OBJN
ONLINE BRAZILIAN JOURNAL OF NURSING
ISSN: 1676-4285

REVIEW PROTOCOL

The use of ultrasound by nurses, midwives, and nurse-midwives in obstetric care: a scoping review protocol

Uso do ultrassom por enfermeiros(as), parteiras e enfermeiras parteiras na atenção obstétrica: protocolo de revisão de escopo

Elandia Chaves Caetano[1]
ORCID: 0000-0003-3261-3832

Géssyca Moreira Santiago[1]
ORCID: 0000-0002-0069-7376

Valdecyr Herdy Alves[1]
ORCID: 0000-0001-8671-5063

Pâmela Roberta de Oliveira[2]
ORCID: 0000-0003-0497-6548

Ana Clara Ribeiro Guimarães[2]
ORCID: 0009-0003-1185-2524

Rafaela Chagas Pereira[1]
ORCID: 0000-0003-4797-2467

Sandra do Nascimento Ribeiro Flauzino[1]
ORCID: 0009-0001-7904-1416

Siomara Correia de Holanda Barbosa[1]
ORCID: 0000-0001-7977-9448

[1]Fluminense Federal University

[2]Federal University of Mato Grosso

Editors:
Ana Carla Dantas Cavalcanti
ORCID: 0000-0003-3531-4694

Paula Vanessa Peclat Flores
ORCID: 0000-0002-9726-5229

Cláudia Maria Messias
ORCID: 0000-0002-1323-0214

Corresponding author:
Elandia Chaves Caetano
E-mail: chaveselandiaenf@gmail.com

Submission: 10/03/2023
Approved: 05/20/2024

ABSTRACT

Objective: To review the scientific literature on how nurses and/or midwives have incorporated ultrasound technology into the clinical management of pregnancy and/or childbirth in health care settings. **Method:** Scoping review protocol according to JBI guidelines and using the PRISMA-P checklist. Stages of the search strategy: (1) initial search of PUBMED (keywords and MeSH terms); (2) search of MEDLINE, LILACS, BDENF, Embase, SCOPUS, CINAHL, Ovid Journals Full Text, and Web of Science; and (3) screening of the reference list of all evidence sources identified during extraction. Studies addressing ultrasound in obstetric care in health care settings were included. The process of assessment, selection and data extraction will be performed by two independent researchers. Descriptive analysis (basic analysis of frequencies and percentages) will be performed. The results will be presented narratively.
Descriptors: Nursing; Prenatal Ultrasound; Midwife.

RESUMO

Objetivo: mapear a literatura científica acerca de como enfermeiros(as) e/ou parteiras ou enfermeiras parteiras têm incorporado o uso da ferramenta ultrassonográfica no manejo clínico da gravidez e/ou parto, nos contextos de atenção à saúde. **Método:** protocolo de revisão de escopo seguindo as diretrizes do JBI e uso do checklist PRISMA-P. Etapas da estratégia de busca: (1) busca inicial no PUBMED (palavras-chave e termos MeSH); (2) pesquisa em MEDLINE, LILACS, BDENF, Embase, SCOPUS, CINAHL, Ovid Journals Full Text e Web of Science e (3) triagem da lista de referências de todas as fontes de evidências encontradas na extração. Serão incluídos estudos que abordem o uso do ultrassom durante a atenção obstétrica, nos contextos de atenção à saúde. O processo de avaliação, seleção e extração dos dados será realizado por dois pesquisadores independentes. Uma análise descritiva (análise básica de frequências e porcentagens) será conduzida. Os resultados serão apresentados de forma narrativa.
Descritores: Enfermagem; Ultrassonografia Pré-Natal; Parteira.

INTRODUCTION

As obstetric ultrasound becomes more widely available, it is increasingly used by health care providers in various settings during pregnancy and childbirth. The scientific literature has reported that nurses have successfully used ultrasound as a complementary tool to physical examination and history in the assessment of pregnant women and fetuses in a variety of clinical, social, and geographic contexts. The primary aim is to ensure the highest quality of care and to reduce maternal and fetal mortality[1-4].

Studies conducted in various countries have reported that nurses and midwives are responsible for the primary care of pregnant and laboring women and that the effective use of portable ultrasound is necessary to provide this care[3] and to make accurate clinical decisions[4]. In addition, ultrasound can overcome the limitations of physical examination

How to cite: Caetano EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, et al. The use of ultrasound by nurses, midwives, and nurse-midwives in obstetric care: a scoping review protocol. Online Braz J Nurs. 2024;23 Suppl 1:e20246756. https://doi.org/10.17665/1676-4285.20246756

by offering greater portability, durability, and accessibility[1]. Ultrasound improves accuracy in identifying obstetric risk factors in the third trimester[5] and in diagnosing and managing complications during the pregnancy cycle[6].

A nurse skilled in using the ultrasound machine and knowledgeable about the scanning range performs a procedure that can be very effective and reliable in making quick decisions with favorable outcomes for maternal and fetal health[1]. In addition, it prevents pregnant women and newborns from experiencing delays in health care and additional costs[4]. An increasing number of nurses and midwives are undergoing training and qualification to strengthen their skills in using this technology in maternal and perinatal health, particularly regarding obstetric anatomy and physiology and psychosocial aspects[3].

The use of ultrasound by nurses and midwives is an emerging topic in literature. However, more specific issues remain unclear, such as the appropriate number of ultrasound examinations during pregnancy[7], the clinical indication for performing the examination[8], and public access, given the shortage of equipment and qualified personnel for its use[4,6]. There are also safety concerns, including the recommended minimum exposure time[9-10] and the potential reduction in clinicians' ability to make clinical decisions because of the overuse of this tool[4]. In addition, health care providers are concerned about ethical issues such as parents seeking the "perfect" baby, termination of pregnancy when congenital anomalies are detected[6], determination of fetal sex, production of photographs and advertisements[9], and increasing medicalization of pregnancy[11].

A scoping review can provide an overview or map of the evidence on the use of ultrasound by nurses or midwives during prenatal care and childbirth. This review can help to clarify how this emerging practice has been used and operationalized in different social, geographical, and health care contexts, highlighting existing shortcomings, weaknesses, and ethical issues. Such an analysis may be useful in informing future research needs and in contributing to the creation of reliable guidelines that will guide the use of this tool by nurses and/or midwives.

An initial search for studies focusing on the use of ultrasound technology by nurses was conducted in PUBMED, the JBI Evidence Synthesis journal, Epistemonikos, and the Cochrane Database of Systematic Reviews. No completed systematic reviews or scoping reviews were identified. However, an ongoing scoping review on this topic has been registered in the Open Science Framework. However, the objectives, guiding questions, population, and data to be extracted differ from those proposed in this scoping review protocol[12].

Therefore, the aim of this study is to map the scientific literature on how nurses or midwives have incorporated the use of ultrasound into the clinical management of pregnancy and/or childbirth. Aspects such as access, frequency, exposure time, indications for use, the clinical context of pregnancy/childbirth, and ethical issues in different healthcare settings will be considered.

METHOD

The present protocol was developed based on items adapted from PRISMA-P[13], recommended for a scoping review protocol[14], and registered on the Open Science Framework (https://osf.io/7nm24/). The scoping review will follow the JBI methodology[15]. In addition, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses—Extension for Scoping Reviews (PRISMA-ScR) checklist[16] will ensure the final report's integrity, transparency, and rigor.

Review questions

How have nurses, midwives, and nurse-midwives incorporated ultrasound into their obstetric practice (i.e., clinical management of pregnancy and/or childbirth), including ethical aspects, in all health care settings?

What is the role of nurses, midwives, and nurse-midwives using ultrasound in the clinical management of pregnancy and/or childbirth?

What ethical issues have been reported in the scientific literature regarding the use of ultrasound technology in the clinical management of pregnancy and/or childbirth by nurses, midwives, and nurse-midwives?

What gaps in knowledge have been identified in the scientific literature regarding the performance of obstetric ultrasound by nurses, midwives, and nurse-midwives?

Inclusion criteria

Population

This review will include studies involving nurses, midwives, and nurse-midwives, including those involving all of these professionals and those involving one or more of them. There will be no restrictions regarding the professionals'

education level, but this information will be detailed in the results.

Concept
The concept of interest is the use of ultrasound technology (regardless of model, brand, or year of manufacture) by nurses, midwives, and nurse-midwives in the clinical management of pregnancy and/or childbirth.

Context
The context includes all health care settings with no distinction by level of care, health care system, or country/region.

Sources
This scoping review will consider articles from peer-reviewed journals that use qualitative, quantitative, or mixed approaches. Evidence syntheses (e.g., systematic or integrative reviews) will also be included. In addition, text and opinion articles, dissertations and theses, and official documents (e.g., standards, laws, resolutions, guidelines, regulations, etc.) from governmental institutions or recognized scientific bodies/societies will be considered for inclusion in this scoping review.

Exclusion criteria
To avoid the extraction of duplicate data, primary sources may be excluded if the information they contain is already reported in the included evidence synthesis[14]. In addition, theses and dissertations with published articles will be excluded if the articles contain the same information relevant to the questions of this review.

Search strategy
The search strategy will be conducted in three stages, with no restrictions on the year of publication or language. The first stage was conducted on July 11, 2023, through an initial search limited to MEDLINE (via the National Library of Medicine) and CINAHL (via EBSCO) to identify eligible articles according to the review's population, concept, and context. Titles, abstracts, and descriptors (i.e., keywords) of the identified articles on the topic were reviewed. Potential search terms (both controlled and uncontrolled) were recorded in a notebook to develop an advanced, high-quality, sensitive search strategy for each database. This first phase of the search was conducted under the guidance of a nurse with expertise and advanced training in database searching. The search terms used were "nursing," "nurses," "nurse practitioners," "nurse midwives," "obstetric nursing," "midwifery," "midwife," "midwives," "ultrasonography, prenatal," "prenatal diagnosis," "fetal ultrasonography," "prenatal diagnosis, ultrasonic," "prenatal ultrasonic diagnosis," "prenatal ultrasonography," "ultrasonic prenatal diagnosis," and "ultrasonography, fetal."

A second search using all identified keywords and index terms was performed on September 11, 2023, in all included databases: MEDLINE (via National Library of Medicine), LILACS (via Biblioteca Virtual em Saúde [BVS]), BDENF (via Biblioteca Virtual em Saúde [BVS]), Embase (via Elsevier®), SCOPUS (via Elsevier®), CINAHL (EBSCOhost), Ovid (Journals Full Text), and Web of Science (via Clarivate). Boolean operators "AND" and "OR" were combined with the search terms. A complete search strategy for MEDLINE is provided in Figure 1. Upon publication of the protocol, all searches will be updated.

The grey literature search has not yet been conducted. Sources of grey literature to be searched include Google, Google Scholar, Biblioteca Digital Brasileira de Teses e Dissertações (BDTD), ProQuest Dissertations and Theses, Theses Canada Portal (Library and Archives Canada), and TROVE (National Library of Australia). We use an advanced search strategy for searches on Google and Google Scholar that examines the first 500 results for each included search term[17].

Finally, in the third stage of the search, the reference lists of all included evidence sources (after full-text reading) are screened for additional studies. If necessary, the authors of the included studies may be contacted for further information.

MEDLINE (via National Library of Medicine)
Search conducted on April 26, 2024, at 18:22:43 ("nursing"[MeSH Terms] OR "nursing"[All Fields] OR "nursings"[All Fields] OR "nursing"[MeSH Subheading] OR "nursing s"[All Fields] OR ("nurse s"[All Fields] OR "nurses"[MeSH Terms] OR "nurses"[All Fields] OR "nurse"[All Fields] OR "nurses s"[All Fields]) OR "Nurse Practitioners"[All Fields] OR "Nurse Midwives"[All Fields] OR "Obstetric Nursing"[All Fields] OR ("midwifery"[MeSH Terms] OR "midwifery" OR "midwife"[All Fields] OR "midwives"[All Fields])) AND ("ultrasonography prenatal"[All Fields] OR "Fetal Ultrasonography"[All Fields] OR "prenatal diagnosis ultrasonic"[All Fields] OR "Prenatal Ultrasonic Diagnosis"[All Fields] OR "Prenatal Ultrasonography"[All Fields] OR "Ultrasonic Prenatal Diagnosis"[All Fields] OR "ultrasonography fetal"[All Fields]) Results: 584 records found

Figure 1 - Complete search strategy, using all identified keywords and index terms, adapted for each database, 2024.

Study selection

After the publication of this protocol for scoping review, based on a systematic search of databases and data repositories, all identified records will be uploaded and grouped into Rayyan, considering the eligibility criteria[18]. Titles and abstracts will be reviewed individually and blindly by two review authors. Selection will be based on the review's inclusion and exclusion criteria. A third review author will be involved in the decision in case of disagreement.

We will pilot our selection process. A framework similar to that suggested by JBI for conducting a pilot test[14-15] will be followed. After completion of the first stage of selection (title and abstract screening), the potentially relevant evidence sources (articles and grey literature) will be retrieved in full for full-text reading and analysis of the eligibility criteria and the research question of this review by two members of the research team, individually and blinded. The reasons for excluding evidence sources will be recorded and reported in the final research report. The screening of grey literature will also be conducted with the same rigor and transparency, following an analogous approach.

We will use Google Translate to translate titles and abstracts in the selection phase. However, the documents included for data extraction (full text) will be translated by professional translators or research team members with expertise in translating scientific literature from English and/or Spanish into Brazilian Portuguese[19]. The PRISMA-ScR diagram will succinctly present the quantitative results of the database searches and the selection process (inclusion and reasons for exclusion) of evidence sources[16].

Data extraction

Relevant data will be extracted using a standardized extraction form (Figure 2). This form contains the extraction items and guidelines for completion as recommended by studies that provide recent recommendations for extraction, analysis, and presentation of results in scoping reviews[20]. Two review authors (ECC and GMS) will extract data independently. To increase consistency between review authors and to avoid extraction bias, both review authors will independently analyze ten publications (with different methodological designs), reviewing the title, abstract, and full text before starting the data extraction process to test and refine the data extraction form[15,20].

During the extraction, each review author will be able to update the extraction form continuously, and changes will be documented in the final scoping review report. Regular research team meetings will be held to assess the extraction progress and the extraction form's effectiveness in capturing the information relevant to the review questions[20]. After data extraction, the review authors and other research team members will hold a meeting to review and consolidate the data collected and, if necessary, resolve any differences in the extraction. Suppose disagreements arise that cannot be determined by the review authors (ECC and GMS). In that case, an additional review author (PRO) may be invited to assist in decision-making along with other research team members. If necessary, the authors of the included evidence sources may be contacted to provide relevant information for data extraction.

Details and characteristics of the evidence source	
Scientific articles or grey Literature	Citation details: (e.g. author/s, date, title, journal, volume, issue, pages)
	Source of information (MEDLINE/Scopus or grey literature)
	Type of study (scientific articles): (qualitative, quantitative, or mixed approach as well as systematic reviews, pilot study, and literature review)
	Country or/and continent: country or continent where the study was conducted.
	Population/participants: (e.g. by nurses, midwives and nurse midwives, training, certification, years in practice, etc.)
	Participants (details, e.g. age/sex and number)
	Eligibility criteria (where applicable).
Details/Results extracted from the source of evidence	
Clinical management of pregnancy and/or childbirth:	1. place of management (e.g. hospital, outpatient clinic, home, etc.); 2. Access/difficulty in accessing the ultrasound examination: 3. Frequency of nursing consultations; 4. Periodicity of use of ultrasound during prenatal/childbirth consultations; 5. Length of time pregnant women are exposed to ultrasound; 6. Indications for the use of ultrasound; 7. In which clinical situation the ultrasound was used; 8. The role that nurses, midwives and nurse midwives play in the clinical management of pregnancy and/or childbirth: (e.g. education, training, resource management, physical and/or psychosocial care, health promotion, disease prevention, etc.); 9. Involvement of other health professionals in the prenatal/childbirth consultation: ( ) yes: which ones?____( ) no.
Ethical aspects:	All ethical aspects/conflicts related to the use of ultrasound by nurses, midwives, and nurse-midwives identified in the included articles will be extracted.
Gaps and future research needed:	All the knowledge gaps and points about the need for future research related to the use of ultrasound by nurses, midwives, and nurse-midwives identified in the included articles will be extracted.

Figure 2 - Standardized data extraction form for the review "Use of ultrasound by nurses, midwives, and nurse-midwives in obstetric care: scoping review protocol", 2024.

Analysis and presentation of data

To maintain alignment between the study objectives and research questions, data analysis will be descriptive, with a basic analysis of frequencies and percentages[14-15]. Tables, graphs, and charts will be used to report the characteristics of the articles, such as year of publication, country of origin, methods, and objectives. Finally, a detailed narrative describing the results and the visual data presentation (graphs, tables, charts, or word clouds) are provided.

CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

REFERENCES

1. Ribeiro RMAS, Rocha NL, Souza BS, Brandão JC, Anjos SJSB . Ultrassonografia Obstétrica como Prática Avançada de Enfermagem: Relato de Experiência. XXVI ENFERMAIO e IV SIEPS, 2023 [citado 2023 Set 15]; 1(1): 1-8. Disponível em: https://www.uece.br/eventos/enfermaio/anais/trabalhos_completos/937-22774-18042023-235751.pdf.
2. Shah S, Santos N ,Kisa R , Maxwell OM , Mulowooza J , Walker D, et al. Efficacy of an ultrasound training program for nurse midwives to assess high-risk conditions at labor triage in rural Uganda. PLoS Um. 2020 June 30;15(6): e0235269, 1-14. https://doi.org/10.1371/journal.pone.0235269.
3. Dornhofer K, Farhat A, Guan K, Parker E, Kong C, Kim D, et al. Evaluation of a point-of-care ultrasound curriculum taught by medical students for physicians, nurses, and midwives in rural Indonesia. J Clin Ultrasound. 2019 Dec 26; 48(3):145-151. https://doi.org/10.1002/jcu.22809.
4. Bentley S, MD, MPH, Hexom B, MD, Nelson BP, MD. Evaluation of an Obstetric Ultrasound Curriculum for Midwives in Liberia. Ultrasound Med. 2015 Sep; 34(9):1563-8. https://doi.org/10.7863/ultra.15.14.08017.
5. Kozuki N, Mullany LC, Khatry SK, Ghimire RK, Paudel S, Blakemore K, Bird C, Tielsch JM, LeClerq SC, Katz J. Accuracy of Home-Based Ultrasonographic Diagnosis of Obstetric Risk Factors by Primary--Level Health Care Workers in Rural Nepal. Obstet Gynecol. 2016 Sep; 128(3): 604-612. https://doi.org/10.1097/AOG.0000000000001558.
6. Åhman A, Edvardsson K, Fagerli TA, Darj E, Holmlund S, Small R, Mogren I. A much valued tool that also brings ethical dilemmas - a qualitative study of Norwegian midwives' experiences and views on the role of obstetric ultrasound. BMC Pregnancy Childbirth. 2019 Jan 16; 19(1): 33. https://doi.org/10.1186/s12884-019-2178-x.
7. Fagerlia TA, Mogrenb I ,Adolfssonc A ,Edvardssonb K, Åhmanb A , Holmlundb S, et al. Midwives' and obstetricians' views on appropriate obstetric sonography in Norway. Sex Reprod Healthc. 2018 Jun; 16:1-5. https://doi.org/10.1016/j.srhc.2017.12.006.
8. Menihan, CA. Limited Sonography in Collaborative Midwifery Practice. J Midwifery Womens Health. 2000 Nov-Dec; 45(6): 508-16. https://doi.org/10.1016/s1526-9523(00)00068-4.
9. Van den Hof MC and Halifax NS. No. 359-Obstetric Ultrasound Biological Effects and Safety. J Obstet Gynaecol Can. 2018 May; 40(5): 627-632. https://doi.org/10.1016/j.jogc.2017.11.023.
10. Board of the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG). ISUOG statement on the non--medical use of ultrasound, 2009.Ultrasound Obstet Gynecol. 2009 [citado 2023 Set 15]; 33: 617–620. Disponível em: https://www.isuog.org/static/uploaded/2b4462d-7-53a6-451a-846dd0485afc093b.pdf.
11. Edvardsson K, Mogren I, Lalos A, Persson M, Small R. A routine tool with far-reaching influence: Australian midwives' views on the use of ultrasound during pregnancy. BMC Pregnancy Childbirth. 2015; 15:195; 1-11. https://doi.org/10.1186/s12884-015-0632-y.
12. Borborema RDB, Alves VH, Calandrini TSS, Santos MV, Caetano EC. Utilização da inovação tecnológica ultrassom na prática profissional da enfermeira obstétrica: scoping review. OSF Registries. 2023 January 20. https://doi.org/10.17605/OSF.IO/K8PGX.
13. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA; PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev. 2015 Jan 1; 4(1):1. https://doi.org/10.1186/2046-4053-4-1
14. Peters MDJ, Godfrey C, McInerney P, Khalil H, Larsen P, Marnie C, Pollock D, Tricco AC, Munn Z. Best practice guidance and reporting items for the development of scoping review protocols. JBI Evidence Synthesis. 2022 April; 20(4): 953-968. https://doi.org/10.11124/JBIES-21-00242.
15. Peters MDJ, Marnie C, Tricco AC, Pollock D, Munn Z, Alexander L, et al. Updated Methodological guidance for the conduct of scoping reviews. JBI Evid Synth. 2020 Oct; 18(10): 2119-2126. https://doi.org/10.11124/JBIES-20-00167.

16. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. 2018 Oct 2; 169(7): 467-473. https://doi.org/10.7326/M18-0850.

17. Godin K, Stapleton J, Kirkpatrick SI, Hanning RM, Leatherdale ST. Applying systematic review search methods to the grey literature: a case study examining guidelines for schoolbased breakfast programs in Canada. Syst Rev. 2015; 138. https://doi.org/10.1186/s13643-015-0125-0.

18. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app for systematic reviews. Syst Rev. 2016 Dez [citado 2022 nov 11]; 5(1). https://doi.org/10.1186/s13643-016-0384-4.

19. Pollock D, Tricco AC, Peters MDJ, Mclnerney PA, Khalil H, Godfrey CM, Alexander LA, Munn Z. Methodological quality, guidance, and tools in scoping reviews: a scoping review protocol. JBI Evidence Synthesi. 2022 April; 20(4): 1098-1105. https://doi.org/10.11124/JBIES-20-00570.

20. Pollock D, Peters MDJ, Khalil H, McInerney P, Alexander L, Tricco AC, Evans C, Moraes EB, Godfrey CM, Pieper D, Saran A, Stern C, Munn Z. Recommendations for the extraction, analysis, and presentation of results in scoping reviews. JBI Evidence Synthesis. 2023 March; 21(3): 520-532. https://doi.org/10.11124/JBIES-22-00123.

AUTHORSHIP CONTRIBUTIONS
Project design: Caetano, EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, Flauzino SNR, Barbosa SCH
Data collection: Caetano, EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, Flauzino SNR, Barbosa SCH
Data analysis and interpretation: Caetano, EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, Flauzino SNR, Barbosa SCH
Writing and/or critical review of the intellectual content: Caetano, EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, Flauzino SNR, Barbosa SCH
Final approval of the version to be published: Caetano, EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, Flauzino SNR, Barbosa SCH
Responsibility for the text in ensuring the accuracy and completeness of any part of the paper: Caetano, EC, Santiago GM, Alves VH, Oliveira PR, Guimarães ACR, Pereira RC, Flauzino SNR, Barbosa SCH