthy behaviors, birth preparedness, and alleviating the anxiety of antenatal women may be squandered during pandemics.

Although there is ample published literature regarding the management of pregnant women affected with prior pandemics, there is no literature on how routine antenatal care was reorganized during those times. Even for the severe acute respiratory syndrome SARS pandemic of 2003, researchers have reported only about how they handled complicated issues. In Toronto, obstetric services for suspected patients were shifted to a separate building with different entrances, elevators, and air-handling systems. All patients and healthcare providers were screened at the hospital entrance for SARS symptoms. All caregivers wore N-95 respirator masks, face shields or eye protection, gowns, and non-latex gloves while the patients wore N-95 respirator masks. Frequent hand washing with ethanol-based gels was used. Patient's attendants were limited to the minimum. After early discharge, women were instructed to stay at home under quarantine for 10 days, and a nurse visited them on their third day postpartum. Healthcare workers were asked to observe work quarantine.[4]

The obstetric services were provided in a separate area from where SARS cases were managed in Hong Kong. There was a tendency to discharge patients in the early postpartum period, and all non-essential obstetric services (e.g., routine ultrasonography and prenatal diagnosis) were temporarily suspended.[5]

Strategies to overcome challenges during a pandemic

Some of the strategies that can be used by primary care physicians to overcome the difficulties in providing routine antenatal care during the pandemic are summarized in Box 1 and are discussed below in detail:

1. **Reducing the number of routine antenatal visits to those that require in-person services (like ultrasounds and lab tests)**

Traditional antenatal care includes eight visits, as recommended by WHO 2016. However, during a pandemic, consideration should be given to reducing the number of recommended prenatal visits for low-risk pregnancies.

The optimal frequency, timing, and content of visits should be determined according to the needs and risk status of each pregnant female or her fetus, as well as the risk of contracting infection when a pandemic like COVID-19 sets in.

Prior to the WHO 2016 recommendations, a focused ANC model was recommended by WHO in 2002, particularly in LMICs.[6] It suggested four ANC visits, first between 8 and

Box 1: Practice points for primary care physicians

Post to local authority and facilitate testing
Promote social distancing signage at their clinic asking patients to self-identify if they're having flu-like symptoms, and have travelled abroad or come into close contact with positive case
Screen patients over the phone before visiting the clinic
Reduce in-person antenatal care services
Promote tele-consultations
Be aware of the under investigation levels of personal protective equipment and examine patients only with all precautions.
Report all patients with fever and hand hygiene in each visit
Promote social distancing and hand hygiene in each visit

12 weeks, then between 24 and 26 weeks, at 32 weeks, and last between 36 and 38 weeks. Villar *et al.*, through a multicenter randomized controlled trial, established the fact that there were no disadvantages of fewer visits.[7]

Focused antenatal care is evidence-based and has been the best approach for resource-limited countries with few health professionals and limited infrastructures as can happen in any pandemic due to quarantine of exposed healthcare providers. FANC has already proved its effectiveness in terms of reducing maternal and perinatal mortality and morbidity.[7,8]

Hence this model can be used for routine antenatal care in times of pandemic where the health system is already overwhelmed, and the risk of getting infected deters both the pregnant women and healthcare provider. Recently global interim guidance on coronavirus disease 2019 during pregnancy and puerperium from FIGO and allied partners also advocated for a reduced number of antenatal visits for low-risk uncomplicated pregnancies to minimize the risk of cross-infection.[9]

The most important evidence-based intervention that requires mandatory in-person prenatal visits is checking of blood pressure to diagnose and treat preeclampsia, a leading cause of maternal mortality. This can be done even at home and supervised through telemedicine. Measuring weight beyond the first prenatal visit has not been shown to improve outcomes. Listening to fetal heart tones has also not been shown to change pregnancy outcomes. There is insufficient evidence that abdominal palpation or measuring SFH improves pregnancy outcomes. However, of late Turrentine *et al.* have proposed a drive-through prenatal care model where blood pressure measurements, fetal heart rate assessment, and selected ultrasound-based observations along with face-to-face doctor–patient interaction can occur with the pregnant women remaining in her private vehicle. This model also has the potential to reduce patient anxiety due to restricted antenatal visits.[10]

During this pandemic of COVID-19, some Australian hospitals have decided to reduce the in-person antenatal visits to only three for low-risk women throughout their entire pregnancy.[11] Those visits are linked to key immunisations:

- The first antenatal visit to coincide with the delivery of the influenza vaccine

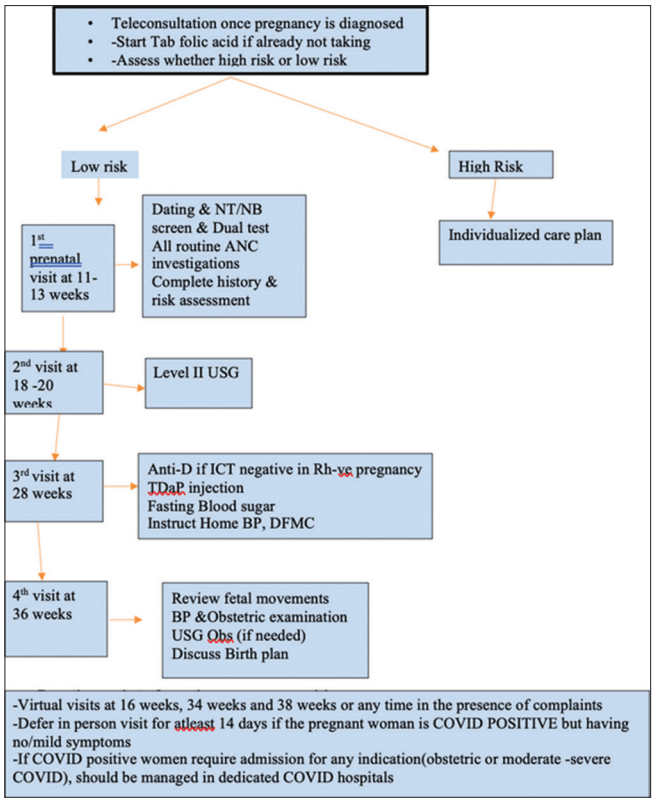

Diagram 1: Schematic diagram to represent a proposed schedule for antenatal care in low-risk women

- The second appointment at 28 weeks to include the pertussis vaccine
- The third appointment between 34 and 37 weeks to include an ultrasound for fetal position and biometry.

Similarly, because of the COVID-19 pandemic, in-person prenatal care at an American hospital has now been reduced to an initial prenatal visit, an anatomy ultrasound, and the 28-, 36-, and 39-week visits. All labs tests are to be conducted during these visits, rather than in separate appointments.[12]

Home monitoring of blood pressure, weight, urine protein, and glucose can be an alternative to some antenatal visits in low-risk patients. Pregnant women can also measure their fundal height starting at 20 weeks when the fundus should be at the level of the umbilicus. They can even mark their fundus after passing urine and send their photos so that doctors can see the progression.

The usual antenatal blood tests can be done normally at one of the antenatal visits, except for testing for gestational diabetes mellitus (GDM). Oral glucose tolerance test (OGTT) done usually between 24 and 28 weeks' gestation involves a follow-up blood test 2 h after the fasting sample. However, this waiting period is not ideal at the time of the pandemic. Hence, low-risk women can have a fasting blood sugar level performed at the 26–28-week while high-risk women can have glycosylated haemoglobin (HbA1C) test instead of an OGTT during the first trimester.

Healthcare providers can do their telehealth visit the day before their face-to-face visit. Those telehealth appointments should cover the majority of what is needed to be discussed, thereby limiting the time required for the follow-up face-to-face interaction to less than 15 minutes.

For the care of pregnant women at high risk, including obstetrical risks, fetal risks, medical comorbidities, or psychosocial issues, an individualized care plan should be created to determine the schedule of visits. All the visits need not be face-to-face consultations. A schedule for antenatal care during the COVID-19 pandemic is proposed as shown in Diagram 1.

2. **Remote and Distance Care With Telemedicine**

Telemedicine can play a vital role in revamping health care systems during the surge of COVID-19 cases. The Medical Council of India, in partnership with the Government of India, recently released the telemedicine practice guidelines to enable any registered medical practitioner to practice telemedicine safely.[13] Although such digital technologies have existed for decades and are already at advanced stages of adoption in medical sciences like radiology, pathology, and ophthalmology, they have been minimally explored for obstetric care. Online antenatal education resources and real-time synchronous telecommunication through various tools of telemedicine like video, audio, or chat-based platforms like WhatsApp and Google Hangouts can be utilized to provide support from experienced healthcare providers well trained in communication skills.[14] In the setting of country lockdowns to contain the spreading pandemic, information on antenatal care can also be accessed through trusted official hospital websites.

Digital health apps can serve a promising role in pregnant women. A mobile health app may enable provision as well as the integration of prenatal care with other aspects of their family and professional life. Furthermore, the majority of prenatal care visits are scheduled to exchange educational information with the patient; pregnant women may be more receptive to educational programs that can be delivered through a mobile health app. In-person visits for weight and blood pressure measurement are also especially amenable to communication via mobile technology or remote monitors. Developing such an app for antenatal care during this COVID pandemic can achieve milestones for obstetric care providers.[15]

Telemedicine can also be used to educate pregnant women about preventive measures like isolation of ill persons, voluntary quarantine of households with sick persons, and social distancing techniques to limit exposure to infected persons. However, these measures present unique challenges for pregnant women. They can be guided through telemedicine on how to protect themselves from becoming infected if they are quarantined with or directly providing care for ill persons. Also, they can be reassured that COVID-19 infection is not necessarily an indication for delivery as the risk of vertical transmission is not yet proven.

3. **Telephone triage**

Telephone triage can be utilized to prevent women from visiting hospitals unnecessarily. The services of senior experienced, trustworthy health care providers with excellent communication skills could be more effective in reassuring patients and reducing the number of unnecessary patient visits than would other providers. Virtual triage also allows us to obtain more history, trace contacts, and discuss recent travel. If a pregnant woman requires testing for COVID infection, the triage facility may aid her in getting to the right location and also allows time for the infection prevention team to prepare at the facility. It can also be utilized to defer prenatal care for at least 2 weeks if a pregnant woman is found positive.

4**. Utilization of the private sector**

While the government hospitals may be redesigned to provide care to ill persons affected during the pandemic, routine antenatal care services can be provided by the private sector utilizing telemedicine. However, they should adhere to all the recommendations enlisted in the telemedicine practice guidelines of the country both to maintain the privacy and confidentiality of the patient as well as to safeguard themselves from the existing laws.

5**. Online help groups** can be made where patients can be peer mentors and share their lived experiences with pregnant women. These mentors, besides helping them for home monitoring of their pregnancy, can also guide them to recognize any danger signs. Such online groups can prove to be instrumental not only during periods of lockdown but also can contribute outside of the pandemic by providing extra support and reassurance to pregnant women.

6. Utilization of outreach facility for antenatal care

In countries where healthcare delivery is based on the provision of outreach services by ASHAs or ANMs, routine antenatal care can be provided without any hassles. They can allocate fixed day services in their area while ensuring adherence to social distancing norms. They can even create awareness in their community about the need for reducing the number of antenatal visits and mobilise women only in small batches of 3–4 to peripheral health centres to avoid overcrowding. They can even list and follow up high-risk pregnancies to ensure early detection of complications, referral, and follow up. Each pregnant woman, with the help of ASHA, can be linked with the appropriate health facility for delivery. All districts should identify and communicate to peripheral facilities a list of functional and adequately staffed centres where high-risk pregnancies and women who develop complications can be shifted.

Antenatal care during the last trimester requires prioritisation. Telephonic contact should be made by ASHAs/ANMs to high-risk pregnant women during the last trimester to ascertain

their status and home-based follow up if necessary. Home visits by ASHA with all protective measures may also provide them with the opportunity to distribute iron, folic acid, and calcium tablets to pregnant women. In the case of home deliveries, immediate visits can be made by ANM to assess the health of the woman and new-born.

Conclusion

Outbreaks of infectious diseases pose unique challenges for obstetric care facilities. Denying essential health services like outpatient antenatal care and inpatient delivery services during a pandemic can have severe implications for maternal and fetal health. Social distancing and countrywide lockdowns have proven their role in slowing down the viral transmission giving time to revamp the health system for the pandemic. Healthcare facilities need to develop plans to minimize exposure of healthy pregnant women while continuing to provide both routine and emergency obstetric care. A strategy to reduce the number of antenatal visits and segregation of place for care and delivery of pregnant women with confirmed COVID or recent exposure from healthy pregnant women might minimise the risk of infection. Intelligent and smart use of technology like telemedicine, which has been used for chronic illness since long, can be incorporated for the care of the obstetric population. Furthermore, triaging of pregnant women based on their period of gestation and their symptoms have the potential to avoid the risk of exposure while ensuring that pregnant women most in need of attention receive care. Lastly, a collaborative work-model involving health workers in the community and the regional levels of health centres also has the potential to prevent the catastrophic collapse of obstetric care services during any pandemic like COVID-19.

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Conflicts of interest

There are no conflicts of interest.

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