

# Breastfeeding inserted in telehealth: an integrative review

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## Abstract

*Introduction: Breastfeeding is considered a strategy of affection and effective nutrition for the child, contributing to the reduction of infant morbimortality. Method: Search in the indexed databases VHL, MEDLINE, COCHRANE and SCIELO using the descriptors: breastfeeding, telemedicine and biomedical technology. We included articles in English, Spanish or Portuguese, published from 2007 to 2017. Results: We found 22 articles and after the selection by reading the title and abstract, two articles were excluded because access was not possible in full and five because they did not address the focus or period of the study. Thus, 15 articles were analyzed to verify suitability. Discussion: It was observed that the interactive monitoring system of breastfeeding on the internet is a promising intervention to improve duration, exclusivity, intensity of breastfeeding and decrease the symptoms of postpartum depression. Works indicated that the use of tools such as videoconferencing sessions, connection or sending messages through mobile devices in the prenatal and puerperal corroborated for the implementation of tele-breastfeeding and telephone call, with positive results for the reduction of morbimortality. Conclusion: Technologies provided better health outcomes, reducing distance between the mother-child binomial and health professionals during care and after discharge and contributing to breastfeeding. Keywords: Breastfeeding; Telemedicine; Biomedical Technology.*

## Resumen

**La lactancia materna inserida en la telesalud: revisión integrativa.**

*Introducción: La lactancia materna es considerada una estrategia de afecto y nutrición efectiva al niño, contribuyendo a la reducción de la morbimortalidad infantil. Método: Investigación en las bases de datos indexadas BVS, MEDLINE, COCHRANE y SCIELO utilizando los descriptores: lactancia materna, telemedicina y tecnología biomédica. Se incluyeron artículos en Inglés, español o portugués, publicados entre 2007 y 2017. Resultados: Se encontraron 22 artículos e después de la selección por la lectura del título y resumen, dos artículos fueron excluidos por no haber sido posible el acceso en su totalidad y cinco por no tratar del foco o periodo del estudio. De esta forma, 15 artículos fueron analizados para verificar la adecuación al tema. Discusión: Se observó que el sistema de monitoreo interactivo de la lactancia por Internet es una intervención prometedoras para mejorar la duración, la exclusividad, la intensidad de la lactancia y la disminución de los síntomas de la depresión posparto. Los trabajos indicaron que el empleo de herramientas como sesiones de videoconferencia, realización de llamadas o envío de mensajes a través de dispositivos móviles en el prenatal y puerperio corroboraron para implementación de la teleamamantamiento y teleenfermería, con resultados positivos para la reducción de la morbimortalidad. Conclusión: Las tecnologías proporcionaron mejores resultados en salud, reduciendo la distancia entre el binomio madre-hijo y los profesionales de la salud durante la atención y después del alta hospitalaria y contribuyendo a la lactancia materna.*

**Palabras-clave:** Lactancia Materna; Telemedicina; Tecnología Biomédica.

**O aleitamento materno inserido na telessaúde: revisão integrativa.**

O aleitamento materno é considerado uma estratégia de afeto e nutrição efetiva à criança, contribuindo para a redução da morbimortalidade infantil. **Método:** Pesquisa nas bases de dados indexadas BVS, MEDLINE, COCHRANE e SCIELO utilizando os descritores: aleitamento materno, telemedicina e tecnologia biomédica. Foram incluídos artigos em inglês, espanhol ou português, publicados de 2007 a 2017. **Resultados:** Encontraram-se 22 artigos e após a seleção pela leitura do título e resumo, dois artigos foram excluídos por não ter sido possível o acesso na íntegra e cinco por não tratarem do foco ou período do estudo. Dessa forma, 15 artigos foram analisados para verificar a adequação ao tema. **Discussão:** Observou-se que o sistema de monitoramento interativo da amamentação pela internet é uma intervenção promissora para melhorar duração, exclusividade, intensidade da amamentação e diminuição dos sintomas da depressão pós-parto. Trabalhos indicaram que o emprego de ferramentas como sessões de videoconferência, realização de ligações ou envio de mensagens por meio de dispositivos móveis no pré-natal e puerpério corroboraram para implementação da teleamamentação e tele-enfermagem, com resultados positivos à redução da morbimortalidade. **Conclusão:** Tecnologias proporcionaram melhores resultados em saúde, reduzindo distância entre o binômio mãe-filho e os profissionais de saúde durante o atendimento e após alta hospitalar e contribuindo para o aleitamento materno.

**Palavras-chave:** Aleitamento Materno; Telemedicina; Tecnologia Biomédica.

## Introduction

Breastfeeding, that in its definition is when the child receives the mother's milk directly from her breast or manually pumped, independently of receiving complementation with other foods, is a natural affection, protection and nurturing strategy for the child and constitutes the most sensible, economic and effective intervention to reduce the child morbimortality<sup>1</sup>. However, although the scientific evidences prove the superiority of breastfeeding compared to other feeding ways, and although the efforts of many national and international organizations, the breastfeeding rates in Brazil, especially the exclusive breastfeeding ones, are really below what's recommended<sup>1</sup>.

Around 200 million children under the age of five, that live in developing countries, don't achieve their potential growth and development. Actions to promote breastfeeding contribute to the improvement of this situation and it is estimated that they are capable of reducing to 13% the occurrence of death in children under the age of five all around the world<sup>2</sup>.

The recommendation from the World Health Organization (OMS) and from the Brazilian Ministry of Health (MS) is that exclusive breastfeeding should be in the first six months of life and that the mother should breastfeed her baby for two or more years, which results in many benefits for children's health in all stages of life<sup>2,4</sup>.

The mother's milk not only protects the child against diarrhea, pneumonias, ear infections and allergies, but also provides the better development of the nervous system, a strong bond with the mother and smaller chances of developing diabetes, obesity, hypertension and many types of cancer during adult life, as well as the benefits to the mother, such as bigger ease at weight-loss postpartum and the prevention of breast cancer during and after the breastfeeding period<sup>2</sup>.

In front of what was exposed, the challenge of the health professional in the breastfeeding support implies technical knowledge and ability, attitude and knowledge throughout the assistance to the binomial mother-son, in order to embrace by means of actively hearing the doubts and maternal concerns, as well as their and their parents difficulties, that

are the maternal support network, being capable of proposing practices that are compatible to a quality assistance and coherent to the family context<sup>2</sup>.

In relation to the improvement in the health professionals capacitation implies in alterations in the way of organizing teaching, seeking alternatives that enable the development of the capacitation of critical and effective intervention in health assistance, so that it may result in the learning of the patient's characteristics<sup>5</sup>.

In this way, the use of technologies in the teaching amplifies the individual's access to information and interactivity between health professionals and patients, because it enables the interactive educational process that can be stimulated by the integration of multiple medias, languages and resources, causing the fluidity of information and a better service coverage<sup>5</sup>.

Therefore, by definition the use of technologies such as: telephones, computers, interactive transmission by video, softwares, digital applications, to promote and be a support tool to care and health education can be defined as telehealth<sup>5</sup>.

In Brazil, the development of the University Network of Telemedicine (RUTE) in 2005 was a opening milestone to the concept of telehealth, since RUTE concentrated its activities in the public universities, acting in the training of health professionals and simultaneously in carrying out clinical and translational researches<sup>6</sup>.

The term telehealth implies in a service modality that diversifies itself in many acting forms, such as a computation application, can be the clinical use in networks, as well as the transmission of information and clinical data through telecommunication networks in specialized center. Telehealth can also be layeres among professions, such as teledentistry, telenursing and telemedicine<sup>6</sup>.

In front of the exposed, it was defined the following leading question: How can breastfeeding be addressed through telehealth? This study aims to analyse the scientific production about the use of telehealth tools on behalf of breastfeeding.

## Methods

It is an integrative revision, a method capable of carrying out a synthesis and analysis of scientific knowledge pub-

lished about the researched theme, therefore it is possible to systematize the scientific knowledge, highlighting the evolution of the said theme over time, envisioning by this new paths for researches<sup>7</sup>.

The integrative revision of literature has well defined criteria about the data collection, data analysis and exposition, therefore, the studied based itself in the six constituent stages of this kind of study, which are: the selection of the problem, the definition of the inclusion and exclusion criteria, the identification of the pre selected and selected studies, the categorization of the studies, considering its characteristics, the critical analysis and interpretations of the findings, and at last the presentation of knowledge<sup>7</sup>.

As leading question the study elected the following tack: How breastfeeding can be approached by telehealth tools? In front of this question, a strategy to identify the studies was used, and it was the search for publications in the main databases: LILACS, MEDLINE, SCIELO and COCHRANE by means of the descriptors Breastfeeding, Telemedicine and Biomedical Technology.

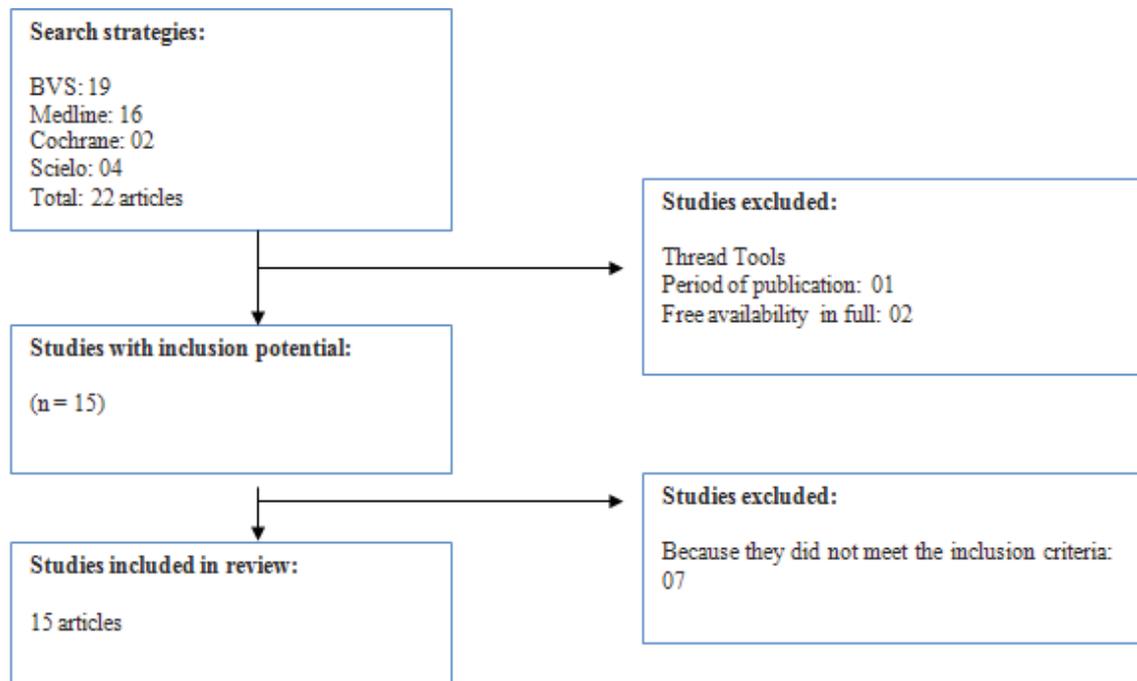
The inclusion criteria for the selection of the sample were considered all categories of articles in English, Spanish or Portuguese that addressed breastfeeding in the period from

2007 to 2017, that were fully available and that the titles and abstracts included the descriptors in sciences of health.

## Results

The search performed through the defined descriptors, the selected languages and the desired period, were found 22 articles. After the refinement of this search, it was observed that four articles were related to infant sleep, zika, diabetes in pregnancy, technical cooperation bulletin and a publication was prior to the year 2007, thus were excluded from the research. After the search, 17 articles were aligned with the inclusion criteria. However, two articles were not freely available in their entirety and thus, the 15 articles selected were analyzed according to the title and the respective summaries to verify suitability to the theme. The data found were treated with the intention of presenting the most relevant aspects of each production. The comprehensive research, refinement, selection and evaluation of the articles, as well as the treatment of the data were carried out by the three authors responsible for collecting the data and discussed with the other authors.

Figure 1 - Flowchart of articles' selection



After the evaluation of the studies, it was observed that the interactive monitoring system using telehealth tools for breastfeeding may be a promising intervention to improve the duration, exclusivity, and intensity of breastfeeding as primary outcomes and decrease postpartum depression symptoms as a secondary outcome.<sup>8</sup> Regarding breast-

feeding support to low-income women at home, work indicated that teleclass videoconferencing sessions were easy to implement<sup>8</sup>.

To understand the articles, we chose to construct an exhibition table (chart 1).

Chart 1 - Systematic chart with the studies' results.

Author/Year	Objective	Method	Results	Conclusions
Ericson et al. (2013) <sup>9</sup>	Evaluate the cost-effectiveness of the telephone support for breastfeeding of premature infants with 14 days after hospital discharge and from 6 months of age (n=1,116)	Controlled, randomized, multicenter study  Collection by blind researchers in relation to the research.  Target audience: mothers and professionals.	Raise in the proportion of moms that breastfeed exclusively at 8 weeks after hospital discharges: proportions of breastfeeding (exclusively, partial, none and feeding method), maternal satisfaction, attachment, stress and quality of life in mothers/partners 8 weeks after discharge from the hospital and at 6 months of age.	The interventions were more effective than the habitual cares in the raising of the breastfeeding rates in short and long terms.
Ahmed et al. (2016) <sup>8</sup>	Determine the system's effects of the monitoring based on the web, interactive in relation to breastfeeding.	Controlled and randomized study.	The discharged groups didn't have significant differences  Intervention group have bigger exclusive breastfeeding rates in 1,2 and 3 months.  84% of the intervention group in 3 months were breastfeeding in comparison to 66% in the control group.  Depression was indifferent in groups 1,2 and 3 months.	The interactive monitoring system of breastfeeding in web can be a promising intervention to better the duration, exclusiveness and intensity of breastfeeding.
Lee et al. (2016) <sup>10</sup>	Evaluate the interventions of maternal, neonatal and infantile health in low and medium income countries.	Meta-analysis	Improvement in mortality and/mortality; reduction of newborn perinatal death in kids from mothers that received messages through mobile devices during pregnancy compared to the routinely prenatal. The meta-analysis of 3 studies about infant food showed that prenatal interventions through messages via mobile devices (versus routine care) improved the ratings of breastfeeding after birth with a confidence interval and AME for 3/4/6 months.	The majority of the mHealth studies of maternal, neonatal and infant health in low and medium income countries are of poor methodological quality, without impact evaluation. The improvements in the intermediate results were reported in studies and there are evidences that the interventions delivered through messages via mobile devices can better the infant food.

Friesen et al.(2015) <sup>11</sup>	Explore the videoconference technology for education and support in breastfeeding to women with low income in communities.	Meta-analysis	The telebreastfeeding sessions provided education and raised the women's confidence, reduced the anxiety among mothers about the childbirth process and the experience in the hospital.	The incorporation of videoconference in routine care can promote the collaboration between care providers and supply mothers with support and education about easy access continuous feeding .
Silva et al.(2014) <sup>12</sup>	Review the conceptual relation between telehealth and translational research.	Bibliographic review	The cycle of the translational research, of collected, stored and distributed human milk presented integrated telehealth initiatives, such as videoconferences, softwares and portals of knowledge synthesis.	Telehealth must be comprehended as a group of network activities mediated by computing and that promote the translation of knowledge amon research and health services.
Prado et al. (2013) <sup>5</sup>	Report tele breastfeeding experiences in Brazil's National Telehealth Project in the São Paulo Centers.	Creation of a multidisciplinary group.  There were elaborated multimedia learning materials inserted in a platform.	Production of material about breastfeeding composed by 12 chapters; video about breastfeeding; elaboration of 10 clinical cases related to the professional areas that compose the Telebreastfeeding Group; script of questions for the development of 3D iconographies.	The telenursing is integrated to the characteristics of the profession and to the ethicalpolitical reflexion. Telebreastfeeding is envisioned as an innovative and promising strategy in the permanent education of health professionals.
Rojjanasirat et al. (2012) <sup>13</sup>	Evaluate the reliability and feasibility of the domestic videoconferences to evaluate and support breastfeeding.	Realization of 4 videoconferences in real time for the support of breastfeeding for 10 mothers in domicile.	The percentage varied between 40% to 100% during the first visit and 80% to 100% during the second visit. All the participants strongly agreed that they were comfortable with talking about breastfeeding issues using household videoconferences.	The results suggest that the videoconference can be used to support mothers that breastfeed at home.

Hmone et al. (2016) <sup>14</sup>	Explore the practices related to breastfeeding, the barriers and facilitating points of the use of mobile communications for counselling.	Controlled and randomized study.	Barriers to breastfeeding exclusively by 6 months: limited comprehension of exclusive breastfeeding, insufficient milk supply or breast problems, return to work or the grandparents' influence.  The barriers of the study included: coverage of limited mobile network, cellphone and telephone accounts accessibility, literacy and familiarity with sending messages.	The results inform that the design of a controlled, randomized study to promote exclusive practices of breastfeeding among mothers.
Silva et al. (2016) <sup>15</sup>	Identify the scientific production about the technologies of promotion and incentive to the practice of breastfeeding.	Integrative review	Efficiency revision of educational technologies: albums, educational manual, tele-breastfeeding, CD-ROM, videoconference and cordel literature to incentive breastfeeding among women who have recently given birth.	Technologies are strategies for the capacitation of health professionals in breastfeeding and allow relevant impact in the improvement of the breastfeeding rates.
Lau et al. (2015) <sup>16</sup>	Evaluate the effect of electronic technologies in the results of breastfeeding among perinatal women.	Electronic database review/meta-analysis (n=16)	It totalled 1842 studies of electronic searches, and 16 were selected after inclusion and exclusion criteria; 8 had low risk of bias, including 5505 women in 6 countries. The electronic technologies improved the beginning of exclusive breastfeeding (z = 6,90, P <0,00001), the exclusive breastfeeding at 4 weeks (z = 2,12, P = 0,03) and 6 months (z = 3,2, P = 0,001), breastfeeding attitude (z = 3,01, P = 0,003) and knowledge about breastfeeding (z = 4,54, P = <0,00001) in the subgroups analysis.	The review provides support for the development of text messages based in the web, reading memory of compacted discs, electronic instructions and interactive interventions of computing agents to promote and support breastfeeding.

Gujarro, Luna, Fernández (2014) <sup>17</sup>	Analyze the implementation of technologies to the families counselling.	Intervention pilot study, prospective, non controlled, consecutive sampling with the longitudinal following of 6 months. Group discussions.	Sociodemographic distribution and pathology detection was homogenous among the 2 groups. In the intervention one, there was reducing in the frequency of pediatrics/nursing visits; the exclusive breastfeeding was reinforced until the sixth month (control of 18,6% / intervention 36%). Monitoring: web 72,5%; social media 58,8% telemedicine 88,3% and speech 78,4%. Pre and post intervention survey: changes in the attitude during the travel to the emergency/hospital due to doubts from 58,62% to 0% ( $p < 0.05$ ). Safe position while sleeping: face up/ to the side from 73,68% to 100% ( $p < 0.05$ ).	Telehealth has shows itself as effective and efficient in controlling, monitoring and prevention common problems of healthy children among the first 6 months of life. Telemedicine fortifies the continuous medical assistance, reducing the pediatric/nursing service (AU)
Corrêa, Ferrari, Felix. (2013) <sup>18</sup>	Evaluate the quality and coverage of the internet pages in respect to the orofacial functions.	Google™ searching tool with the selection of internet pages oriented towards parents/baby caregivers addressing breastfeeding and eating after 6 months.	From the access of 350 webpages, 35 were selected and 315 excluded for not attending to the inclusion criteria. En relation to the readability, the internet pages presented the IFLF average of 61,23% expressed the average of 6,43 points in the application of the modified HONCode, having found the average of 2,49 themes per evaluated internet page, with higher frequency of information about breastfeeding and smaller of subjects such as breathing and speech.	The internet pages that approached the orofacial functions fulfilled half of the ethical principles proposed by the modified HONCode, in its majority, and presented as most approached theme "breastfeeding" with restrict coverage.
Uscher-Pines Mehrotra Bogen (2017) <sup>19</sup>	Allow that the IBCLCs connect with mothers that breastfeed at home using video in personal devices (tablets and smartphones).	Controlled randomized study	The professional support to breastfeeding has a positive influence in the breastfeeding behaviours. The access to International Lactation Certified Consultants (IBCLCs) is limited in many communities.	Recognizing its exclusive role in providing support to breastfeeding, the called Action of Breastfeeding Support identifies the raise to the IBCLCs as a political priority.

Macnab, Rojjanasri-rat, Sanders (2012) <sup>20</sup>	Publish the considerations pointed out by the authors in a round table.	Six questions were carried out addressing the following aspects of breastfeeding: the use of remote techniques of consulting of breastfeeding; what is the mothers' reaction regarding the remote consultancy about breastfeeding; advantages and/or barriers to the use of remote consultancies about breastfeeding and if there is perspective of a future in such experience.	Videoconferences were used after the presential conferences in real time at home, together with the use of tools for evaluating breastfeeding; The use of telephone and fax to long distance consultations. After the nineties, email and softwares that allow free video and voice calls, such as Skype, were used.	The use of technology is a strategy to achieve the population that lives in places of difficult access, geographically, or by the distance of big centers, having a positive impact in the improvement of breastfeeding rates. And that telebreastfeeding consultations will continue to become increasingly more popular as the transport cost raises and the technology cost reduces.
McCann, McCulloch (2012) <sup>21</sup>	To address the online and social media as support network to the mothers that breastfeed to search information.	A bibliographic review and practical test were carried out by the authors about the theme.	Facebook, Twitter, Blogs and Pinterest are identified as useful platforms to connect with mothers that breastfeed. More than half of all the women that answered to a research their intention to share their birthing experience, as it happens in social media. Besides that, the time online increases after birthing - 44% of american women spend more time online with a new baby - and the probability of a new mother search information about breastfeeding and support online is high.  Researches indicate that new health service providers continue to be the first choice to most of the people wuth health problems, but online resources, including pair counseling, are significant source of information about health.	Women in fertile age, specially in industrialized countries, are using social medias in record number and are searching for information about pregnancy, labour and breastfeeding online.  Those who support mothers who breastfeed can also learn to use these methods to get involved with the breastfeeding community. Women are accessing information online about health to help in the decision making, and the healt professionals must learn to work alongside with women to orient them in the search for websites based in evidences and to be prepared to discuss the following information.

## Discussion

Concerning the health professional that favored breastfeeding, referring to the incentive and support for breastfeeding, it is highlighted the importance of the primary care professionals, especially the nurses, due to the completeness of the provided care and the bond that must be created with the women in the pregnant-puerperal cycle<sup>3</sup>. Therefore, it is necessary to think about incentive strategies in primary care and to provide subsidies so that these professionals can be trained to handle breastfeeding adequately<sup>3</sup>.

In front of the exposed, technologies are a strategy for the capacitation of health professionals in the qualified assistance of breastfeeding, therefore the use of educational technologies implemented in health education carried out by professionals allows relevant impact in permanent education to improve the breastfeeding rates<sup>15</sup>.

Other point that the implementation of technology in the incentive and support of breastfeeding can be used in an effective way is in the health education of the mother and her relatives, therefore demystifying some cultural beliefs, many times passed through generations, for example weak milk, the absence of the mother's nipples, the mother isn't capable of producing milk, as well as small possible complications over the process of breastfeeding<sup>4</sup>. These myths and beliefs end up being a hindrance to the success of the breastfeeding, because it directly influences the precocious introduction of teas, water and even semi-pasty foods, which affects the milk production, since the baby will suck the breast less, resulting in the decrease of milk excretion due to reduced stimulus<sup>4</sup>.

Telehealth being used as facilitating agent in the disclosure of informations for health, both health professionals and the child's parents and relatives can act as a strategy to fortify promotion and protection actions by the diffusion of the law 11.265 that regulates the marketing of foods for babies and young children (NBCAL)<sup>20</sup>. The goal of this standard is to contribute to the promotion of breastfeeding and to help reduce the malnutrition and child mortality rates, ensuring by this that there is no interference in the practice of breastfeeding<sup>20</sup>.

Concerning the translational research telehealth comprehends a group of network activities mediated by computing and that promote the translation of knowledge between research and health services<sup>12</sup>. Telebreastfeeding and telenursing were used as tools to train health professionals, for example videoconference was used to lactating consultants, being an opportunity to provide quality support for breastfeeding adapted to the specific maternal necessities at home<sup>5</sup>.

Regarding the different levels of social classes, the studies highlighted that the access to information tools by internet was viable to all women<sup>10</sup>. And as for the morbimortality indicators, there was specifically the reduction of perinatal death risks in child's whose mothers receive SMS support during pregnancy, compared to the routine prenatal<sup>10</sup>.

A study highlighted that the carried out interventions to the mothers during the prenatal by means of sending messages through mobile devices compared to the prenatal routine care, obtained improvement in the breastfeeding during the first hour after childbirth rates<sup>10</sup>.

The articles presented in the systematic framework used different methodologies and strategies and by that, demonstrated good results with the use of telehealth tools on behalf of the promotion of breastfeeding. In relation to the coverage of our study, the impossibility of access of the two selected articles in the research due to their high cost and the absence of funding of our research, characterizes as a hindering and limiting point to the work, but that doesn't mischaracterise the knowledge concerning the discussed theme.

## Conclusion

By means of the conducted revision it is possible to ensure the evolution of knowledges and strategies to promote breastfeeding through innovative and effective technological policies, and that telehealth is an effective tool with technological advances in health, positively characterized by the health professionals and the users involved in the studies.

Regarding breastfeeding and telehealth as an educational technology tool used by the health professionals to incentive breastfeeding and promote its practice demonstrated effectiveness and favorable behaviour to breastfeeding. With the use of technologies it is possible to improve health results, reducing the distance between the binomial mother-son and the health professionals during the prenatal performance, period that comes before the birth and after hospital discharge.

It is important to highlight that in front of the necessity to reduce the inequalities of the access of resources necessary to health, measures in the present scenery can reduce distances and optimize time, therefore generating changes in the present health scenery in Brazil and the world.

A troublesome factor pointed in all of the analyzed articles as limitant in the research was the difficulty to access some of the geographic regions by unavailability of internet or poor connection, therefore an important variable that hindered the coverage in the studies.

The actions of breastfeeding promotion contribute to the growth and the adequate development in children under the age of five and it is estimated that these actions can reduce the occurrence of these children's death<sup>15</sup>.

The use of telehealth tools and the expansion of internet access can contribute to health promotion and to the increase of the breastfeeding rate. Researches point that the average duration of exclusive breastfeeding (AME) was of 54,1 days and that only 41% of these children were in AME and the general breastfeeding was of 11,2 months and such data is alarming, considering that according to the Mundial Health Organization the ideal it that 90% to 100% of the babies stay in exclusive breastfeeding<sup>15</sup>.

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