



REVIEWS

Effects of educational technologies developed for labor and delivery: a systematic review

Efectos de las tecnologías educativas desarrolladas para el trabajo de parto y parto: una revisión sistemática

Efeitos das tecnologias educacionais desenvolvidas para o trabalho de parto e parto: revisão sistemática

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ABSTRACT

Introduction: Educational technologies (ET) are highly relevant tools for the production, dissemination, and transmission of knowledge. Within the field of Obstetric Nursing, these devices are used for health education and promotion activities, with the purpose of promoting the autonomy of pregnant women and their companions, thus strengthening good practices in childbirth and delivery.

Objective: to evaluate the effects of educational technologies developed for labor and delivery.

Material and method: A systematic review was developed according to JBI recommendations. The research question was formulated using the PICOS acronym, and its report was described according to PRISMA. Searches were conducted in the Pubmed/Medline, Cochrane, Scopus, EMBASE, CINAHL, Web of Science, and grey literature databases, without idiomatic and/or temporal restrictions. The RoB-2 and Robins-I tools were used to assess the risk of bias, and GRADE was used to assess the quality of evidence.

Results: 630 studies were retrieved, of which 7 comprised the final sample of the review. Pregnant women who used TE showed greater knowledge about the signs of labor and delivery, in addition to feeling more prepared to experience these moments. Among the companions, there was greater security and expansion of support actions for women, with increased autonomy and empowerment, which contributed to greater satisfaction of postpartum women in relation to childbirth.

Conclusion: the use of educational technologies proved to be effective and promotes improved knowledge and satisfaction of pregnant women and their birth companions when used effectively, obtaining a “strong” degree of recommendation.

Keywords: Educational Technology; Labor, obstetric; Parturition; Systematic Review.

RESUMEN

Introducción: Las tecnologías educativas (TE) son herramientas para la producción, difusión y transmisión del conocimiento. En el ámbito de Enfermería obstétrica, estos dispositivos se utilizan para actividades de educación y promoción de la salud, con el fin de fomentar la autonomía de las mujeres embarazadas y sus acompañantes, fortaleciendo así las buenas prácticas en el parto.

Objetivo: evaluar los efectos de las tecnologías educativas desarrolladas para el trabajo de parto y el parto.

Material y método: revisión sistemática según recomendaciones de JBI. La pregunta de investigación se formuló en PICOS y su informe se describió según PRISMA. Bases de datos PubMed/Medline, Cochrane, Scopus, EMBASE, CINAHL, WoS y literatura gris, sin restricciones idiomáticas ni temporales. Se utilizaron las herramientas RoB-2 y Robins-I para evaluar el riesgo de sesgo y GRADE para evaluar la calidad de la evidencia.

Resultados: recuperados 630 estudios, 7 conformaron la muestra final de la revisión. Las mujeres embarazadas que utilizaron TE mostraron mayor conocimiento sobre los signos del trabajo de parto y el parto, además de sentirse más preparadas para vivir estos momentos. Entre las acompañantes, se observó mayor seguridad y una mayor amplitud de las acciones de apoyo para las mujeres, con mayor autonomía y empoderamiento, lo que contribuyó a una mayor satisfacción de las mujeres en el posparto en relación con el parto.

Conclusión: su uso demostró ser efectivo y promueve un mejor conocimiento y satisfacción en las embarazadas y sus acompañantes cuando se utiliza de forma efectiva, obteniendo un grado de recomendación “fuerte”.

Palabras clave: Tecnología Educativa; Trabajo de Parto; Parto; Revisión Sistemática.

RESUMO:

Introdução: As tecnologias educacionais (TE) constituem-se em ferramentas de grande relevância para a produção, veiculação e disseminação de conhecimentos. Dentro da área da Enfermagem Obstétrica, esses dispositivos são utilizados para as atividades de educação e promoção da saúde, com o propósito de favorecer a autonomia da gestante e de seu acompanhante, proporcionando maior fortalecimento das boas práticas no parto e nascimento.

Objetivo: avaliar os efeitos das tecnologias educacionais desenvolvidas para o trabalho de parto e parto.

Material e método: revisão sistemática desenvolvida conforme as recomendações do JBI. A questão de pesquisa foi elaborada por meio do acrônimo PICOS e o seu relatório descrito segundo o PRISMA. As buscas foram realizadas nas bases de dados Pubmed/Medline, Cochrane, Scopus, EMBASE, CINAHL, Web of Science e literatura cinzenta, sem restrição idiomática e/ou temporal. Utilizou-se a ferramenta *RoB-2 e Robins-I*, para avaliação do risco de viés e o GRADE para qualidade das evidências.

Resultados: foram recuperados 630 estudos, dos quais 07 compuseram a amostra final da revisão. As gestantes que utilizaram as TE apresentaram maior conhecimento sobre os sinais do trabalho de parto e parto, além de sentir-se mais preparadas para vivenciar esses momentos. Entre os acompanhantes, evidenciou-se maior segurança e ampliação das ações de apoio às mulheres, com aumento da autonomia e do empoderamento, que contribuiu para maior satisfação das puérperas em relação ao parto.

Conclusão: o uso das TE mostrou-se eficaz e promove melhoria do conhecimento e da satisfação das gestantes e seus acompanhantes quando utilizadas de forma efetiva, obtendo-se “forte” grau de recomendação.

Palavras-chave: Tecnologia Educativa; Trabalho de Parto; Parto; Revisão Sistemática.

INTRODUCTION

The process of gestation involves nuances that go beyond the physical condition, as bodily changes occur, specific symptoms of the period involving psychosocial and socio-emotional issues. The woman, previously unique, now finds herself in a process that

places her before transformations in all spheres, triggering a range of adaptations that involve her physical and mental health, as well as the health of the unborn child⁽¹⁾.

In this sense, it is observed that from the moment of pregnancy discovery until the imminent arrival of labor and birth, the pregnant woman goes through distinct emotions and feelings ranging from happiness to fear and anxiety. With this, encouraging the pregnant woman to seek knowledge from prenatal care and the construction of knowledge related to the pregnancy cycle, labor and delivery can be benefited by the use of tools that contribute to the parturition process and are essential to nursing care. In labor, different resources can be used to support safe and qualified care, among them health technologies ⁽¹⁻²⁾.

In the health field, technologies are divided into three categories based on their density. These are: soft technologies, which refer to the interactions and relationships between professionals and patients; soft-hard technologies, which encompass the knowledge necessary for clinical diagnosis; and hard technologies, which include machines, equipment, and medications used in health care ⁽³⁾.

In the context of Nursing, there are three types of technologies: educational, referring to scientific knowledge embedded in a formal or informal teaching plan, applied by an educator to a specific clientele; managerial, used in health services to intervene in professional practice and improve its quality; and the third type consists of care technologies, which refer to the systematized practice in health that encompasses the human being in all its spheres ⁽⁴⁾.

Thus, educational technologies constitute instruments for the production, dissemination, and transmission of knowledge. They are tools used in the field of nursing for health education, development of individual autonomy, and strengthening of good practices ⁽⁵⁻⁶⁾.

Among the main educational technologies that have been used to prepare pregnant women and their birth companions for labor and delivery, the following stand out: targeted courses/classes, teaching materials such as videos, booklets, infographics, pamphlets, serial albums, and individualized verbal educational guidance.

In this way, it is understood that, along with the advent of good practices, the incorporation of health technologies into nursing care enables a teaching process carried out with supervision and monitoring, which makes a healthy and safe birth possible, while promoting the strengthening of bonds, expanding maternal knowledge about the process in which she is involved, thus favoring her ability to make informed and assertive decisions, contributing to the reduction of iatrogenic events and negative outcomes of childbirth ⁽⁷⁾.

Given this scenario, the study is justified by the need to promote the incorporation and strengthening of the use of educational technologies within the context of labor and delivery care, based on an understanding of the benefits that the application of these resources provides to pregnant women and/or their companions. Thus, the need arose to investigate the effects of educational technologies that have been employed in the birthing process.

This review has the potential to build reliable evidence on the effects of educational technologies adopted in the birthing process, promoting their inclusion within public and

private health services, contributing to increased quality of childbirth care and the satisfaction of the parturient and her companion.

Therefore, the objective of this study is to evaluate the effects of educational technologies developed for labor and delivery, through the following guiding question: "What are the effects of educational technologies developed for labor and delivery?"

MATERIAL AND METHOD

Study type

Systematic review constructed following the recommendations of the Joanna Briggs Institute (JBI): development of the research question, definition of inclusion and exclusion criteria, literature search strategies, screening and selection of studies, assessment of methodological quality, data extraction, data analysis and synthesis, assessment of the quality of evidence, presentation and interpretation of results ⁽⁸⁾.

The report description was based on the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), with the intention of carefully planning and organizing the study and thus ensuring the development of a rigorous systematic review⁽⁹⁾. The protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO) with the identifier CRD42024582856.

Location and Period

This systematic review was conducted in Fortaleza, capital of the state of Ceará, Brazil, from January to December 2024.

Research Question

The research question was formulated using the PICOS acronym (P - Population; I - Intervention; C - Comparison; O - Outcomes; and S - Study design). The following were defined:

- Population: Pregnant women, women in labor, birth companions, fathers, and healthcare professionals,
- Intervention: Educational technologies for labor and delivery,
- Comparison: Usual guidance offered by the service,
- Outcomes: Effects/Efficacy/Effectiveness of the technologies,
- Study design: Randomized clinical trials and quasi-experimental studies.

Thus, the research question that guided this review was: "What are the effects of educational technologies developed for labor and delivery?"

Eligibility Criteria

Studies that investigated pregnant women, women in labor, or their birth companions and that evaluated educational technologies applied to preparation for labor and delivery were included. Research comparing these interventions with usual guidance or with the absence of intervention and analyzing their effects, efficacy, or effectiveness was also considered. Only randomized clinical trials and quasi-experimental studies, available in full text, without restriction of language, year of publication, or document type, including articles, dissertations, and theses, were considered.

Studies addressing non-educational technologies, interventions restricted to prenatal care unrelated to labor and delivery, texts unavailable in full text, reviews, case reports, abstracts, book chapters, and documents with insufficient data for extraction were excluded. Theoretical studies, simulation models, or research that did not involve human participants were also excluded.

Bibliographic Survey and Search Strategy

The search for studies was conducted in the following databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL-Ebsco); Cochrane Central Register of Controlled Trials (CENTRAL Cochrane); Medical Literature Analysis and Retrieval System online (MEDLINE via PubMed), Scopus (via Elsevier), Web of Science, and Embase. Through access to the Virtual Health Library, studies indexed in the Nursing database (BDENF), the bibliographic index of Latin American and Caribbean Literature in Health Sciences (LILACS), and the Scientific Electronic Library Online (SciELO) were listed.

Articles in PubMed, Web of Science, and Scopus were accessed using controlled descriptors from Medical Subject Headings (MeSH); in the VHL, the search was conducted using Health Sciences Descriptors (DeCS); The Heading-MH database was consulted for the CINAHL database, and for the Embase search, the Embase Subject Headings (EMTREE) was adopted. Keywords and controlled descriptors were connected using the Boolean operators "OR" and "AND".

Grey literature was also consulted in order to expand the findings. Searches were conducted in the CAPES Theses and Dissertations Database, the Brazilian Digital Library of Theses and Dissertations (BDTD), the Brazilian Registry of Clinical Trials (ReBEC), Google Scholar, Open Grey, and ProQuest.

For searches in Portuguese, the following descriptors and keywords were considered: *parturiente, mulher grávida, profissionais de saúde, profissional de saúde, pessoal de saúde, acompanhante, acompanhante do paciente, acompanhantes do paciente, pai, tecnologia, tecnologia educacional, trabalho de parto, parto, ensaio clínico randomizado controlado e estudo quase experimental.*

For searches in English, the following descriptors and keywords were considered: pregnant women; pregnant woman; woman, pregnant; women, pregnant; health personnel; healthcare workers; healthcare worker; medical chaperones; patient chaperones; chaperone, patient; patient chaperone; father; fathers; educational technology; technology, educational; educational technologies; technology; labor,

obstetric; obstetric labor; parturition; parturitions; delivery, obstetric; obstetric delivery; randomized controlled trial; non-randomized controlled trials as topic.

The search strategies were adapted according to the characteristics of each database consulted, as shown in Table 1.

Table 1: Search strategy used in each database.

DATABASES	Search strategy
MedLine / PubMed Cochrane Scopus	((“Pregnant Women” OR “Pregnant Woman” OR “Woman, Pregnant” OR “Women, Pregnant” OR “Health Personnel” OR “Healthcare Workers” OR “Healthcare Worker” OR “Medical Chaperones” OR “Patient Chaperones” OR “Chaperone, Patient” OR “Patient Chaperone” OR Father OR Fathers) AND (“Educational Technology” OR “Technology, Educational” OR “Educational Technologies” OR Technology) AND (“Labor, Obstetric” OR “Obstetric Labor” OR Parturition OR parturitions OR “delivery, obstetric” OR “Obstetric Delivery”) AND (“Randomized Controlled Trial” OR “Non-Randomized Controlled Trials as Topic”))
Web of Science	((ALL=(“Pregnant Women” OR “Pregnant Woman” OR “Woman, Pregnant” OR “Women, Pregnant” OR “Health Personnel” OR “Healthcare Workers” OR “Healthcare Worker” OR “Medical Chaperones” OR “Patient Chaperones” OR “Chaperone, Patient” OR “Patient Chaperone” OR Father OR Fathers)) AND ALL=(“Educational Technology” OR “Technology, Educational” OR “Educational Technologies” OR Technology)) AND ALL=(“Labor, Obstetric” OR “Obstetric Labor” OR Parturition OR parturition OR “delivery, obstetric” OR “Obstetric Delivery”))
CINAHL e Embase	('pregnant women'/exp OR 'pregnant women' OR 'pregnant woman'/exp OR 'pregnant woman' OR 'woman, pregnant' OR 'women, pregnant' OR 'health personnel'/exp OR 'health personnel' OR 'healthcare workers' OR 'healthcare worker'/exp OR 'healthcare worker' OR 'medical chaperones'/exp OR 'medical chaperones' OR 'patient chaperones'/exp OR 'patient chaperones' OR 'chaperone, patient' OR 'patient chaperone' OR 'father'/exp OR father OR 'fathers'/exp OR fathers) AND ('educational technology'/exp OR 'educational technology' OR 'technology, educational'/exp OR 'technology, educational' OR 'educational technologies' OR 'technology'/exp OR technology) AND ('labor, obstetric'/exp OR 'labor, obstetric' OR 'obstetric labor'/exp OR 'obstetric labor' OR 'parturition'/exp OR parturition OR parturitions OR 'delivery, obstetric'/exp OR 'delivery, obstetric' OR 'obstetric delivery'/exp OR 'obstetric delivery') AND ('randomized controlled trial'/exp OR 'randomized controlled trial' OR 'non-randomized controlled trials as topic'/exp OR 'non-randomized controlled trials as topic')
Biblioteca Virtual da Saúde	((<i>parturiente*</i> OR <i>gestante*</i> OR " <i>profissionais da saúde</i> " OR " <i>profissional de saúde</i> " OR " <i>pessoal da saúde</i> " OR <i>acompanhante*</i> OR " <i>acompanhante de paciente</i> " OR " <i>acompanhantes de pacientes</i> " OR <i>pai</i>) AND (" <i>tecnologia educacional</i> " OR " <i>tecnologia educativa</i> " OR <i>tecnologia</i>) AND (" <i>trabalho de parto</i> " OR <i>parto</i>) AND (" <i>ensaio clínico controlado randomizado</i> ") OR (" <i>estudo quase experimental</i> ")

DATABASES	Search strategy
BDTD Banco de Teses e Dissertações da CAPES	"tecnologia educacional" OR "tecnologia educativa" AND "trabalho de parto" OR parto AND "ensaio clínico controlado randomizado" OR "estudo quase experimental"
ReBEC	tecnologia educacional OR tecnologia educativa AND trabalho de parto OR parto AND ensaio clínico controlado randomizado
Google Scholar	("tecnologia educacional" OR "tecnologia educativa" OR tecnologia) AND ("trabalho de parto" OR parto) AND ("ensaio clínico controlado randomizado") OR ("estudo quase experimental"))
Open Grey ProQuest	((“Educational Technology” OR “Technology, Educational” OR “Educational Technologies” OR Technology) AND (“Labor, Obstetric” OR “Obstetric Labor” OR Parturition OR parturitions OR “delivery, obstetric” OR “Obstetric Delivery”)) AND (“Randomized Controlled Trial” OR “Non-Randomized Controlled Trials as Topic”))

Source: Prepared by the authors.

Study Selection

In this process, the software (Rayyan) was used to manage the selected studies. First, all articles were entered into Rayyan, and duplicate articles were removed. Non-duplicated studies were evaluated by reading the titles and abstracts by two independent and blinded reviewers. Then, the full texts of the selected studies were read after evaluation. Discrepancies in the selection process were resolved by a third reviewer.

Data Extraction

The data from the selected studies were extracted and analyzed by two independent reviewers based on the completion of a characterization form, structured with the following data:

- Study characteristics: title, year, country of development of the study, journal, study design, and objectives;
- Population characteristics: target audience, sample size, and average age.
- Main outcome: Efficacy/effectiveness of educational technologies developed for labor and delivery.

Methodological Assessment of Studies

The methodological quality of randomized clinical trials was assessed using the Collaboration Risk of Bias Tool (RoB-2 tool), and non-randomized studies were assessed using the Robins-I tool, both developed and made available by the Cochrane Collaboration.

The RoB-2 tool specifically assesses randomized clinical trials. The tool is composed of five domains (randomization, deviations from planned interventions, data completeness, outcome measurement, and results reporting), which assess the risk of bias in studies, where the risk judgment is classified as “low”, “high”, or “some concerns” ⁽¹⁰⁾.

The Robins-I assesses the methodological quality of non-randomized intervention studies, judging their effects. The tool focuses on assessing the risk of bias in estimates of the efficacy or safety (benefit or harm) of an intervention from studies that did not use randomization to allocate interventions. The instrument is composed of 7 domains: 1. bias due to confounding; 2: bias in participant selection for the study; 3: bias in intervention classification; 4: bias due to deviations from intended interventions; 5: bias due to missing data; 6: bias in outcome measurement, and 7: bias in reported outcome selection⁽¹¹⁾.

Data analysis and presentation

The data were analyzed according to the research objectives, characterizing the variables researched and the methods of the selected studies. The collected data were arranged in a flow diagram, and the main results were mentioned in the discussion to clarify the study question and answer the designated objectives.

Open access and free articles available in the aforementioned databases and other sources of scientific literature were analyzed. The results were organized through a descriptive synthesis of the quantitative data.

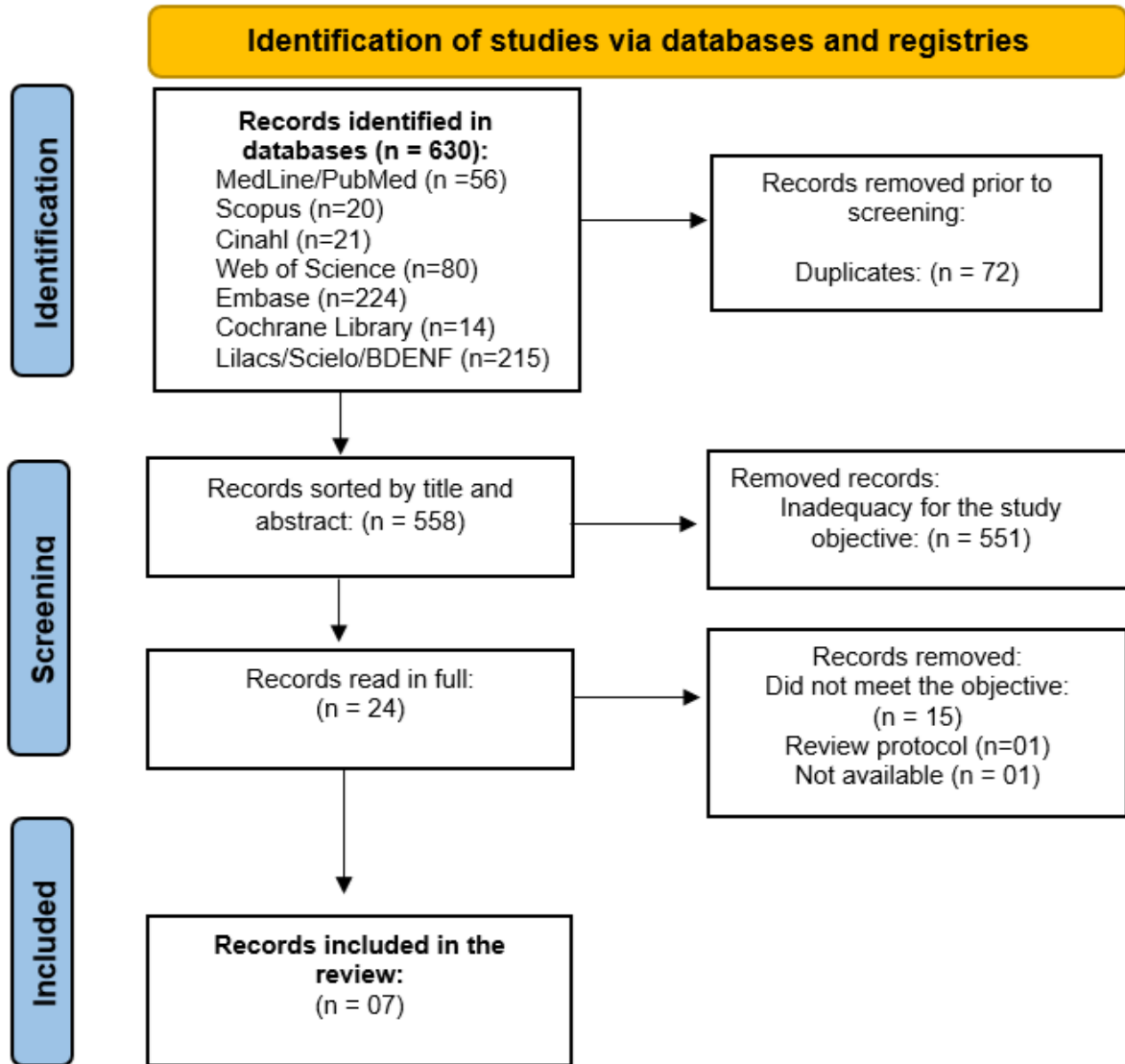
The quality of the evidence was assessed using the Grading of Recommendations, Assessment, Development and Evaluation (GRADEpro) Working Group system, which divides the evidence into 4 levels of confidence: “high”, “moderate”, “low”, or “very low”. GRADEpro also separates the level of evidence from the strength of recommendation, which are “strong” or “weak” and even “conditional”, depending on other factors⁽¹²⁾.

To obtain the degree of recommendation of the evidence, the GRADEpro Guideline Development Tool (GDT) software was used, which considers the following points: limitations of the studies (e.g., risk of bias), inconsistency of the effect, imprecision of the estimates, indirect effect, and publication bias⁽¹²⁾.

RESULTS

The results were summarized in an illustrative way using the PRISMA flowchart (Image 1). A total of 630 publications were identified in databases, and 72 duplicates were removed. 558 articles were screened based on title and abstract, with 551 excluded due to inadequacy to the study's objective. The final sample of the research consists of 7 studies, which were read in full and meet the objective of this review.

Image 1: PRISMA flowchart for study selection.



Source: Prepared by the authors.

Table 2 characterizes the 7 studies included in the review, identified by type of educational technology, authorship, country of origin, and year of publication, target audience, and journal in which it was published.

Table 2: Characteristics of the studies included in the review.

Code	Educational Technology	Authors/Year/ Country	Title	Target Audience	Periodical
A1 ⁽¹³⁾	Printed Educational Manual	Mendes; Teles; Costa <i>et al.</i> , 2024 / Brazil	Effectiveness of an educational manual in providing support by birth companions in an obstetric center: Randomized clinical trial	Birth companions and postpartum women	<i>Texto & Contexto em Enfermagem</i>

Code	Educational Technology	Authors/Year/ Country	Title	Target Audience	Periodical
A2 ⁽¹⁴⁾	Animated Educational Video	Cassiano; Teixeira; Menezes, 2022 / Brazil	Educational technology for primiparous women: Quasi-experimental study	First-time mothers	Journal of Nursing, Universidade de São Paulo
A3 ⁽¹⁵⁾	Printed Educational Manual	Silva; Vasconcelos; Nicolau <i>et al.</i> , 2021 / Brazil	Effect of applying educational technology to guide birth companions of parturients: Randomized controlled trial	Labor companions	Journal of Nursing, Universidade de São Paulo
A4 ⁽¹⁶⁾	Educational Text Messages via SMS	Frazon; Oliveira; Bonifácio <i>et al.</i> , 2019 / Brazil	Health communication and information strategy and the perception of feeling prepared for childbirth: Randomized cluster trial	Pregnant women with gestational age less than 20 weeks	<i>Cadernos de Saúde Pública</i>
A5 ⁽¹⁷⁾	Educational Video	Andrade; Castro; Moreira <i>et al.</i> , 2019 / Brazil	Effects of technology on the knowledge, attitude, and practice of pregnant women for childbirth	Pregnant women in the last trimester	Rene Journal
A6 ⁽¹⁸⁾	In-Person Childbirth Preparation Course	Hatamleha; Abujilbanb; Abuabeda <i>et al.</i> , 2019 / Jordan	The effects of a childbirth preparation course on childbirth outcomes among nulliparous Jordanian women	Nulliparous women	Midwifery Journal
A7 ⁽¹⁹⁾	Educational Software	Rahimparv; Hamzehkhani; Geranmay <i>et al.</i> , 2012 / Iran	Effect of educational software on the self-efficacy of pregnant women to cope with labor: Randomized clinical trial	Nulliparous women	Arch Gynecol Obstet

Note: SMS: Short Message Service.

Source: Prepared by the authors.

Different types of technologies were identified, including videos, manuals, software, educational text messages, and preparation courses, primarily targeting pregnant women and their birth companions. The studies predominantly originated in Asia and South America, and were mostly published in the last 10 years.

Table 3 presents the objectives, design, and outcomes of the studies regarding the use of technologies and their effects on labor. Among the studies, randomized clinical trials

predominated in the sample, with outcomes that included empowerment, greater knowledge for women and their companions, and positive experiences related to childbirth.

Table 3: Summary of articles included in the review.

Code	Objectives	Drawing/ Sample	Outcome
A1 ⁽¹³⁾	Evaluate the effectiveness of an educational manual in supporting birth companions during the labor process in an obstetrics center.	Randomized clinical trial / IG: 62 CG: 62	It was evident that birth companions in the intervention group (IG) were more likely to provide physical, emotional, informational, and advocacy/mediation support compared to the two groups. Postpartum women accompanied by IG participants were more likely to express satisfaction with the labor process.
A2 ⁽¹⁴⁾	Analyze the influence of an educational technology on the knowledge of primiparous women about the signs of labor and obstetric risk before and after the video.	Quasi-experimental before-and-after study / N: 90	Technology had a positive influence on the knowledge of primiparous women regarding the signs of labor and obstetric risk after watching the animated video and completing the questionnaire.
A3 ⁽¹⁵⁾	Evaluate the birth companion's role in the labor process, comparing the influence of using an educational technology aimed at birth companions in the delivery room with the standard intervention performed in the service.	Randomized clinical trial / IG: 35 CG: 38	In comparing the experience and support provided, no difference was found between the groups regarding the level of support and satisfaction with the experience of accompanying the birth. However, there was a difference in insecurity about accompanying and concern about the parturient's health status; birth companions who used the manual felt more prepared to support their partner.
A4 ⁽¹⁶⁾	Determine if the program contributes positively to women feeling more prepared to experience childbirth.	Randomized clinical trial / IG: 145 CG: 436	It was observed that the use of technology increased women's perception of feeling more prepared for childbirth. Positive impacts were also identified in the achievement of skin-to-skin contact and breastfeeding in the delivery room, as well as in knowledge about obstetric interventions.
A5 ⁽¹⁷⁾	Evaluate the effects of an educational video on the knowledge, attitude, and practice of pregnant women for active childbirth.	Randomized clinical trial / IG: 145 CG: 436	The Intervention Group showed greater adequacy in knowledge, attitude, and practice, with significant statistics in all variables, highlighting the influence of the educational video for active childbirth.
A6 ⁽¹⁸⁾	Examine the effectiveness of a childbirth preparation	Randomized clinical trial /	The intervention had a positive effect on the spontaneous onset of labor and

Code	Objectives	Drawing/ Sample	Outcome
	course aimed at nulliparous women in Jordan.	IG: 64 CG: 64	greater cervical dilation at admission, as well as reducing the time needed to initiate breastfeeding.
A7 ⁽¹⁹⁾	Determine the effect of educational software on the self-efficacy of pregnant Iranian women in coping with labor.	Randomized clinical trial / IG: 75 CG: 75	There was a statistically significant difference between the two groups evaluated. Pregnant women who used the educational software showed increased self-efficacy in coping with labor.

Note: IG: intervention group; CG: control group; L: labor.

Source: Prepared by the authors.

Studies have shown that first-time mothers who used educational technologies demonstrated greater knowledge about the signs of labor and delivery, and about obstetric risk, generating a greater perception of the event they were about to experience and its nuances.

In addition, a positive effect was noted in relation to the onset of spontaneous labor. Furthermore, women expressed feeling more prepared for childbirth, as well as knowledge about obstetric interventions, observing in parallel the positive impacts on skin-to-skin contact and breastfeeding in the delivery room.

Regarding the technologies applied to birth companions, greater security was noted during labor, with a greater likelihood that they would provide greater care and support to women, showing more autonomy and empowerment in relation to emotional and physical care actions, demonstrating that postpartum women accompanied by participants in the intervention group were more likely to express satisfaction with labor.

The assessment of the methodological quality of randomized clinical trials

Using the RoB-2 tool provided by Cochrane, the risk of bias of the selected studies was assessed. As illustrated in Figure 2, among the five selected studies, three presented a “low risk” of bias, and two presented “some concerns.” No trial showed a high risk of bias, thus reflecting the methodological quality of the included experimental studies. All trials met the criteria established by the fifth domain of the instrument, which refers to the description of the results report.

One study did not meet the first domain of the tool, which addresses the randomization process, where gaps were evidenced regarding the sampling and randomization of the groups. Another study did not meet all the criteria of the second domain, which concerns deviations from the intended interventions, being classified as having a moderate risk of bias by the tool. Regarding the third domain, which refers to the completeness of the data, one trial did not meet all the criteria required by the software. Regarding the fourth domain, outcome measurement, one study also failed to meet all criteria, as illustrated in Figure 2.

Figure 2: Critical appraisal of randomized clinical trials.

Study ID	D1	D2	D3	D4	D5	Overall	
Mendes et al., 2024	+	+	+	+	+	+	+
Silva et al., 2022	+	+	+	+	+	+	!
Hatamleha et al., 2019	+	!	+	!	+	!	-
Frazon et al., 2019	!	+	+	+	+	+	
Rahimparvar et al., 2012	+	+	!	+	+	!	
							D1 Randomisation process
							D2 Deviations from the intended interventions
							D3 Missing outcome data
							D4 Measurement of the outcome
							D5 Selection of the reported result

Source: Created using the RoB-2 tool.

Methodological Quality Assessment of Included Quasi-Experimental Studies

Using the Robins-I tool provided by Cochrane, the risk of bias of the selected studies was assessed. One study was judged to have a low risk of bias, as it met all the items required by the instrument, and the other study was classified as having a moderate risk, as it did not meet all the criteria of dimensions two and four, which address the selection of participants for the study and deviations from the intended interventions, respectively, as illustrated in Figure 3.

Figure 3: Critical appraisal of quasi-experimental studies

Study	Risk of bias domains							Overall
	D1	D2	D3	D4	D5	D6	D7	
Cassiano et al., 2022	+	+	+	+	+	+	+	+
Andrade et al., 2019	+	-	+	-	+	+	+	-

Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended interventions.
D5: Bias due to missing data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
- Moderate
+ Low

Source: Created using the Robins I tool.

Evidence Quality Assessment

Based on the assessment of the evidence quality of the included articles using GRADEpro, a “high” level of evidence was obtained, since none of the studies presented a high risk of bias, as illustrated in Figures 2 and 3. The publications presented an appropriate relationship between the proposed objectives and the research design and described their interventions clearly, which contributed above all to the understanding and interpretation of the object of study and the results achieved.

Regarding the strength of the recommendation for the use of educational technologies for preparation for labor and delivery, according to the GRADEpro GDT software, a “strong” rating was obtained, which means that the strategy was strongly recommended based on the conclusions of the experimental and quasi-experimental studies analyzed, as well as considering its potential advantages and disadvantages, as recommended by the tool ⁽¹²⁾.

DISCUSSION

With the conduct of the study, it was possible to evaluate the effects of educational technologies developed in the context of parturition, taking into account important aspects such as women’s knowledge about the childbirth process, their emotional preparation, the role of companions, and, importantly, care practices in the perinatal period. All studies included in the sample presented good methodological quality, which strengthened the interpretation and reliability of the findings.

The results reinforce the idea that educational technologies are important tools for better preparing pregnant women and their companions to experience the childbirth process. The findings showed that interventions based on videos, manuals, applications, and courses significantly contribute to increasing knowledge, reducing anxiety, and strengthening women’s autonomy. Supporting these findings, international studies ^(20–21) also reported positive effects of digital educational materials, which contributed to improvements in emotional aspects and maternal outcomes.

At the international level, a study ⁽²⁰⁾ that investigated the use of mobile applications in prenatal health education practices demonstrated an increase in self-confidence and a reduction in pregnant women’s fear regarding the process. Similarly, another study ⁽²¹⁾ concluded that different approaches, whether face-to-face or digital, positively influence women’s perception of their knowledge and preparedness, reinforcing relevant aspects for decision-making. These pieces of evidence reinforce the results of this review, indicating that educational technologies should be used in the context of parturition as facilitating tools in the care process.

Regarding companions, this review identified evidence aligned with the scientific literature. A study ⁽²²⁾ revealed that educational interventions directed at the partner increase their ability to provide effective and continuous support, promoting a more positive childbirth experience. Similarly, a classic study ⁽²³⁾ emphasizes that continuous support during the process, provided by a well-prepared companion, significantly improves maternal satisfaction and has the potential to reduce unnecessary interventions.

With respect to immediate post-birth practices, there is consistent evidence that educational interventions during prenatal care increase adherence to good practices recommended by the WHO, such as the use of pain control methods, skin-to-skin contact in the first hour, and early initiation of breastfeeding. The multicenter study ⁽²⁴⁾ highlighted the impact of these actions across different countries and contexts, reinforcing the importance of prior preparation. These data align with the Brazilian studies included in this review, as they indicate positive behavioral changes resulting from the use of educational technologies.

However, despite the various benefits, the literature points to important challenges.

Studies ⁽²⁶⁾ indicated that fears, anxieties, previous experiences, and cultural expectations may influence how women engage with and adopt these resources. In addition, issues such as digital literacy, internet access, and social inequalities may limit the reach of interventions, especially among more vulnerable populations ^(26–27). Thus, these factors indicate that the use of such resources cannot be considered in isolation, but rather integrated into public policies and strategies to address social inequalities.

Another point highlighted in international studies concerns the quality of digital content for pregnant women. Researchers ⁽²⁸⁾ warn that applications without proper validation may disseminate inaccurate, outdated, or incorrect information, potentially causing insecurity and negatively influencing the care process. Although the studies included in this review used validated technologies, this issue reinforces the importance of rigorous development and evaluation processes.

In light of this, the findings of this review suggest that educational technologies should be understood as part of a broader approach, involving welcoming care, effective communication, and continuous support. Studies ^(23–24) conducted in developed countries, focused on maternal care, indicate that interventions tend to be more effective when implemented in contexts that value humanization and the active participation of pregnant women.

In summary, this review shows that educational technologies can positively impact preparation for childbirth, decision-making, and a more favorable maternal experience. However, it highlights the need to expand studies that consider diverse contexts and population profiles, and that evaluate more standardized interventions. Furthermore, the incorporation of these technologies should be accompanied by actions that ensure accessibility, quality of information, and cultural sensitivity.

As a limitation of this systematic review, it is important to consider that, although it was conducted with methodological rigor and comprehensive search strategies, some weaknesses must be acknowledged. The small number of eligible studies and the diversity among methodological designs, types of educational technologies, and analyzed outcomes made more direct comparisons between interventions difficult and prevented the performance of a meta-analysis. In addition, many studies included small samples and were conducted in specific contexts, which may limit the generalizability of the results.

Another aspect to be considered is the predominance of studies conducted in middle-income countries, especially Brazil, which may reflect cultural, structural, and healthcare access specificities. Furthermore, variability in the quality of methodological descriptions and the use of self-reported measures in some studies may have introduced biases, such as recall or interpretation bias.

Finally, it is necessary to consider that, despite efforts to minimize publication bias through the inclusion of gray literature, there may still be studies not retrieved or unpublished with different results. Therefore, the findings should be interpreted with caution. It is thus reinforced the need for new, more robust studies, with larger samples and more standardized interventions, to deepen the understanding of the impact of educational technologies in the context of labor and childbirth.

CONCLUSIONS

The use of educational technologies for labor and delivery has proven effective in expanding knowledge about the process and has been associated with greater satisfaction among pregnant women and their birth companions when used effectively. This evidence obtained a "strong" degree of recommendation.

The methodological quality of the studies demonstrated a low risk of bias and a high level of evidence, bringing reliable findings to this review. Thus, the effectiveness of educational technologies is observed, which contributes to improving care during labor and delivery.

This overview reinforces the importance of integrating technologies into clinical practice, not only as teaching tools but as an instrument of transformation for care during childbirth. This integration requires the continuous development of technical and pedagogical skills by health professionals, so that this educational tool is used in an ethical, accessible, and culturally sensitive manner.

Only technologies directed at pregnant women and birth companions were identified, which can only be applied to the general public, lacking inclusive characteristics that would allow for use by people with some type of physical or intellectual limitation. In this sense, the development of new educational tools is suggested, both directed at healthcare professionals involved in assisting with the childbirth process, and in different formats, to be applied to diverse audiences and settings.

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