Title
Statewide assessment of telehealth use for obstetrical care during the COVID-19 pandemic

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Statewide assessment of telehealth use for obstetrical care during the COVID-19 pandemic

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BACKGROUND: The COVID-19 pandemic started a period of rapid transition to telehealth in obstetrical care delivery to maintain social distancing and curb the spread of the virus. The use of telehealth, such as telephone and video visits, remote imaging interpretation, and provider-to-provider consultations, increased in the early months of the pandemic to maintain access to prenatal and postpartum care. Although there is considerable literature on the use of telehealth in obstetrical care, there are limited data on widespread telehealth use among different practice types and patient populations during the pandemic and whether these are preferred technologies.

OBJECTIVE: This study aimed to describe variations in telehealth use for obstetrical care among practices in North Carolina during the COVID-19 pandemic and to outline future preferences and needs for continued telehealth use. This study also aimed to delineate telehealth use among rural and micropolitan and metropolitan practices to better understand if telehealth use varied by practice location.

STUDY DESIGN: A web-based survey was distributed to practice managers of obstetrical practices in North Carolina from June 14, 2020 to September 14, 2020. Practice managers were contacted through assistance of the Community Care of North Carolina Pregnancy Medical Home program. Practice location was defined as rural, micropolitan, or metropolitan based on the county population. The survey assessed telehealth use before and during the COVID-19 pandemic, types of modalities used, and preferences for future use. Descriptive statistics were performed to describe survey responses and compare them by practice location.

RESULTS: A total of 295 practice managers were sent a web-based survey and 98 practice managers responded. Responding practices represented 66 of 100 counties in North Carolina with 50 practices from rural and micropolitan counties and 48 practices from metropolitan counties. The most common type of provider reported by practice managers were general obstetrician and gynecologists (85%), and the most common practice type was county health departments (38%). Overall, 9% of practices reported telehealth use before the pandemic and 60% reported telehealth use during the pandemic. The most common type of telehealth modality was telephone visits. There were no significant differences in the uptake of telehealth or in the modalities used by practice location.

A total of 40% of practices endorsed a preference for continued telehealth use beyond the COVID-19 pandemic. The most commonly reported need for continuation of telehealth use was assistance with patient access to telehealth technologies (54%). There were no significant differences in the preferences for telehealth continuation or future needs by practice location.

CONCLUSION: Telehealth use increased among a variety of practice types during the pandemic with no variation observed by practice location in terms of modalities used, future preferences, or needs. This study assessed statewide uptake of and differences in obstetrical telehealth use during the early COVID-19 pandemic. With telehealth becoming an integral part of obstetrical care delivery, this survey has implications for anticipating the needs of practices and designing innovative solutions for providers and pregnant people beyond the COVID-19 pandemic.

Key words: access, policy, remote monitoring, rural health, SARS-CoV-2, technology, telemedicine

Introduction

On January 30, 2020, the World Health Organization declared COVID-19 (caused by SARS-CoV-2) a public health emergency and by March 11, 2020, a pandemic.[1] As countries implemented lockdowns to stem the spread of COVID-19, healthcare providers and health systems quickly implemented practice changes to ensure social distancing while also maintaining access to care. Such adaptations included changing prescribing practices, modifying laboratory testing, mobilizing providers from various fields to provide COVID-19–related care, and altering the structure of healthcare teams.[2–5] Most notably, telehealth was rapidly adopted across many healthcare settings during the early days of the pandemic.[1,6–8]

Defined as the use of technology for healthcare delivery, telehealth enables the dissemination of remote healthcare services, including provider encounters, patient monitoring, and patient education.[9] These technologies, such as phone encounters, video conferencing, and image-sharing, have been used for several decades in both primary care and medical subspecialties.[10] Existing data suggest that telehealth may increase access to general and specialized healthcare services, assist in delivery of care to rural areas, provide greater flexibility for patient and provider scheduling, and save patients' time and money in seeking care.[11,12]

Obstetrical care in the pandemic was no exception to the rapid shifts in delivery models. Healthcare providers transitioned to the use of telehealth to provide timely and appropriate care for pregnant people.[1] Before the pandemic, telehealth for obstetrical care had variable success and notable barriers. Preliminary data from the obstetrical literature suggest that telehealth may be an acceptable and satisfactory modality of providing prenatal care with equivalent maternal and neonatal outcomes as standard, in-person obstetrical care.[12,13] Barriers to implementation, such as technical challenges, resistance to

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AJOG MFM at a Glance

Why was this study conducted?

This study was conducted to describe the early patterns of adoption of telehealth for obstetrical care during the COVID-19 pandemic and the needs that will enable continued use of these technologies.

Key findings

This survey revealed an increase in telehealth use after the start of the pandemic. This increase did not differ by practice location. The most common modalities were telephone and virtual video visits. When asked what resources practices needed to continue telehealth use, they requested assistance with patient access to telehealth technologies.

What does this add to what is known?

This study contributes to a growing body of literature on the use of telehealth in obstetrics during the COVID-19 pandemic. This study is unique in that it describes patterns of adoption across practices in an entire state, including diverse populations, practice types, and geographic characteristics.

change, perceived costs, and payment policies, potentially preclude the uptake of telehealth.[14] Policy changes in the pandemic, such as reimbursement for telehealth-administered obstetrical care and strategies for hybrid, in-person and remote care, have enabled the use and expansion of these technologies.[15]

In North Carolina, 64 of 100 counties are classified as >50% rural and approximately 28% of the population lives in a rural area. With regards to access to obstetrical services, all but 5 counties in the state have prenatal care services available within the county. Moreover, North Carolina is diverse with respect to race and ethnicity, socioeconomic status, education, employment, and healthcare and digital literacy——barriers to equitable care are often complex and rooted in both individual and systemic factors. Changes in clinical practice and health policy to facilitate the use of telehealth during the pandemic, therefore, were important to maintain healthcare access.[16,17]

Because the COVID-19 pandemic presented a period of rapid transition in the use of telehealth, a technology that did not have widespread uptake previously, there were gaps in the general understanding of how telehealth was used and whether these are preferable technologies. The objective of this study was to describe variations in telehealth use for obstetrical care among practices in North Carolina in the early months of the COVID-19 pandemic and to outline future preferences and needs for continued telehealth use. This study also aimed to delineate telehealth use among rural or micropolitan and metropolitan practices to better understand if telehealth use varies by practice location. We hypothesized that the uptake of telehealth, types of telehealth technologies used, and the perceived future needs for continuation of telehealth by practices would differ by rural or urban location of the practice.

Materials and Methods

We conducted a web-based survey among managers of practices in North Carolina that provided obstetrical care between July 14, 2020 and September 14, 2020. For purposes of standardization, we defined the start of the pandemic as March 15, 2020, to encompass both practice- and state-based social distancing recommendations.

Study population

The population included practice managers of obstetrical practices in North Carolina. Practice managers were targeted because they are often charged with the logistics and technical details of clinical operations and are knowledgeable about the practice provider and patient characteristics in a practice. Thus, they were deemed the most appropriate representatives to answer questions regarding telehealth use and future operational needs.

We used a convenience sample of practice managers of obstetrical practices identified through the Community Care of North Carolina Pregnancy Medical Home program. The purpose of the program is to enhance access to comprehensive care for pregnant Medicaid beneficiaries and to improve birth outcomes while containing cost. The program, composed of 95% of prenatal care providers who serve the Medicaid population, promotes evidence-based, high-quality maternity care in practices across the state. Community Care of North Carolina maintains the list of managers for all enrolled obstetrical practices, including information about physical location, phone numbers, and email addresses. Although all of these practices accept Medicaid payment, they similarly might accept other public or private payers. We did not include practices in our sample that solely serve those with private insurance because those practices were not entered in the available database (providers who do not bill Medicaid are not enrolled in the Pregnancy Medical Home program and are therefore not part of the practice roster).

Each practice was classified as rural, micropolitan, or metropolitan based on county of location using the United States Office of Management and Budget standards for delineating metropolitan and micropolitan statistical areas.[18] According to these standards, counties that are classified as metropolitan are defined by a core population of ≥50,000, whereas micropolitan areas contain a core population of at least 10,000 but <50,000 people; rural counties are those that do not meet these core urban population definitions. In North Carolina, based on these definitions, 29 counties were described as rural, 31 as micropolitan, and 40 as metropolitan.

Survey design and dissemination

We designed a web-based survey to assess practice-based characteristics and demographics, current and previous

telehealth use, and preferences for future telehealth use (Supplement 1). For information on practice-based characteristics and demographic factors, practice managers were asked to describe their practice type (academic, community health center, health system−owned practice, etc.), the kinds of providers at their practices (general obstetrician-gynecologists, family medicine physicians, advanced practice providers, midwives, and maternal-fetal medicine physicians, or other), and the number of providers. In addition, they were asked about the percentage of patients within the practice who were non-English speaking and the percentage of patients covered by Medicaid, which served as a proxy for assessing the socioeconomic status of a practice's patient panel.

The survey assessed telehealth use before and from the time the pandemic was declared. Managers of practices that endorsed using telehealth after the start of the pandemic were additionally asked what telehealth modalities they were using. We defined these modalities as telephone visits, virtual video visits, provider-to-provider consultations (or e-consultations), remote pregnancy monitoring, electronic patient portal communication or encounters, and remote imaging interpretation. Practice managers were asked to estimate what percentage of prenatal visits (<25%, 25%−50%, or >50%) were conducted via telehealth after March 15, 2020, and up to the time they completed the survey.

The survey also assessed whether practice managers would prefer to continue the use of telehealth after restrictions surrounding the COVID-19 pandemic were relaxed. If practice managers indicated a preference to continue telehealth use, we assessed what kind of assistance the managers felt their practice would require to enhance future use of these technologies. Forms of assistance included help with patient access to telehealth, electronic medical records, remote monitoring for patients, access to interpreter services, and assistance with billing and documentation. Practice managers were also asked if maternal-fetal medicine consultation via telehealth or a maternal-fetal medicine hotline was desired to provide high-risk obstetrical services through these technologies.

The survey tool was designed with the assistance of a survey methodologist at the University of North Carolina at Chapel Hill. Once the survey was finalized, it was translated into a web-based platform. Each practice had a profile created on this platform with the name, email address, and phone number of the practice manager. On July 14, 2020, each practice manager was emailed a personal link that included a consent form and the survey. Two weeks after initial survey dissemination, nonresponders were sent 3 weekly reminders by email and then contacted by telephone by members of the study team.

Statistical analysis

Descriptive statistics were performed to describe survey responses and compare them by practice location. For purposes of this analysis, rural and micropolitan practices were combined into 1 group and compared with metropolitan practices. Chi-square and Fisher exact tests were conducted (P value <.05 was considered statistically significant). This study was approved by the University of North Carolina at Chapel Hill Institutional Review Board (approval number 20-1490).

Results

Between July 14, 2020 and September 14, 2020, 295 managers of practices that provided obstetrical care in North Carolina were emailed a web-based survey link; 98 practice managers responded to the survey with a response rate of 34%. Responding practices represented 66 of 100 counties in NC; 50 responses were from rural or micropolitan counties and 48 were from metropolitan counties.

Practice demographics varied widely among respondents. The majority of practice managers (85%) reported having general obstetricians and gynecologists on staff, followed by advanced practice providers (76%), midwives (48%), and family medicine physicians (16%) (Table 1). Few reported employment of a maternal-fetal medicine physician (8%). The average number of providers in practices was 4 (interquartile range, 2−7). County health departments and health system−owned practices were well represented in our sample (38% and 33%, respectively). When asked about patient insurance coverage, 38% of practices reported that 51% to 75% of patients were insured by Medicaid. The majority of practices (65%) reported that <25% of their patients were non-English speaking.

Before the start of the COVID-19 pandemic, 8 of the 89 responding practices (9%) reported using telehealth technologies (Table 2). Of these practices, community health centers had the highest rate of use (33%) and academic medical centers had the lowest rate of use (0%). During the pandemic, 54 practices (61%) reported using telehealth modalities with health system−owned community practices and academic medical centers having the highest uptake rate (84% and 75%, respectively). Community health centers and county health departments had the lowest uptake rate (33% and 35%, respectively). Among all practices, the most commonly used telehealth modalities were telephone visits (57%) and virtual video visits (47%), whereas the least used modality was remote imaging interpretation (5%). There were no significant differences by practice location in telehealth use before and during the pandemic or in the type of telehealth modalities used.

When asked if they would like to continue the use of telehealth, 89 practice managers responded, with 36 practices (40%) responding yes, 10 practices (11%) responding no, and 38 (43%) responding that they do not know (Table 3). The most commonly reported needs for continued telehealth use were assistance with patient access to telehealth technologies (54%), electronic medical records (51%), and remote monitoring for patients (48%). The least reported need was assistance with documentation (3%). There were no significant differences in the preferences for telehealth continuation or future needs by practice location.

TABLE 1
Characteristics of responding obstetrical practices in North Carolina

Practice characteristic	n (%)
Provider types in practice	
General obstetrician-gynecologist physicians	83 (85)
Advanced practice providers	74 (76)
Midwives	47 (48)
Family medicine physicians	16 (16)
Maternal-fetal medicine physicians	8 (8)
Other	2 (2)
Number of providers in clinic, median (IQR)	4 (2–7)
Clinic type	
County health department	37 (38)
Health system–owned community practice	32 (33)
Independently owned community practice	22 (22)
Federally qualified health center	8 (8)
Academic medical center	4 (4)
Community health center	3 (3)
Other	5 (5)
Location of practice	
Rural or micropolitan	50 (51)
Metropolitan	48 (49)
Percentage of patient population covered by Medicaid	
≤25%	16 (16)
26%–50%	30 (29)
51%–75%	39 (38)
76%–100%	14 (14)
No Medicaid patients	1 (1)
I do not know	2 (2)
Percentage of patient population that are non-English speaking	
None	3 (3)
≤25%	66 (65)
26%–50%	24 (23)
51%–75%	6 (6)
76%–100%	4 (4)

Data are presented for 98 practices.

IQR, interquartile range.

Mallampati. Telehealth use in obstetrical practices in North Carolina. Am J Obstet Gynecol MFM 2023.

Finally, 47% of all respondents agreed that a maternal-fetal medicine hotline would be valuable, and 46% stated that they would like the ability to access maternal-fetal medicine consultative services through telehealth technology.

Comment

Principal findings

This study describes practice patterns and anticipated future use of telehealth services by obstetrical practices in North Carolina during the first 6 months of the COVID-19 pandemic. Telehealth use increased among practices during the pandemic when compared with before the pandemic. The most commonly used telehealth modalities were telephone and video visits. Practice managers most commonly indicated that they did not know or were unsure about using telehealth after the COVID-19 pandemic; however, managers reported that if they were to continue the use of these technologies, they would need assistance with patient access to telehealth technologies.

Results in context

This study addresses the paucity of information on statewide uptake of telehealth for obstetrical care and leverages the existing infrastructure of a Medicaid-managed program in North Carolina to capture these data. A systematic review published in 2011 identified 60 papers on telehealth in obstetrics and described the ways in which these technologies have been used for clinical care.[12] For instance, virtual consultations for prenatal diagnoses and fetal echocardiograms, fetal surgery, the coordination of medical management, and postpartum care have been described in various settings such as Australia, England, Hungary, and the United States.[19–24] Telehealth has also been used to monitor patients remotely for medical issues such as diabetes or for fetal monitoring.[24,25] Benefits of telehealth include less time off from work for patients, lower transportation costs, and improved efficiency for providers[12]; yet, the evidence on the clinical benefits are mixed. Although some studies suggest that the use of telehealth is unclear, others have found decreased rates of preeclampsia, increases in smoking cessation and breastfeeding, and early access to medical abortion.[13]

Limitations and strengths

There are several important limitations to our study. First, because this was a survey, the interpretation of results is dependent on our response rate. Because our response rate was 34%, we were unable to account for the majority of obstetrical practices in the state or

TABLE 2
Telehealth use before and during the COVID-19 pandemic and telehealth modalities used during the COVID-19 pandemic by practice location

Telehealth use before and during pandemic	Total (N=89)[a]	Metropolitan (n=47)	Rural or micropolitan (n=42)	*P* value
Used before pandemic	8 (9)[b]	7 (15)	1 (2)	.88
Used during pandemic	54 (61)	35 (75)	19 (45)	.10
Modalities used during pandemic				
Telephone visit	51 (57)	33 (70)	18 (43)	.12
Virtual video visit	42 (47)	27 (58)	15 (36)	.21
Remote monitoring	11 (12)	5 (11)	6 (14)	.75
E-consultation	8 (9)	7 (15)	1 (2)	.88
Electronic portal	7 (8)	5 (11)	2 (5)	.36
Remote imaging interpretation	4 (5)	4 (9)	0	n/a

n/a, not applicable.

[a] The data are shown as number (percentage); [b] The Data may not add to 100% because responses were not mutually exclusive or because practices chose not to respond to the question

Mallampati. Telehealth use in obstetrical practices in North Carolina. Am J Obstet Gynecol MFM 2023.

TABLE 3
Preference for continued use of telehealth and needs for future use by practice location

Total	Total (N=89)[a]	Metropolitan (n=47)	Rural or micropolitan (n=42)	*P* value
Desire continued telehealth use				
Yes	36 (40)[b]	26 (55)	10 (24)	.32
No	10 (11)	3 (6)	7 (17)	.79
Do not know	38 (43)	15 (32)	23 (55)	.25
Future needs for continued use				
Patient access	48 (54)	25 (53)	23 (55)	.13
Electronic medical records	45 (51)	8 (17)	37 (88)	.71
Remote monitoring	43 (48)	24 (51)	19 (45)	.18
Interpreter services	33 (37)	21 (45)	11 (26)	.35
Billing	32 (36)	17 (36)	15 (36)	.33
Clinical workflow	30 (34)	17 (36)	13 (31)	.36
Telecommunication technology	29 (33)	18 (38)	11 (26)	.39
Material goods	26 (29)	15 (31)	11 (26)	.43
Administrative assistance	19 (21)	9 (19)	10 (24)	.57
Communication training	16 (18)	11 (23)	15 (36)	.43
Patient education materials	10 (11)	8 (17)	2 (5)	.81
Documentation assistance	3 (3)	1 (2)	2 (5)	.93

[a] The data are shown as number (percentage) unless noted otherwise; [b] The data may not add to 100% because the responses were not mutually exclusive or because practices chose not to respond to the question.

Mallampati. Telehealth use in obstetrical practices in North Carolina. Am J Obstet Gynecol MFM 2023.

even the majority of practices within our surveyed population. We believe this response rate was low because we deployed this survey at the start of the pandemic and many practices were overwhelmed with their clinical processes and services. Practice managers might not have had the time to complete this survey or the ability to answer the questions within the given time period. Moreover, our response rate might have been low if the contact information of practices was outdated, incorrect, or did not reach the appropriate survey respondent for that practice. Second, contact information for practices included in this survey were obtained from the Community Care of North Carolina, which partners with clinics that provide care for patients with Medicaid. Consequently, our survey was not emailed to practices that solely care for those with private insurance and might not be generalizable to the entire population of practices that provide obstetrical care. It is likely that practices not represented in our study are also those that have more financial resources and logistical capacity to introduce telehealth technologies. Third, our survey tool was designed by a survey methodologist but was not validated before dissemination. Although there are validated surveys to assess provider and patient satisfaction with telehealth for obstetrical care, validated surveys assessing telehealth use for practice managers or administrators were not available to the study team.[11] Moreover, the time frame in which this assessment was performed was rapid to inform statewide needs to ensure continued access to obstetrical care and thus precluded a process of survey validation. Lastly, this survey was limited to practice managers and reflects only their perceptions. Surveying providers (physicians, advanced practice practitioners, nurses, etc.) and patients would yield additional useful information regarding day-to-day use, ease, and benefits of telehealth in the pandemic.

Despite these limitations, this study has several strengths. Respondents to this survey represent practices in more than half of all the counties in North

Carolina, a state that is diverse in terms of population, demographic characteristics, and healthcare systems. The results of this study might reflect challenges institutions faced in terms of the rapid dissemination of telehealth by reporting future needs for implementation. These needs were consistent among different practice locations in our survey, suggesting that these needs might be general challenges that all practices have been facing. Because the nature of the COVID-19 pandemic changed with the introduction of vaccines, healthcare systems will likely readdress how they deliver services. This study demonstrated that telehealth is an acceptable modality for use by practices and also that significant efforts are needed to enhance these technologies. Although this survey did not evaluate the patient perspectives on telehealth use, it illuminated issues that practices might perceive as challenges when providing quality telehealth care by enquiring about the needs to improve future use, such as assistance with patient access and integrating services with the electronic medical record system. Moreover, this survey analysis did not explicitly describe changes in telehealth use by practice type, yet it is worth noting that the practices with the lowest uptake rate during the pandemic were county health departments and community health centers, whereas health system–owned community practices and academic medical centers had the highest rates of uptake. It is possible that larger healthcare systems have more robust infrastructures to accommodate a rapid transition to telehealth, suggesting that telehealth might preferentially benefits patient populations with access to those systems.

Clinical and research implications

We believe that this study is significant because it describes how healthcare delivery, particularly the use of telehealth, changed because of a public health emergency across a single state. As practices continue to employ these technologies, particularly telephone and video visits, survey studies such as this one can inform clinicians, practice managers, and policy makers. Moreover, characterizing how telehealth is used can enable healthcare systems to modify the technologies that they invest in and aid state organizations, such as public health departments, Medicaid, or private payor organizations, to integrate their services into existing telehealth models.

Although this study is helpful to those involved in the design and delivery of patient care, future research ought to seek the perspectives of patients and providers in their preferences around telehealth use and the challenges surrounding its effective use in prenatal care across different practice settings. Research using a prospective study design, surveys, qualitative methods, and implementation science ought to be performed to understand the multitude of manners in which telehealth can be used to care for pregnant people. Importantly, equity-based research aimed at understanding the barriers are crucial because the introduction and propagation of technologies can often widen existing disparities, including racial and ethnic and rural-urban differences.[26,27]

Conclusion

The use of telehealth in obstetrical care has the potential to change how care is provided in many dimensions. Existing platforms and the development of new technologies provide novel ways to communicate with patients and providers, interpret images, develop care plans, coordinate high-risk obstetrical care, and monitor patients when they are at home. Although there is tremendous potential for the field, it is crucial to ensure that health systems and those they provide for have the capacity and are equipped to adopt these promising services. ■

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.ajogmf.2023.100941.

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