

Optimizing mother–baby wellness during the 2019 coronavirus disease pandemic: A case for telemedicine

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Abstract

Background: The 2019 coronavirus disease pandemic poses unique challenges to healthcare delivery. To limit the exposure of providers and patients to severe acute respiratory syndrome coronavirus 2, the Centers for Disease Control and Prevention encourages providers to use telehealth platforms whenever possible. Given the maternal mortality crisis in the United States and the compounding 2019 coronavirus disease public health emergency, continued access to quality preconception, prenatal, intrapartum, and postpartum care are essential to the health and well-being of mother and baby.

Objective: This commentary explores unique opportunities to optimize virtual obstetric care for low-risk and high-risk mothers at each stage of pregnancy.

Methods: In this review paper, we present evidence-based literature and tools from first-hand experience implementing telemedicine in obstetric care clinics during the pandemic.

Results: Using the best evidence-based practices with telemedicine, health care providers can deliver care in the safest, most respectful, and appropriate way possible while providing the critical support necessary in pregnancy. In reviewing the literature, several studies endorse the implementation of specific tools outlined in this article, to facilitate the implementation of telemedicine. From a quality improvement standpoint, evidence-based telemedicine provides a solution for overburdened healthcare systems, greater confidentiality for obstetric services, and a personalized avenue for health care providers to meet maternal health needs in the pandemic.

Conclusion: During the COVID-19 pandemic, continued access to quality prenatal, intrapartum, and postpartum care are essential to the health and well-being of mother and baby.

Keywords

obstetric care, pregnancy, smartphone app, telemedicine, virtual visit

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Introduction

According to the Centers for Disease Control and Prevention (CDC), there was a decrease in patients seeking medical care at the peak of the 2019 coronavirus disease (COVID-19) pandemic.¹ In a small, single-center study, Khalil et al. also documented an increase in the incidence of stillbirths during the pandemic period that is not as a result of COVID-19 infection.² One of the theories postulated is that patients may not be attending prenatal care as scheduled or may not be calling provider with concerns such as decreased fetal movements, for fear of contracting COVID-19 or adding to the National Health

Service Burden.² Although the Khalil study was limited in scope, it is worrisome that there is a decline in prenatal

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Table 1. Obstetric traditional versus telemedicine model.

Gestation (weeks)	Consultation details	Traditional visit schedule	Virtual model
Initial Obstetric visit	<ul style="list-style-type: none"> – Pregnancy confirmed – Orientation – Blood work 	In-person	<ul style="list-style-type: none"> – In-person or drive-thru labs – Virtual visit – Smartphone apps – Wearable technology
11–14	<ul style="list-style-type: none"> – Aneuploidy screening 	In-person	<ul style="list-style-type: none"> – In-person or drive-thru ultrasound – Drive-thru labs – Virtual visit with results
18–20	<ul style="list-style-type: none"> – Anatomy scan 	In-person	<ul style="list-style-type: none"> – In-person or drive-thru ultrasound followed by virtual communication
24	<ul style="list-style-type: none"> – Obstetric visit 	In-person	<ul style="list-style-type: none"> – Virtual visit
28–30	<ul style="list-style-type: none"> – I-h GCT – Anti-D immunoglobulin – Vaccines – Delivery consents 	In-person	<ul style="list-style-type: none"> – In-person or drive-thru virtual consultations with advanced care providers – Wearable technology
32	<ul style="list-style-type: none"> – Obstetric visit 	In-person	<ul style="list-style-type: none"> – Virtual visit
34	<ul style="list-style-type: none"> – Obstetric visit 	In-person	<ul style="list-style-type: none"> – Virtual visit
36–37	<ul style="list-style-type: none"> – GBS screen – Cervical exam – Discuss C-section/induction – Delivery consents 	In-person	<ul style="list-style-type: none"> – In-person – Wearable technology
40–42	<ul style="list-style-type: none"> – Discuss induction 	In-person	<ul style="list-style-type: none"> – In-person
Postpartum	<ul style="list-style-type: none"> – Discuss mother and baby needs 	In-person	<ul style="list-style-type: none"> – Virtual visit

GCT: glucose challenge test; GBS: Group B streptococcus.

Providers make phone calls to patients intermittently to ensure total care coverage throughout the pregnancy. Depending on the institution, patients may be given fetal monitoring device and a blood pressure monitoring kit.

visit attendance, given the overall rise in pregnancy-related mortality in the United States.^{2,3}

Telehealth may offer a panacea. It is associated with improvements in obstetric outcomes, perinatal smoking cessation, breastfeeding, early access to medical abortion services, and schedule optimization for high-risk obstetric patients.⁴ Telehealth also removes barriers to in-person healthcare access, such as lack of childcare support, work limitations, and poor access to transportation.⁵ Since the pandemic started, federal officials have announced almost US\$12 million in grants aimed at expanding access to telehealth services in rural parts of the country and promote education about best practices for primary care providers across the United States.⁶

The field of reproductive medicine has an advantageous lead in the use of technology to enhance medical care. Smartphone apps for fertility tracking, menstrual cycles, and pregnancy rank among the most popular medical apps in our smartphone-driven world.⁷ Clinicians can conveniently capitalize on apps to connect with their patients, disseminate important obstetric information, improve clinical decision making, and enhance pregnancy-related outcomes.⁸

Preconception care

Preconception care provides a unique window of opportunity to identify, prevent, and treat modifiable risk factors to optimize the health of couples trying to become pregnant.⁹ Interventions that focus solely on pregnancy may be too

narrow and miss early opportunities to reduce perinatal morbidity and mortality.^{10,11} For instance, preconception folic acid supplementation prevents neural tube defects, and cessation of teratogenic medications such as oral isotretinoin is crucial for fetal health.^{12–14} Other health risks such as alcohol, tobacco, substance use, nutritional deficiencies, obesity, diabetes, hypertension, asthma, and known genetic diseases demand attention in the preconception period.^{11,15,16} For these chronic health issues, telemedicine offers opportunities for more accurate and continuous monitoring (i.e. automatic reporting versus requesting patient-recorded data) and can simulate frequent direct contact with health providers for improved behavioral outcomes.¹⁶ Previous studies have shown that smartphone apps and virtual coaching platforms overcome the time and cost barriers of in-person counseling and visits, while providing individual, tailored, and continuous information on a large scale.^{17–19}

Prenatal care

The goal of prenatal care is to ensure that pregnancy ends with a healthy mother and baby.²⁰ The typical prenatal care schedule averages 12 to 14 visits.²¹ These visits consist of patient education, serial screening, diagnostic tests, and evaluation of the pregnant woman for underlying medical conditions that may require further investigation and management.⁴ The premise for telehealth in the prenatal period is to ensure that pregnant women do not miss crucial

Table 2. Utilizing telehealth over the continuum of pregnancy.

Prenatal	Intrapartum	Postpartum
<ul style="list-style-type: none"> Smartphone apps^{a,31,32} <ul style="list-style-type: none"> Ngala Healthy You, Healthy Baby App Pregnancy+[®] Ovia Pregnancy Tracker App[®] My South West Sydney Baby Pregnancy Journey[®] Sprout Pregnancy[®] The Bump Pregnancy Guide SmartQuit[®] (smoking cessation) Virtual Consult^b <ul style="list-style-type: none"> On Demand: <i>American Well Platform</i> Scheduled: <i>MyChart/Zoom</i>[®] Integrated visits: FaceTime/Google Meet Drive-thru visit Ultrasound scans 	<ul style="list-style-type: none"> Virtual Doula Services Virtual ICU <ul style="list-style-type: none"> Multidisciplinary Tele-monitoring of mother and baby e-Consult (Peer-to-Peer) Virtual family visitation 	<ul style="list-style-type: none"> Virtual lactation classes <ul style="list-style-type: none"> Over the Moon Parenting by Tufts Medical Center in Boston Evidence-based mental health, social support, parenting, and resilience building resources <ul style="list-style-type: none"> SAMHSA's National Helpline (English/Spanish) The MGH PDS BetterHelp[®] Therapy for Black Girls[®] ROSE (for mothers of newborns) by Brown University³³ Mother and Baby Virtual Curriculum by Northwestern University Headspace[®] Talkspace[®] HelloJoey Parenting App[®] Maternal nutrition and healthy lifestyle apps <ul style="list-style-type: none"> Ngala Healthy You, Healthy Baby App¹⁸ Virtual Mom and Baby Groups <ul style="list-style-type: none"> OBNeSt by the Mayo Clinic Over the Moon Parenting
<ul style="list-style-type: none"> Wearable technology <ul style="list-style-type: none"> Remote monitoring: Fetal non-stress tests Virtual tours of Labor and Delivery Floors before delivery date 		

ICU: intensive care unit; SAMHSA: Substance Abuse and Mental Health Services Administration; MGH PDS: Massachusetts General Hospital Perinatal Depression Scale; ROSE: Reach Out, Stay Strong Essentials; MARS: Mobile Application Rating Scale.

^aThese smartphone apps scored the highest in terms of quality on the MARS as documented in clinical trials, systematic reviews, and meta-analyses.^{31,32}

^bThese technologies must use end-to-end encryption or be integrated with the healthcare system and electronic medical record to ensure no violations to the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

appointments and information about their pregnancy. Telehealth decreases the frequency of in-person visits without diminishing the quality of care (Table 1).

In a recent study, patients who utilized a virtual-care model to receive one-third of their antenatal visits in a videoconference reported significantly higher mean satisfaction scores than those who received 12 to 14 face-to-face visits in clinic with their physician/midwife.²² Other studies show that mothers who already have children, and mothers who are partnered, embraced virtual-care models significantly more than those experiencing pregnancy for the first time.²³

There is more to telehealth than virtual visits (Table 2). Telehealth could assist with patient monitoring, education, and information. In 2017 and 2018, Apple, Inc., collaborated with Stanford School of Medicine to develop atrial fibrillation detection software compatible with the Apple Watch product. The use of wearable technology to aid physicians in

diagnoses, ultimately optimizing healthcare delivery,²⁴ must be harnessed during this pandemic to monitor and generate data. Obstetrician-gynecologists should consider harnessing smartphones and wearable technologies for non-invasive monitoring of pregnant women such as non-stress tests (NSTs), maternal vitals, and fetal vitals. Several studies document the safety and utility of wearable devices in obstetrics, and some of these mobile technologies are already available on the market or undergoing evaluation for Food and Drug Administration (FDA) approval.^{25–27} These smart apps may provide a more pragmatic approach to healthcare monitoring. In addition, they may provide more reliable information than sometimes based on patient's own recall of self-monitoring values and may be harnessed for research purposes in the future. For instance, home blood pressure monitoring (a telehealth intervention) has been well documented and can be an effective tool for monitoring hypertensive diseases of pregnancy.^{28–30}

Intrapartum care

The birth of a baby is a special moment in most families and with the restriction in visitors during the pandemic, telehealth can allow families to celebrate this special moment. Before delivery dates, virtual tours of hospital facilities can help familiarize patients with their delivery process and hospital staff, thereby reducing patient anxiety. Licensed counselors and health practitioners can offer virtual classes for new parents in preparation for the newborn. Physicians too can think of innovative ways to create virtual support for laboring mothers by using a “virtual Doula” via audiovisual technology to bring close family and friends together at the time of labor while maintaining adequate social distancing and patient privacy during a very intimate moment.

While previous literature focuses on the use of telehealth for low-risk mothers, maternal fetal medicine specialists can use technology to monitor high-risk mothers as well. In 2016, Leovic et al. proposed the concept of “the virtual intensive care unit (ICU)” for the critically ill obstetric patient.³⁴ In this model, the ICU no longer refers to a fixed physical location on the labor and delivery wards.³⁵ Instead, it reflects a mobile, multispecialty team capable of providing individualized, patient-centered care, regardless of setting.^{34,35} This model of caring for the critically ill obstetric patient in a setting other than the traditional ICU is especially favorable during the COVID-19 pandemic where ICUs are burdened with the care of COVID-19 patients.³⁶ Separating critically ill obstetric mothers from ICUs caring for COVID patients is essential since emerging evidence from the CDC suggests that pregnant patients with COVID-19 may be at increased risk for ICU admission, mechanical ventilation receipt, and severe illness compared to non-pregnant COVID-19-positive patients.³⁷ To mitigate these risks, clinicians must rethink how we deliver obstetric care and innovatively use technology to reach our patients with excellent medical care. Tele-ICUs allow for continuous remote visualization of patients and confer an advantage relative to the on-call intensivist.³⁸ Tele-ICUs leverage algorithms to predict patient deterioration and facilitate efficient interventions.³⁸ In addition, if the newborn needs to be kept in the neonatal ICU (NICU) due to prematurity or other congenital complications, mothers can continuously be connected in real time, to their isolated babies and vice versa (Table 2).

Postpartum care

Postpartum care may continue up to 12 months after the delivery of the baby. Qualitative studies have shown that new mothers, and their partners, who are discharged early from hospital may experience lack of support, have many doubts, and feel insecure.^{39–41} Since the first-year postpartum carries the highest physiological and psychological morbidity risks, sustaining consistent care for mother and baby is crucial for maternal–child wellness.^{41,42} Virtual check-in and virtual lactation classes with opportunity for

new mothers to call in and ask questions are encouraged. Virtual postpartum visits at the 2-week and 6-week landmark can be arranged with or without drive-through blood pressure checks for high-risk patients (patients with hypertensive disorder in pregnancy), 7 to 10 days postpartum. Self-isolation during the pandemic can worsen risks of postpartum depression. Physicians can recommend evidence-based apps such as Headspace[®] that can help enhance coping mechanisms, meditation, and stress management. Furthermore, multidisciplinary teams of clinicians, psychiatrists, and counselors can partner with such app developers to curate video counseling sessions unique to postpartum mothers. In addition, patients can use evidence-based online therapy platforms such as BetterHelp[®], which accept diverse forms of insurance, thereby increasing access to mental health resources and support.

Discussion

The COVID-19 pandemic propelled many hospitals to strategically expand telehealth services. Although telemedicine provides a convenient and cost-effective patient–doctor interaction, poor patients, patients with low health literacy, and patients in rural areas may not be able to access the technology and equipment necessary for telehealth visits.⁴³ In addition, imaging tests and blood work cannot be done remotely and still require in-person visits.⁴³ Furthermore, despite telehealth’s rapid expansion during the COVID-19 era, there are still legal and regulatory issues such as licensing, credentialing, malpractice insurance, reimbursement, billing, and data transmission privacy, complicating its implementation.⁴⁴ In spite of these barriers, studies show that telemedicine can be effectively implemented in rural and even disaster settings.⁴⁵ The proliferation of smartphones even in rural areas provides an opportunity for greater access to obstetric care and improved clinical outcomes such as reduced infant and maternal morbidity and mortality, through synchronous or asynchronous telemedicine.⁴⁶ Free apps such as Doximity[®], FaceTime[®], and EPIC[®] provide a convenient and secure way to host telehealth visits using smart devices. Therefore, by using best practices and evidence-based resources, successful obstetric and gynecological telehealth services can be developed in remote areas.⁴⁴

How to initiate and advocate for telehealth

Every new initiative needs a champion or advocate. The first step to implementing telehealth in obstetric practice is to recognize leaders with a passion for and experience with virtual tools to champion telehealth. Some hospitals have created the role of “Telehealth Champions,” to support physician and advanced practice provider telehealth adoption. Telehealth Champions are responsible for hosting educational workshops, communicating with providers, organizing resources, and reassessing their departments’ technical

Table 3. Pearls for implementing telehealth.

Key takeaways

- Select a telehealth advocacy team
Recognize leaders with a passion for and experience with virtual tools to champion telehealth.
- Decide the scope of implementation
Does the hospital intend to use telehealth for only ambulatory services, or would telemedicine include in-patient services?
- Perform continuous education
Continuously educate healthcare providers and patients about protected health information.
- Identify opportunities to enhance quality, clinical efficiency, and patient experience
Collaborate with other teams and services and look for avenues for growth and expansion such as peer-to-peer consult or e-Consult services.

needs. The next phase of telehealth implementation is to determine the scope of telehealth services a hospital can offer (ambulatory, in-patient, or both). Once these decisions have been made, the focus should be to continuously educate healthcare providers and patients about protected health information and virtual visit guidelines. Finally, providers must constantly identify avenues for growth and expansion of the quality, outcomes, clinical efficiency, and virtual patient experience by collaborating with other teams and services through peer-to-peer consults or e-Consult services. In Table 3, we summarize these evidence-based pearls for clinicians seeking to expand or implement telehealth services to optimize care for their obstetric patients.

Conclusion

More than any other crisis in modern history, the COVID-19 pandemic has transformed how we deliver care. Poor or lack of prenatal care could be detrimental to mother and baby. In this article, we show that the idea that telemedicine only lends itself to virtual interviewing is untrue. Telemedicine offers clinicians the opportunity for a paradigm shift in how we deliver excellent obstetric care. From a quality improvement standpoint, telemedicine provides a solution for overburdened healthcare systems, greater confidentiality for obstetric services, and an avenue to meet maternal health needs in the pandemic. Using technology and evidence-based strategies to prioritize women's health, obstetrician-gynecologists can deliver care in the safest, most respectful, and appropriate way possible while providing the critical support necessary in pregnancy.

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