

Westwood, Anjali Raj (2021) Telehealth and maternity. British Journal of Midwifery, 29 (6). pp. 352-355.

Downloaded from: <https://ray.yorks.ac.uk/id/eprint/5335/>

The version presented here may differ from the published version or version of record. If you intend to cite from the work you are advised to consult the publisher's version:

<https://doi.org/10.12968/bjom.2021.29.6.352>

Research at York St John (RaY) is an institutional repository. It supports the principles of open access by making the research outputs of the University available in digital form. Copyright of the items stored in RaY reside with the authors and/or other copyright owners. Users may access full text items free of charge, and may download a copy for private study or non-commercial research. For further reuse terms, see licence terms governing individual outputs. [Institutional Repositories Policy Statement](#)

# RaY

Research at the University of York St John

For more information please contact RaY at  
[ray@yorks.ac.uk](mailto:ray@yorks.ac.uk)

# Telehealth and Maternity

Dr Anjali Raj Westwood, Associate Lecturer, York St John University  
[a.raj@yorks.jsc.uk](mailto:a.raj@yorks.jsc.uk)

## Introduction

The World Health Organisation (WHO) defines telehealth as, “ The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities” (Organization, 2010). A more recent definition by The European Code of Practice for Telehealth Services defines telehealth as “the means by which technologies and related services concerned with health and wellbeing are accessed by people or provided for them irrespective of location.” (Gu and Dupre, 2019). The term telehealth is often used interchangeably with telemedicine, telecare, technology enabled health, digital health and m-health. For the purpose of consistency within this paper, we will be using the term telehealth.

Telehealth as a mode of service delivery has been particularly valuable for those in remote areas, vulnerable groups and ageing populations. 2020 changed how the world views telehealth. One look at the world healthcare news, and it can be observed that the coronavirus pandemic has brought telemedicine to the front stage and the world has now seen and benefitted from its practice.

Telehealth can be delivered through two modes: asynchronous, also known as store-and-forward, where patient’s medication information is stored and reviewed later by a medical provider, and synchronous, also known as live interactive consultations,

where patient and physician interact remotely in real time to preserve physical distancing (Wootton et al, 2017).

The United Nations launched a world strategy for women and child health in 2010, which was further adopted in 2015 during the World Summit for Sustainable Development. Among the envisaged strategies for women and child health, telehealth is now increasingly being acknowledged for its potential to reduce maternal morbidity and mortality (Lee et al, 2016). Telehealth is increasingly being used to enhance health care utilisation, improve the quality of pre- and post-pregnancy care, and as a means of collecting pregnancy and child health data.

This paper looks into the potential applications of telehealth in maternity services post-pandemic. Though the author is located in the UK, the evidence presented here is gathered from studies conducted across the world as there is limited evidence in any one geographical location. The combined evidence and its implications provide an extensive view of the applications of telehealth across a variety of demographics.

### **Pre-Pandemic Evidence**

The use of telehealth in the field of maternity services did not start during the pandemic. In this section, the pre-pandemic evidence of applications of telehealth to improve maternal and newborn health, is presented. Firstly, an increase in adherence to antenatal visits has been reported among services where telehealth was integrated into mainstream care (Farrag and Metwely, 2016). In terms of the most common uses of telehealth, a systematic review by Lee and colleagues which included studies from Sub-Saharan Africa, East Asia, South Asia and the Middle East, reported that the most common uses of telehealth were for health information delivery like nutritional advice, reminders for clinic attendance, as a communication platform to access support from care providers, as a data collection platform to enable registration of birth or report

health indications, for reporting test results, peer support and for psychological interventions (Lee et al, 2016).

Some studies showed that telehealth interventions, particularly those delivered using a mobile messaging system (SMS), were associated with increased utilisation of health care, including uptake of recommended prenatal and postnatal care consultation, skilled birth attendance, and vaccination. Amongst the eight studies (Cheng et al, 2008; Chuang et al, 2012; Gisore et al, 2012) (Jareethum et al, 2008; Khorshid et al, 2014; Lund et al, 2012; Oyeyemi and Wynn, 2014; Simonyan et al, 2013) examining indicators of maternal, new-born, and child morbidity and mortality, only one study from Tanzania (Lund et al, 2012) reported a decreased risk of perinatal death with use of SMS for prenatal support during pregnancy. The other studies did not report significant differences.

A meta-analysis of three studies (Flax et al, 2014; Jiang et al, 2014; Sellen et al, 2013) judged to be sufficiently homogenous showed that delivering prenatal breastfeeding interventions using SMS/cell phone (vs routine prenatal care) improved rates of initiation of breastfeeding within one hour after birth and increased the likelihood of exclusive breastfeeding for up to six months, although there was no strong evidence regarding the giving of colostrum or breast milk within three days after birth. This evidence of the effect of telehealth interventions on breastfeeding rates is important as some of the short-term and long-term benefits of exclusive breastfeeding for children include healthier eating habits, reduced length of hospital stay, favourable weight increase, lower body mass index, lower adiposity, lower total cholesterol values, better cognitive and behavioural development, as well as stability of metabolic levels in children with metabolic disorders (Couto et al, 2020). Unfortunately, the

existing evidence from this review (Lee et al, 2016) is of moderate quality and lacks the methodological rigor expected.

In Sub-Saharan Africa, though the benefits of telehealth are acknowledged, the knowledge on how these interventions can succeed or be scaled is limited (Ahmed et al, 2017). Ahmed and colleagues identified that the limited scientific evidence regarding the benefits of telehealth could be partly explained by a systemic failure to take into account the success factors in the implementation and use of telehealth projects (Ahmed et al, 2017). Their review confirmed the lack of documentation in Sub-Saharan Africa, but this could be true in other countries where telehealth is relatively new and/or protocols are yet to be established.

Among developed countries there is evidence in Australia and the UK. Zairina and colleagues have reported that in Australia, telehealth interventions supporting self-management of asthma are feasible and could potentially improve asthma control and asthma related quality of life during pregnancy (Zairina et al, 2016). In the UK, NHS England maternity review 2016 reports that though there is a large amount of pregnancy-related information available digitally, women are unsure whether the information is accurate or if it is reflective of UK maternity health care practice (England, 2016). The NHS report also suggests that maternity services in the UK are starting to move away from apps in search of other digital solutions like websites, text messaging, online support groups and telehealth.

On the positive side, the author is of the belief that these studies demonstrate sufficient benefit to warrant further investigation into integrating telehealth into mainstream maternity care. However, a commonality that can be derived from the pre-pandemic

evidence is the lack of good quality evidence. The reasons could be funding, resistance from clinical staff and patient alike, and/or lack of proactive thinking. When the pandemic struck, health services had no choice but to innovate service delivery.

### **Maternity care response to telehealth during the pandemic**

The American College of Obstetrics and Gynaecology (ACOG) published recommendations for telehealth use in February 2020 in response to COVID-19. Potential uses included consultation with specialty services, remote observation of foetal monitoring by maternal foetal medicine and reproductive endocrinology specialists, bladder diary tracking with smartphone applications, postpartum blood pressure monitoring with synced Wi-Fi and data connection, remote provision of medically induced abortions, and fertility tracking with patient-generated data (DeNicola et al, 2020). In this section, key studies undertaken during the pandemic in the USA and the UK are discussed.

With Covid-19 spreading across the USA, in New York City, in their paper Aziz and colleagues reported a rapid integration of telehealth into prenatal care (Aziz et al, 2020). The goals were to consolidate in-person prenatal screening, surveillance, and examinations into fewer in-person visits while maintaining patient access to ongoing antenatal care and subspecialty consults via telehealth. The integration of telehealth reduced approximately one half of in-person visits for low-risk patients. For high-risk patients, depending on their individual scenarios, it reduced to one half or lower, and none of the mothers needed 100% in-person visits. There have been no numbers provided except that the hospitals included in the study cater to approximately 6900 births annually, leading to an assumption that large numbers were involved.

Aziz and colleagues provide data and protocols for effectively managing high-risk pregnancies using telehealth. The range of risks covered in their study include hypertensive disorders, diabetes, cardiovascular and neurological conditions, preterm births, poor obstetrical history, foetal conditions, congenital anomalies, multiple gestations, genetic counselling, mental health services, and postpartum complications (Aziz et al, 2020).

De Nicola and colleagues add further evidence for high risk pregnancies by reporting that telehealth can significantly enhance health promotion lifestyle profile, self-efficacy scores, maintain blood glucose levels among mothers with gestational diabetes, smoking cessation, reduced the need for high-risk obstetric monitoring office visits, reductions in diagnosed preeclampsia among women with gestational hypertension and breastfeeding (DeNicola et al, 2020).

A study in the UK reported that adopting a remote monitoring system replaced 800 face to face appointments, achieved better compliance with National Institute for Health and Care Excellence (NICE) guidelines, improved patient satisfaction and reduced the burden on NHS resources (savings between £29,957 in community settings -£56,070 in hospital settings) (Fazal et al, 2020). In the NHS, Patients with Pregnancy Induced Hypertension (PIH) are required to attend face to face sessions once or twice a week depending on the severity of PIH, leading to excessive burden on the NHS resources. Attending these sessions are impractical and difficult for many women because it requires taking time off work, arranging for childcare, paying for parking and long waiting times of approximately 2 hours (exclusive of travelling) (Aziz et al, 2020; van den Heuvel et al, 2019).

In addition to the above, a preliminary report states that in the USA, adherence to telehealth for maternal and foetal care was higher than pre-Covid (Kouba et al, 2021). The acceptance of telehealth services was high and integrating this into a post-Covid world may improve access to care as women face challenges managing the need for in-person visits with other commitments.

## **Discussion**

The Lancet's 2014 commission report on culture and health concluded that the neglect of culture is the single biggest obstacle to development of equitable healthcare (Napier et al, 2014). Nurses are often members of at-risk communities and offer a form of cultural alliance, advocacy, and emotional support for women impacted by racial biases experienced in the healthcare system (Gudia and El Toukhi, 2020). The expansion of telehealth services has the potential to reduce health disparities in maternity care, bridge cultural gaps, and improve health outcomes by increasing access to affordable services at home (Gudia and El Toukhi, 2020). By utilizing text messaging and live-video platforms, nurses can help clients communicate with their healthcare providers and maintain continuity of care during the postpartum period. Home-visiting offers culturally relevant services for mothers and links families to resources and education. Positive outcomes have been reported for home visiting telehealth programs as states partner with Medicaid agencies to redesign home visiting programs and expand access to telehealth services for families and nurses (Gudia and El Toukhi, 2020).

Hypertension, gestational diabetes and postpartum care integrate especially well with telehealth services. Tracking blood pressure with home automated blood pressure

cuffs is convenient and cost-effective. Management of gestational diabetes and postpartum care are heavy on education and information transfer, which lends well to telehealth visits, pre-recorded videos and interactive user interfaces. It requires training for the women on how to use the machine (blood pressure or blood sugar) and record data digitally. As presented earlier, the cost savings to the health system and the time savings for the mother will surpass the challenges associated with integrating telehealth into mainstream care protocol.

Digital innovation in itself cannot improve women's experience of pregnancy and childbirth (Leoncea and Harrisb). However, the current appetite for digital advancement is higher than ever before. The Wachter report highlighted the important role that clinicians must play in making new digital initiatives a success (Wachter, 2016). Challenges within digital working in maternity include workforce readiness, resources, infrastructure, equipment, interoperability, technology, and enabling mobile working (Leoncea and Harrisb). In the UK, in 2018, NHS Digital conducted a Maternity Digital Maturity Assessment (DMA) which had indicated a wide variation across England in terms of how well maternity services are using digital technology (England, 2018). Irrespective of geography, system-wide protocols, training and pathways will need to be created for telehealth to be truly successful in terms of service delivery, health outcomes and demonstrate cost-savings.

In private healthcare, telehealth can contribute to achieving universal health coverage by improving access for patients to quality and cost-effective health services wherever they may be. Telehealth can have greater benefits for women who are geographically isolated (Shaw et al, 2016). As telehealth becomes widespread, their ability to transcend access barriers and convenience is attractive.

The biggest roadblock to achieving all the above stated benefits is access to technology. There can be an argument made on the exponential rise in smartphone usage. However, telehealth programs often require adequate broadband access, which is often limited in rural and under-served settings (Hirko et al, 2020). There is a risk that telehealth can further increase health disparities, especially among low-income populations (Nicol Turner Lee and Roberts, 2020). Whilst the infrastructure for telehealth is created, shifting to telephonic instead of internet-based telehealth can be a transitional phase (Hirko et al, 2020).

Healthcare providers can struggle with digital poverty as well. Strategies to support healthcare providers could include ensuring the availability of relevant training for staff, data capture about technology use by population groups, and appointing digital champions within health-care teams (Aref-Adib and Hassiotis, 2021).

Aziz and colleagues report that in the initial stages of transition to telehealth, scheduling for maternity patients should take into consideration that telehealth sessions may be longer than in-person visits (Aziz et al, 2020). It is also important to convey to the patient that her care quality will not be affected and that the obstetric team will be available for support. Seamless transition between digital and physical care will be necessary for the women to experience high-quality care from the care providers. Channels of communication need to be open to instil trust and confidence in the women. Telehealth can help create a culture of patient-led care. Patients or, in the case of maternity, women, will be encouraged to play a larger role in taking charge of their health, while being supported at every stage by the care providers.

## **Conclusion**

Changing epidemiology of women giving birth is one of the indicators that drive telehealth in maternity. Working women, women with other responsibilities, geographical isolation, financial struggles, all of these can be tackled by integrating telehealth into mainstream maternity care. There is evidence that telehealth is feasible for prenatal care. Organisations that choose to adopt telehealth need to create a strong yet flexible protocol for seamless health service delivery during maternity. Strong yet flexible as high-risk pregnancies will need more attention and low-risk pregnancies can become high-risk overnight. The challenge isn't in designing the software, the real challenge lies in training healthcare providers and women to use the program. Upfront capital will be required to create the digital platforms, set the pathways and train people to use it. Digital solutions must provide a joined-up experience for women and families, where they feel confident that up-to-date information is flowing safely between care settings and chronological stages of development or pathways of care.

The flexible nature of telehealth provides an opportunity to expand access to pregnancy and childbirth services and may help to mitigate adverse health outcomes for pregnant women. We have evidence that telehealth in maternity is feasible and beneficial. Going forward, there is no reason why telehealth should not play a central role in maintaining continuity of care in the perinatal period.

## **References**

Ahmed MAA, Gagnon M-P, Hamelin-Brabant L, Mbemba GIC, Alami H. 2017. A mixed methods systematic review of success factors of mhealth and telehealth for maternal health in sub-saharan africa. Mhealth. 3.

- Aref-Adib G, Hassiotis A. 2021. Frontline 2020: The new age for telemental health. *The Lancet Psychiatry*. 8(1):3-4.
- Aziz A, Zork N, Aubey JJ, Baptiste CD, D'alton ME, Emeruwa UN, Fuchs KM, Goffman D, Gyamfi-Bannerman C, Haythe JH. 2020. Telehealth for high-risk pregnancies in the setting of the covid-19 pandemic. *American journal of perinatology*. 37(8):800.
- Cheng PJ, Wu TL, Shaw SW, Chueh HY, Lin CT, Hsu JJ, Hsieh TsTa, Soong YK. 2008. Anxiety levels in women undergoing prenatal maternal serum screening for down syndrome: The effect of a fast reporting system by mobile phone short-message service. *Prenatal Diagnosis: Published in Affiliation With the International Society for Prenatal Diagnosis*. 28(5):417-421.
- Chuang L-L, Lin L-C, Cheng P-J, Chen C-H, Wu S-C, Chang C-L. 2012. The effectiveness of a relaxation training program for women with preterm labour on pregnancy outcomes: A controlled clinical trial. *International journal of nursing studies*. 49(3):257-264.
- Couto GR, Dias V, de Jesus Oliveira I. 2020. Benefits of exclusive breastfeeding: An integrative review. *Nursing Practice Today*. 7(4):245-254.
- DeNicola N, Grossman D, Marko K, Sonalkar S, Tobah YSB, Ganju N, Witkop CT, Henderson JT, Butler JL, Lowery C. 2020. Telehealth interventions to improve obstetric and gynecologic health outcomes: A systematic review. *Obstetrics and gynecology*. 135(2):371.
- England N. 2016. National maternity review. Better births; improving outcomes of maternity services in england. NHS England, London.
- England N. 2018. Maternity dma report.
- Farrag RE, Metwely S. 2016. Effect of tele-nursing services on healthy lifestyle and self-efficacy among gestational diabetes women. *International Journal of Novel Research in Healthcare and Nursing*. 3(1):129-140.
- Fazal N, Webb A, Bangoura J, El Nasharty M. 2020. Telehealth: Improving maternity services by modern technology. *BMJ open quality*. 9(4):e000895.
- Flax VL, Negerie M, Ibrahim AU, Leatherman S, Daza EJ, Bentley ME. 2014. Integrating group counseling, cell phone messaging, and participant-generated songs and dramas into a microcredit program increases nigerian women's adherence to international breastfeeding recommendations. *The Journal of nutrition*. 144(7):1120-1124.

- Gisore P, Shipala E, Otieno K, Rono B, Marete I, Tenge C, Mabeya H, Bucher S, Moore J, Liechty E. 2012. Community based weighing of newborns and use of mobile phones by village elders in rural settings in kenya: A decentralised approach to health care provision. *BMC pregnancy and childbirth*. 12(1):1-8.
- Gu D, Dupre ME. 2019. *Encyclopedia of gerontology and population aging*. Springer, Cham.
- . Impact of using telehealth to improve maternal outcomes during pandemic covid-19. *Proceedings of the International Conference on Nursing and Health Sciences*; 2020.
- Hirko KA, Kerver JM, Ford S, Szafranski C, Beckett J, Kitchen C, Wendling AL. 2020. Telehealth in response to the covid-19 pandemic: Implications for rural health disparities. *Journal of the American Medical Informatics Association*. 27(11):1816-1818.
- Jareethum R, Titapant V, Tienthai C, Viboonchart S, Chuenwattana P, Chatchainoppakhun J. 2008. Satisfaction of healthy pregnant women receiving short message service via mobile phone for prenatal support: A randomized controlled trial. *Medical journal of the Medical Association of Thailand*. 91(4):458.
- Jiang H, Li M, Wen LM, Hu Q, Yang D, He G, Baur LA, Dibley MJ, Qian X. 2014. Effect of short message service on infant feeding practice: Findings from a community-based study in shanghai, china. *JAMA pediatrics*. 168(5):471-478.
- Khorshid MR, Afshari P, Abedi P. 2014. The effect of sms messaging on the compliance with iron supplementation among pregnant women in iran: A randomized controlled trial. *Journal of telemedicine and telecare*. 20(4):201-206.
- Kouba I, Wei LS, Bennett T-AM, Aglialoro G, Walker AA, Friedman S, Mehta-Lee SS. 2021. 1048 the impact of telehealth: Adherence to high-risk maternity care during the sars-cov-2 pandemic. *American Journal of Obstetrics & Gynecology*. 224(2):S649.
- Lee SH, Nurmatov UB, Nwaru BI, Mukherjee M, Grant L, Pagliari C. 2016. Effectiveness of mhealth interventions for maternal, newborn and child health in low–and middle–income countries: Systematic review and meta–analysis. *Journal of global health*. 6(1).
- Leoncea J, Harrisb MJ. Digitalisation in maternity: Improving the patient experience. *Emerging Technologies in Healthcare: Legal, Ethical & Social Aspects*.25.
- Lund S, Hemed M, Nielsen BB, Said A, Said K, Makungu M, Rasch V. 2012. Mobile phones as a health communication tool to improve skilled attendance at delivery in zanzibar: A cluster-randomised controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*. 119(10):1256-1264.

- Napier AD, Ancarno C, Butler B, Calabrese J, Chater A, Chatterjee H, Guesnet F, Horne R, Jacyna S, Jadhav S. 2014. Culture and health. *The Lancet*. 384(9954):1607-1639.
- Nicol Turner Lee JK, Roberts J. 2020. Removing regulatory barriers to telehealth before and after covid-19. Brookings Institution.
- Organization WH. 2010. Telemedicine: Opportunities and developments in member states. Report on the second global survey on ehealth. World Health Organization.
- Oyeyemi SO, Wynn R. 2014. Giving cell phones to pregnant women and improving services may increase primary health facility utilization: A case-control study of a nigerian project. *Reproductive health*. 11(1):1-8.
- Sellen D, Mbugua S, Webb G, Kalungu S, Sarange C, Lou W. 2013. A randomized controlled trial indicates benefits of cell phone based peer counseling to support exclusive breastfeeding in kenya. . Paper presented at: 20th International Congress of Nutrition Granada. *Annals of Nutrition and Metabolism Spain*.
- Shaw D, Guise J-M, Shah N, Gemzell-Danielsson K, Joseph K, Levy B, Wong F, Woodd S, Main EK. 2016. Drivers of maternity care in high-income countries: Can health systems support woman-centred care? *The Lancet*. 388(10057):2282-2295.
- Simonyan D, Gagnon M-P, Duchesne T, Roos-Weil A. 2013. Effects of a telehealth programme using mobile data transmission on primary healthcare utilisation among children in bamako, mali. *Journal of telemedicine and telecare*. 19(6):302-306.
- van den Heuvel JF, Kariman SS, van Solinge WW, Franx A, Lely AT, Bekker MN. 2019. Safe@ home-feasibility study of a telemonitoring platform combining blood pressure and preeclampsia symptoms in pregnancy care. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 240:226-231.
- Wachter RM. 2016. Making it work: Harnessing the power of health information technology to improve care in england.
- Wootton R, Craig J, Patterson V. 2017. Introduction to telemedicine. CRC Press.
- Zairina E, Abramson MJ, McDonald CF, Li J, Dharmasiri T, Stewart K, Walker SP, Paul E, George J. 2016. Telehealth to improve asthma control in pregnancy: A randomized controlled trial. *Respirology*. 21(5):867-874.