



## Telephone intervention to promote maternal breastfeeding self-efficacy: randomized clinical trial\*

Intervenção telefônica para promoção da autoeficácia materna ao amamentar: ensaio clínico randomizado

Intervención telefónica para promover la autoeficacia materna en la lactancia: ensayo clínico randomizado

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### ABSTRACT

**Objective:** To analyze the effects of an educational intervention via telephone on maternal breastfeeding self-efficacy. **Method:** Randomized controlled clinical trial including 240 puerperae from a secondary care hospital randomized into two groups: control and intervention. The educational intervention took place at seven, 30, 90, and 150 days postpartum and centered on self-efficacy and motivational interviewing principles. Self-efficacy was measured by the Breastfeeding Self-Efficacy Scale – Short Form. The data followed the abnormal distribution, so non-parametric tests were used. **Results:** The intervention group obtained higher median breastfeeding self-efficacy scores across the three outcome measures when compared to the control group ( $p < 0,001$ ). Furthermore, the intervention group showed increased self-efficacy scores at all monitoring moments, which shows that the educational intervention was able to raise and maintain women's confidence in breastfeeding their child over time. **Conclusion:** The use of a telephone-based intervention focused on self-efficacy principles and delivered by trained nurses effectively promoted maternal confidence in breastfeeding. Brazilian Clinical Trial Registry: RBR-7m7vc8.

### DESCRIPTORS

Breast Feeding; Self Efficacy; Nursing; Health Education; Communications Media; Clinical Trial.

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## INTRODUCTION

Breastfeeding is a fundamental practice for the child's development, both nutritionally, immunologically and psychologically, since it also favors the mother-baby bond. Due to its protective potential against infections, breastfeeding can reduce infant morbidity and mortality and positively impact maternal and child health<sup>(1)</sup>.

Updated data show that expanding this practice to a nearly universal level could prevent 823,000 deaths each year in children under five<sup>(2)</sup>. In this context, it is essential to note that maternal breastfeeding (MBF) brings other benefits that are important to mention, such as children survival, especially in developing countries like Brazil<sup>(3-4)</sup>.

Despite government initiatives and the broad and well-known benefits of breastfeeding for the mother-child binomial health, the prevalence of exclusive breastfeeding (EBF) in children under six months was 36.6% in in Brazil's last National Health Survey<sup>(5)</sup>. This rate is still considered very low, and it is necessary to take actions that work on the causes of early weaning. Knowing that the initiation and maintenance of EBF are influenced by several biological, environmental, sociocultural, and psychosocial factors, we highlight self-efficacy as a psychosocial factor susceptible to change. Self-efficacy is defined as a person's belief in his or her ability to perform a specific activity or behavior successfully<sup>(6)</sup>.

Also known as confidence, self-efficacy is built from four information sources: personal experience, observational experience, verbal persuasion, and somatic or emotional states<sup>(7)</sup>. In addition to these information sources, self-efficacy theory also adds the perspective of the human being as an agent of change, in other words, we are able to influence our behavior and life circumstances according to our interests.

When it comes to breastfeeding, self-efficacy is one of the aspects that can influence the mother, based on her expectations related to her ability and knowledge to breastfeed<sup>(8)</sup>. Studies point out that the greater the mother's confidence in breastfeeding, the greater the chances of initiating and maintaining this practice for a more extended period<sup>(9-10)</sup>. When considering the modifiable nature of self-efficacy, health professionals should be attentive to promote interventions that improve this characteristic among postpartum women, affecting breastfeeding adherence and maintenance<sup>(11)</sup>.

In this sense, some educational technologies have been used to promote breastfeeding by health professionals. Among these technologies, the telephone has been increasingly used as a helpful tool to support breastfeeding practice. Despite the shortcomings presented by this technology regarding the interpersonal relationship, it plays a fundamental role in reducing the consultation time, avoiding displacement of users and professionals, and favoring access to professionals who perform specialized services<sup>(12)</sup>, besides being feasible during pandemic situations, such as COVID-19.

A recent systematic review demonstrated that the use of long-term telephone-based educational interventions mediated by nurses, who are lactation consultants, effectively increased the duration and/or exclusivity of breastfeeding.

Thus, the evidence shows that the telephone is a viable technology for breastfeeding promotion, providing facilities and health professionals with an alternative that can contribute to mother-baby care<sup>(13)</sup>. However, none of the telephone studies used self-efficacy theory as a reference, or they measured breastfeeding self-efficacy in women exposed to the phone-based intervention. Hence, the guiding question of this study is: Can the use of a long-term telephone-based educational intervention focused on self-efficacy principles raise maternal confidence in breastfeeding among postpartum women?

The evidence presented above justifies this study, and its results may help contribute to the educational and health-promoting practices carried out by nurses at various levels of care, in addition to proposing a low-cost technology that can be adopted to support the educational process both in the Unified Health System and in the private health system. Thus, this study aimed to analyze the effects of a long-term telephone-based educational intervention on maternal breastfeeding self-efficacy.

## METHODS

### STUDY DESIGN

Randomized Clinical Trial (RCT) based on CONSORT guidelines for non-pharmacological interventions<sup>(14)</sup>.

### POPULATION OR SETTING

The research was conducted with 240 puerperae admitted to the rooming-in unit (RI) of a secondary-level maternity hospital in Fortaleza, Ceará. The place was chosen for being a reference in the municipal health network in gynecology, obstetrics, and pediatrics.

### SELECTION CRITERIA

Eligibility criteria included women in the immediate puerperium resulting from a single full-term pregnancy, healthy newborns hospitalized in a rooming-in setting, with at least six hours postpartum, a minimal age of 12 years, who were breastfeeding, and had at least one telephone contact.

### SAMPLE DEFINITION

The sample was calculated considering the following parameters: 5% significance level, 80% test power, expected 20% clinical difference. The sample obtained was 90 puerperae for each group. A 30% safety percentage was added for eventual losses, so that the sample resulted in 120 puerperae for each group using block randomization (12 blocks of 20 puerperae).

### DATA COLLECTION

Data collection took place between October 2016 and July 2019 and followed the phases described below.

#### PHASE 1. BASELINE

At Baseline, we applied to all women a form containing sociodemographic, obstetric, behavioral, and variable characteristics related to current pregnancy, delivery, and puerperium. In

addition to this instrument, we applied. In addition to this instrument, we applied the *Breastfeeding Self-Efficacy Scale – Short Form* (BSES-SF) to assess puerperal women's initial breast feeding self-efficacy<sup>(15)</sup>. A BSES-SF has shown excellent results when used in several cultures<sup>(10,16)</sup>. A BSES-SF was adapted and validated for Brazil<sup>(17)</sup>. A BSES-SF has 14 items, which makes it easy to apply in the rooming-in and by telephone. The participants were approached in the obstetric ward, and we explained the research and its benefits. Afterward, their consent was requested by reading and signing the Informed Consent Form and the Consent Form for those under 18. The women were randomized by a blinded statistician who kept the groups' codes confidential until the end of the study. Randomization was done in blocks electronically generated through SPSS version 20, totalizing 12 blocks of 20 participants. Randomization resulted in two paired groups (Control Group – CG and Intervention Group – IG) of 120 women.

## PHASE 2. INTERVENTION

A standard intervention was applied to the CG, and a standard intervention plus educational intervention to the IG as a way of blinding women. The standard intervention consisted of regular orientations from the health service's nursing team in the rooming-in unit of the maternity hospital under this study, in addition to the visit of a professional from the hospital milk bank who provided daily guidance on the importance of breastfeeding, the benefits, and the function of the milk bank, clarifying possible doubts about donation. The IG was exposed to the standard intervention plus the educational intervention by telephone at seven, 30, 90, and 150 days postpartum.

During the first month, the women received two contacts, since the first six weeks after birth are considered a critical period for the establishment of breastfeeding due to the numerous adaptations and difficulties experienced. The third contact was made at 90 days (3rd month postpartum), since this is the period before many women return to their activities outside the home, such as work and studies, since, in most cases, the maternity leave ends after four months, and the return to activities is a factor that can contribute to early weaning. The last contact was made at 150 days to address aspects that would strengthen the woman's confidence in exclusively breastfeeding until the sixth month, as well as to assess whether, after returning to activities, she remained confident in breastfeeding or she was having difficulties.

The educational intervention was based on the principles of self-efficacy and employed the motivational interviewing approach to conduct the intervention. To avoid potential biases, the intervention was delivered only by the study's principal investigator, a nurse with breastfeeding experience. During the educational intervention sessions, we addressed up to two items of the BSES-SF in which the women experienced difficulty. However, if there was a specific demand, the researcher could explain this need during the intervention. It is noteworthy that when the woman did not present difficulties or items with low self-efficacy, the intervention was focused on those items of the scale that had not been addressed in previous contacts.

## PHASE 3. OUTCOME ASSESSMENT

The study's dependent variable was maternal breastfeeding self-efficacy, which was verified by applying the BSES-SF. This outcome was assessed at 60, 120, and 180 days postpartum by telephone for both IG and CG. This period was chosen because these were the months following the educational interventions to assess their effects on the outcome. The evaluation was conducted by previously trained research assistants who were blinded to the women's allocation in the study groups. Highlighting, thus, that the study was double-blind since the research assistants responsible for evaluating the outcome did not have information about the group in which the women were part. The independent variables were sociodemographic, maternal, and intervention-related variables.

Figure 1 represents the flowchart of the participants during the study course. There were 45 women excluded for not answering the telephone contact after three attempts, representing an overall percentage of 18.75% of losses to the initial sample.

## DATA ANALYSIS

The data were analyzed in the Statistical Package for the Social Sciences (SPSS), version 20.0 for Windows. The Kolmogorov-Smirnov test has demonstrated that the continuous data have not reproduced normality patterns, and thus, non-parametric tests were used to test the data distribution normality.

For categorical variables, the Chi-square test and Fisher's exact test were used for comparisons, with Fisher's exact test being used when the percentage of expected values below five was higher than 20%. The Mann-Whitney U test was used to compare numerical variables. And for paired data, the Wilcoxon test was used to compare the association among numerical variables related to time.

## ETHICAL ASPECTS

The study met the standards of Resolution N° 466/2012 and obtained approval from the Research Ethics Committee at the Universidade Federal do Ceará, under number 1,026,156, from April 2015, as well as clinical registration in the Brazilian Registry of Clinical Trials database with primary identifier: RBR-7m7vc8.

## RESULTS

The effect of the telephone educational intervention on maternal breastfeeding self-efficacy was assessed at three puerperal times (at 60, 120, and 180 days postpartum) during the course of the study. However, it should be noted that in order to maintain the logistics of the phone calls, there were small variations in days (two days before and two days after) for the research team to speak with all the women. For this reason, an evaluation was made to see if the variation in the days of the calls could interfere with the results. The data revealed no significant difference between the groups at none of the three evaluation times (1<sup>st</sup> outcome p: 0,313; 2<sup>nd</sup> outcome p: 0,980; 3<sup>rd</sup> outcome p: 0,488).

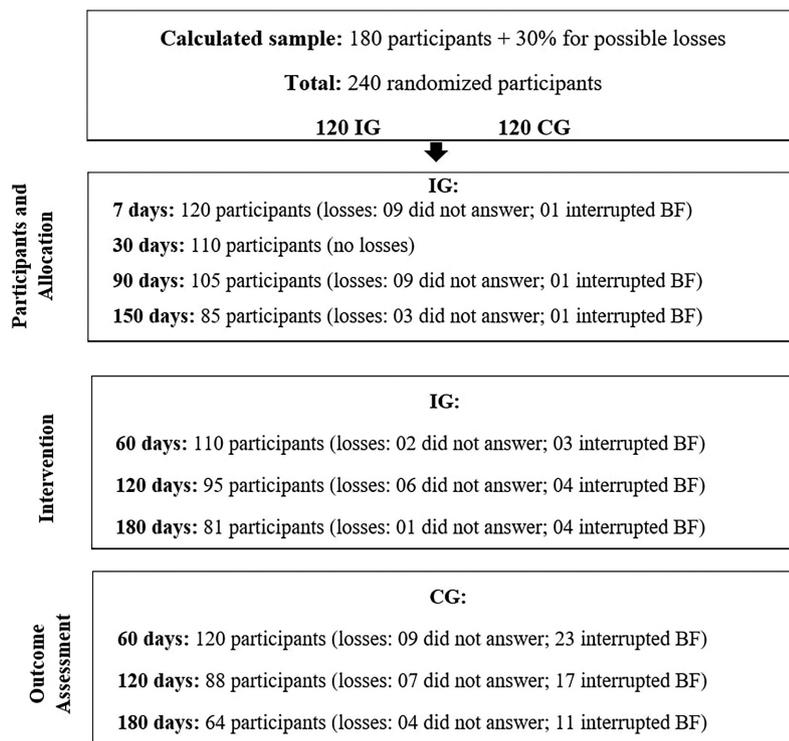


Figure 1 – Diagram representing the participants’ flux in each phase of the study – Fortaleza, CE, Brazil, 2017.

Figure 2 shows how the women’s breastfeeding self-efficacy outcome behaved over the course of the study between IG and CG.

It can be seen that the intervention and control groups differed at baseline in relation to self-efficacy scores, with the CG showing a higher median (59.0) than the IG (58.0),  $p = 0.048$  (Figure 2). This difference did not influence the effect of the intervention on the outcomes measured since it was the CG and not the IG that started with higher self-efficacy scores. Moreover, at baseline, the groups were homogeneous in relation to the type of self-efficacy, since 84.2% IG and 90% CG had high self-efficacy ( $p = 0,178$ ).

When we compared the two groups, there was a difference in the median breastfeeding self-efficacy scores between the groups, with the IG reaching higher medians throughout the three outcome assessments when compared to the CG ( $p < 0.001$ ), which demonstrates the intervention’s effectiveness in promoting maternal confidence in breastfeeding.

In addition to the intervention impacting on median self-efficacy scores in the IG, it also affected the women’s self-efficacy type within 60 days postpartum. In this period, the IG had a higher percentage of women with high self-efficacy than the CG ( $p < 0.001$ ). However, at 120 and 180 days postpartum, although 100% of the women in GI had high self-efficacy, in the CG, 95.2% and 95.9%, respectively, also had high self-efficacy in these periods, with no significant difference observed (Table 1).

Table 2 shows the intragroup comparison of median self-efficacy scores. The IG showed increased self-efficacy

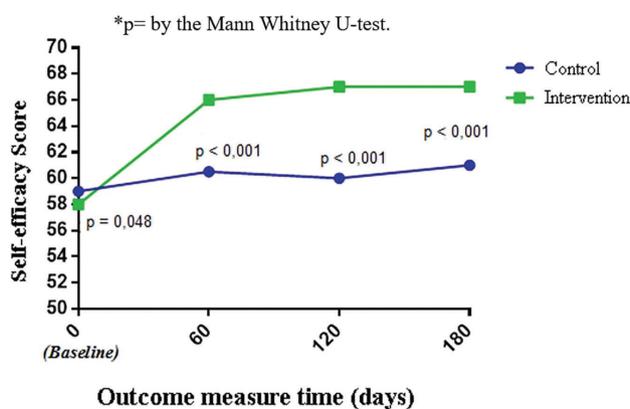


Figure 2 – Median Intergroup comparison of breastfeeding self-efficacy scores over time – Fortaleza, CE, Brazil, 2017.

scores at all monitoring times, which shows the effectiveness of the educational intervention over time.

CG had increased self-efficacy from month four to month six and at month six, evidencing that over time women tend to raise their efficacy, since confidence to breastfeed also depends on other sources, such as the woman’s observational and personal experience, as well as her physiological and emotional state.

## DISCUSSION

The outcome assessment was performed in the second, fourth, and sixth months postpartum for women in both groups. When assessing the women’s postpartum days at the time of outcome assessment, it is observed that there

**Table 1** – Type of self-efficacy among groups over time – Fortaleza, CE, Brazil, 2017.

		Total n(%)	Intervention n(%)	Control n(%)	OR (CI 95%)	p-value
<b>Baseline</b>	Medium	n = 240 31 (12,9)	n = 120 19 (15,8)	n = 120 12 (10,0)	0,59 (0,27–1,28)	0,178 <sup>1</sup>
	High	209 (87,1)	101 (84,2)	108 (90,0)		
<b>60 days</b>	Medium	n = 193 13 (6,7)	n = 106 0 (0)	n = 87 13 (14,9)	...	<b>&lt;0,001<sup>1</sup></b>
	High	180 (93,3)	100 (100)	74 (85,1)		
<b>120 days</b>	Medium	n = 150 3 (4,8)	n = 87 0 (0)	n = 63 3 (4,8)	...	0,072 <sup>2</sup>
	High	147 (95,2)	87 (100)	60 (95,2)		
<b>180 days</b>	Medium	n = 122 2 (1,6)	n = 74 0 (0)	n = 49 2 (4,1)	...	0,157 <sup>2</sup>
	High	121 (98,4)	74 (100)	47 (95,9)		

\*p<sup>1</sup> = Chi-square Test; \*p<sup>2</sup> = Fisher's Exact Test; \*OR = Odds ratio; \*CI (confidence interval) = 95%.

**Table 2** – Median intragroup comparison of breastfeeding self-efficacy scores over time – Fortaleza, CE, Brazil, 2017.

Comparison	Intervention			Control		p value <sup>1</sup>
	Md initial (p25–p75)	Md final (p25–p75)	p value <sup>1</sup>	Md initial (p25–p75)	Md final (p25–p75)	
<b>Baseline x 60 days</b>	n = 120 58 (53–62)	n = 104 65,5 (63–68)	<b>&lt;0,001</b>	n = 120 59 (56–64)	n = 87 60 (55–64)	0,622
<b>Baseline x 120 days</b>	n = 120 58 (53–62)	n = 87 67 (64–68)	<b>0,010</b>	n = 120 59 (56–64)	n = 62 60 (56–64)	0,889
<b>Baseline x 180 days</b>	n = 120 58 (53–62)	n = 74 67 (65,7–69)	<b>&lt;0,001</b>	n = 120 59 (56–64)	n = 49 61 (59–65,5)	<b>0,019</b>
<b>60 days x 120 days</b>	n = 104 65,5 (63–68)	n = 87 67 (64–68)	<b>&lt;0,001</b>	n = 87 60 (55–64)	n = 62 60 (56–64)	0,277
<b>120 days x 180 days</b>	n = 87 67 (64–68)	n = 74 67 (65,7–69)	<b>&lt;0,001</b>	n = 62 60 (56–64)	n = 49 61 (59–65,5)	<b>0,032</b>

\*p<sup>1</sup> = Wilcoxon Test for paired data.

was no difference since the groups had equal medians at the three times, which were 60, 120, and 180 days. Therefore, we consider that this factor did not interfere with the findings presented here.

In the baseline assessment, 12.9% of the total sample showed medium self-efficacy and 87.1% high self-efficacy for breastfeeding. This result is similar to the research findings from several of Brazil's regions<sup>(9,18–19)</sup>.

It was possible to observe that the intervention effectively improved the self-efficacy type of its participants throughout the monitoring.

Research in Hong Kong involving pregnant women in an intervention with a breastfeeding workshop and telephone counseling with a breastfeeding specialist showed improved levels of breastfeeding self-efficacy, raising breastfeeding self-efficacy scale (BSES) scores by 15.1 points<sup>(20)</sup>.

This impact upon women's confidence to breastfeed is an indication that the tested intervention was able to influence women's self-efficacy beliefs. Based on Social Cognitive

Theory, self-efficacy beliefs help determine how much effort a person will put into the activity, perseverance in the face of obstacles, and how resilient they are in adverse situations. Thus, the puerperal women's self-efficacy beliefs facilitate or hinder the conditions for facing the difficulties that arise with the breastfeeding practice, being decisive in the resilience of these women<sup>(8,21)</sup>.

Literature indicates that women with higher self-efficacy levels breastfeed for longer when compared to those with lower confidence levels<sup>(9–10)</sup>, i.e., they are more able to face adverse situations that may arise along with breastfeeding and persist in this practice. Moreover, some factors such as the support received can influence the behavior towards BF<sup>(22)</sup>. Thus, the use of the self-efficacy framework to support the intervention and the support provided during the telephone monitoring contribute to strengthening these women's confidence to breastfeed.

In addition to the inter-group comparison, it was also possible to conduct an intra-group analysis showing that the

IG showed a significant increase in their median scores at all follow-up times, while the CG had increased scores only from the fourth to and during the sixth month.

These results are justified by the fact that it was possible to use verbal persuasion to address technical issues and the BSES-SF intrapersonal thoughts in the educational intervention. This aspect promotes support to mothers for the capacity and motivation to breastfeed by providing positive information, encouragement, support, as well as counseling to their families about breastfeeding, and this must be done from the prenatal period to the maternity hospital, making the woman more confident and secure in the postpartum period<sup>(23)</sup>.

Regarding the CG, despite not having received the intervention, the previous personal and acquired experience with the BG practice are factors that may have contributed to self-efficacy remaining high over time. Moreover, women's self-efficacy beliefs are influenced by the results of their actions and the vicarious experience in observing others performing the practice<sup>(6)</sup>. This means that when puerperal women perceive the positive effects of breastfeeding (like strengthening the attachment with the child, his/her healthy growth and development), as well as when they observe and learn from other mothers who practice breastfeeding, their self-efficacy can increase.

Added to this, the family support in the baby's care and in the breastfeeding practice influence the self-efficacy level, which may have had repercussions in the increased confidence of the women from the CG and GI throughout the study<sup>(24)</sup>.

In this context, several studies using educational technologies and interventions, such as albums, booklets, brochures, audiovisual materials, educational workshops, and computer programs, built on the reference of self-efficacy for breastfeeding, have shown that they were effective in increasing maternal confidence to breastfeed<sup>(9,11,20)</sup>.

In Brazil, a study using a short-term telephone-based educational intervention based on self-efficacy principles also had an impact on women's confidence to breastfeed, as at the sixth month, the IG showed higher scores than the CG ( $p = 0.011$ ) on breastfeeding self-efficacy scale (BSES-SF)<sup>(18)</sup>.

Additionally, it should be noted that the immediate puerperium is considered a necessary time of learning and adjustment for mother, child, and family, which requires continuous attention from health professionals since women have many difficulties related to breastfeeding, which can be

minimized through constant support, guidance, and motivation<sup>(25)</sup>. In this sense, we consider it relevant that, during the puerperium, educational actions should be implemented to delineate and support positive self-efficacy beliefs in breastfeeding women.

In this context, educational strategies can be considered important sources of behavior change by generating a reflection and possible decision making in women's life<sup>(9)</sup>. In the case of breastfeeding, education affects how women will behave when facing difficulties and it also influences their commitment. Thus, educational practices are means to strengthen women's confidence in their ability to breastfeed successfully, and the results achieved with the breastfeeding practice, such as the strengthening of the bond, the child's growth and development are perceived as a merit of their effort and motivators for the continuity of this practice.

Among the factors that may have contributed to the outcomes achieved are the theoretical framework of self-efficacy and motivational interviewing used to support the intervention, the mediation by a nurse trained in breastfeeding, and especially the continuity of the intervention for six months of life, which allowed the monitoring of the woman during the entire EBF. There was no association between the sociodemographic variables and the outcomes.

This study's limitations include its restriction to a single maternity hospital in Ceará state and the participants' loss percentage during the monitoring period.

Hopefully, the evidence presented here can support other clinical trials testing interventions on larger scales, and the results achieved can be used in new educational practices linked to existing technologies to meet the new demands of health and professional performance that arise with modernity. Therefore, we suggest that these interventions should be feasible since they are low-cost and can help reduce early weaning rates and have a favorable impact for Brazil to achieve better indicators to achieve the Sustainable Development Goals.

## CONCLUSION

Long-term educational intervention through telephone and based on the self-efficacy principles and motivational interviewing allowed greater breastfeeding self-efficacy among postpartum women, since it provided the opportunity to strengthen their confidence to breastfeed successfully, the counseling regarding the difficulties experienced, and the women's motivation to practice breastfeeding.

## RESUMO

**Objetivo:** Analisar os efeitos de uma intervenção educativa, via telefone, sobre a autoeficácia materna ao amamentar. **Método:** Ensaio clínico randomizado controlado incluindo 240 puérperas de um hospital de atenção secundária e que foram randomizadas em dois grupos: controle e intervenção. A intervenção educativa se deu aos sete, 30, 90 e 150 dias pós-parto e foi centrada nos princípios da autoeficácia e entrevista motivacional. A autoeficácia foi medida pela *Breastfeeding Self-Efficacy Scale – Short Form*. Os dados seguiram a distribuição anormal sendo, portanto, utilizados testes não-paramétricos. **Resultados:** O grupo intervenção obteve maiores medianas de escores de autoeficácia ao amamentar ao longo das três avaliações de desfecho, isso quando comparado ao grupo controle ( $p < 0,001$ ). Além disso, o grupo intervenção apresentou aumento dos escores de autoeficácia em todos os momentos de acompanhamento, o que evidencia que a intervenção educativa foi capaz não apenas de elevar, mas também manter a confiança da mulher em amamentar o seu filho ao longo do tempo. **Conclusão:** O uso de uma intervenção por telefone centrada nos princípios da autoeficácia e realizada por enfermeiro treinado foi eficaz para promover a confiança materna em amamentar. Registro Brasileiro de Ensaio Clínico: RBR-7m7vc8

**DESCRITORES**

Aleitamento Materno; Autoeficácia; Enfermagem; Educação em Saúde; Meios de Comunicação; Ensaio Clínico.

**RESUMEN**

**Objetivo:** Analizar los efectos de una intervención educativa, vía telefónica, sobre la autoeficacia de la lactancia materna. **Método:** Es un ensayo clínico randomizado controlado, que incluye 240 puérperas de un hospital de atención secundaria que fueron aleatorizadas en dos grupos: control e intervención. La intervención educacional se llevó a cabo a los 7, 30, 90 y 150 días posparto, centralizada en los principios de la autoeficacia y en la entrevista motivacional. La autoeficacia se midió con la BSES-SF. Los datos siguieron la distribución anormal; por esta razón, se utilizaron pruebas no-paramétricas. **Resultados:** El grupo intervención obtuvo medianas más altas de las puntuaciones de autoeficacia en la lactancia a lo largo de las tres evaluaciones de desenlace, comparado al grupo control ( $p < 0,001$ ). Además, el grupo intervención mostró un aumento de las puntuaciones de autoeficacia en todos los momentos del seguimiento, lo que demuestra que la intervención educativa fue capaz no sólo de aumentar, sino también de mantener la confianza de la mujer en la lactancia de su hijo a lo largo del tiempo. **Conclusión:** El uso de una intervención telefónica centrada en los principios de autoeficacia y llevado a cabo por enfermeros capacitados fue eficaz para promover la confianza en la lactancia materna. Registro Brasileño de Ensayos Clínicos de Brasil: RBR-7m7vc8

**DESCRIPTORES**

Lactancia Materna; Autoeficacia; Enfermería; Educación en Salud; Medios de Comunicación; Ensaio Clínico.

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