

## Telehealth in maternity care: benefits, barriers, and the future of digital maternity care: a narrative review

Neha Ali<sup>1\*</sup>, Sheeba Philip<sup>2</sup>, Deepika Rawat<sup>1</sup>

<sup>1</sup>Department of Obstetrics and Gynecological Nursing, Sai College of Nursing, Dehradun, Uttarakhand, India

<sup>2</sup>Department of Medical Surgical Nursing, Sai College of Nursing, Dehradun, Uttarakhand, India

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**\*Correspondence:**

Neha Ali,

E-mail: nehaa6065@gmail.com

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### ABSTRACT

Telehealth is emerging as a vital tool in maternity care, supporting pregnant women and their families through remote healthcare services, it creates new opportunities to provide continuous, patient-centered, and accessible care. This review examines the applications, benefits, and challenges of telehealth in maternity care with a focus on its implications. A structured search strategy was conducted across PubMed, Medline, Google Scholar, Research Gate, Scopus, and Science Direct. Keywords included telehealth, telemedicine, nursing, and maternity care. Relevant studies were screened and references cross-checked to capture additional evidence. Telehealth interventions in maternity care demonstrate significant benefits such as reduced travel costs, decreased waiting time, and improved access in rural or underserved areas. For health care workers, telehealth supports timely antenatal education, early detection of complications through remote monitoring (e.g., blood pressure and weight), and enhanced patient engagement via mobile applications. The COVID-19 pandemic has accelerated the use of virtual antenatal consultations, creating opportunities for nursing professionals to extend their role in health promotion, psychosocial support, and counseling. However, challenges persist technological barriers, inequitable access, patient trust issues, and limitations in replacing physical examinations with virtual care raise concerns about patient safety. Telehealth in maternity care holds promise for advancing practices through innovations like tele-ultrasound, remote blood pressure surveillance, self-monitoring of fundal height, and digital maternal health education platforms. Yet, barriers related to equity, nurse preparedness, provider adoption, and regulatory frameworks must be addressed. Collaborative, research and policy support are essential to harness the full potential of telehealth, ensuring safe, equitable, and holistic care for pregnant women and their families.

**Keywords:** Telehealth, Telemedicine, Nursing, Maternity care

### INTRODUCTION

Telehealth, encompassing the remote provision of healthcare services such as consultations, diagnoses, therapy guidance, monitoring, and referrals, has rapidly evolved as a transformative approach in healthcare delivery.<sup>1,2</sup> With internet-enabled data storage, sharing, and videoconferencing, telehealth is especially advantageous in underserved and rural areas, reducing patient travel, saving time, and improving continuity of care.<sup>3,4</sup> For nursing practice, this innovation expands the scope of patient-centered care beyond traditional clinical

settings, enabling nurses to engage in remote monitoring, health education, counseling, and follow-up care.

The COVID-19 pandemic in 2020 further accelerated telehealth adoption, particularly in maternal health services, where minimizing face-to-face interactions became essential to safeguard both patients and healthcare providers.<sup>5,6</sup> In antenatal and postnatal care, telehealth offers multiple benefits—reducing financial burden, increasing system efficiency, and providing convenience to expectant mothers.<sup>7</sup> However, reliance on telehealth also poses challenges. Nurses and other healthcare

professionals must address issues such as limited access to technology, concerns about patient privacy, difficulties in establishing therapeutic relationships online, and the risk of missing subtle clinical signs due to the absence of physical examination.<sup>8</sup>

In maternity care, where timely interventions and compassionate support are vital, midwives play a pivotal role in ensuring that telehealth is implemented safely and effectively. This includes providing health education, emotional support, early detection of complications through virtual assessments, and fostering trust in digital platforms.

The present study “Telehealth in maternity care: benefits, barriers, and the future of digital maternity care seeks to examine the implications, applications, and benefits of telehealth in maternity nursing. By analyzing existing literature, it highlights how telehealth can strengthen maternal and neonatal health outcomes, while also acknowledging its limitations and the responsibilities of nurses in bridging technology with human touch.

## SEARCHING AND SCREENING STRATEGY

The search strategy aimed to obtain published material and was structured in three steps. Initially, a restricted exploration of PubMed, Medline, Google Scholar, and Research Gate, International Journal of Nursing Education and Research was conducted to identify relevant keywords in titles, abstracts, and subject descriptors.

Secondly, the terms identified, along with their synonyms recognized by the respective databases, were subsequently utilized in an extensive literature search and lastly furthermore, the reference lists and bibliographies of articles collected in the second stage were meticulously scrutinized (Figure 1).

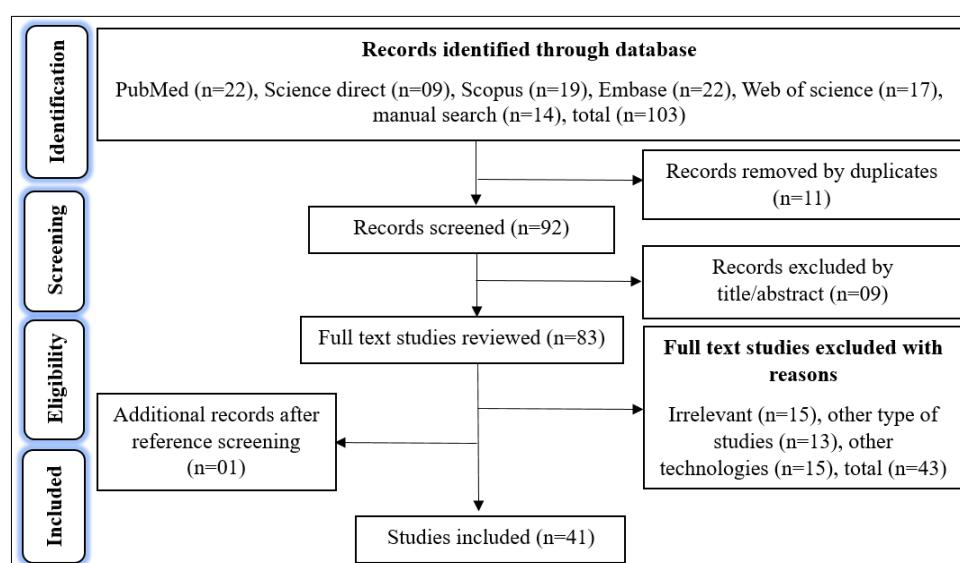


Figure 1: CONSORT diagram representing selection of records (PRISMA).

## CURRENT LANDSCAPE OF TELEHEALTH IN MATERNITY CARE

The current landscape of telehealth in maternity care reflects the integration of digital technologies to enhance prenatal and postpartum services. Telehealth in maternity care involves using telecommunications, remote monitoring, and digital communication tools to provide healthcare services and support for pregnant individuals (Figure 2). Key aspects of the current landscape include the following.

### Virtual consultations

Telehealth offers pregnant individuals the opportunity for remote interactions with healthcare providers, facilitating the monitoring of maternal and fetal health, and addressing concerns through virtual consultations, eliminating the need for in-person visits. According to Shamsabadi et al virtual clinics played a pivotal role in virtual visits, consultations, monitoring, follow-ups, and remote home care, with caregivers expressing high satisfaction scores post-virtual interactions.<sup>9</sup> In a study by Saad et al participants lauded virtual care for its comfort, convenience, and effective communication, foreseeing its potential as a promising tool for long-term compliance in obstetric patients.<sup>10</sup>

### Distant surveillance

Distant surveillance can be incorporated as an alternative to in-person examinations, enabling entirely virtual consultations. This technology relies on wearable or portable devices to gather health and biometric information from pregnant women, transmitting the data to their healthcare providers. This method demonstrated to be as accurate as in-clinic assessments, monitors various parameters like blood pressure, fetal heart rate, and fetal growth using tools such as tape measures.<sup>11-14</sup>

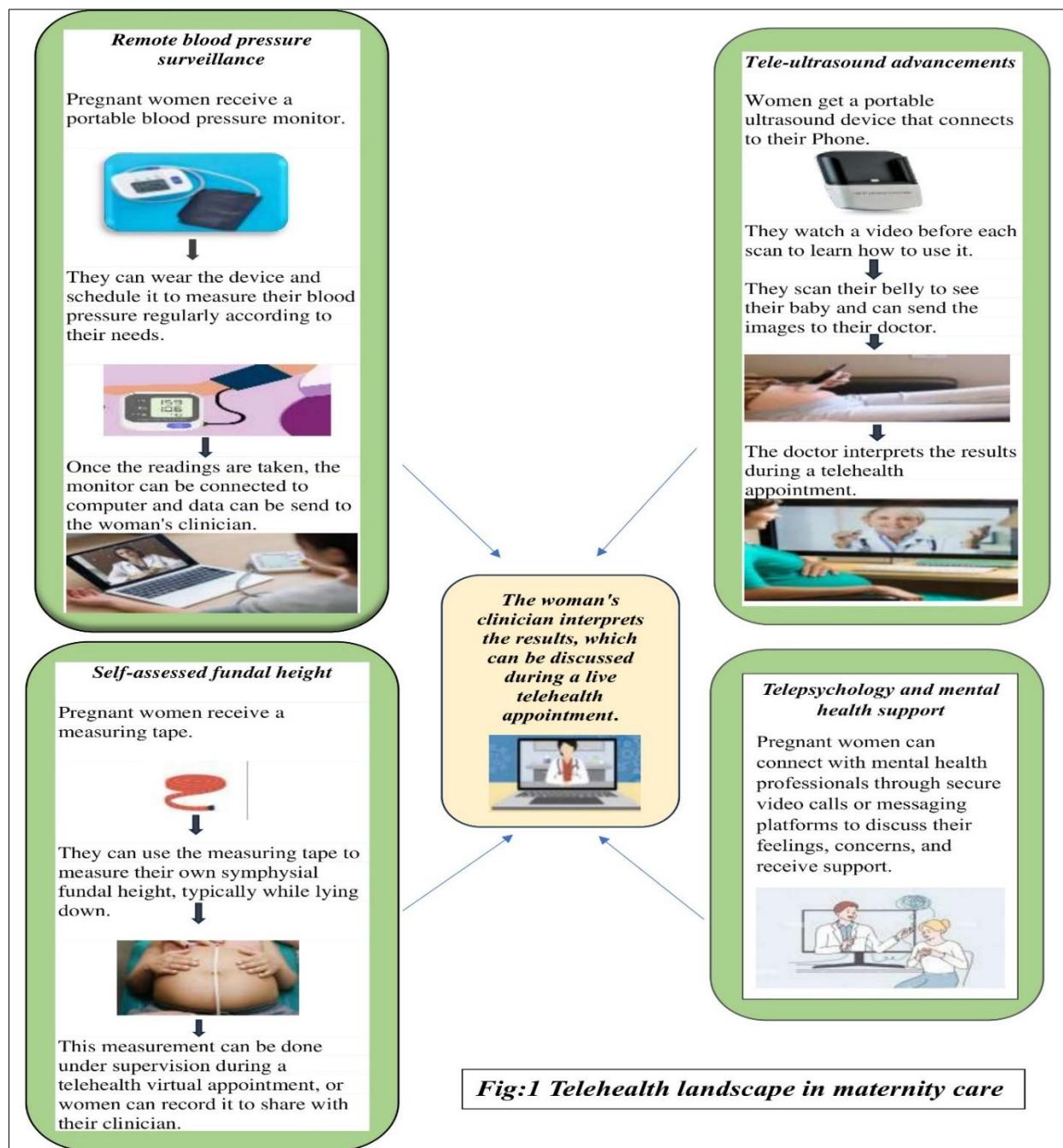


Figure 2: Telehealth landscape in maternity care.

#### Tele-ultrasound advancements

Remote ultrasound consultations in telehealth enable healthcare providers to guide and interpret scans conducted at local facilities or homes, enhancing diagnostic imaging accessibility. Emerging technology, known as tele-ultrasound, allows for remote ultrasound examinations.<sup>15</sup> Initially employed in rural areas for distant oversight of sonographers, this technology, as explored by Hadar et al., has now expanded.<sup>16</sup> In their observational study, women used self-operated tele-ultrasound devices connected to mobile phones for assessing fetal biophysical profiles. The INSTINCT ultrasound device, developed by

PulseNmore, facilitated real-time image sharing with clinicians.<sup>16</sup> Women performed initial ultrasounds under technician guidance, achieving a 95.3% success rate in detecting fetal heart activity and varying success rates for individual profile components.<sup>16,17</sup> Notably, our investigation revealed a research gap in patient-operated tele-ultrasound for estimating fetal weight, suggesting a potential area for future exploration.<sup>17</sup>

#### Remote blood pressure surveillance

The importance of remote blood pressure surveillance lies in its ability to enable continuous monitoring of maternal

health without the need for frequent clinic visits. This approach facilitates early detection of changes in blood pressure, allowing timely intervention and management of conditions such as gestational hypertension or preeclampsia. It enhances the overall efficiency of maternal care, promotes proactive healthcare interventions, and contributes to better outcomes for both mothers and infants. A 2018 systematic review found little difference between blood pressure measurements in clinics and those taken at home during pregnancy.<sup>18</sup> Recent extensive trials, including an analysis of the OPTIMUM-BP randomized trial by Bowen et al, indicated that women with gestational hypertension or preeclampsia could accurately self-monitor their blood pressure, aligning closely with in-clinic readings.<sup>19,20</sup> Similarly, in the BUMP 2 randomized trial involving 850 pregnant women, Chappell et al concluded that blood pressure readings from home monitoring and standard care (clinic readings) were similar.<sup>21</sup>

#### *Self-assessed symphysial fundal height*

Self-assessed symphysial fundal height (SFH) in telehealth refers to a method where pregnant individuals measure the distance between the pubic bone and the top of the uterus (fundus) at home, rather than during an in-person visit to a healthcare provider. This approach is part of telehealth models, which use technology to remotely monitor and manage healthcare. Research, like that conducted by Palmer et al has explored the effectiveness of incorporating self-assessed SFH into telehealth programs.<sup>23</sup> building upon the feasibility demonstrated by Bergman et al.<sup>22</sup> While measurements taken by pregnant women exhibit greater individual variance compared to those by midwives, the approach of obtaining multiple measurements at each visit has been proposed to mitigate this discrepancy.<sup>22</sup> During the telehealth period, Palmer et al. observed a 24% rate of undetected fetal growth restriction in low-risk pregnancies and 5% in high-risk pregnancies, figures comparable to those seen in conventional care settings.<sup>23</sup> These findings suggest that self-measured SFH may be just as accurate as in-clinic measurements in identifying instances of poor fetal growth.

#### *Mobile apps for maternal health*

The landscape of maternal healthcare is evolving with the proliferation of mobile applications designed to cater to the specific needs of expectant mothers. These apps encompass a range of functionalities, including appointment tracking, pregnancy milestones monitoring, and the dissemination of personalized health information. Notably, many of these applications seamlessly integrate with telehealth services, augmenting their utility and accessibility. A noteworthy case study in this domain is the collaborative effort between NEEDS (Network for Enterprise Enhancement and Development Support) and Simavi, a Dutch NGO, focused on maternal health enhancement in rural India.<sup>24</sup> Together, they conceived

Mobile for Mothers (MfM), an application aimed at bolstering maternal awareness and fostering positive health behaviors within tribal communities. This initiative, supported by the Government of Jharkhand and the European Union, signifies a concerted effort to leverage mHealth solutions for the betterment of maternal health outcomes. In Jharkhand's tribal communities, the adoption of mHealth technologies heralds a transformative shift, engendering heightened awareness, increased engagement, and a gradual transition from traditional to modern healthcare practices.<sup>24</sup> By harnessing the power of smartphones for out-of-hospital pregnancy care, both healthcare providers and expectant mothers stand to benefit significantly. These devices facilitate the delivery of personalized services, grant easy access to vital health information, and ultimately contribute to improved pregnancy outcomes.<sup>25</sup>

#### *Telemonitoring high-risk pregnancies*

Telehealth has emerged as a valuable tool in managing high-risk pregnancies, fostering enhanced monitoring and communication channels between healthcare providers and expectant mothers. This innovative approach, as highlighted by Heuvel et al offers a distinct advantage by enabling the observation of fetal and maternal conditions within the comfort and privacy of one's home, contrasting with the traditional confines of hospitalization.<sup>26</sup> The potential of telemonitoring in high-risk pregnancies lies in its capacity to detect complications early, thus enabling timely intervention at the local level before necessitating hospitalization, a prospect that holds promise for improving gestational outcomes.<sup>27</sup> To fully harness the benefits of obstetrical telemonitoring, it is recommended to implement integrated systems that facilitate the comprehensive collection of obstetric parameters throughout the stages of childbirth and postpartum care, ensuring a holistic approach to maternal and fetal health management.<sup>27</sup>

#### *Telepsychology and mental health support*

Telehealth expands its scope to encompass mental health services, catering to the psychological needs of individuals during pregnancy and the postpartum period. Remote counseling and therapy sessions offer accessible support for maternal mental well-being. According to Paul et al, telehealth presents an effective solution for ensuring continual access to evidence-based group therapy programs targeting perinatal mood and anxiety disorders, while also fostering the mother-infant relationship.<sup>28</sup> Additionally, further research provides corroborative evidence, drawing from the experiences of perinatal women and underscoring positive interactions with a videoconference intervention for perinatal depression.<sup>29</sup> These advancements underscore the potential of telehealth to revolutionize mental health support during the perinatal period, offering convenience and effectiveness to mothers in need.

### **Tele-education and support**

Telehealth platforms furnish expectant mothers with educational materials and assistance, delivering guidance on prenatal care, dietary recommendations, breastfeeding, and postpartum recuperation. Moreover, they offer virtual support networks and counseling services, which are increasingly accessible. According to Gill et al, a hybrid care model integrating interdisciplinary education benefits the mental well-being of first-time mothers. Their study indicates that incorporating small-group online education alongside individual pregnancy health assessments in a bustling antenatal clinic yields promising outcomes with minimal staff assistance.<sup>30</sup> Similarly, Escobar et al introduced a telehealth and education model between secondary and tertiary care centers, enhancing obstetric emergency care readiness and decreasing perinatal mortality rates.<sup>31</sup>

### **Cost optimization**

Cost optimization in telehealth maternity care involves harnessing digital technologies to deliver efficient prenatal and postnatal services while minimizing costs. By utilizing telehealth platforms, providers decrease overhead expenses associated with traditional in-person visits, streamline resource allocation, and mitigate indirect costs for patients. This approach not only enhances access to care and improves health outcomes for mothers and babies but also ensures financial sustainability in healthcare delivery. Although research on the cost-effectiveness of prenatal telehealth is limited, existing studies generally demonstrate positive results. Sung et al found that telehealth for pregnant women with pre-existing diabetes saved an average of \$2,798 per woman compared to in-person antenatal care.<sup>32</sup> Similarly, Van den Heuvel et al conducted a cost analysis on a digital health platform and remote monitoring for high-risk preeclampsia women, revealing a 19.7% average cost reduction compared to conventional antenatal care.<sup>33</sup>

### **Contentment**

#### *Healthcare provider contentment*

Healthcare providers engaged in telehealth maternity care find satisfaction in delivering personalized, high-quality services efficiently through digital channels. Telehealth enhances communication, boosts accessibility, and facilitates flexible appointment management, thereby optimizing resource allocation and easing administrative burdens. This approach not only enhances provider satisfaction and patient outcomes but also advances the quality and accessibility of maternal healthcare. Generally, healthcare providers view telehealth positively, as indicated by Konnyu et al's review of 674 providers, who showed a preference for flexible scheduling and viewed telehealth as convenient, particularly for high-risk pregnancies.<sup>34</sup> Similarly, Hofman et al found that 94% of 56 maternity care providers considered telehealth feasible,

with a majority deeming it appropriate and acceptable.<sup>35</sup> Moreover, Hargis-Villanueva et al. reported high provider satisfaction rates with telehealth, with a significant proportion expressing a preference for future use.<sup>36</sup> However, concerns exist, including worries about timely information delivery and potential challenges in self-managing pregnancies, as highlighted by Konnyu et al.<sup>34</sup> Additional barriers identified by Hofmann et al included equipment shortages, inadequate clinic support, and issues with audiovisual quality.<sup>35</sup> Moreover, Holman et al noted concerns about telehealth exacerbating existing health inequities.<sup>37</sup> Nevertheless, Wali et al's study demonstrated high provider satisfaction with antenatal telephone clinics during the pandemic, supporting the ongoing transition towards digitalization in antenatal care.<sup>38</sup>

#### *Patient contentment*

Patient contentment in telehealth maternity care refers to the fulfillment experienced by pregnant individuals who receive remote prenatal and postnatal services. This sense of contentment arises from the convenience, accessibility, privacy, continuity of care, shorter wait times, personalized attention, and improved communication facilitated by telehealth platforms. Telehealth maternity care overall enhances patient experiences and contributes to better maternal and neonatal health outcomes. In a study on tele-ultrasound by Hadar et al, 100 women gave an average user experience rating of 4.4/5 and an average satisfaction rating of 3.9/5, indicating high overall contentment and ease of use.<sup>8</sup> Ghimire et al conducted an extensive review of women's experiences, analyzing 23 studies from 2011 to 2021 with over 15,000 pregnant participants.<sup>39</sup> Their findings revealed preferences for video conferencing, communication in one's native language, user-friendly technology, cost-effectiveness, and a preference for a combined approach of in-person and virtual visits, especially among multiparous women. In a recent systematic review by Konnyu et al, which investigated the experiences of 251 pregnant women with telehealth, concerns were raised about delayed information, increased personal responsibility due to reduced visits, and safety issues.<sup>34</sup> However, women also expressed the belief that telehealth could be tailored more effectively to meet their individual needs compared to traditional care.

### **GAPS AND CHALLENGES IN THE EXISTING LITERATURE**

Telehealth in maternity care faces several notable gaps and challenges that necessitate careful consideration and targeted research efforts. Foremost among these challenges is the need for a robust evidence base supporting the efficacy and safety of telehealth interventions. While promising, many existing studies are limited in scale and scope, hindering conclusive findings and widespread adoption. Additionally, issues of equity and access remain prominent, as not all pregnant individuals have equal access to the necessary technology

or reliable internet connection. Addressing disparities in access to telehealth services is vital for ensuring equitable care delivery. Furthermore, understanding patient acceptance and satisfaction with telehealth in maternity care is essential for successful implementation. Patient preferences and experiences vary, highlighting the importance of tailoring telehealth services to meet individual needs. Provider training and adoption also pose significant challenges, requiring education on technology use, communication skills, and clinical decision-making in remote settings. Overcoming legal and regulatory barriers, ensuring cost-effectiveness, and establishing adequate reimbursement mechanisms are additional hurdles that must be addressed to realize the full potential of telehealth in maternity nursing. By systematically tackling these challenges through multidisciplinary collaboration and targeted research efforts, the field can continue to evolve and improve the quality and accessibility of care for pregnant individuals and their families.

## CONCLUSION

In conclusion, the literature on telehealth in maternity care underscores its potential to revolutionize prenatal and postnatal services, offering remote interactions, distant surveillance, and telemonitoring for high-risk pregnancies. Virtual consultations have shown high patient satisfaction, while technologies like tele-ultrasound and remote blood pressure surveillance enhance diagnostic accessibility. Additionally, self-assessed symphysial fundal height and mobile apps further augment maternal health support. Telehealth's role extends to mental health services, education, and cost optimization, benefiting both providers and patients. However, challenges remain in the evidence base, equity, provider adoption, and regulatory barriers. Addressing these gaps through collaborative research efforts is imperative to fully realize the benefits of telehealth in maternity care, ultimately improving outcomes for pregnant individuals and their families.

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