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REVIEW

TECHNOLOGIES FOR PROMOTING SKIN-TO-SKIN CONTACT IN THE FIRST HOUR OF LIFE: AN INTEGRATIVE REVIEW

TECNOLOGIAS PARA A PROMOÇÃO DO CONTATO PELE A PELE NA PRIMEIRA HORA DE VIDA: REVISÃO INTEGRATIVA

TECNOLOGÍAS PARA FAVORECER EL CONTACTO PIEL CON PIEL EN LA PRIMERA HORA DE VIDA: REVISIÓN INTEGRADORA

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ABSTRACT

Objective: to map scientific production on the use of technologies to promote skin-to-skin contact in the first hour of life. **Method**: this was an integrative review of the Lilacs, BDENF, MedLine/PubMed, CINAHL, Web of Science, SCOPUS, Cochrane and Embase databases. The searches were carried out on April 10, 2023, using the following descriptors: "mothers"; "Newborn"; "neonate"; "neonates"; "Newborns"; "Educational Technology"; "Instructional Technology"; "Information Technology"; "Information Technology"; "multimedia"; "Health Education"; "Educational Intervention"; "Distance Education"; "Media"; "Social Media"; "Online Social Networks"; "Audiovisual Resources"; "Educational Film and Video"; "Teaching Materials"; "Mother-Child Relationships"; "Maternal-Filial Relationships"; "Mother-Child Relationships"; and "Skin-to-Skin Contact". **Results**: out of a total of 2,017 publications, our sample consisted of ten studies. The first category identified was "Management and care technologies to encourage skin-to-skin contact", which explored management and care technologies aimed at health professionals.The second category was "Educational technologies to promote skin-to-skin contact", which looked at educational technologies aimed at pregnant women. **Conclusion**: management technologies aimed at health professionals prevailed, resulting in an increase in the practice of skin-to-skin contact in the first hour of life.

Keywords: Technology; Perinatal Care; Mother-Child Relations; Humanizing Delivery.

RESUMO

***Objetivo**: mapear as produções científicas sobre o uso de tecnologias para promover o contato pele a pele na primeira hora de vida. **Método**: realizamos uma revisão integrativa das bases de dados Lilacs, BDENF, MedLine/PubMed, CINAHL, Web of Science, SCOPUS, Cochrane e Embase. As buscas foram realizadas em 10 de abril de 2023, utilizando os seguintes descritores: "mães"; "Recém-Nascido"; "neonato"; "neonatos"; "Recém-Nascidos"; "Tecnologia Educacional"; "Tecnologia Instrucional"; "Tecnologia da Informação"; "Tecnologia de Informação"; "multimídia"; "Educação em Saúde"; "Intervenção Educativa"; "Educação à Distância"; "Meios de Comunicação"; "Mídias Sociais"; "Redes Sociais Online"; "Recursos Audiovisuais"; "Filme e Vídeo Educativo"; "Materiais de Ensino"; "Relações Mãe-Filho"; "Relações Materno-Filiais"; "Relações Mãe-Filho"; e "Contato pele a pele". **Resultados**: de um total de 2.017 publicações, nossa amostra foi composta por dez estudos. A primeira categoria identificada foi "Tecnologias gerenciais e assistenciais para incentivar o contato pele a pele", que explorou as tecnologias gerenciais e assistenciais voltadas para os profissionais de saúde. A segunda categoria foi "Tecnologias educacionais para promover o contato pele a pele", que abordou as tecnologias educacionais direcionadas às gestantes. **Conclusão**: prevaleceram as tecnologias gerenciais direcionadas aos profissionais de saúde, o que resultou em um aumento da prática do contato pele a pele na primeira hora de vida.*

***Palavras-chaves:** Tecnologia; Assistência Perinatal; Relações Mãe-Filho; Parto Humanizado.*

RESUMEN

***Objetivo**: mapear las investigaciones científicas sobre el uso de tecnologías para promover el contacto piel a piel en la primera hora de vida. **Método:** realizamos una revisión integradora de las bases de datos Lilacs, BDENF, MedLine/PubMed, CINAHL, Web of Science, SCOPUS, Cochrane y Embase. Las búsquedas se llevaron a cabo el 10 de abril de 2023, utilizando los siguientes descriptores: "madres"; "Recién Nacido"; "neonato"; "neonatos"; "Recién Nacidos"; "Tecnología Educativa"; "Tecnología Instruccional"; "Tecnología de la Información"; "Tecnología de Información"; "multimedia"; "Educación en Salud"; "Intervención Educativa"; "Educación a Distancia"; "Medios de Comunicación"; "Medios Sociales"; "Redes Sociales en Línea"; "Recursos Audiovisuales"; "Películas y Videos Educativos"; "Materiales de Enseñanza"; "Relaciones Madre-Hijo"; "Relaciones Materno-Filiales"; "Relaciones Madre-Hijo"; y "Contacto piel a piel". **Resultados:** de un total de 2,017 publicaciones, nuestra muestra estuvo compuesta por diez estudios. La primera categoría identificada fue "Tecnologías gerenciales y asistenciales para fomentar el contacto piel a piel", que exploró las tecnologías gerenciales y asistenciales dirigidas a los profesionales de la salud. La segunda categoría fue "Tecnologías educativas para promover el contacto piel a piel", que abordó las tecnologías educativas dirigidas a las gestantes. **Conclusión:** prevalecieron las tecnologías gerenciales dirigidas a los profesionales de la salud, lo que resultó en un aumento de la práctica del contacto piel a piel en la primera hora de vida.*

***Palabras clave:** Tecnología; Atención Perinatal; Relaciones Madre-Hijo; Parto Humanizado.*

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INTRODUCTION

Skin-to-skin contact (STSC) is a practice based on scientific evidence and consists of placing the naked baby on the mother's chest or abdomen during the first hour of the newborn's life or until the first breastfeeding. The United Nations Children's Fund (UNICEF) launched the "Ten Steps to Successful Breastfeeding" in 1991, as part of the Baby-Friendly Hospital Initiative (BFHI), and the fourth step consists of carrying out STSC in at least 80% of births in the first hour of life, without interruptions. Maternity hospitals seeking to achieve Baby-Friendly Hospital certification must follow the initiative's ten steps[1].

The first hour of the newborn's life, known as the golden hour, refers to the period of neonatal adaptation to the extrauterine environment, involving the regulation of cardiovascular and respiratory functions, thermal and immunological stabilization and neurodevelopment[2]. The STSC is considered the gold standard for facilitating this adaptation, promoting early and lasting breastfeeding, strengthening the bond between mother and baby and providing a pleasant birth experience, as well as ensuring women's satisfaction with the care they receive in the maternity ward[3-5].

In Brazil, government initiatives encourage the practice of STSC, according to Ordinance Nº. 371 of May 7, 2014, which establishes guidelines for immediate and continuous STSC in the first hour of life. The Prenatal and Birth Humanization Program[6], the National Policy for Comprehensive Women's Health Care[7] and the Stork Network[8] recommend good practices aimed at women's autonomy and the quality of prenatal care, childbirth and the puerperium. However, studies show that the prevalence of STSC is lower than expected, occurring in only 37.2% of births[9]. Even in cases where it is performed in 94.9% of births, it is often not maintained for the time recommended by the BFHI, which is 60 minutes[10].

In this context, one of the main barriers identified for mothers' adherence to STSC is lack of knowledge about this practice, reflecting the lack of educational interventions during prenatal care to train mothers about their right to opt for STSC if they wish[3-5,9-11].

In addition, factors related to the hospital environment stand out, such as resistance on the part of health professionals to postponing routine care, especially the first procedures carried out on the newborn (anthropometric measurements, physical examination and vaccine and vitamin K administration); work overload and lack of training for the health team; inadequate room temperature; positioning of medical devices under the mother (electrodes, sphygmomanometer and venous accesses), which make it difficult to hold the newborn; and lack of space to accommodate the child on the mother's lap [3-5,9-11].

A protective factor for the STSC practice is quality prenatal care, including preparing pregnant women about the importance of this care in the first hour of life and favoring the right to decide whether or not to do it. Having six or more prenatal appointments can favor maternal and newborn health, and is an indispensable factor in enabling the mother to have immediate contact with the newborn; the more prenatal appointments, the greater the opportunity to address the issue. As for the route of delivery, normal delivery was associated with 15 times more chances of the mother receiving immediate STSC when compared to caesarean section. In addition, the presence of a companion was related to a higher prevalence of this practice, and being cared for in a BFHI hospital increased the possibility of receiving humanized care in the first hour of life[2,10-13].

In this context, the use of technologies has emerged as a resource that facilitates prenatal health education and the training of health professionals to comply with the recommendations, and can contribute to the promotion of STSC in hospital institutions[7]. In this review, technologies are considered to be processes, material or otherwise, developed from a body of scientific knowledge designed to intervene in certain situations[14].

Technologies can be classified as Educational Technology (ET), Management Technology (MT) and Assistance Technology (AT). The first consists of a systematic set of scientific knowledge that enables the planning, execution and monitoring of the educational process, involving the educator/health professional and the student/client (video, leaflets, booklets). The second is a systematized and tested process of theoretical and/or practical actions that include the care management and health service operation, intervening directly in human and material resources (institutional routines, courses, discussion groups). Finally, AT is a set of systematized, procedural and instrumental actions to direct the provision of qualified assistance to human beings in all the dimensions that involve the process of health and illness[14].

Technologies are capable of enhancing the planning, execution and monitoring of maternal and child health interventions, as well as contributing to the construction of knowledge through dialogue by encouraging the promotion of PPC between mother and newborn after childbirth. This study is justified by the need to strengthen scientific research into technologies for promoting PPC and to encourage interventions that strengthen a respectful and humanized birth. Therefore, the aim of this

study was to map scientific research on the use of technologies to promote skin-to-skin contact during the first hour of life.

METHOD

This is an integrative review developed in accordance with the recommendations proposed by Mendes, Silveira and Galvão[15]. In this study, the following steps were followed: a) research question identification; b) definition of the inclusion and exclusion criteria for the articles and literature search; c) definition of the information to be identified, extracted and categorized based on the selected studies; d) evaluation of the articles to be included in the integrative review; and e) interpretation and publication of the results[15].

To this end, the research question was defined using the Population Interest Context (PICo) strategy: Mothers and Newborns (P - Population), Educational Technology (I - Interest) and Skin-to-Skin Contact (Co - Context)[15]. The following question was therefore devised: What technologies are used to promote skin-to-skin contact in the first hour of life?

The electronic search was carried out on April 10, 2023 in eight national and international databases to identify the main descriptors and keywords. Access was via the Capes Periodicals Portal, and a highly sensitive search was carried out with the development of a specific search strategy for each database: Latin American and Caribbean Health Sciences Literature (LILACS) and Nursing Database (BDENF) via the Virtual Health Library (BVS); Medical Literature Analysis and Retrieval System on-line (MEDLINE via PubMed); Cumulative Index of Nursing and Allied Health Literature (CINAHL via EBSCO); SCOPUS; Web of Science; COCHRANE; and EMBASE via ELSEVIER.

Controlled and non-controlled descriptors were identified after consulting the Health Sciences Descriptors (DeCS) and the Medical Subject Headings (MeSH). The terms were combined with the Boolean operators AND and OR, following the specificity of each base for review sensitivity. After defining the terms and search strategies, as described in Figure 1, the searches were carried out.

Initially, 2,017 publications were identified in the databases (Table 1). Duplicates were then removed (435 publications) and only counted once. This left 1,582 publications which were analyzed by carefully reading the titles and abstracts. A total of 1,563 studies that did not deal with the use of technologies in the study or "STSC during the first hour of the newborn's life" were excluded. After this stage, the remaining 19 texts were analyzed in full.

Table 1. Search strategies for the review study databases. Teresina - Piauí, 2023

LILACS e BDENF via BVS	(mh: (mães)) OR (mh: ("Recém-Nascido")) OR (neonato) OR (neonatos) OR ("Recém-Nascidos") AND (mh: ("Tecnologia Educacional")) OR ("Tecnologia Instrucional") OR (mh: ("Tecnologia da Informação")) OR ("Tecnologia de Informação") OR (mh: (multimídia)) OR (mh: ("Educação em Saúde")) OR ("Intervenção Educativa") OR (mh: ("Educação à Distância")) OR (mh: ("Meios de Comunicação")) OR (mh: ("Mídias Sociais")) OR (mh: ("Redes Sociais Online")) OR (mh: ("Recursos Audiovisuais")) OR ("Filme e Vídeo Educativo") OR (mh: ("Materiais de Ensino")) AND (mh: ("Relações Mãe-Filho")) OR ("Relações Materno-Filiais") OR ("Relações Mãe-Filho") OR ("Contato pele a pele") AND (db: ("LILACS" OR "BDENF"))
MEDLINE via PUBMED	(((("mothers"[MeSH Terms]) OR ("infant, newborn"[MeSH Terms])) OR ("newborn infants"[All Fields])) AND (((((((((((("educational technology"[MeSH Terms]) OR ("instructional technology"[All Fields])) OR ("information technology"[MeSH Terms])) OR ("information technologies"[All Fields])) OR ("multimedia"[MeSH Terms])) OR ("health education"[MeSH Terms])) OR ("educational intervention"[All Fields])) OR ("education distance"[MeSH Terms])) OR ("communications media"[MeSH Terms])) OR ("social media"[MeSH Terms])) OR ("online social networking"[MeSH Terms])) OR ("audiovisual aids"[MeSH Terms])) OR ("instructional film and video"[All Fields])) OR ("teaching materials"[MeSH Terms]))) AND (((((("Mother-Child Relations"[MeSH Terms]) OR ("mother infant relations"[All Fields])) OR ("skin to skin contact"[All Fields])) OR ("skin to skin contacts"[All Fields])) OR ("skin to skin contact ssc"[All Fields])) OR ("skin to skin practice"[All Fields])) OR ("skin to skin contact after birth"[All Fields]))
CINAHL via EBSCO	((MH "Mothers") OR "Mothers" OR (MH "Infant, Newborn") OR "Infant, Newborn" OR "Newborn Infants") AND ((MH "Educational Technology") OR "Educational Technology" OR "instructional technology" OR (MH "Information Technology") OR "Information Technology" OR "Information Technologies" OR (MH "Multimedia") OR "multimedia" OR (MH "Health Education") OR "Health Education" OR "educational intervention" OR "education distance" OR (MH "Communications Media") OR "communications media" OR (MH "Social Media") OR "Social Media" OR (MH "Online Social Networking") OR "Online Social Networking" OR "audiovisual aids" OR (MH "Teaching Materials") OR "teaching materials" OR "instructional film and video") AND ("Mother-Child Relations" OR (MH "Mother-Infant Relations") OR "Mother Infant Relations" OR "Skin to Skin Contact" OR "skin to skin contacts" OR "skin to skin contact ssc" OR "skin to skin practice" OR "skin to skin contact after birth")
WEB OF SCIENCE	(TS= (Mothers) OR TS= ("Infant, Newborn") OR TS= ("Newborn Infants")) AND (TS= ("Educational Technology") OR TS= ("instructional technology ") OR TS= ("Information Technology") OR TS= ("Information Technologies") OR TS= (multimedia) OR TS= ("Health Education") OR TS= ("educational intervention") OR TS= ("education distance") OR TS= ("communications media") OR TS= ("Social Media") OR TS= ("Online Social Networking") OR TS= ("audiovisual aids") OR TS= ("instructional film and video") OR TS= ("teaching materials")) AND (TS= ("Mother-Child Relations") OR TS= ("Mother Infant Relations") OR TS= ("Skin to Skin Contact") OR TS= ("skin to skin contacts") OR TS= ("skin to skin contact ssc") OR TS= ("skin to skin practice") OR TS= ("skin to skin contact after birth"))
SCOPUS	((TITLE-ABS-KEY (Mothers) OR TITLE-ABS-KEY ("Infant, Newborn") OR TITLE-ABS-KEY ("Newborn Infants"))) AND ((TITLE-ABS-KEY ("Educational Technology") OR TITLE-ABS-KEY ("instructional technology") OR TITLE-ABS-KEY ("Information Technology") OR TITLE-ABS-KEY ("Information Technologies") OR TITLE-ABS-KEY (multimedia) OR TITLE-ABS-KEY ("Health Education") OR TITLE-ABS-KEY ("educational intervention") OR TITLE-ABS-KEY ("education distance") OR TITLE-ABS-KEY ("communications media") OR TITLE-ABS-KEY ("Social Media") OR TITLE-ABS-KEY ("Online Social Networking") OR TITLE-ABS-KEY ("audiovisual aids") OR TITLE-ABS-KEY ("instructional film and video") OR TITLE-ABS-KEY ("teaching materials"))) AND ((TITLE-ABS-KEY ("Mother-Child Relations") OR TITLE-ABS-KEY ("Mother Infant Relations") OR TITLE-ABS-KEY ("Skin to Skin Contact") OR TITLE-ABS-KEY ("skin to skin contacts") OR TITLE-ABS-KEY ("skin to skin contact ssc") OR TITLE-ABS-KEY ("skin to skin practice") OR TITLE-ABS-KEY ("skin to skin contact after birth")))

Continue...

...Continuation.

Table 1. Search strategies for the review study databases. Teresina - Piauí, 2023

COCHRANE	((Mothers) OR ("Infant, Newborn") OR ("Newborn Infants")) AND (("Educational Technology") OR ("instructional technology ") OR ("Information Technology") OR ("Information Technologies") OR (multimedia) OR ("Health Education") OR ("educational intervention") OR ("education distance") OR ("communications media") OR ("Social Media") OR ("Online Social Networking") OR ("audiovisual aids") OR ("instructional film and video") OR ("teaching materials")) AND (("Mother-Child Relations") OR ("Mother Infant Relations") OR ("Skin to Skin Contact") OR ("skin to skin contacts") OR ("skin to skin contact ssc") OR ("skin to skin practice") OR ("skin to skin contact after birth"))
EMBASE via ELSEVIER	('mother'/mj OR 'mother' OR 'mothers' OR 'newborn'/mj OR 'infant, newborn' OR 'newborn' OR 'newborn infant') AND ('educational technology'/mj OR 'information technology device'/mj OR 'multimedia'/mj OR 'health education'/mj OR 'education, health' OR 'health education' OR 'distance learning'/mj OR 'distance education' OR 'distance learning' OR 'education, distance' OR 'tele-education' OR 'teleeducation' OR 'virtual education' OR 'virtual classroom' OR 'mass medium'/mj OR 'communications media' OR 'mass medium' OR 'social media'/mj OR 'social networking site' OR 'social networking website' OR 'social platform' OR 'social networking platform' OR 'social media' OR 'online social network'/mj OR 'online social network' OR 'audiovisual aid'/mj OR 'audiovisual aid' OR 'audiovisual aids' OR 'teaching'/mj OR 'teaching' OR 'teaching material' OR 'teaching materials' OR 'teaching method' OR 'teaching program' OR 'teaching programme' OR 'teaching, programmed' OR 'cameras and films'/mj OR 'cameras and films' OR 'video camera and films') AND ('mother child relation'/mj OR 'mother infant relation' OR 'skin to skin contact'/mj OR 'skin to skin contacts' OR 'skin to skin contact ssc' OR 'skin to skin practice' OR 'skin to skin contact after birth')

Source: Study review.

The following inclusion criteria were considered: original primary studies in Portuguese, English and Spanish, available in full in the databases used, which addressed the use of technologies to perform STSC during the first hour of the newborn's life. No time or target audience filter was established in order to guarantee the largest possible number of publications. In relation to the exclusion criteria, one master's dissertation was excluded, two studies that did not specify the type of technology used in their intervention and six studies that did not specify the process of using the technology. After applying these criteria, ten studies met the review question and the proposed objective, making up the final sample (Figure 1).

Initially, 2,017 publications were identified in the databases (Figure 1). Duplicates were then removed (435 publications) and only counted once. This left 1,582 publications which were analyzed by carefully reading the titles and abstracts. A total of 1,563 studies that did not deal with the use of technologies in the study or "STSC during the first hour of the newborn's life" were excluded. After this stage, the remaining 19 texts were analyzed in full.

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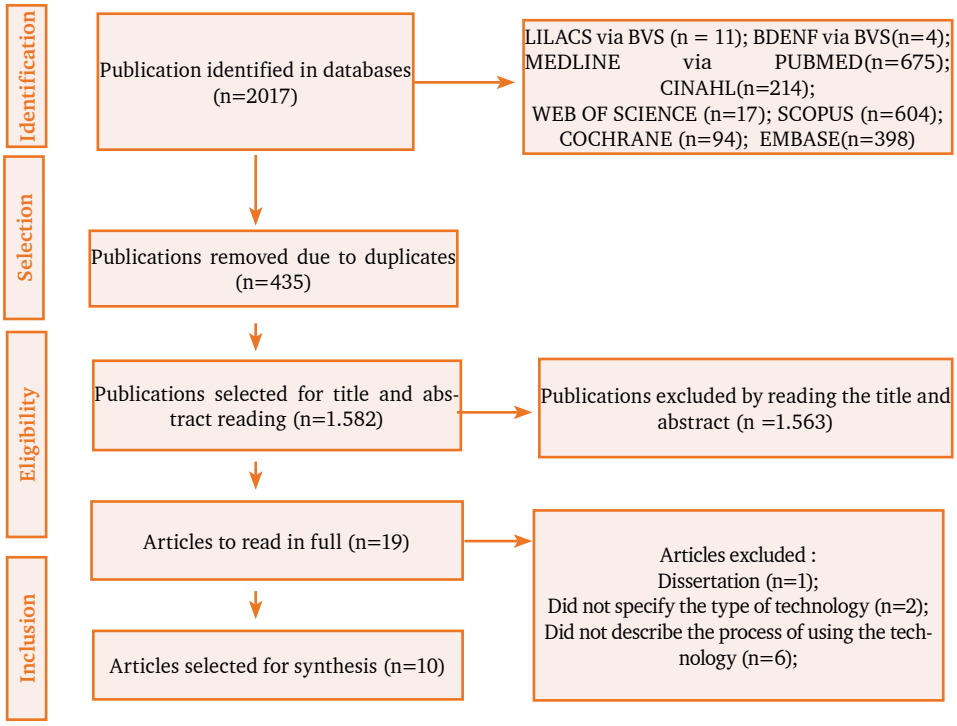
The process of searching for and selecting studies was carried out simultaneously by two researchers, with the aim of blindly selecting studies and removing duplicates using the Rayyan platform[17]. Disagreements were resolved with the help of a third reviewer, before proceeding with the full reading and inclusion of the studies in the review. Data extraction was carried out using the form recommended by the Joanna Briggs Institute (JBI) protocol for the synthesis of information and quality of recommendations[18]. A validated instrument from the literature was then adapted to collect data[19], including the following fields: author, year and country; publication journal; methodological characteristics (type of study and level of evidence); and main results.

The classification of scientific evidence follows the Melnyk and Fineout-Overholt classification[20], which categorizes the quality of evidence into seven levels: evidence from systematic reviews or meta-analyses of all relevant randomized controlled clinical trials, or clinical guidelines based on systematic reviews of randomized controlled clinical trials (level I); evidence from at least one well-designed randomized controlled clinical trial (level II); evidence from well-designed clinical trials, but without randomization (level III); evidence from well-designed cohort and case-control studies (level IV); evidence from systematic reviews of descriptive and qualitative studies (level V); evidence from a single descriptive or qualitative study (level VI); and evidence from expert opinions and/or expert committee reports (level VII).

The studies were read in their entirety until all the relevant information was obtained and the thematic categorization for the synthesis of this review was defined. To this end, a framework was drawn up, using a visual representation that is widely accepted by the World Health Organization and international literature for understanding complex health issues[19,21].

The framework was structured by the first author and revised by the review supervisor. In addition, a meeting was held with members of the Women's Health Study,

Figure 1. Flowchart of the study selection stages, based on the PRISMA guidelines. Teresina - Piauí, 2023.



Source: Adapted from PRISMA.

Extension and Research Group (GEPSM) at the Federal University of Piauí (UFPI) to synthesize knowledge. The proposed framework has quality content, obtained through a literature review, and specificity, as it relies on professionals with theoretical and practical experience in maternal and child health[21].

RESULTS

Ten studies were included in the review, listed in Table 2 with the following characteristics: first author, year, country, objective, methodological design, educational technology, outcome and level of evidence.

A total of ten studies were included in the review, listed in Figure 3, with the following characteristics: first author, year, country, objective, methodological design, educational technology, outcome and level of evidence.

The majority of the studies carried out interventions to promote STSC using management technologies (five studies)[24,25,28,29,31], followed by care technologies (three studies)[23,26,30] and educational technologies (two studies) [22,27]. The articles were published between 2011 and 2022 and the year of greatest production was 2018, with three studies[23-25]. In terms of geographical distribution, the most prominent country was the United States[29,31], with three studies, and the most prevalent language was English, with only one study retrieved in Portuguese [27]. As for the type of research, there was a predominance of descriptive and qualitative studies[24-26] and only one randomized clinical trial[22]. Thus, level of evidence VI was highlighted in seven articles[24,23-27,29,31].

In relation to the types of technology used as a teaching method, the majority used discussion groups and focus groups, corresponding to eight studies[23-26,28-31]. The target audience for the use of these technologies was health professionals (seven studies)[23-26,28-30], two studies highlighted the use of technologies for pregnant women and health professionals[23,26], and two studies had pregnant women/mothers as participants[22,27]. Figure 2 shows the framework developed through the literature review.

Based on the content extracted, the data was summarized by carefully grouping the content based on the similarities identified. The aim was to exhaust the findings in order to answer the research question. After an exhaustive data analysis, two thematic categories emerged: "Management and care technologies to encourage skin-to-skin contact" and "Educational technologies to promote skin-to-skin contact".

Table 2. Analysis of the studies included in the review. Teresina - Piauí, 2023.

First author	Year/country	Objective	Methodological design	Technology	Classification	Outcome	Level of evidence
Caponero (22)	2022, United States	To measure the impact of the educational video on the intention to participate in skin-to-skin contact immediately after birth.	Type of study: Descriptive Participantes: 36 health professionals and 240 pregnant women Setting: Hospital	Video	ET	After the video, 98.3% of the pregnant women planned to do STSC after delivery. However, only 59.8% started STSC within 5 minutes of delivery.	Level II
Sanchez--Espino (23)	2019, Mexico	To evaluate the impact of an educational intervention to change current practice and promote skin--to-skin contact and early breastfeeding in a hospital in rural Mexico.	Type of study: Descriptive Participantes: 36 health professionals and 240 pregnant women Setting: Hospital	Lectures/Algorithm/Discussion Group	AT	Including skin-to-skin contact and early breastfeeding as part of standard care in a rural hospital.	Level VI
Mbalinda (24)	2018, Uganda	To identify barriers and facilitators to uninterrupted and safe skin-to-skin contact in the first hour after birth in a low--resource environment. To evaluate how health professionals dealt with the identified barriers after the intervention package was completed.	Type of study: Qualitative Participants: 81 health professionals Setting: Hospital	Video/Lectures/ Focus Group/ Questionnaire/ Pamphlets/Poster/ Educational Card	MT	It resulted in a change in the attitudes and practices of the professionals, as well as encouraging other initiatives to pass on information about skin-to-skin contact, such as radio broadcasts to the community and a presentation on the subject to the mothers of cesarean section patients.	Level VI
Alenchery (25)	2018, India	To determine the barriers, facilitators and potential solutions for the implementation of skin-to-skin contact in healthy newborns in a level III neonatal care unit in Bangalore, India.	Type of study: Qualitative Participants: 41 health professionals Setting: Hospitall	Focus group discussions	MT	The main barriers to skin--to-skin contact at birth are staff shortages, time constraints and safety concerns. Training health professionals and teamwork are the main interventions that can improve the realization of skin-to-skin contact at birth.	Level VI
Stevens (26)	2018, Australia	To explore how the practice of healthcare professionals impacts on facilitating skin-to-skin contact in the first two hours after a caesarean section.	Type of study: Qualitative Participants: 21 pregnant women and 26 professionals Setting: Hospital	Focus group discussions/Video	AT	The actions of health professionals are influenced by their working environment and institutional norms. Health education practices can improve skin-to-skin contact after caesarean sections.	Level VI
Silva (27)	2017, Brazil	Evaluating educational practices according to the "Ten Steps to Successful Breastfeeding" in a Human Milk Bank.	Type of study: Retrospective and quantitative Participants: 12,283 mothers Setting: Human Milk Bank	Questionnaire/ Protocol	AT	The health professional's role in advising mothers on skin-to-skin contact was highlighted.	Level VI
Turenne (28)	2016, Canada	Development and evaluation of an educational intervention aimed at evidence-based practice of skin-to-skin contact at birth among nurses in a maternity hospital.	Type of study: Methodological Participants: 38 professional nurses and nursing students Setting: Hospital	Lecture/Video/ Simulation/Poster/ Scenario/Algorithm/Discussion Group	MT	The educational intervention resulted in a longer duration of skin-to-skin contact, breastfeeding and better guidance for parents on skin-to-skin contact at birth.	Level V
Schoch (29)	2014, United States	Commit to the designation of the Baby-Friendly Hospital Initiative (BFHI) to increase support for breastfeeding	Type of study: Descriptive Participantss: 250 health professionals Setting: Hospital	Lecture/Video/ Simulation/Discussion Group	MT	The interdisciplinary multi--departmental simulation allowed the team to understand each professional's role in skin-to-skin care.	Level VI

Continue...

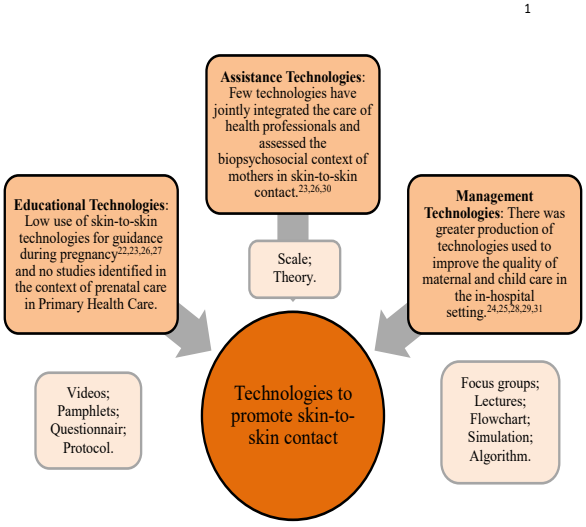
...continuation.

Table 2. Analysis of the studies included in the review. Teresina - Piauí, 2023.

First author	Year/country	Objective	Methodological design	Technology	Classification	Outcome	Level of evidence
Nahidi (30)	2014, Iran	To develop and psychometrically evaluate an instrument to measure factors associated with skin-to-skin contact between mother and newborn (MSSCQ) based on the PRECEDE--PROCEED model.	Type of study: Methodological Participants: 450 health professionals Setting: Hospital	Questionnaire/ Focus Groups	AT	The Mother-Newborn Skin-to-Skin Contact Questionnaire (MSSCQ) is valid, based on reliable theory and can be used in clinical and obstetric practice and in nursing studies.	Level V
Hung	2011, United States	To describe a project to improve the quality of early skin-to-skin contact in the operating room and post-anesthetic recovery.	Type of study: Descriptive Participants: Not specified Setting: Hospital	Information board/Creation of educational flowchart/Discussion group	MT	It has been shown that skin-to-skin contact is feasible after caesarean section. Perinatal and neonatal nurses should be leaders in changing practices to incorporate early skin-to-skin contact into routine care after cesarean delivery.	Level VI

Source: Review study. Caption: Educational Technology - ET; Management Technology -MT; Assistance Technology – AT.

Figure 2 - Summary of the use of technologies to promote skin-to-skin contact after birth. Teresina - Piauí, 2023.



Source: Adapted from Nietsche et al. (2005).

DISCUSSION

Technologies are essential tools for improving institutional processes in health services, for the continuing professional education, for improving care and health education practices with pregnant women, and for encouraging PPC from prenatal care to hospitalization. Based on the findings, most of the studies proposed the use of management technologies[24,25,28,29,31], aimed at promoting changes in routines and achieving institutional targets and indicators; educational technologies[22,23,26,27], which worked on the teaching-learning process with pregnant women/parturients, strengthening health education and women's autonomy in relation to childbirth; and care technologies[23,26,30] to cover the multidimensionality of the factors that involve care provided by health professionals to patients.

Management and care technologies to encourage skin-to-skin contact

The development of new technologies to improve the quality of care in health services is a growing reality. Most of these technologies focus on interventions in hospital management, seeking to improve quality, fill gaps in the institution's routine and achieve the certification goals as a Baby-Friendly Hospital[31]. Most of the studies applied group techniques aimed at health professionals and considered full-term pregnancies (after 37 weeks) for the interventions, in which higher rates of immediate STSC in the first hour of life were observed[24,25,28,29,31].

One of the main challenges in meeting the BFHI recommendations is to guarantee early STSC, within 5 minutes, and lasting 60 minutes or the first hour of the newborn's life[10]. To meet this challenge, the technologies were implemented together, through lectures, algorithms and discussion groups, resulting in a 77% increase in STSC with early breastfeeding and a reduction in the time taken to start STSC after birth. The onset time fell from approximately 18.5 to 9.6 minutes and there was an increase in the mean STSC duration from 22 to 40.9 minutes[22].

In this regard, a quasi-experimental study carried out in Uganda used a set of low-cost educational technologies, including videos, lectures and pamphlets for health professionals. This study showed a 54.8% rate of uninterrupted STSC in the first hour of the newborn's life, whereas previously there had been no practice of this care[32]. The introduction of technologies in health services has contributed to solving problems in the hospital environment, based on permanent education and participatory and dialogued practice, as opposed to the reproduction of the biomedical model and based on shared decision-making by the multi-professional obstetrics and pediatrics team[33].

As for printed materials, posters, pamphlets and educational cards were used to inform, train and educate health professionals on how to implement STSC in their institutions[24,28,31]. These materials were considered easy to distribute to staff in different hospital sectors, contributing to the dissemination of information in prenatal care, during childbirth, in the neonatal unit and in the postnatal ward[24].

In the case of the use of educational videos, lectures, simulations and group discussions to support the designation of the hospital as Baby-Friendly, the main benefit was to encourage professionals to work together to recognize their role as part of a multidisciplinary team. In addition to the improvement in STSC practices, the results highlight the ease of understanding the topic, the reproduction of the knowledge acquired, the change in relationships and interaction between health professionals and other members of the team and with pregnant women[27].

The topics/content most frequently covered were the STSC's benefits[22-26,28-31], the steps to implement this care in the hospital environment[23,24,28,30,31] and breastfeeding [23,24,26,27,29]. For the newborn, the stabilization of vital cardiovascular, respiratory and neurological functions, temperature regulation and the hormonal release of oxytocin [34] in the first hour encourage the baby to go through the nine behavioral phases: crying, relaxation, awakening, activity, crawling, resting, familiarization, suction and sleeping in the STSC[35,36]. This promotes optimal adaptation to the environment outside the womb and reduces the risk of complications and admissions to neonatal care units. For mothers, the STSC favors bonding with their child, speeds up postpartum recovery and reduces the risk of bleeding[25,28,30,31].

It is important to consider that the STSC has improved the provision of postpartum care for health professionals. It has also favored the relationship between professionals and mothers[30], facilitated suturing in cases of laceration in normal births[24] and provided comfort to mothers who have undergone caesarean sections. Carrying out STSC allows health professionals[24,26,31] to focus on the birth in both normal and caesarean deliveries. It also contributes to reducing neonatal identification errors through the use of wristbands and increases professionals' satisfaction with their work[24,29].

Skin-to-skin contact and breastfeeding in the first hour of the newborn's life are essential in maternal and neonatal care. However, several factors can make it difficult to perform STSC. These include the lack of knowledge among health professionals and pregnant women about its importance[22-27,31,35], resistance or demotivation caused by work overload[24,25,28,30], insecurities related to the risk of the newborn falling[26] insufficient sizing of the health team and difficulties in interprofessional teamwork due to the need for effective communication and empathy to promote STSC after birth[25,29].

It is therefore necessary to invest in ongoing continuing education practices for health professionals, starting with the curriculum at educational institutions, adequately addressing this issue so that they can acquire theoretical and practical knowledge. In addition, it is important to strengthen the Ministry of Health's government programs, encouraging public and private hospital institutions to maintain the quality of care provided by performing immediate STSC after childbirth[24-28].

Some studies indicate that the use of technologies can promote STSC in both vaginal and cesarean deliveries, although it is less common in the latter[28-31]. Technology development, such as information boards, flowcharts and team discussions, proved to be effective in meeting the needs of the local reality, with an increase from 20% to 68% of STSC practices in cesarean sections after the educational intervention[31]. These technologies should include the procedures that health professionals should carry out to implement STSC in the postpartum period [23-26,28-31], along with feedback after the intervention.

In this context, the use of MT by the hospital administration to implement STSC in the first hour of life stood out. This has contributed to health professionals training, the routines standardization and quality monitoring through scales[23] and questionnaires[29]. This low-cost strategy aims to improve the healthcare provided to mothers and newborns by promoting understanding and reflection among the interprofessional team through interventions such as discussion groups, lectures and simulations[25,26].

In addition, it is important to note that the use of MT makes it possible to record health professionals' practices through video recordings, interviews and questionnaires. This enables a detailed analysis of the care provided in the first hour of life after birth, identifying any gaps and strengthening teamwork relationships and a culture of effective communication. This information also helps management make decisions to encourage the STSC to be implemented as a routine in healthcare institutions [25,26].

The health professionals' and pregnant women's actions are influenced by the environment and institutional regulations. Therefore, AT encompasses several dimensions to ensure adequate patient care, considering physical, psychological, environmental and cultural aspects that involve the challenges of practicing STSC in the first hour of life. Video analysis enabled us to identify practices that contributed to the separation of mother and baby, such as positioning the woman in such a way that she couldn't hold her child. Lectures and discussion groups were used as strategies to improve care[26].

In this sense, one study developed a 120-item questionnaire, based on a behavioral model, to measure the factors that influence health professionals' attitudes towards promoting STSC in the first hour postpartum. This questionnaire covers the knowledge, values, attitudes, personal beliefs, priorities, skills and self-confidence needed to carry out the practice[29]. This AT opens up new possibilities for changing behaviors and environments related to maternal and child care. Similarly, Sánchez-Espino's study[22] used the algorithm described by Brimdyr, with standardized steps for each approach by health professionals, from the stages of childbirth to hospital transport. The results showed a significant increase in the STSC rate over the course of the intervention.

Carrying out the STSC as the Baby-Friendly Hospital's fourth step must guarantee stable conditions for the mother and the newborn, a private environment with an adequate temperature of approximately 26°C[7,31]. Mother and newborn should be covered with a sterile cloth to maintain thermoregulation[23]. The trained obstetric and pediatric team must be vigilant in reassessing maternal and neonatal stability, support the STSC and proceed with the necessary initial birth care[23,31]. Some studies have also highlighted that mother and newborn should remain together throughout the postpartum period until hospital discharge, including postnatal transport to the rooming-in unit or post-anesthetic recovery room, favoring bonding and early breastfeeding in the long term[24,28,31].

Only one study[30] detailed the process of instrument validation, while the others merely presented the intervention and the results achieved. It is therefore clear that the technologies need to be validated by expert judges and evaluated by the target audience in order to guarantee their scientific rigor[30]. Another aspect identified is that the technologies were not tested individually, but most were used together in non-experimental studies, which does not allow their effectiveness to be affirmed [38].

However, the studies followed the theoretical basis of the Iowa Model of Evidence-Based Practice to promote quality care. Active methodologies centered on the professional and their learning needs were used, following predetermined stages of the decision algorithm. This tool allowed the professional to lead changes in practice and evaluate the results achieved, contributing to the knowledge acquisition, learning process and formation of a critical sense[28]. Therefore, the findings can be applied in clinical practice.

Educational technologies to promote skin-to-skin contact

ETs are teaching-learning tools that are easy to apply, require few financial resources and have great benefits for pregnant women[22,23,26,27]. This is because they can contribute to building a new culture of STSC at the time of birth, valuing respectful childbirth and favoring women's protagonism in labor and birth, including in caesarean sections, when professionals' practices tend to be more rigid[5].

One study trained professionals to promote STSC in the first hour of life; it then worked on health education with pregnant women from 36 weeks' gestation in a hospital environment, through weekly lectures with PowerPoint presentations on the benefits of STSC and early breastfeeding. Pregnant women were encouraged to ask questions and, after evaluation, there was an increase in the number of mothers who received their newborns in STSC. Thus, the approach with the mothers allowed them to be prepared for this experience and increased the duration of this postpartum practice[22].

In this sense, ET was used as a means of building bonds and exchanging knowledge between patients and professionals[22,23,26,27]. More broadly, in another integrative review study, the bond was considered a technology, based on a broad definition in which the process built during the relationship between the health professional and the user results in co-responsibility for health care[37].

The results show that ETs aimed at STSC have been developed mainly for pregnant women's health education in the in-hospital environment[22,23,26,27]. However,

an important step to promote the practice immediately is health education for mothers from prenatal care in Primary Health Care, so that they can express their wishes during labor, which is a time of great expectations. Most mothers want to have a special moment with their newborn, especially when the need arises for a caesarean section, and it is important to advise them that STSC can be carried out in the operating room and increase maternal satisfaction with the birth of their bab [22,23,26,27].

The studies showed that the majority of pregnant women were unaware of STSC before the educational intervention, except for those who had experienced it in previous births[26]. The technologies could be used to strengthen the relationship between mothers and their children from the beginning of pregnancy, to work on PPC as a facilitator for accepting motherhood and strengthening the mother's role, and to prepare them for the first meeting with the baby[22,23,26,27].

In this context, the use of technologies to inform pregnant women during prenatal care in Primary Health Care was identified as a gap in this review, as there has been no study in this scenario. The technologies used for pregnant women during hospitalization were videos, protocols, questionnaires, lectures and pamphlets; however, the users' assessment of the services offered is important to understand the clarity of the information received and the receptiveness to the care provided[22,23,26,27].

It is also possible to suggest the use of other technologies not explored in the studies analyzed, such as collective prenatal care, digital technologies such as software, games, applications and virtual learning environments, and other printed materials such as booklets, comics and serialized albums for application in prenatal care. It should be borne in mind that one of the obstacles to the STSC practice is the lack of awareness of the importance of this care among pregnant women[28,37,38].

It should be noted that economic issues can influence the development of high-cost technological research, such as software. Although there was a greater number of publications in the United States, a developed country with a strong global economy, low-cost technologies predominated, which can be applied in a variety of contexts[29,30]. An example of this is Uganda, a country that faces serious social and economic problems, such as a lack of hospital supplies, high demand for services and few human resources, as well as cultural beliefs, a lack of information and attitudes on the part of professionals and family members. However, this reality was minimized by the educational interventions[24].

A randomized clinical trial used an educational video in the normal pre-birth department. Before the video, 89.2% of the pregnant women in the group with the video and 83.3% of the pregnant women in the group without the video wanted the practice; after the video, 98.3% wanted STSC. Thus, there was an increase in immediate (up to 5 minutes) postpartum STSC of 59.8% in the group with the video and 49.4% in the group without the video, demonstrating the importance of the ET intervention in increasing maternal intention to perform STSC and the prevalence of this practice [22].

One study used an educational practice protocol based on the "Ten Steps to Successful Breastfeeding" for mothers who sought the services of a Human Milk Bank (HMB). Most of the participants who had skin-to-skin contact with their newborn soon after birth were aged between 20 and 29, had been instructed on the benefits of STSC in the first hour of life as a facilitator of breastfeeding and had breastfed in the delivery room[27]. In Brazil, most of the research using the ET is mainly about breastfeeding[1,37,38].

The ETs should use simple language and clear information to summarize the necessary content, preferably with the opinions of pregnant women and caregivers based on the reality they have experienced, enabling precise solutions to the needs identified[18,24]. Printed materials and videos have also been suggested as effective means of communication to facilitate audiovisual language and mothers' understanding[22,25].

It is important to note that international clinical trials have explored new contexts related to the STSC's implementation in premature newborns (before 37 weeks of gestation), when the early bond between mother and baby should be stimulated from birth[4,11]. This fact highlights the need to develop well-designed studies to associate the use of ET, promoting STSC and maternal bonding with preterm newborns in the first hour of life.

Another aspect to be considered in relation to the content of educational, management and care technologies is the lack of STSC guidance or practice in the first hour of life for HIV-positive mothers, as breastfeeding is contraindicated in these cases. This indicates the need to include these technologies, especially ET, to guide mothers on how to deal with this care in the first contact with the baby, clarifying the risks of breastfeeding and adequate nutrition for the newborn in the long term[2].

When analyzing the available studies, only four [22,23,26,27] used the technologies with pregnant women and, among them, only one[28] included family members/carers for health education. The main content covered

the benefits of STSC for breastfeeding, the logistics of carrying out this care and making mothers aware of the importance of adhering to this practice. There is a need for further research to cover technologies aimed at preparing pregnant women for STSC from prenatal care onwards, as well as the inclusion of content related to the partner's prenatal care, through Birth Plans, and the importance of companion support throughout the pregnancy-puerperal period until STSC is carried out [13,23,28].

Study limitations

The study's limitations refer to this review's findings, most of which have a low scientific evidence level, which makes generalizations difficult. In addition, the methods used are very different, which restricts the possibility of comparisons between the results obtained. These comparisons could be useful for drawing up new recommendations..

CONCLUSION

In this review, management technologies predominated in the studies applied to the hospital environment, aimed at health professionals in a set of interventions to improve the quality of care and promote skin-to-skin contact in the first hour of life, in line with BFHI recommendations. This was done mainly through discussion groups, focus groups and lectures. It was observed that assistive technologies helped to address the multiple dimensions involved in providing adequate care to mothers, especially in relation to the scales. On the other hand, educational technologies provided an exchange of knowledge between pregnant women and health professionals, proving to be important for increasing maternal intention to perform skin-to-skin contact and for the prevalence of this practice, especially videos and printed materials.

The technologies were used together, showed satisfactory results and increased the practice of immediate and lasting skin-to-skin contact at birth, as well as raising awareness among health team professionals to improve teamwork and the institutional routine standards. It is suggested that obstetric and neonatal care protocols be created, with continuous training for the multi-professional team and the implementation of systems to evaluate maternal care, based on indicators of skin-to-skin contact in the first hour of life.

In addition, the technologies have given mothers greater autonomy to choose how they will have first contact with their newborn. Few studies have targeted pregnant women, highlighting the need for new technologies on this subject during prenatal care, especially in Primary Health Care. We believe this review is unprecedented and hope to encourage new studies to expand the use of technologies and promote the culture of skin-to-skin contact, bringing benefits to both mothers and newborns.

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