Original Article

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CONTRIBUTION OF DIGITAL EDUCATIONAL TECHNOLOGIES, DESIGNED FOR FATHERS, IN PROMOTING BREASTFEEDING: AN INTEGRATIVE REVIEW

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ABSTRACT

Objective: to analyze the contributions of digital educational technologies, designed for fathers, in promoting breastfeeding.
Method: a literature review, integrative type, carried out in December 2022, after electronic consultations in the CINAHL, Web of Science, EMBASE, MEDLINE, BDENF, IBECS and LILACS databases, without restriction of language and publication time. Article selection and information extraction were performed by peers independently.
Results: sample of seven articles were published between 2017 and 2022 in Australia, Canada and Ethiopia. Digital educational technologies developed for fathers were mobile apps, eHealth resources, and text messaging. These technologies contributed to improve access to information, sharing of experiences, paternal self-efficacy to support breastfeeding, knowledge and attitude about infant feeding, consequently, improving breastfeeding rates.
Conclusion: digital educational technologies on breastfeeding, designed for fathers, are poorly studied. However, they are fundamental to improve paternal support in promoting breastfeeding; therefore, more research is needed for the development of other digital educational technologies for this target audience.

DESCRIPTORS: Educational Technologies. Breastfeeding. Health Promotion. Fathers.

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CONTRIBUIÇÃO DAS TECNOLOGIAS EDUCACIONAIS DIGITAIS, CONCEBIDAS PARA OS PAIS, NA PROMOÇÃO DO ALEITAMENTO MATERNO: REVISÃO INTEGRATIVA

RESUMO

Objetivo: analisar as contribuições das tecnologias educacionais digitais, concebidas para os pais, na promoção do aleitamento materno.
Método: revisão de literatura, tipo integrativa, realizada em dezembro de 2022, após consultas eletrônicas nas bases de dados CINAHL, *Web of Science,* EMBASE, Medline, BDENF, IBECS e LILACS, sem restrição de idioma e de tempo de publicação. A seleção dos artigos e extração de informações foi realizada por pares de forma independente.
Resultados: amostra de sete artigos publicados entre os anos de 2017 e 2022, na Austrália, no Canadá e na Etiópia. As tecnologias educacionais digitais desenvolvidas para os pais foram os aplicativos móveis, os recursos *eHealth* e as mensagens de texto. Essas tecnologias contribuíram para melhorar o acesso à informação, o compartilhamento de experiências, a autoeficácia paterna para apoiar o aleitamento materno, o conhecimento e a atitude sobre alimentação infantil, consequentemente, melhorando as taxas de Aleitamento Materno.
Conclusão: as tecnologias educacionais digitais sobre aleitamento materno, concebidas para os pais, são pouco estudadas. No entanto, são fundamentais para melhorar o apoio paterno na promoção do aleitamento materno, portanto, mais pesquisas são necessárias para o desenvolvimento de outras tecnologias educacionais digitais para esse público-alvo.

DESCRITORES: Tecnologias educacionais. Aleitamento materno. Promoção da saúde. Pai.

CONTRIBUCIÓN DE LAS TECNOLOGÍAS EDUCATIVAS DIGITALES, DISEÑADAS PARA PADRES, EN LA PROMOCIÓN DE LA LACTANCIA MATERNA: UNA REVISIÓN INTEGRADORA

RESUMEN

Objetivo: analizar las contribuciones de las tecnologías educativas digitales, diseñadas para padres, en la promoción de la lactancia materna.
Método: revisión de literatura, tipo integradora, realizada en diciembre de 2022, previa consulta electrónica en las bases de datos CINAHL, Web of Science, EMBASE, Medline, BDENF, IBECS y LILACS, sin restricción de idioma y tiempo de publicación. La selección de artículos y extracción de información fue realizada por pares de forma independiente.
Resultados: muestra de siete artículos publicados entre 2017 y 2022 en Australia, Canadá y Etiopía. Las tecnologías educativas digitales desarrolladas para los padres fueron aplicaciones móviles, recursos de eHealth y mensajes de texto. Estas tecnologías han contribuido a mejorar el acceso a la información, el intercambio de experiencias, la autoeficacia paterna para apoyar la lactancia materna, el conocimiento y la actitud sobre la alimentación infantil, consecuentemente, mejorando las tasas de lactancia materna.
Conclusión: las tecnologías educativas digitales sobre lactancia materna, diseñadas para padres, están poco estudiadas. Sin embargo, son fundamentales para mejorar el apoyo paterno en la promoción de la lactancia materna, por lo que se necesita más investigación para el desarrollo de otras tecnologías digitales educativas para este público objetivo.

DESCRIPTORES: Tecnología Educacional. Lactancia Materna. Promoción de la Salud. Padre.

INTRODUCTION

Globally, breastfeeding (BF) practice is widespread and recommended, as it is an essential strategy that promotes bonding, affection, protection and nutrition. Moreover, it is economical and effective in reducing maternal and child morbidity and mortality[1]. Among the benefits, BF favors children's growth and development process, prevents infections in children and improves mothers' physical and mental health[2].

Despite the increase in exclusive breastfeeding (EBF) rates, in the current context, prevalence rates are below recommended recommendations. According to the World Health Organization (WHO), the prevalence of EBF is classified as very good when it reaches a range of 90% to 100%; good, when it reaches between 50% and 89%; reasonable, from 12% to 49%; and bad, between zero and 11%[3]. The WHO target, by the year 2025, is to increase the global rates of EBF[4] by 50%, but many countries will not achieve this result, including Brazil[5].

Worldwide, only 40% of children are exclusively breastfed in the first six months of life[6]. In Brazil, the results of the Brazilian National Child Food and Nutrition Study (ENANI – *Estudo Nacional de Alimentação e Nutrição Infantil*), carried out between 2019 and 2020, with a total of 14,584 children under five years of age, pointed out that, among those aged less than six months, only 45.7% were on EBF; among those with less than four months, this rate was 60%; and only 53.1% continued with BF in the first year of life[7].

There are some barriers that contribute to low EBF rates, such as low socioeconomic status, limited education, cultural factors, discomfort when breastfeeding, lack of support, embarrassment and encouragement for using formulas and other types of food[8]. Inverted nipples or a history of mastoplasty are also factors that can make BF difficult[9]. However, BF is important for all children and women, regardless of the context in which they live[6]. For this reason, measures that promote and encourage immediate and continuous BF need to be adopted in order to intensify BF prevalence rates[5].

BF promotion should be a continuous practice, starting from prenatal care to the postpartum period, being increased mainly in the first days after babies' birth, a period of significant learning and adaptation for mother, child and father[10]. Fathers play an important role in the success of BF, given that they can be a great ally in child care, especially in the puerperal period. Father support can influence maternal decisions and behavior regarding child nutrition, and this participation should be encouraged, even in the face of the insecurity they feel in the care to be performed during this period. In this context, using educational technologies, scientifically developed and validated, aimed at fathers, can help them to rethink attitudes, expanding knowledge and encouraging them to promote BF[11].

Thus, digital educational technologies (DET) have been widely used to promote BF among mothers, breastfeeding women and health professionals, and their introduction in health actions is recommended to provide users with ease of access, preferably at any time they feel the need[12]. DET are educational technological resources (applications, virtual environments, videos, games) that can be used in person or at a distance (e-learning), and can be disseminated via the internet, cell phone (m-learning), television, DVDs or CD-ROMs[13]. Despite this, little is known about the contributions of DET aimed at fathers in promoting BF.

Therefore, it is relevant that the results of existing studies on the contributions of DET aimed at fathers in BF promotion are synthesized, allowing health professionals involved in the care process to be able to implement them, considering the needs of this public to promote BF.

Given the above, the objective was to analyze the contributions of DET, designed for fathers, in BF promotion.

METHOD

This is an integrative literature review, in which five steps were followed: research question elaboration; definition of inclusion and exclusion criteria for studies; determination of the information to be extracted from included articles and characterization; data collection and interpretation; and presentation of results[14].

To prepare the research question, the PICO strategy (Population; Intervention; Comparison; Outcome) was adopted[15]. In this study, P: fathers; I: educational technologies; C: not used; O: BF. The research question was: what are the contributions of DET, designed for fathers, to encourage BF promotion?

Primary articles, in any language and that answered the research question, were included. Dissertation, thesis, book or book chapter, annals of events, editorial, literature review studies, studies that developed DET for other target audiences (only mothers, caregivers or health professionals) were excluded. Articles repeated in more than one database were considered for analysis only once.

Study search and selection was carried out in December 2022 in the electronic databases: Cumulative Index to Nursing and Allied Health Literature (CINAHL); Web of Science; BASE; Medical Literature Analysis and Retrieval System Online (MEDLINE via PubMed); Nursing Database (BDENF – *Banco de Dados em Enfermagem*); Spanish Bibliographical Index in Health Sciences (IBECS – Índice *Bibliográfico Español en Ciencias de la Salud*); Latin American and Caribbean Literature on Health Sciences (LILACS – *Literatura Latino-Americana e do Caribe em Ciências da Saúde*) via Virtual Health Library (VHL).

To carry out the searches, controlled descriptors indexed in the Health Sciences Descriptors (DeCS – *Descritores em Ciências da Saúde*) and Medical Subject Headings (MeSH) vocabularies were adopted as well as uncontrolled descriptors (keywords).

To carry out the high sensitivity search, initially, the descriptors of the PICO strategy components were combined with each other with the Boolean OR connector, then each set was combined with the AND connector.

The search strategy was the same used for all databases. In the BDENF, IBECS and LILACS databases, in which the search was performed via VHL, the same crossings were used, but with descriptors in Portuguese. Figure 1 presents the terms and the search strategy used in all databases.

Article selection and data extraction were carried out by two independent researchers, with the help of the Rayyan QCRI application[16]. Faced with divergences in selection, a consensus strategy was adopted for inclusion or exclusion from the study.

The information extracted from the articles included in the review were year, country, DET aimed at fathers, objective, population and the respective contributions of technologies to promote BF. To extract this information, an instrument adapted from the literature was used to collect data to be used in an integrative review[17].

The identification of articles according to the level of evidence (LoE) was based on the Evidence-Based Practice model, being considered level I – evidence resulting from a systematic review, meta-analysis or clinical guidelines derived from systematic reviews of randomized controlled clinical trials; II – evidence from at least one randomized controlled clinical trial; III – evidence derived from well-designed clinical trials without randomization; IV- evidence from well-designed cohort and case-control studies; V – evidence presented from a systematic review, from descriptive and qualitative studies; VI – evidence from a single descriptive or qualitative study; VII – evidence derived from the opinion of authorities and/or the opinion of a commission of experts[18].

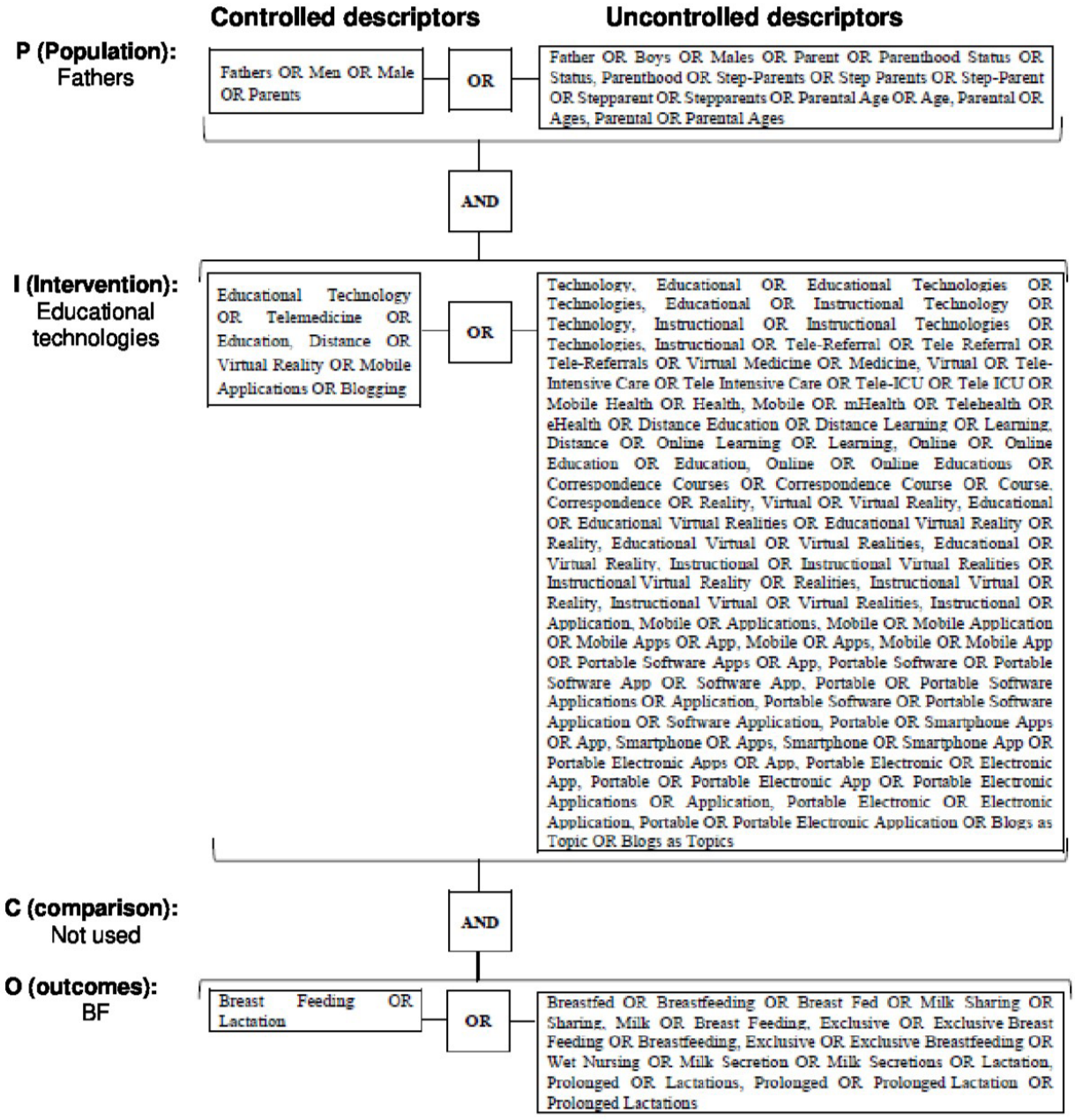

Figure 1 – Terms and search strategy used in the integrative review. Teresina, PI, Brazil, 2022.

Critical analysis and synthesis of knowledge were carried out in a descriptive way and the review presented in a table containing the contributions of DET aimed at fathers in BF promotion.

RESULTS

A total of 1,806 articles were retrieved from electronic databases, 71 from CINAHL, 593 from EMBASE, 332 from LILACS, 128 from Web of Science, 32 from BDENF, 74 from IBECS and 576 from MEDLINE. After excluding 339 duplicate studies,1,467 remained for title and abstract reading. Forty studies were eligible for full reading. From the reading in full, 33 articles were excluded, being studies of technology construction and validity (n=11), with deviation from the theme (n=13) and that did not answer the research question (n=9). Therefore, this review is composed of seven articles, which met

the inclusion criteria. Identification, selection and inclusion followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) recommendations[19], as shown in Figure 2.

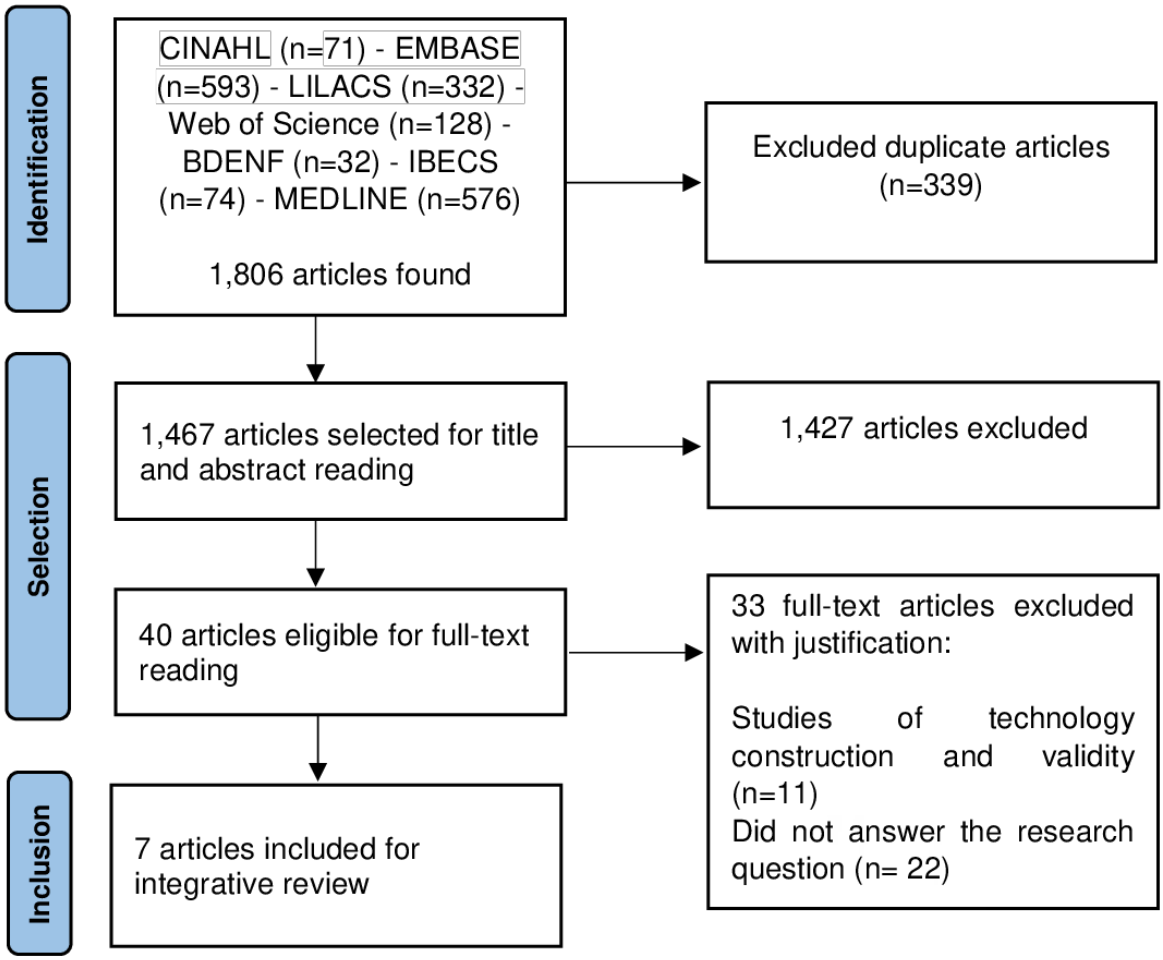

Figure 2 – Flowchart of article search and selection. Teresina, PI, Brazil, 2022.

Five studies were published in medical journals[20,23,26] and two in interdisciplinary health journals[24,25]. The year in which the most publications were found was 2020, with two studies[24,26]. Regarding the countries that were research sites, four studies were carried out in Australia[20,22,25] and the others in Canada[23,26] and Ethiopia[24]. As for study design, four were randomized clinical trials[20,22,25,26], two were qualitative[21,24] and one was a three-phase pilot study[23]. The DET developed for fathers were mobile applications[20,22,25], eHealth resources[23,26] and text messages[24]. The synthesis of articles regarding characterization is found in Chart 1.

Chart 1 – Synthesis of the articles that were part of the sample of the integrative review. Teresina, PI, Brazil, 2022

Year/ country	DET	Objective	Population	Contributions	LoE*
2021 Australia[20]	Mobile app	To determine the effectiveness of various father-centered BF interventions in terms of key infant feeding outcomes.	1,426 fathers recruited from public and private hospitals.	The mobile app did not increase the level of BF self-efficacy and the support that fathers offered their partners during BF.	II
2018 Australia[21]	Mobile app	To examine how fathers used a BF-focused conversation forum contained in a mobile application during the perinatal period.	208 fathers who used the app's forum.	The mobile application's conversation forum allowed fathers to seek and offer support, share experiences with other fathers during the prenatal period and after babies' birth.	VI
2019 Australia[22]	Mobile app	To describe the process Milk Man app assessment process that was tested in the Parent Infant Feeding Initiative randomized controlled trial.	730 randomized men who downloaded and used the extension.	The mobile app made fathers more aware of how they could help with BF and encouraged them to discuss this issue with their partner.	II
2017 Canada[23]	eHealth resource	To design and test an interactive eHealth resource for BF coparenting designed for mothers and fathers.	15 partners who completed the questionnaires and participated in the first phase of the study.	Paternal self-efficacy in BF and knowledge and attitude scores about infant feeding increased from pre-test to post-test.	Not applicable
2020 Ethiopia[24]	Text messages	To explore the feasibility of a short message service for BF education in Ethiopia.	42 partners divided into two focus groups with 21 participants each.	Text messages improved fathers' knowledge of BF and were easy and could be read at any time without the need for an internet connection.	VI
2022 Australia[25]	Mobile app	To describe the custom engagement rate for the Milk Man app.	400 partners who installed the app and completed the questionnaire.	Partners of fathers who installed the mobile app were less likely to stop EBF at any time from birth to six weeks postpartum.	II
2020 Canada[26]	eHealth resource	To compare two study conditions to determine which is the most effective way to provide BF education and the difference in co-parenting and partner support between study groups.	104 partners participated in the survey.	BF rates have increased.	II

*LoE: level of evidence[1]

DISCUSSION

Types of digital educational technologies designed for fathers

Father support is an important factor for EBF practice in the first six months of babies' lives[27]. However, this review identified that the scientific production on DET aimed at fathers as strategies to support BF promotion is scarce[20,26]. More studies are needed, considering that BF rates are below ideal, putting the health of the mother-child dyad at risk, and that parental support is a factor that can be modified with educational programs and strategies[26].

In this review, DET aimed at fathers were asynchronous, among which mobile applications[20,25] and eHealth resources stood out[23,26]. On the contrary, the results of another review pointed out that most studies (60.9%) had synchronous DET, such as phone calls and videoconferences[28]. The advantage of synchronous DET is that they enable real-time interaction between user and tutor, and therefore facilitate interaction and the resolution of urgent problems. However, it is important to highlight that no technology is capable of replacing the contact that the health professional must have with fathers. DET should only be supporting strategies for fathers whose partners are breastfeeding[28].

It is believed that the first digital technology for fathers was developed in 2016 in Australia, a mobile application called Milk Man that contains information, gamification, push notifications and discussion forum, with the aim of increasing the support that fathers can offer to breastfeeding partners[29]. Canada has designed eHealth resources[23,26] and Ethiopia has explored text messaging[24]. These DET were considered safe and economical by users[20,22,24,26].

Contributions of digital educational technologies designed for fathers

With regard to the contributions of DET in promoting BF, only one study did not find significant differences between the control group (received only a face-to-face BF class) and none of the intervention groups (received only the Milk Man), and (received a face-to-face BF class plus the Milk Man) in the level of self-efficacy in BF and partner support for mothers[20]. However, another study found that approximately one third of users who accessed the mobile application commented on the discussion forum, allowing them to seek or receive support and share information, including with other fathers, in the perinatal period[21].

Furthermore, the mobile app made fathers more aware of how they could support their partners during BF and encouraged them to discuss this issue with them[22]. And fathers who installed the mobile app helped their partners reduce the likelihood of stopping EBF anytime from birth to six weeks postpartum[25]. Other DET, such as eHealth resources and text messages, also increased paternal self-efficacy to support BF, knowledge and attitude about infant feeding[23], consequently, improving BF rates[24,26].

In this context, health professionals should value and use DET as strategies to support BF promotion in clinical practice[30,31,32]. In nursing care, it is common to see that educational technologies are used in prenatal consultations and meetings with pregnant women. However, even though they are encouraged to participate with their partners, due to commitments and work, fathers are not always present[20]. In view of that, the development and implementation of a DET for fathers about BF could favor nursing practice, enabling closer contact between professionals and partners as well as dissemination of information about BF.

Therefore, it is not only necessary to promote any and all health information, concrete information from a reliable source is needed. Therefore, educational technologies must undergo a validity process before reaching fathers, since the impacts of erroneous or distorted information can be immense[33].

The admission of validated educational technologies promotes a greater degree of reliability in the teaching-learning process, and may also narrow health care communication[34].

In the search for the development of DET that promote the inclusion of fathers in BF promotion, through access to health information, it is recommended that new DET for this public be developed and validated by specialists, through using specific methodologies, through which the access and effectiveness of the educational technology that will be used are verified.

Study limitations

With regard to the limitations of this study, the lack of studies aimed at fathers was evidenced with the search performed. The small number of countries that developed research of this nature was also another limitation identified.

CONCLUSION

This review identified that DET on BF, designed for fathers, are poorly studied. Asynchronous DET such as smartphone mobile apps prevailed, followed by eHealth features and text messaging.

Regarding the contributions, it was found that DET allowed fathers to seek and offer support, share experiences with other fathers during the prenatal period and after babies' birth. Increased paternal self-efficacy to support BF, knowledge and attitude about infant feeding. Moreover, the public considered DET safe, economical and easy to use.

New research needs to be carried out to develop and validate DET for fathers, especially synchronous ones, such as phone calls, videoconferences, among others, as strategies to support BF promotion.

It is hoped, therefore, that the study will motivate researchers, including nurses, regarding the development and implementation of new DET for fathers as an educational strategy.

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NOTES

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CONFLICT OF INTEREST

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