NCPD **2.5 ANCC Contact Hours**

TELEHEALTH TO IMPROVE PERINATAL CARE ACCESS

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Abstract

The United States has the worst maternal mortality rate of peer countries. Since 1935, the maternal mortality risk among Black women has remained three to four times higher than that of White women. Perinatal health care is not available in all areas, which limits the access for certain groups. Many women in the United States live in maternity care deserts with no access to obstetric providers, whereas others live in areas with very limited access. One way to bridge the gap between effective perinatal care and access to care is use of telehealth. Telehealth allows health care providers to communicate directly with patients that cannot physically be seen in a clinic or hospital. Telehealth is endorsed by the American College of Obstetricians and Gynecologists as an alternate mode to deliver prenatal and postpartum services. The potential for telehealth services as part of perinatal care to reduce maternal and neonatal morbidity and mortality by improving access to care is presented.

Key words: Health services accessibility; Maternal health services; Perinatal; Pregnancy; Telemedicine; Vulnerable populations.

Context of Risk of Adverse Maternity Outcomes

Telehealth is an effective strategy to address health disparities among rural or underserved populations (Weigel et al., 2020). The Coronavirus (COVID-19) pandemic has affected access to care for many patients and highlighted the importance that aspects of telehealth should be incorporated into standard care. Factors such as level of education, socioeconomic status, gender, and ethnicity have a direct impact on societal health (World Health Organization [WHO], 2018). In the United States, these factors disproportionately affect Black, Hispanic, and Indigenous American women in low-income areas (Weigel et al., 2020). Women and children living in poverty are at increased risk of mental, physical, emotional, and behavioral health problems (Hill et al., 2012). As per the U.S. Census Bureau, in 2020, the poverty rate was 11.4%, up from 10.5% in 2019 (Shrider et al., 2021). Poverty thresholds are updated annually for inflation using the Consumer Price Index and are based on a set of dollar value thresholds that vary by family size and composition (Shrider et al., 2021). Nearly half (44.6%) of those living in poverty are classified as a member of a minority group, and approximately one-quarter (23.2%) live outside principal cities and metropolitan areas (Shrider et al., 2021).

From 1990 to 2015, the global maternal mortality rate decreased by 44% (UNICEF, 2019). In contrast, maternal mortality in the United States has steadily increased (MacDorman et al., 2016). From 2000 to 2014, the U.S. maternal mortality rate increased by 26% (MacDorman et al., 2016). In 2019, the maternal mortality rate was 20.1 deaths per 100,000 births, an increase from 2018, which was 17.4 deaths per 100,000 (Hoyert, 2021; Hoyert, & Miniño, 2020). The upward trend continued in 2020; maternal mortality rate for 2020 was 23.8 deaths per 100,000 live births (Hoyert, 2022).

The rising maternal mortality rate is an indicator of health and socioeconomic development and reflective of existing disparities in health care (Weigel et al., 2020). The number of pregnancy-related deaths has received international and national attention and efforts to eliminate inequities related to access, quality, and outcomes of care (Aspen Health Strategy Group, 2021).

Racial and ethnic disparities in maternal mortality were first noted in 1935 and continue today (United States Department of Health and Human Services [US DHHS], 2010; US Department of Health and Human Services, 2018). From 1935 to 2007, the maternal mortality risk among Black women was three to four times higher than White women (US DHHS, 2010). Current data reflect very little change. In 2020, the maternal mortality rate for non-Hispanic Black women was 55.3 deaths per 100,000 live births, 2.9 times the rate for non-Hispanic White women, which was 19.1 deaths per 100,000 live births (Hoyert, 2022). Individual biases, stereotyping, prejudice, and clinical uncertainty of health care providers play an integral role in widening the disparity gap (Office of Disease Prevention and Health Promotion, 2022). Structural and systematic racism imbedded in the health care system have a negative effect on minoritized childbearing women (Aspen Health Strategy Group, 2021).

In 2021, the U.S. population was estimated to be 332 million people (United States Census Bureau, 2022). Almost half (42.1%) of the U.S. population declared a racial or ethnic minority group (United States Census Bureau, 2022). U.S. Census Bureau data did not stratify by childbearing age; however, 50.8% of the population identified as female (United States Census Bureau, 2022). Of the 97% of rural lands across the nation, only 19.3% is inhabited (United States Census Bureau, 2022). The geographical difference in the United States further potentiates disparities in health and access to health care. Compared with urban areas, the risks for poorer health outcomes in rural populations are associated with "lower median household incomes, a higher percentage of children living in poverty, fewer adults with postsecondary educations, more uninsured residents under age 65, and higher rates of mortality" (Association of American Medical Colleges, 2017, p. 2). Additional barriers to health care access among rural populations include lack of preventive and screening services, primary care services, timely urgent and emergent services, distance and transportation, social stigma and privacy issues, and health literacy (Rural Health Information Hub, 2019). In 2020, 2.2 million women of childbearing age were estimated to reside in maternity care deserts (March of Dimes, 2020). Maternity deserts refer to counties with limited or no access to maternal health services, that is, hospital with obstetrical care, birth center, obstetrical provider (March of Dimes, 2020). Almost 5 million women of childbearing age live in areas with limited access to maternal services (March of Dimes, 2020). However, the addition of birth centers led a shift to a higher level access of care for 6% of counties in the United States (March of Dimes, 2020).

Efforts to Improve Access and Quality

In the 1970s, the designations of Medically Underserved Areas/Populations (MUA/Ps) and Health Professional Shortage Areas (HPSA) were established to identify areas and populations with access challenges and require federal government assistance, and to describe and assess community needs (Health Resources and Services Administration [HRSA], 2010). MUA/Ps are defined as areas or populations with limited primary care providers, high infant mortality rate, high poverty, or a high elderly population (HRSA, 2021a). Distribution of federal resources is prioritized and focused on areas of highest need. HPSA is the sister program to MUA/Ps. The designation of HPSA indicates shortages in primary care, dental, and mental health providers, and may be addressed in terms of geographic area, population groups, and facilities (HRSA, 2021b). Shortage designation is based upon eligibility and scoring of standard national data sets, National Provider Identifier for provider data,

Environmental System Research Institute for mapping data, census for demographic data, and Centers for Disease Control and Prevention National Vital Statistics for health-related data (HRSA, 2020a). Designation type may prompt additional health and demographic data (HRSA, 2020a). In October 2018, there were 6,893 designated HPSAs in primary care (HRSA, 2021b). Of which, 65% were classified as rural or partially rural (HRSA, 2021b). For a population greater than 37 million, HRSA indicates 6,449 providers are needed to remove the designation status (HRSA, 2021b).

Patterns of use and demand for primary care services indicate an estimated 35,000 to 124,000 deficit of primary and specialty care physicians by 2034 (Association of American Medical Colleges, 2021). The number of primary care nurse practitioners and physician assistants is expected to grow far more rapidly. In 2010, the supply of primary care nurse practitioners and primary care physician assistants was projected to increase by 17% in 2020 (HRSA, 2020b). The increased supply of primary care providers is a mitigating strategy in the wake of primary care physician shortages.

Efforts to measure the quality of care in obstetrics has been challenging. Many of the traditional obstetric indicators have been deemed poor markers due to infrequent occurrence, substantial risk-adjustment, and lack of association with opportunities for process improvement (Howell & Zeitlin, 2017). For maternal mortality, there are no quality measures to gain greater appreciation about the persistent racial and ethnic disparities. Until the identification of quality measures sensitive to disparities in obstetrics, some experts recommend stratifying quality information by race, ethnicity, and other sociodemographic data to track and improve the overall health of a population; classifying racial and ethnic disparities using quality of care framework such as overuse, underuse, and misuse to understand baseline and identify realistic target goals; and establishing an expanded set of quality measures in obstetrics to track and reduce disparities (Howell & Zeitlin, 2017).

Telemedicine and Telehealth

Definition of Terms

The terms telemedicine and telehealth are often used interchangeably. However, telemedicine refers to two-way communication between health care providers, for example, grand rounds via videoconference, radiology transmissions for consultation to a specialist (US DHSS, 2016). Whereas telehealth expands beyond technology to include any electronic means to collect and transmit patient health information for management of health conditions, such as direct, mobile apps, activity trackers, blood glucose monitors (US DHHS, 2016). In this discussion, the appropriate term depicting a health technology used to bridge the gap between patients and health care professionals is telehealth.

Telehealth is comprised of four basic components: *live video* (interaction between the provider and the patient via videoconferencing, telephone or home health monitoring device); *store and forward* (asynchronous interaction between two providers on specialized needed treatment for the patient); *remote patient monitoring* (method used to monitor medical and health data of a patient from a distance continuously or periodically by some form of media); and *mHealth* (use of mobile devices such as cell phones and tablets to deliver established health care, public health practices, and health education (US DHHS, 2016).

Since 1935, the maternal mortality rate among Black women has remained three to four times higher than that of White women.

Evolution of Telehealth

Telehealth has evolved since its inception in the early 1900s where radios were used to communicate medical advice to clinics aboard ships (Institute of Medicine [IOM], 2012). As technology advanced, ancillary services capitalized upon teleradiology, telepathology, and telepharmacology services (IOM, 2012). In 1950–1960, hospital-based telemedicine was established using closed-circuit television links to communicate medical advice (IOM, 2012). The COVID-19 pandemic sparked a dramatic increase in telehealth use; however, reports have indicated inequity of access to telehealth based upon geographical locations and population subgroups (Karimi et al., 2022).

Advances in telecommunication technology and adoption of smartphone technology have been speculated as major contributors to increased use. Functionality and convenience have contributed to the increasing popularity and affordability. In the United States, lower socioeconomic status is associated with smartphone-only households due to fewer devices and increased opportunities for connectivity (Pew Research, 2022). Nearly 97% of Americans own a smartphone, 92% have a computer, and 85% have internet access (Pew Research Center, 2021). Smartphone technology has improved patient-provider interaction, improved quality of care, and demonstrated cost savings. "Telehealth technologies can enhance patient-physician collaborations, increase access to care, improve health outcomes by enabling timely care interventions, and decrease costs when utilized as a component of, and coordinated with, longitudinal care" (American Academy of Family Physicians, 2021, p. 1). Use of telehealth services is changing the landscape for health care delivery. In mental health, integration of telemedicine for providers and patients has been associated with ease and convenience, increased access to care, fewer missed appointments, the ability to expand reach new clients, and appropriate customization of care (Health IT Outcomes, 2017). Telehealth and telemedicine programs can be a successful strategy in perinatal care to improve patient outcomes, address the workforce shortages, and reduce health disparities.

The rising demand for accessible health care in remote locations, telecommunication technology advances, and aim to identify cost reduction measures have sparked significant market growth. In the United States, over 90% of health care organizations have implemented or are beginning telemedicine programs (Pew Research, 2022). Implementation has also triggered legislative and policymaker engagement on insurance coverage and reimbursement for telehealth services. Today, all 50 states and the District of Columbia provide some form of reimbursement for telehealth (National Telehealth Policy Resource Center, 2021). With over half of the nation (58%) providing reimbursement for remote patient monitoring, and 44% providing reimbursement for store-and-forward and audio-only telephone (National Telehealth Policy Resource Center, 2021). The proportion of reimbursement may vary due to ambiguity and interpretation of defining telehealth. Use of telehealth services remains a favorable and innovative solution in the efforts to address the racial and ethnic disparities associated with maternal mortality.

Telehealth in Perinatal Care

By virtue of growing up in a digital age, women of childbearing age are frequent users of the internet, social media, and smartphone apps. A systematic review to evaluate effectiveness of electronic health (eHealth) technology in perinatal care included 71 articles categorized in six areas, information and eHealth use, lifestyle, gestational diabetes, mental health, low- and middle-income countries, and telemonitoring or teleconsulting (van den Heuvel et al., 2018). Authors concluded use of apps and individualized text messages were effective, and preferred, to ensure engagement; use of apps and text messaging led to decreased gestational weight gain, increased step count, and increased smoking abstinence teleconsulting (van den Heuvel et al., 2018). eHealth interventions such as remote blood glucose management and telephone screening for postpartum depression were considered appropriate alternatives to the standard face-to-face encounter teleconsulting (van den Heuvel et al., 2018). However, additional research is needed to determine the efficacy of home monitoring in the high-risk obstetrical population teleconsulting (van den Heuvel et al., 2018).

Telemedicine has played an integral role in perinatal regionalization. The "birth" of the neonatology specialty and increased infant mortality risk associated with births outside level III hospitals were factors in developing and promoting perinatal regionalization (American Academy of Pediatrics [AAP], 2012). Benefits of coordinated continuum of care are well-documented, increased neonatal survivability, centralization of costly resources and technologies, and opportunities for collaboration to build clinical expertise (AAP & American College of Obstetricians and Gynecologists [ACOG], 2017). The implementation of telemedicine into perinatal regionalization has improved communication and collaborative efforts (Nesmith et al., 2020). However, there is limited research evaluating the outcomes of telemedicine collaboration and regionalization of perinatal care (Kim et al., 2014).

An early study from Arkansas to evaluate effects of telemedicine on decreasing statewide infant mortality and decreasing the number of very low birthweight (VLBW, <1,500 g) babies in hospitals without a neonatal intensive care unit used a prospective study design, with pre- and postassessment, for nine obstetric and nursery sites across the state (Kim et al., 2014). Participants had 4 months to establish connectivity and training with the community hospitals, then the telemedicine program was implemented for 9 months (Kim et al., 2014). They did not account for demographics beyond birthweight, specific morbidities associated with VLBW, and hospital capabilities. Using Medicaid claims, the number of VLBW babies born in hospitals with telemedicine decreased from 50 to 27 during the study period, whereas there was no significant change in the percentage of VLBW babies born at hospitals without telemedicine (Kim et al., 2014).

Generally, a woman with an uncomplicated pregnancy, who begins prenatal care at 6 weeks of gestation and the last visit is at 40 weeks, will have 15 prenatal visits (Zolotor & Carlough, 2014). ACOG's (2018) current model recommends 12 to 14 prenatal visits for an uncomplicated pregnancy. The number of prenatal visits is based upon maternal and fetal health status, weeks of gestation at first prenatal visit, and estimated due date (Zolotor & Carlough, 2014).

The American Academy of Family Physicians recommends a bathroom scale, blood pressure monitor, fetal Doppler monitor, smartphone, tablet, or computer with video camera and microphone, and internet connect for all telehealth prenatal visits (Zolotor & Carlough, 2014). Within 24 to 48 hours of the scheduled telehealth prenatal visit, the pregnant woman can record and upload her weight, blood pressure, and fetal heart tones to her health care provider using an online patient portal (Zolotor & Carlough, 2014). In many instances, equipment may be supplied by the health care system, or can be purchased for a reasonable cost. ACOG (2020) offers guidance on telehealth including legal and regulatory issues, billing and payment, and requirements for providing telehealth services.

Nelson and Holschuh (2021) conducted a pilot study to evaluate the satisfaction of a telehealth hybrid care model for a cohort of 22 pregnant women and a cohort of 6 obstetrical providers. The hybrid model was defined as the conventional schedule of prenatal visits; however, included addition of telehealth encounters offered for patient convenience (Nelson & Holschuh, 2021). Patients were willing to learn how to successfully take their own blood pressure and use the fetal Doppler ultrasound (Nelson & Holschuh, 2021). Providers were accepting of the model and felt it promoted partner inclusion (Nelson & Holschuh, 2021). Participation in telehealth during prenatal care was a positive experience for patients and providers (Nelson & Holschuh, 2021).

Reisinger-Kindle et al. (2021) used retrospective chart review to evaluate the rapid implementation of telehealth services for delivery of prenatal and postpartum care during the COVID-19 pandemic in a large urban

academic practice. Before the pandemic, the obstetrical clinic used the traditional prenatal and postpartum care models, in-person visits at the standard interval, however over the pandemic, the percentage of telehealth visits ranged from 42.6% to 69.9% (Reisinger-Kindle et al., 2021). Appointment type was based upon patient preference, medical complexity, and need for in-person services, such as ultrasound or lab work. There was a low rate of video use compared with audio-only telephone encounters, likely due to reported challenges with video platform set-up (Reisinger-Kindle et al., 2021). Eligibility for using telehealth to conduct prenatal care visits was individualized. Results suggest telehealth is feasible for a low-income, Hispanic population (Reisinger-Kindle et al., 2021). The best candidates are women with low-risk pregnancies.

In a study of 1,058 women in Washington state, a program of virtual prenatal visits combined with in-person visits was found to be successful for low-risk women when compared with a cohort of low-risk women with the usual prenatal care (Pflugeisen et al., 2016). The virtual care cohort had 9 in-person visits and 5 videoconference visits prenatally followed by a 2-week postpartum virtual visit, whereas the usual care cohort had 14 in-person prenatal and 1 in-person postpartum visit. Patients had similar outcomes and no safety concerns were identified in the group that participated in virtual prenatal care (Pflugeisen et al., 2016). Virtual prenatal visits were found to be feasible and well accepted by patients and providers (Pflugeisen et al., 2016). Virtual perinatal education, childbirth preparation, and infant care classes initiated because of the COVID-19 pandemic have been found to be a way to share important information with parents and their partners (Pasadino et al., 2021).

Potential Telehealth Effects on Outcomes and Disparities in Perinatal Care

The implication for telehealth extends beyond a state or regional construct. Telehealth is an innovative solution to address health disparities associated with the rising U.S. maternal mortality rate. The fundamental benefits of improved access, cost-effectiveness, improved quality, and patient convenience reinforce the growing demand (American Telemedicine Association, 2022). Recently, HRSA's Maternal and Child Health Bureau announced a $375,000 challenge seeking financial innovative solutions to improve maternal–child health by improving access to care for underserved women (Wicklund, 2018).

In 2016, the Agency for Healthcare Research and Quality created an evidence map to apprise decision makers in clinical practice, policy, and research (Totten et al., 2016). The map of 58 systematic reviews noted a saturation of evidence supporting use of telehealth in remote monitoring, communication, and counseling for patients with several chronic conditions, and for psychotherapy (Totten et al., 2016). They recommended the focus of future research to address implementation and clinical practice (Totten et al., 2016). There is limited research about the effect of telehealth on individual health disparities, maternal morbidity and mortality, and perinatal regionalization (Totten et al., 2016).

SUGGESTED CLINICAL IMPLICATIONS

- Integration of telehealth into the health care system allows patients to access to care who otherwise would not be able to have health care.
- Providing virtual access to health care providers in place of an in-person visit is a feasible way to continue care during the current COVID pandemic.
- Some patients prefer the comfort of their own home for a health care visit and can avoid time and transportation challenges involved in an in-person visit.
- Most patients have access to a smart phone or computer to participate in a virtual health care visit.
- More research is needed to determine if virtual perinatal care can be a routine part of traditional in-person care for women over the course of the childbearing continuum.

Projected shortages in the health profession workforce must be acknowledged and remedied. There must be continuous innovation in the consumer technology market, continuous advancement in electronic health records and clinical-decision support systems, reorganization in the delivery and financing of medical care, and growth of consumerism in health care (Fernandez-Moyano et al., 2018). The health and economic costs of chronic disease highlight a growing crisis. Legislators are actively engaged in the identification of effective solutions to address coverage and reimbursement challenges (Care Innovations, 2022). For many, telehealth has successfully proven its ability to decrease Medicare costs while improving access to care for those in vulnerable populations and remote geographical locations (Care Innovations, 2022). As technology continues to advance, evidence will continue to illustrate the value of telehealth. However, legal and regulatory challenges hinder the ability of health care providers to maximize alternative modes of care delivery to continue addressing health care disparities and the growing burden of chronic disease. For example, most states require a physician to be licensed in the state where the patient is located, thereby creating a challenge for conducting a telehealth encounter across state lines. Whereas the nurse licensure compact allows a nurse to maintain a license in the state of their primary residence and practice in other compact states (National Council of State Boards of Nursing, n.d.). Additional challenges may be credentialing and privileging in telemedicine imposed by the facility and source(s) of payment or reimbursement.

Conclusion

Since 2018, the maternal mortality rate has increased by 35% (Hoyert, 2022). During the COVID-19 pandemic, the rate of pregnancy-related deaths in the United States

increased by 20% (Johnson, 2022). Evidence continues to highlight the widening gap of mortality rates among non-Hispanic Black and Hispanic women. "In 2020, the maternal mortality rate for non-Hispanic Black women was 55.3 deaths per 100,000 live births, 2.9 times the rate for non-Hispanic White women. The increases from 2019 to 2020 for non-Hispanic and Hispanic women were significant. The observed increase from 2019 to 2020 for non-Hispanic White women was not significant. Rates increased with maternal age" (Hoyert, 2022, p. 1).

The COVID-19 pandemic has caused a major acceleration in use of telehealth. The pandemic prompted changes in legislation and reimbursement, thereby reinforcing telehealth as an effective way to increase access to care. Despite the increasing access for many, there are communities and geographical locations that remain plagued by broadband connectivity. Challenges for prenatal care are feasibility for physical exam maneuvers, such as auscultation and palpation, that are essential components of prenatal care. Further research must be conducted to identify causative factors of the increased maternal mortality rate in the United States and the disparities in outcomes being a member of a minoritized group so effective strategies can be developed and initiated to address preventable adverse outcomes for mothers and babies. ✣

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