# APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN OBSTETRIC ULTRASONOGRAPHY: ADVANCES, BENEFITS, AND CHALLENGES

# APLICAÇÕES DA INTELIGÊNCIA ARTIFICIAL NA ULTRASSONOGRAFIA OBSTÉTRICA: AVANÇOS, BENEFÍCIOS E DESAFIOS

# APLICACIONES DE LA INTELIGENCIA ARTIFICIAL EN LA ULTRASONOGRAFÍA OBSTÉTRICA: AVANCES, BENEFICIOS Y DESAFÍOS

Isabella Rissi Vicentini de Morais[1], Wilnaira Costa[2], Emanuela Gama Sousa[3], Leônidas Barbosa Porto Neto[4]

**ABSTRACT**

Obstetric ultrasonography is recognized as an essential tool in prenatal care, allowing early identification of conditions that may affect maternal and fetal health. However, the traditional method presents limitations such as operator-dependent variability, prolonged examination time, and difficulties in access in regions with limited infrastructure. In this context, artificial intelligence has been incorporated as a strategy to optimize diagnostic processes, reduce examination time, and increase the reproducibility of results. This study aims to critically analyze the applications of artificial intelligence in obstetric ultrasonography, highlighting recent advances, perceived clinical benefits, risks, and implementation challenges. The deductive method was adopted, with bibliographic research in specialized sources. The results indicate that although the technology offers important operational and diagnostic gains, its full adoption depends on overcoming technical, ethical, financial, and regulatory barriers. It is concluded that the incorporation of artificial intelligence in obstetric ultrasonography requires strategic planning, professional training, and specific regulation.

**Keywords:** Artificial Intelligence. Obstetric Ultrasonography. Prenatal Care. Diagnostic Imaging. Maternal and Fetal Health.

**RESUMO**

A ultrassonografia obstétrica é reconhecida como uma ferramenta essencial no acompanhamento pré-natal, permitindo a identificação precoce de condições que podem impactar a saúde materno-fetal. No entanto, o método tradicional apresenta limitações, como a variabilidade operador-dependente, o tempo prolongado de exame e as dificuldades de acesso em regiões com infraestrutura reduzida. Nesse contexto, a inteligência artificial tem sido incorporada como estratégia para otimizar processos diagnósticos, reduzir o tempo de exame e aumentar a reprodutibilidade dos resultados. Este estudo tem como objetivo analisar de forma crítica as aplicações da inteligência artificial na ultrassonografia obstétrica,

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[1] Graduate in Medicine. Centro Universitário do Maranhão (UNICEUMA).
E-mail: isabellarissivicentini@gmail.com
Orcid: https://orcid.org/0009-0005-0056-1208 Lattes: http://lattes.cnpq.br/7898337523348071
[2] Graduate in Medicine. Centro Universitário do Maranhão (UNICEUMA). E-mail: wilnaira@gmail.com
[3] Graduate in Medicine. Centro Universitário do Maranhão (UNICEUMA). E-mail: manuugama@outlook.com
[4] Graduate in Medicine. Centro Universitário do Maranhão (UNICEUMA).
E-mail: leonidasbnporto@hotmail.com
Orcid: https://orcid.org/0000-0003-4462-0167 Lattes: http://lattes.cnpq.br/1845213536840527

destacando os avanços recentes, os benefícios clínicos percebidos, os riscos e os desafios para sua implementação. Adotou-se o método dedutivo, com pesquisa bibliográfica em fontes especializadas. Os resultados apontam que, embora a tecnologia ofereça importantes ganhos operacionais e diagnósticos, sua adoção plena depende da superação de barreiras técnicas, éticas, financeiras e regulatórias. Conclui-se que a incorporação da inteligência artificial na ultrassonografia obstétrica exige planejamento estratégico, capacitação profissional e regulamentação específica.

**Palavras-chave:** Inteligência Artificial. Ultrassonografia Obstétrica. Pré-natal. Diagnóstico por Imagem. Saúde Materno-fetal.

## RESUMEN
La ecografía obstétrica es reconocida como una herramienta esencial en la atención prenatal, ya que permite la identificación temprana de condiciones que pueden afectar la salud materna y fetal. Sin embargo, el método tradicional presenta limitaciones, como la variabilidad dependiente del operador, el tiempo prolongado de examen y las dificultades de acceso en regiones con infraestructura limitada. En este contexto, la inteligencia artificial se ha incorporado como una estrategia para optimizar los procesos diagnósticos, reducir el tiempo de examen y aumentar la reproducibilidad de los resultados. Este estudio tiene como objetivo analizar críticamente las aplicaciones de la inteligencia artificial en la ecografía obstétrica, destacando los avances recientes, los beneficios clínicos percibidos, los riesgos y los desafíos de implementación. Se adoptó el método deductivo, con investigación bibliográfica en fuentes especializadas. Los resultados indican que, aunque la tecnología ofrece importantes beneficios operativos y diagnósticos, su adopción plena depende de superar barreras técnicas, éticas, financieras y regulatorias. Se concluye que la incorporación de la inteligencia artificial en la ecografía obstétrica requiere planificación estratégica, capacitación profesional y regulación específica.

**Palabras clave:** Inteligencia Artificial. Ecografía Obstétrica. Atención Prenatal. Diagnóstico por Imagen. Salud Materna y Fetal.

# 1 INTRODUCTION

Contemporary obstetric care faces significant challenges related to the quality, equity, and efficiency of health services, especially in prenatal care. Among the diagnostic resources available, obstetric ultrasonography has stood out as an essential tool for maternal-fetal surveillance. Its use allows early identification of conditions that can compromise gestational development, guide clinical conduct, and contribute to the reduction of adverse outcomes.

Despite its consolidated importance, the traditional method of performing ultrasonography has structural, technical, and operational limitations. The variability of the results due to the operator's experience, the prolonged time to perform the exams, and the difficulties of access in regions with less infrastructure are just some of the factors that negatively impact the effectiveness of this technology. These aspects, when added together, can compromise the comprehensiveness of prenatal care and hinder the timely detection of risk situations.

In recent decades, artificial intelligence (AI) has emerged as a technological innovation with the potential to transform diagnostic practices in various areas of healthcare. Its application in obstetric ultrasonography has been the subject of study and debate, mainly due to the possibility of optimizing processes, increasing diagnostic accuracy, and reducing inequalities in access to the exam. However, the adoption of AI-based solutions also imposes new ethical, technical, and regulatory challenges that need to be carefully analyzed.

This article aims to perform a critical analysis of the applications of artificial intelligence in obstetric ultrasonography, focusing on recent advances, perceived clinical benefits, and challenges related to its implementation. The study is structured in five main sections. The first presents the contextualization of obstetric ultrasonography in current prenatal care, highlighting its importance and limitations. The second addresses the advances in artificial intelligence applied to the method, exploring its main clinical applications. The third section discusses the perceived clinical benefits of AI integration. In the fourth, the limitations, risks and challenges for its implementation are analyzed. Finally, the fifth section presents the future perspectives of AI in obstetric ultrasound, highlighting the needs for its consolidation in clinical practice.

## 2 CONTEXTUALIZATION OF OBSTETRIC ULTRASONOGRAPHY IN CURRENT PRENATAL CARE

Prenatal care is one of the most effective instruments for reducing maternal and neonatal morbidity and mortality, and is recognized by the World Health Organization (WHO) as a priority public health strategy (Borborema et al., 2024). The effectiveness of prenatal actions is directly related to their ability to identify risk factors early, promote timely interventions, and ensure continuous monitoring of pregnant women, with a view to protecting maternal and fetal health (Silva et al., 2023).

Obstetric ultrasonography emerges in this scenario as an indispensable tool for clinical surveillance during pregnancy. It is a non-invasive technology, with low relative cost and great diagnostic potential, capable of providing detailed information on fetal anatomy, intrauterine development, placental location, and the identification of possible anomalies (Rodrigues et al., 2022). In addition to its diagnostic function, the test has unquestionable value in guiding clinical conducts, favoring risk stratification and contributing to the reduction of negative obstetric outcomes (Borborema et al., 2024).

The WHO, in line with the International Federation of Gynecology and Obstetrics (FIGO), recommends performing at least one ultrasound before the 24th week of gestation, with the aim of ensuring the early evaluation of structural anomalies, confirmation of gestational age, and the identification of multiple pregnancies (Borborema et al., 2024). In Brazil, the Protocol of the Public Health Network guides the performance of two transvaginal ultrasound exams during the first trimester of pregnancy at usual risk, reinforcing the centrality of this method in obstetric care (Silva et al., 2023).

The effectiveness of obstetric ultrasonography can also be perceived in the context of the reduction of perinatal mortality. Studies show that, by enabling the early identification of complications such as fetal growth restriction and placental insufficiency, the test contributes significantly to the improvement of neonatal outcomes (Rodrigues et al., 2022). The evaluation of umbilical blood flow, through Doppler velocimetry, allows the detection of hemodynamic changes, enabling the adoption of therapeutic strategies that minimize maternal and fetal risks (Borborema et al., 2024).

However, despite technological advances and the consolidation of ultrasonography as an essential resource in prenatal care, the traditional method of performing it has limitations that need to be recognized and discussed. One of the main constraints observed is the high dependence on operator experience (Silva et al., 2023). The diagnostic accuracy of the exam

is intrinsically linked to the technical training and expertise of the professional responsible for the execution and interpretation of the images (Rodrigues et al., 2022). This dependence can generate inconsistent results, with possible impairments in clinical management, especially in places where there is a shortage of highly qualified professionals (Borborema et al., 2024).

In addition to operator-dependent variability, another challenge faced refers to the time it takes to perform the test and the consequent limitation in population coverage (Silva et al., 2023). In public health services, there is often a high demand for obstetric ultrasound exams, contrasting with the reduced availability of modern equipment and qualified professionals, which results in long waiting periods for pregnant women (Borborema et al., 2024). This situation compromises the principle of comprehensiveness of care and can delay the adoption of urgent therapeutic measures (Rodrigues et al., 2022).

Also with regard to limitations, the quality of the images obtained stands out, which can be impaired by technical and maternal factors. The use of obsolete appliances, with inadequate resolution, as well as specific clinical conditions, such as maternal obesity, can hinder the proper visualization of fetal structures, increasing the risk of diagnostic errors (Silva et al., 2023). In this context, it is essential to invest in state-of-the-art technology and constantly update the equipment available in health units (Borborema et al., 2024).

Inequality in access to obstetric ultrasound examination is also an important obstacle in ensuring quality prenatal care. Peripheral regions and communities in situations of social vulnerability face marked difficulties in carrying out the test in a timely manner, evidencing structural disparities in the Brazilian health system (Rodrigues et al., 2022). This reality exposes the urgency of public policies that prioritize equity in access to diagnostic services, aiming to guarantee the right to health in a broad and unrestricted way (Silva et al., 2023).

The shortage of trained professionals is another limiting factor that negatively impacts the coverage and quality of obstetric ultrasound exams (Borborema et al., 2024). Many health units, especially in the North and Northeast regions of Brazil, do not have doctors specializing in diagnostic imaging, which restricts the number of exams available and compromises agility in the care of pregnant women (Rodrigues et al., 2022). Such a scenario reinforces the importance of initiatives that promote the continuing education and qualification of health professionals to perform this type of procedure (Silva et al., 2023).

Given these limitations, the use of portable ultrasound equipment has contributed to overcoming some logistical barriers, making it possible to carry out exams in basic health units, outpatient clinics, and even home visits (Borborema et al., 2024). This strategy is

aligned with the guidelines for regionalization and decentralization of health care, bringing diagnostic services closer to communities farther from urban centers (Silva et al., 2023).

In addition to the care benefits, the expansion of the use of obstetric ultrasonography by different professional categories has generated debates in the ethical and legal sphere, especially regarding the attributions of each profession in the execution of diagnostic procedures (Silva et al., 2023). These debates have stimulated the production of new regulations and protocols that aim to regulate the practice, ensuring its legality and technical quality (Rodrigues et al., 2022).

Finally, it is essential to recognize that, although obstetric ultrasound represents a significant advance in prenatal care, its use still requires overcoming structural, organizational, and training challenges to ensure its full effectiveness (Borborema et al., 2024). The strengthening of the health care network, the modernization of equipment, the expansion of training programs, and the formulation of public policies aimed at reducing inequalities are essential actions to consolidate universal and qualified access to this important diagnostic resource (Silva et al., 2023).

Only through an integrated approach, involving managers, health professionals, researchers, and civil society, will it be possible to overcome the limitations of the traditional model of obstetric ultrasound and ensure that all pregnant women, regardless of their socioeconomic condition or geographic location, have access to adequate and timely care during pregnancy (Rodrigues et al., 2022).

## 3 RECENT ADVANCES WITH ARTIFICIAL INTELLIGENCE APPLIED TO OBSTETRIC USG

Technological evolution in recent decades has driven significant transformations in the field of health, especially with regard to diagnostic imaging. Artificial intelligence (AI) emerges as a support tool that promises to reduce the limitations inherent to traditional methods, including obstetric ultrasound (Silva Neto et al., 2025). However, the adoption of this technology on a large scale still faces challenges related to its implementation, validation, and acceptance by health professionals (Silva et al., 2024).

The incorporation of AI into the medical context did not occur abruptly. The development of predictive models, based on machine learning and deep learning, began with the need to improve diagnostic accuracy and reduce subjectivity in the interpretation of imaging exams (Delpino et al., 2023). This evolutionary trajectory has made it possible to

build algorithms capable of processing large volumes of data, identifying complex patterns, and offering clinical decision support (Silva Neto et al., 2025).

In obstetric practice, the most recent advances in AI have focused on applications aimed at optimizing routine tasks, such as automating fetal biometric measurements. This type of application seeks to reduce examination time and minimize operator-dependent variability, one of the main limitations of the traditional method (Silva et al., 2024). Tools based on machine learning are already capable of performing fetal biometrics in an automated way, offering greater standardization and repeatability to the results obtained (Silva Neto et al., 2025).

Another promising field of action concerns the early detection of structural anomalies, including cardiac malformations and fetal brain alterations. Deep learning algorithms have demonstrated performance comparable to that of human specialists in identifying such conditions, based on the analysis of obstetric ultrasound images (Silva Neto et al., 2025). This expanded diagnostic capacity is particularly relevant in health services with a shortage of specialized professionals, as it can contribute to the initial screening of suspected cases and to the appropriate referral of patients (Silva et al., 2024).

The automated evaluation of the placenta and amniotic fluid also represents a relevant innovation in obstetric ultrasound practice. AI models have been trained to perform volumetric quantification of amniotic fluid and placental morphological analysis, fundamental parameters for the follow-up of high-risk pregnancies (Silva Neto et al., 2025). These resources, by providing rapid and reproducible results, tend to optimize the dynamics of care in public health services, especially in high-demand scenarios (Delpino et al., 2023).

In addition to the applications described, AI has been used as a diagnostic decision support tool. Intelligent systems can integrate clinical, laboratory, and imaging data to generate diagnostic suggestions, prioritizing more severe cases and assisting professionals in defining more assertive approaches (Silva et al., 2024). This integration between multiple sources of information can represent a significant advance in obstetric risk management, allowing for earlier interventions and, potentially, better maternal-fetal outcomes (Silva Neto et al., 2025).

However, it is necessary to recognize that the implementation of AI in obstetric ultrasonography still faces important challenges in Brazil. The absence of clear national guidelines on the incorporation of artificial intelligence technologies into the Unified Health System (SUS) limits the standardization of processes and quality assurance in the use of

these tools (Silva et al., 2024). This normative gap compromises the legal and technical certainty of the adoption of clinical algorithms, especially in the field of public health (Silva et al., 2024).

In addition, the literature highlights the need for external validation of currently available AI models, with a view to ensuring their applicability in different population contexts and clinical realities (Silva Neto et al., 2025). Many of the algorithms developed are trained on specific databases, limiting their generalization to populations with distinct characteristics (Delpino et al., 2023).

Another critical aspect refers to the training of health professionals. The safe adoption of AI requires the development of specific skills related to the interpretation of the outputs generated by intelligent systems and the integration of this information into the clinical decision-making process (Silva Neto et al., 2025). Adequate capacity building therefore becomes a key requirement for successful implementation (Silva et al., 2024).

In addition, ethical and data privacy issues require special attention, especially in view of the potential massive use of sensitive information from pregnant patients (Delpino et al., 2023). The protection of personal data, the transparency of algorithms, and the definition of responsibilities in case of diagnostic failures are emerging topics that need to be debated in depth by public managers and the scientific community (Silva et al., 2024).

Considering the national scenario, it is observed that the implementation of health technologies, such as AI applied to obstetric ultrasound, still lacks structured public policies that include everything from cost-effectiveness assessment to training strategies and continuous monitoring (Silva et al., 2024). The Brazilian experience shows the absence of detailed normative instruments to guide the process of incorporation and use of these technologies in public health services, which represents an additional barrier to the advancement of this innovation (Silva et al., 2024).

In view of these considerations, it is possible to state that artificial intelligence applied to obstetric ultrasonography has great potential to overcome historical limitations of the traditional method, providing greater precision, agility, and efficiency to prenatal diagnosis (Silva Neto et al., 2025). However, its effective implementation will depend on a combination of efforts between researchers, health managers, care professionals, and public policy makers, in order to ensure that the benefits of this technology are accessible and safe for the entire population.

# 4 PERCEIVED AND POTENTIAL CLINICAL BENEFITS OF AI IN OBSTETRIC PRACTICE

The incorporation of digital technologies in health care has been pointed out as a promising strategy for overcoming historical challenges in Primary and Specialized Care, including obstetric care (Teixeira et al., 2023). In this context, artificial intelligence (AI) applied to obstetric ultrasonography has concrete clinical benefits, which have been described in the recent literature, especially with regard to the optimization of examination time, improvement of the reproducibility of results, support for less experienced professionals, and expansion of diagnostic access in regions with fewer resources (Silva Neto et al., 2025).

The reduction in the time required to perform the ultrasound examination is one of the most evident benefits of the application of AI algorithms. In a scenario in which the demand for tests exceeds the installed capacity of services, especially in public health units, the reduction in test time can have a positive impact on both the management of care flows and the quality of care provided (Silva et al., 2024). Tools based on machine learning have made it possible to automate steps traditionally performed manually, such as fetal biometric measurements, reducing the interval between performing the exam and obtaining the results (Silva Neto et al., 2025).

In addition to agility, AI contributes to increasing the reproducibility of diagnostic results, minimizing the variability inherent to the human factor. Dependence on the operator's individual experience has been pointed out as one of the main limitations of conventional obstetric ultrasound (Silva et al., 2024). In this sense, the use of artificial intelligence algorithms represents an advance in standardizing procedures and reducing discrepancies in the interpretation of images, promoting greater consistency in the evaluations carried out by different professionals (Delpino et al., 2023).

Another relevant aspect concerns the support that AI offers to less experienced professionals. In many regions of Brazil, especially in locations far from large urban centers, the shortage of physicians specializing in diagnostic imaging is a critical factor that limits access to quality exams (Teixeira et al., 2023). In this scenario, AI-based tools can function as second opinion systems, assisting general practitioners in the interpretation of sonographic findings, reducing the risk of diagnostic errors (Silva Neto et al., 2025).

The expansion of access to diagnosis in regions with less technological infrastructure is also a potential benefit highlighted by the literature. The adoption of portable equipment integrated with AI systems has made it possible to carry out exams in basic health units and in remote locations, favoring the decentralization of care and promoting greater equity in

prenatal care (Silva et al., 2024). This approach is in line with the principles of Primary Health Care (PHC), which advocates comprehensiveness and universality of care, fundamental aspects in tackling regional inequalities (Teixeira et al., 2023).

It should be noted, however, that the literature emphasizes that AI does not replace the clinical performance of health professionals. On the contrary, their role is that of a facilitator, expanding the professionals' capacity for analysis and optimizing the available resources (Silva et al., 2024). The critical interpretation of the results generated by algorithms continues to be a fundamental attribution of professionals responsible for obstetric care, which reinforces the need for specific training for the use of these tools (Delpino et al., 2023).

In addition to direct care gains, the implementation of AI can generate positive impacts on the management of health services. By reducing the examination time and increasing diagnostic accuracy, it is expected to reduce repetitive examinations and unnecessary referrals, optimizing care flows and enhancing the available human and material resources (Silva Neto et al., 2025). These advantages are especially relevant in the context of the Unified Health System (SUS), where the rationalization of resources is a constant imperative (Teixeira et al., 2023).

Finally, the literature points out that the introduction of innovative technologies, such as AI, can stimulate the adoption of new educational practices in the field of obstetric care. The availability of real-time data and the possibility of generating automated reports are factors that can contribute to strengthening educational processes with pregnant women, favoring female empowerment and the construction of care more centered on individual needs (Silva et al., 2024).

Given this panorama, it is observed that the clinical benefits associated with artificial intelligence in obstetric practice are multiple and range from operational aspects, such as the reduction of examination time, to strategic dimensions, such as the expansion of access and the qualification of care. However, for these benefits to materialize effectively and sustainably, it will be necessary to adopt public policies that encourage the responsible implementation of these technologies, as well as to strengthen the training and continuing education processes of the professionals involved (Teixeira et al., 2023).

# 5 LIMITATIONS, RISKS, AND CHALLENGES FOR IMPLEMENTING AI IN OBSTETRIC USG

The introduction of artificial intelligence (AI) into obstetric ultrasonography, despite its potential benefits, raises a number of limitations and challenges that need to be addressed before any large-scale implementation process. Among the risks most discussed in the literature, the possibility of excessive dependence of health professionals on automated decisions generated by algorithms stands out, a phenomenon known as over-reliance (Silva Neto et al., 2025). This situation can lead to a progressive reduction in the analytical capacity of professionals, with impairments in the formation of critical clinical reasoning and autonomy in decision-making (Delpino et al., 2023).

In addition to the concern with the behavior of professionals in the face of technology, the literature points to a relevant technical problem: the need to validate AI models in different populations. Most of the existing algorithms have been developed and tested in specific contexts, often in reference centers with advanced technological resources and with restricted population samples (Silva et al., 2024). This limitation raises doubts about the ability to generalize the results to other clinical scenarios, especially in Brazil, whose population diversity is a determining factor in the evaluation of health technologies (Teixeira et al., 2023).

Another obstacle concerns the financial cost associated with acquiring, maintaining, and upgrading AI-based systems. In a country with regional inequalities as marked as Brazil, the adoption of new technologies in obstetric care needs to be accompanied by public financing policies and strategies that ensure its sustainability in the medium and long term (Silva Neto et al., 2025). The absence of national studies on the cost-effectiveness of AI in obstetric ultrasound reinforces the need for more in-depth evaluations before its wide diffusion (Silva et al., 2024).

Ethical concerns also deserve attention. The use of large volumes of sensitive data, such as obstetric images and clinical information of pregnant women, increases the risk of privacy violations and inappropriate use of this data (Vasconcelos, 2025). In addition, algorithmic bias represents another challenge, since AI systems can reproduce structural inequalities if they are trained with databases that are not representative of Brazilian population diversity (Delpino et al., 2023). This possibility can disproportionately affect groups that are already historically vulnerable, deepening inequities in access to and quality of obstetric care.

Although artificial intelligence (AI) in obstetric ultrasound has shown promising advances, its implementation encounters several concrete barriers. One of the most evident risks is over-reliance on professionals, which can compromise clinical judgment and create a false sense of security (Ginsburg et al., 2025).

From a regulatory point of view, it is observed that Brazil still lacks a specific legal framework for the evaluation and incorporation of artificial intelligence technologies in health (Silva et al., 2024). While international agencies, such as the Food and Drug Administration (FDA) and the European Medicines Agency (EMA), have established strict requirements for the approval of clinical algorithms, in Brazil, the debate on the regulation of AI in health is still at an early stage (Vasconcelos, 2025). This regulatory gap represents a risk to patient safety and to the legal certainty of health professionals and institutions that choose to use such tools without adequate regulatory support (Silva Neto et al., 2025).

From an economic point of view, the acquisition and operation of AI systems, whether in portable equipment or integrated with sonographs, represent high costs, which can make their adoption unfeasible in less favored regions, increasing inequality in access to care (Chen et al., 2021).

In addition to the challenges already mentioned, there is still a lack of international consensus on validation standards for AI technologies applied to health (Delpino et al., 2023). This scenario makes it difficult to compare different technological solutions and compromises the ability of regulatory bodies to perform robust technical analyses for use authorization (Silva et al., 2024).

Given these limitations, the literature emphasizes that any initiative to implement AI in obstetric ultrasound must be preceded by careful evaluations, contemplating not only the technical aspects, but also the ethical, financial, and regulatory impacts resulting from its adoption (Teixeira et al., 2023).

## 6 FUTURE PERSPECTIVES FOR ARTIFICIAL INTELLIGENCE IN OBSTETRIC USG

The future perspectives for the use of artificial intelligence in obstetric ultrasonography are addressed in the literature carefully and with recognized moderation, especially in view of the challenges that have not yet been overcome. It is expected that the next technological advances will be directed at improving the diagnostic accuracy of existing algorithms, with a focus on reducing biases and expanding the clinical applicability of the models (Silva Neto et al., 2025). One of the concrete directions is the adoption of *explainable AI* tools, which offer

real-time feedback, helping professionals to capture correct ultrasound plans (Bashir et al., 2025). This represents a practical advance, different from empty futuristic visions.

The integration of AI with telemedicine systems is pointed out as a concrete possibility, especially in countries with great regional inequalities and difficulties in accessing specialized services, such as Brazil (Teixeira et al., 2023). Such integration, however, is not without challenges, including the need for adequate technological infrastructure and specific training of the professionals involved (Silva et al., 2024).

The literature also highlights that advances in the field of diagnostic personalization will depend directly on the quality of the databases used in the training of algorithms (Delpino et al., 2023). The collection of data representative of the Brazilian reality is an essential step for the AI systems developed to have effective applicability in the national context (Silva Neto et al., 2025).

From the point of view of professional training, the need for continuing education is a recurring theme among authors. The adoption of AI in obstetric practice will require the reformulation of curricula of health courses, as well as the implementation of continuing education programs aimed at updating professionals on the functioning and limitations of these tools (Silva et al., 2024). This preparation is seen as a central element to minimize the risks of inappropriate use of technology and ensure that AI is used as a support and not as a substitute for clinical judgment (Teixeira et al., 2023).

At the international level, there is an initial movement by some regulatory entities to establish minimum parameters for the incorporation of AI into clinical guidelines (Vasconcelos, 2025). However, the studies themselves emphasize that there is still no consolidated consensus on the validation, efficacy, and safety criteria necessary for the formal inclusion of these technologies in care protocols (Silva Neto et al., 2025).

The literature analyzed suggests that, for AI to become an effective tool in obstetric ultrasound, it will be necessary to advance simultaneously on three fronts: technological development, normative regulation, and professional training (Delpino et al., 2023). Without these elements, the adoption of this technology can reproduce or even amplify the inequalities that already exist in the Brazilian health system, in addition to generating relevant ethical, clinical, and legal risks (Silva et al., 2024).

## 7 CONCLUSION

The application of artificial intelligence in obstetric ultrasound represents an innovation with the potential to reconfigure consolidated practices in prenatal care. The test, recognized for its diagnostic importance in maternal-fetal health surveillance, has limitations that compromise its effectiveness, especially in contexts of scarcity of resources and specialized professionals.

Recent advances in artificial intelligence have provided solutions aimed at automating procedures, expanding the reproducibility of results, and supporting less experienced professionals. These innovations, however, do not eliminate the challenges that involve the safe and ethical implementation of these technologies, especially with regard to the validation of algorithms, the costs involved, and regulatory regulation.

The analysis showed that the adoption of artificial intelligence in obstetric ultrasound requires a critical and responsible look. Technological development, alone, is not enough to guarantee concrete benefits to clinical practice. Overcoming the identified limitations requires strategic planning, investment in professional training, and the definition of specific guidelines that guide the safe incorporation of these tools into the care routine.

Given this scenario, it is essential that future research initiatives, formulation of public policies and technological development consider the particularities of the Brazilian context. Only with an integrated and evidence-based approach will it be possible to ensure that artificial intelligence effectively contributes to the qualification of obstetric care and to the reduction of inequities in access to health services.

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