

Health Technologies in Obstetric Care: An Integrative Review Study

Tecnologias em Saúde no Cuidado em Obstetrícia: Estudo de Revisão Integrativa

Tecnologías en Salud en la Atención Obstétrica: Un Estudio de Revisión Integradora

RESUMO

O presente estudo teve como objetivo analisar criticamente as evidências científicas disponíveis sobre o uso de tecnologias em saúde no cuidado obstétrico, identificando seus benefícios, desafios e implicações para a segurança materna e neonatal. Trata-se de uma revisão integrativa da literatura, com buscas realizadas em bases como SciELO, PubMed, LILACS, BDNF e Google Acadêmico. Foram incluídos nove artigos publicados entre 2020 e 2025. Os resultados demonstram que as tecnologias aplicadas ao cuidado obstétrico são diversas, incluindo desde ferramentas digitais, como telemedicina, dashboards, softwares e aplicativos móveis, até práticas não invasivas e humanizadas conduzidas por enfermeiras obstétricas. Entre os principais benefícios, destacam-se a personalização do cuidado, o alívio da dor, a eficiência nos processos assistenciais, a autonomia da gestante e a segurança clínica. No entanto, os estudos também apontam desafios relevantes, como desigualdades no acesso às tecnologias, resistência institucional, necessidade de capacitação profissional e adaptação das ferramentas às realidades locais. Conclui-se que, embora as tecnologias possam qualificar o cuidado obstétrico, sua eficácia depende da articulação entre inovação e humanização, sendo fundamental que sua implementação considere os contextos sociais e culturais das mulheres assistidas.

DESCRIPTORES: Tecnologia em saúde; Obstetrícia; Cuidado obstétrico; Inovação em saúde; Humanização da assistência.

ABSTRACT

This study aimed to critically analyze the available scientific evidence on the use of health technologies in obstetric care, identifying their benefits, challenges, and implications for maternal and neonatal safety. It is an integrative literature review, with searches conducted in databases such as SciELO, PubMed, LILACS, BDNF, and Google Scholar. Nine articles published between 2020 and 2025 were included. The results show that technologies applied to obstetric care are varied, ranging from digital tools such as telemedicine, dashboards, software, and mobile apps to non-invasive and humanized practices led by obstetric nurses. The main benefits include personalized care, pain relief, increased efficiency in care processes, maternal autonomy, and clinical safety. However, the studies also highlight significant challenges, such as unequal access to technologies, institutional resistance, the need for professional training, and the adaptation of tools to local realities. It is concluded that although technologies can enhance obstetric care, their effectiveness depends on the integration of innovation and humanization, and their implementation must consider the social and cultural contexts of the women being cared for.

DESCRIPTORS: Health technology; Obstetrics; Obstetric care; Health innovation; Humanized care.

RESUMEN

Este estudio tuvo como objetivo analizar críticamente las evidencias científicas disponibles sobre el uso de tecnologías en salud en la atención obstétrica, identificando sus beneficios, desafíos e implicaciones para la seguridad materna y neonatal. Se trata de una revisión integradora de la literatura, con búsquedas realizadas en bases como SciELO, PubMed, LILACS, BDNF y Google Académico. Se incluyeron nueve artículos publicados entre 2020 y 2025. Los resultados muestran que las tecnologías aplicadas a la atención obstétrica son diversas, incluyendo herramientas digitales como telemedicina, tableros de control, softwares y aplicaciones móviles, así como prácticas no invasivas y humanizadas lideradas por enfermeras obstétricas. Entre los principales beneficios se destacan la personalización del cuidado, el alivio del dolor, la eficiencia de los procesos asistenciales, la autonomía de la gestante y la seguridad clínica. Sin embargo, los estudios también señalan desafíos importantes, como desigualdades en el acceso, resistencia institucional, necesidad de capacitación profesional y adaptación de las herramientas a las realidades locales. Se concluye que, aunque las tecnologías pueden calificar la atención obstétrica, su eficacia depende de la articulación entre innovación y humanización, siendo fundamental considerar los contextos sociales y culturales de las mujeres atendidas.

DESCRIPTORES: Tecnología en salud; Obstetricia; Atención obstétrica; Innovación en salud; Humanización del cuidado.

Maria Carolina Salustino dos Santos

PhD candidate in Nursing, EPE/UNIFESP.

Bárbara Larissa Lima Leal

Neonatal Intensive Care Nurse.

Otávia Cristina Vaz de Lima

Nurse, Federal University of Uberlândia.

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Josane Gomes da Silva

Nurse at the Municipal Health Department of Miguel Alves

Maria Jandira Rodrigues da Silva

Master's student in Local Development. Bachelor's degree in Human Resource Management Technology.

Maria Beatriz de Andrade Silva

Nurse – Postgraduate in Urgency, Emergency,

and Intensive Care Nursing – Two years of experience in Primary Health Care.

ORCID: <https://orcid.org/0009-0006-1729-7471>

Ana Cristina Rodrigues Luna e Silva

Nurse, Specialist in Women's Health and Family Health, Master in Development and Environment. Coordinator of Women's Health in the municipality of Campina Grande.

INTRODUCTION

Technological advances in healthcare have led to significant changes in obstetric care, ranging from prenatal monitoring to delivery and the postpartum period¹. The incorporation of innovative resources, such as advanced fetal monitoring, telemedicine, artificial intelligence, and wearable devices, expands the possibilities for early diagnosis, personalized care, and improved maternal and neonatal safety, without losing sight of the humanization of care¹. When applied appropriately, these technologies can optimize care processes, reduce complications, and increase the satisfaction of pregnant women, especially when integrated with evidence-based practices and conducted by trained teams².

The COVID-19 pandemic has significantly accelerated the adoption of these tools, especially telemedicine and remote monitoring, which have proven to be viable alternatives for ensuring continuity of care in a context of mobility restrictions and hospital overload³. In this scenario, the use of digital platforms for virtual consultations, monitoring of high-risk conditions, and educational guidance has expanded, minimizing the risk of exposure to the virus and maintaining the bond between professional and patient. In addition, connected home devices and tracking applications have enabled remote clinical monitoring, favoring early detection of changes and timely interventions.

Despite the benefits, the adoption of health technologies in obstetrics presents challenges, such as inequality in digital access, economic and sociocultural barriers, the need for professional training, protection of sensitive data, and adaptation of tools to the uniqueness of each pregnancy^{1,4}. These issues reinforce the importance of a balanced approach that

combines technological innovation and humanized care, aiming not only to improve clinical indicators but also to promote positive experiences for women and their families^{1,4}.

Given this scenario, it is important to synthesize and critically analyze the available evidence on the use of technologies in obstetric care in order to understand their impact, identify knowledge gaps, and propose strategies that strengthen their implementation in a safe, equitable, and patient-centered manner. In this sense, the integrative review makes it possible to gather and evaluate different approaches, favoring a comprehensive and updated view of the role of these innovations in maternal and neonatal health care^{2,4}.

Therefore, the question arises: What is the scientific evidence on the use of health technologies in obstetric care, their benefits, challenges, and impacts on maternal and neonatal care? Thus, the objective is to critically analyze the available scientific evidence on the use of health technologies in obstetric care, identifying their benefits, challenges, and implications for maternal and neonatal safety, in order to support safe, equitable, and humanized care practices and implementation strategies.

METHOD

This is an integrative literature review study, developed in six interdependent stages: identification of the theme and formulation of the research question; establishment of criteria for inclusion and exclusion of studies; definition of the information to be extracted from the publications; critical evaluation of the selected studies; interpretation of the results; and synthesis of the knowledge produced. The guiding question was defined based on the PICO strategy adapted for reviews, considering: **P** (popula-

tion) – pregnant women and health professionals working in obstetrics; **I** (intervention) – use of health technologies; **C** (context) – obstetric care; and **O** (outcome) – benefits, challenges, and implications for maternal and neonatal care.

The search was conducted in the **SciELO, LILACS, PubMed/MEDLINE, Google Scholar, and BDNF** databases, with no language or publication period restrictions. Controlled and uncontrolled descriptors were used, combined by Boolean operators, such as “health technology,” “obstetrics,” “obstetric care,” and “technological innovation.” The inclusion criteria comprised original or review articles addressing the use of technologies applied to obstetric care, published between 2020 and 2025. Duplicate publications, editorials, event abstracts, and studies that were not directly related to the topic were excluded.

The selection took place in two phases: in the first, the titles and abstracts were read to identify relevance; in the second, the potentially eligible texts were read in full. Data extraction was performed using a previously developed instrument, including information on authorship, year, country, objective, type of technology, results, and conclusions. The included studies were analyzed descriptively and interpretatively, allowing for the synthesis of evidence and the identification of knowledge gaps related to the use of health technologies in obstetric care.

RESULTS

In order to systematize and critically analyze the scientific production related to the use of health technologies in obstetric care, a summary table was prepared with the main findings of the studies selected in the review. The articles cover different methodological approaches, such as integrative reviews, qualitative studies, exper-

rience reports, and theoretical essays, and encompass various technological interventions, ranging from digital tools such as software, dashboards, and mobile applications to non-invasive care practices and light technologies aimed at humanizing care.

The following table presents a comparative overview of the main elements of each study, including: title, type of study, technologies or interventions used, observed benefits,

challenges faced, publication journal, and year. This organization provides a panoramic and critical view of how technological innovations are being integrated into obstetric care, as well as their impacts on the safety, autonomy, efficiency, and humanization of care provided to pregnant women and new mothers.

The analysis shows a growing trend toward valuing technologies that combine technical advances with

a woman-centered approach, respecting their uniqueness and promoting greater active participation during pregnancy and childbirth. At the same time, the studies warn of structural challenges, such as inequalities in access, professional resistance, and gaps in training, which need to be addressed so that innovations can fulfill their transformative potential in an equitable and effective manner.

TABLE 1 – Presentation of the studies found:

Nº	Title	Type of Study	Technologies / Interventions	Benefits	Challenges	Journal / Periodical	Year
1	Health technologies in obstetric care	Integrative review	Telemedicine, AI, wearable devices	Early diagnosis, personalized care, maternal/neonatal safety	Inequality in access, training, data privacy	Not specified in the excerpt (likely original article)	2025
2	The importance of Social and Human Sciences in medical education	Experience report	Socio-anthropological approach	Humanization of care, women's autonomy	Integration with the biomedical curriculum	Saúde Coletiva (Brazilian Edition)	2025
3	Non-invasive care technologies used by obstetric nurses	Qualitative and descriptive study	Massage, oils, upright positions	Autonomy, pain relief, humanized care	Institutional recognition of these practices	Escola Anna Nery Journal of Nursing	2022
4	Care technologies in normal childbirth assistance	Analytical cross-sectional study	Non-pharmacological methods, freedom of position	Autonomy, less intervention	Resistance within the traditional medical model	Revista de Enfermagem do Centro-Oeste Mineiro	2021
5	Health technologies in obstetric nursing	Integrative review	Dashboards, software, educational apps	Efficiency, humanization, decision-making	Infrastructure, costs, professional resistance	Revista Eletrônica Acervo Saúde	2025
6	Technology in maternal and child health	Development of a digital booklet	Digital educational booklet	Promotion of self-care in the postpartum period	Need for adequate health guidance	Revista Caderno Pedagógico	2025
7	Recent developments in obstetrics	Literature review	3D/4D ultrasounds, telemedicine	Early detection, expanded access, individualized care	Need for continuous investment and research	Revista Ibero-Americana de Humanidades, Ciências e Educação	2023
8	Technology and innovation in obstetrics	Review article	Fetal monitoring, obstetric telemedicine	Safety and quality of care	Conscious use, adaptation to the uniqueness of pregnancy	Revista Ibero-Americana de Humanidades, Ciências e Educação	2023
9	Adaptations and innovations in obstetrics in times of pandemic	Literature review	Telemedicine and remote monitoring	Continuity of care, self-management of health	Digital inequality, professional and patient adaptation	Brazilian Journal of Implantology and Health Sciences	2025

Source: Research data, 2025.

The analysis of the articles allowed us to identify different categories of technologies used in obstetric care, with an emphasis on digital technologies, non-invasive interventions, and educational strategies with a humanized approach. Among the digital technologies, tools such as management software, dashboards, indicator panels, 3D/4D ultrasounds, telemedicine, and mobile applications stand out. These solutions, as evidenced in the studies analyzed, have contributed to improving the efficiency of care processes, optimizing hospital management, supporting clinical decision-making, and expanding access to care in risky contexts, as observed during the COVID-19 pandemic.

Non-invasive technologies were also widely addressed in the articles, especially with regard to practices developed by obstetric nurses. These include the use of massage, essential oils, warm water baths, conscious breathing stimulation, freedom of position during labor, and encouragement of the parturient's protagonism. According to the studies, these strategies promote pain relief, the well-being of the pregnant woman, and more respectful care, with a lower degree of medical intervention.

Another recurring point in the studies is the value placed on educational and humanized approaches. The use of digital booklets and the encouragement of health education are pointed out as effective tools for promoting self-care, especially in the postpartum period. In addition, the integration of social and human sciences into medical training is highlighted as fundamental for the construction of obstetric care that considers the social determinants of health and respects the diversity of experiences of pregnant women.

Among the most frequently cited benefits are improved quality of care, strengthened women's autonomy, reduced unnecessary interventions, promotion of humanization in child-

birth, and expanded access to safe, evidence-based practices. On the other hand, the main challenges identified relate to inequalities in access to technologies, resistance to innovation among some professionals, the need for investment in training and infrastructure, as well as concerns about data security and the adaptation of tools to local realities. These findings reveal the complexity involved in implementing technologies in obstetric care and reinforce the need for strategies that combine technological innovation and humanized care in order to promote safe, equitable care centered on women's needs.

DISCUSSION

The incorporation of technologies in obstetric care has established itself as a strategic resource for improving maternal and neonatal health care. The findings of this review reveal that, although these innovations offer significant benefits, their implementation is still marked by structural, cultural, and training challenges.

Digital technologies, such as telemedicine, dashboards, and clinical care software, have proven effective in improving care management, especially in high-demand contexts, such as during the COVID-19 pandemic. These tools have facilitated the continuity of prenatal care and enabled greater monitoring of high-risk pregnancies, optimizing clinical decision-making and the allocation of healthcare resources^{1,5,9}. However, this process also revealed significant barriers, such as unequal access to technological tools, especially among vulnerable populations, as well as resistance from some professionals to changes in the traditional model of care^{1,5}.

In addition to digital innovations, the literature highlights the growing importance of light and non-invasive technologies, especially those associ-

ated with the work of obstetric nurses. Practices such as the use of massage, essential oils, breathing techniques, freedom of position, and active participation of the pregnant woman in labor have been recognized as effective in promoting comfort, reducing unnecessary interventions, and strengthening women's protagonism^{3,3,4}. These technologies reinforce an approach centered on autonomy and the humanization of care, and are also valued for their ability to respect the physiological processes of childbirth.

In addition, the educational dimension of technologies has gained prominence in recent studies. The production of digital teaching materials, such as booklets and applications, has been identified as a powerful resource to support self-care, especially in the postpartum period⁶. These strategies not only provide relevant information for women's decision-making, but also contribute to strengthening the bond between professionals and users of the health system.

Another relevant axis observed in the studies is the role of the Social and Human Sciences in the qualification of obstetric care. The integration of socio-anthropological perspectives into medical education favors a broader and more sensitive understanding of the social determinants of health, contributing to more empathetic and inclusive practices⁷. By recognizing the intersectionality of factors such as gender, class, and race, professionals are better able to provide ethical, inclusive, and equitable care.

Despite the advances reported, the articles analyzed also indicate that tensions persist between biomedical models focused on intervention and approaches based on evidence and humanization. While recent developments in obstetrics point to significant technical modernization, it is noted that the success of these strategies depends on the ability of health services

to promote organizational and cultural changes that effectively incorporate the centrality of women in care^{8,9}.

Thus, it is concluded that technologies, when integrated into reflective practice, can not only improve clinical indicators but also transform the care experience, making it more welcoming, safe, and respectful. However, for this potential to be fully realized, continuous investment in professional training, infrastructure, digital accessibility, and revision of health training models is essential.

FINAL CONSIDERATIONS

This study showed that the use of health technologies in obstetric care has expanded significantly, ranging from complex digital tools to light, non-invasive practices focused on hu-

manization. Technological innovations, when integrated with care models that are sensitive to the needs of pregnant women, have the potential to transform obstetric care, promoting greater clinical safety, women's autonomy, and the qualification of professional practices.

The results demonstrated that, although there are several successful initiatives in the field of obstetrics, their implementation still faces considerable challenges, such as unequal access, institutional resistance, lack of infrastructure, and the need for continuing education for professionals. These obstacles reinforce the urgency of public policies that expand technological accessibility, promote equity in care, and encourage the integration of technology and humanized practices.

In addition, the importance of an interdisciplinary approach that values

not only technical advances but also the social, cultural, and subjective aspects that permeate the experience of pregnancy, childbirth, and the postpartum period became evident. The combination of technological innovation and respect for women's uniqueness is essential for building more ethical, efficient, and care-centered obstetric care.

Thus, it can be concluded that the future of obstetrics lies in a balance between science and sensitivity, in which technology should be used as an ally of care, and not as a substitute for listening, bonding, and humanization. Investing in training in the use of these tools, while respecting local contexts and women's rights, is a fundamental step toward achieving fairer, safer, and more transformative obstetric care.

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