

The impact of the extension of the post-natal in the adherence to breastfeeding Cohort study

Impacto de la extensión del postnatal en la adherencia a la lactancia materna. Estudio de Cohorte

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Abstract

Introduction: In Chile, Law 20,545 came into force in 2011, extending the maternity leave from 12 to 21 weeks. The National Breastfeeding Survey (ENALMA, in Spanish), applied after the extended maternity leave, reported a 12% increase in adherence to exclusive breastfeeding (EBF) at the sixth month. However, 63% of the women surveyed were unemployed, therefore, the main causes of cessation of breastfeeding (BF) were not related to maternal rest time. **Objectives:** To calculate the impact of changes in the EBF adherence in patients who attend to well-child visits in the period before and after the entry into force of the extended maternity leave. **Materials and Methods:** Data were collected from electronic medical records of the San Joaquín Health Center between 2009 and 2013, which were recruited according to specified inclusion and exclusion criteria (n = 938 patients). Subsequently, they were divided into two groups according to the presence or absence of the extended maternity leave and with follow-up at three, six and 12 months. Using frequency tables, the characterization of the groups was carried out at the beginning of the observation period. To evaluate group homogeneity, study variables were compared between groups using Chi-square and Wilcoxon Mann-Whitney tests. The prevalence of EBF maintenance was compared by pre-test between the groups with follow-up at three, six and 12 months. Using survival analysis and Cox regression, the impact of the extended maternity leave effect between both groups in the first 12 months was calculated. **Results:** At the beginning of the observation periods, no differences were observed between the groups in the studied variables. When comparing groups, without and with extended maternity leave, there were no significant differences in EBF adherence at three months: 327 (66%) versus 302 (68%), $p = 0.492$, respectively. However, in the groups in follow-up at six and 12 months, there was an increase in EBF adherence from 164 (33%) to 187 (42%), $p = 0.004$ and from 51 (10%) to 72 (16%), $p = 0.007$, respectively. Analyzing the impact of the maternity leave extension on the adherence to breastfeeding, determined by risk ratio, this extension may positively influence on the adherence to EBF over time, with a HR < 1 (HR: 0.852, $p = 0.04$ CI 95%: 0.728-0.996). **Conclusion:** Increased maternal resting time may influence as a protective factor for adherence to EBF.

Keywords:

Exclusive breastfeeding;
maternity leave
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adherence

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Introduction

Breastfeeding (BF) is the natural food par excellence; providing immunoprotection, nutrients and strengthening the mother-child bond¹. Diarrheal and respiratory diseases appear with less frequency and severity in children who receive BF, even in situations where the hygiene is not adequate². In a long term, children fed with artificial formula are at higher risk for asthma, type 1 diabetes, celiac disease, sudden death, high blood pressure, inflammatory bowel disease, leukemia, and lymphoma. Several studies suggest a lower obesity risk, with a dose-response relationship: the longer the BF duration, the lower the obesity risk³. The mother benefits from the BF since she secretes hormones when breastfeeding that promote the synchrony with her child and favors the protection this stage of greater susceptibility, it also decreases the risk of severe diseases, such as breast and ovarian cancer, post-partum hemorrhage, osteoporosis, and cardiovascular diseases. Not only the child and the mother benefit from BF but also the economy and ecology of the country⁴.

The WHO (World Health Organization) and the UNICEF (United Nations Children's Fund) recommend exclusive breastfeeding (EBF) for the first six months of life, based on sound and quality scientific evidence, and to introduce gradually the complementary feeding, maintaining the BF for two or more years⁵. A systematic review showed a higher risk of illness in children fed with formula or other beverages different from breast milk before that age⁶.

At the international level, Chile is in the sixth rank of breastfeeding prevalence at the sixth month (43%), while breastfeeding until the 12th month reaches only 36% (2011)⁷.

In the literature, many studies have demonstrated the importance of women working conditions and the adherence to the BF. The most common causes of the formula introduction are the perception of the mother of insufficient milk production to keep the child satisfied for a longer period and the planning to return to work⁷. The mother employment is usually quoted as a barrier to maintain breastfeeding. The chances of not complying with the intention of breastfeeding are higher in full-time jobs, compared to self-employed or part-time working mothers, who reached a breastfeeding time of no less than four months⁸. It is also associated with a higher propensity to breastfeed for at least four months, if their employer offered a solidarity arrangement, flexible work arrangements or if they received a maternity statutory payment, in addition to the additional paid maternity leave^{9,10}. The length of the maternity leave is crucial for women to recover from the childbirth and return to work while taking care of their children. On the other hand, extended lea-

ves or parental leaves taken only by women, especially if there is no labor protection, may affect the participation of women in work or their promotion in paid work, with the consequent labor penalties^{11,12}.

Child welfare and maternity protection are the main concerns of the International Labour Organization (ILO) since its foundation in 1919. Currently, it has recent data from 185 countries and territories, which show that 34% of them fully comply with the requirements of the Maternity Protection Convention, 2000 and its recommendation, which is divided into three key aspects: granting at least 14 weeks of maternity leave, that the payment amount should not be less than two thirds of previous earnings, and that they are financed through a social insurance or public funds. From the 31 countries of Latin America and the Caribbean, only Chile and Cuba have paid maternity leave, the rest are in developed economies, Eastern Europe and Central Asia¹¹.

In France, the length of the maternity leave period varies not only according to the numbers of born children but also according to the number and age of the previous children. In Norway, there is a 'time on account' leave system, which allows for flexibility in the worktime totally or partially for a period of two years⁴.

In Chile, on October 17, 2011, the law 20,545 was reformed, which 'Modifies the regulations of maternity protection and incorporates the parental leave'. This law allows working mothers, and eventually fathers, to extend the care time of newborns from 12 to 21 weeks, whose support is directly related with the reported scientific evidence of the BF benefits until the six months of age¹³.

The National Breastfeeding Survey (ENALMA), carried out after the entry into force of the extended maternity leave period (2013), reported a 12% increase of BF at the sixth month (from 44% to 56%). The survey was applied in the Primary Health Care (PHC), where 63% of the studied population (n = 9,604) were mothers who do not work, therefore, it is difficult to relate the increase in the BF adherence to the longer maternity leave, where in the cease causes of BF there is not a direct connection with the work of the mother. The main reasons are the perception of the mother that the child is still hungry (27%), breast or nipple problems (14.7%), starting work or academic activities (10%), poor weight gain or low weight (8.6%), the child did not want to continue breastfeeding (8.4%), children disease (7%), mother disease (6.2%), and that the mother considered insufficient milk production (5.4%)⁷.

The objective of our study is to evaluate the impact of the maternity leave extension on the adherence to the BF in working mothers.

Materials and Method

Study design

Analytical epidemiological study of retrospective cohort.

Universe

Total Health Oversight or Well-Child care at the San Joaquín Health Center between January 1, 2009, and December 31, 2013 (total = 19,823). The patients were selected according to the following inclusion and exclusion criteria:

Inclusion criteria

Age (0-30 days of life), term newborn, fed only with EBF (absence of formula) during the first month of life, without pre-, peri-natal or newborn pathology, birth weight between 3,000-3,800 grs, mother age between 20-40 years, without pre-existing pathology of the mother.

Exclusion criteria

Hospitalization before recruitment weighing, children fed with formula, children of mothers with chronic pathologies or with substance abuse history (alcohol, tobacco or drug consumption).

Subsequently, a division into two groups was made, which corresponded to the beneficiaries with the maternity leave extension and those who did not. The cut-off point was three months before the effective date of Law 20,545 (July 17, 2011), in order to include children with the non-extended maternity leave and who were three months old at the effective date (October 17, 2011), therefore, they would be included in the benefit.

The total number of patients who met the criteria was 495 for the first period, without extended maternity leave, and 433 for the second period, with the extended maternity leave. The total number of included children in the study was 938. A follow-up was performed of the electronic clinical records of the patients included in the study at the 3rd, 6th and 12th months, recording the permanence of EBF and the cease causes if needed.

The study was approved by the Ethics Committee of the Pontifical Catholic University of Chile.

Statistical analysis

All statistical analyses were performed using STATA v.13 software (College Station, Texas. USA). From a descriptive point of view, the EBF prevalence in every period and the cease causes were shown in tables and charts.

For the comparison of the groups, both with and without extended maternity leave, at the beginning of the follow-up according to the variables birth weight and mother age, the Wilcoxon Mann-Whitney test was used, considering the absence of normal distribution of these variables in the studied patients. For the variable paid mother work, the Chi-square test was used.

With the proportion test for large samples based on calculated z (PR-test), the EBF incidences between the periods with and without the extended maternity leave were compared for each measurement of the follow-up at the 3rd, 6th and 12th month.

Considering the 'EBF loss' event as a failure, the survival analysis with Kaplan-Meier curves was performed, comparing the periods with and without the extended maternity leave (log-rank test). With these data, using the Cox regression model, the hazard ratio was determined in order to calculate the impact of the extended maternity leave on the EBF maintenance during the follow-up. For all analyses, an alpha type I error of 0.05 was considered.

Results

Table 1 summarizes the demographic characterization of our study, and also shows that there are no significant differences between the groups in the studied variables.

All evaluated patients were exclusively breastfed at the first month of life. In the performed follow-up at the third month, there was no significant difference between the group with extended maternity leave and the group without it, with 302 (68%) and 327 (66%) patients, respectively ($p = 0.0492$). However, the re-

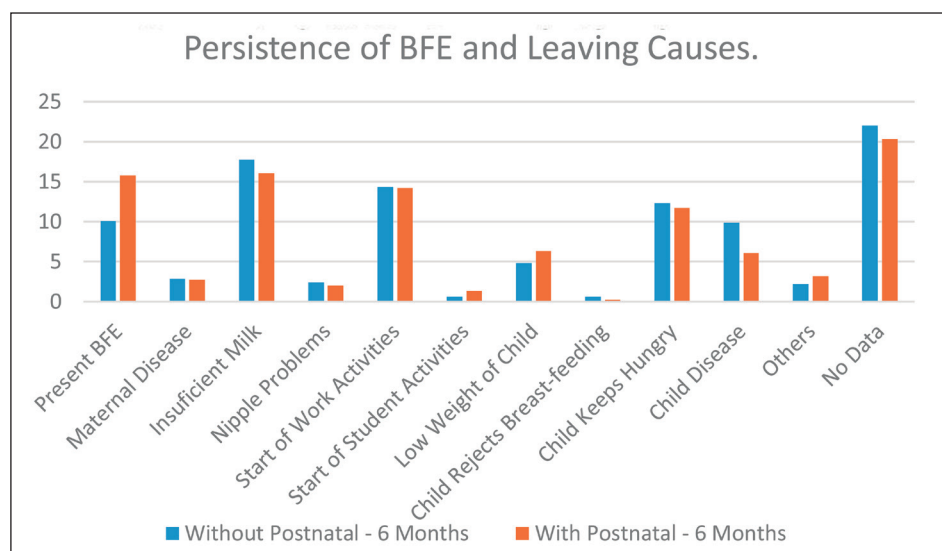
Table 1. Demographic characteristics at the beginning of the observation period

Variable	Without Postnatal - 6 Months	With Postnatal - 6 Months	p value
Age of the Mother (years media, SD)	30.0 (4.6)	29.9 (4.5)	0.547*
Birth weight (grams media, SD)	3.358.30 (209.4)	3.388.03 (212.9)	0.062*
Remunerated job (N, %)	333 (80.6)	290 (81.6)	0.708 [§]

*p-value: Wilcoxon Mann-Whitney test. [§]squared-chi test.

Table 2. Mothers occupations record

Occupation	Without Postnatal - 6 Months	With Postnatal - 6 Months
Remunerated job	333	290
Students, independent workers and housewives	80	65
Total	413	355

**Figure 1.** Leaving causes for exclusive breastfeeding (EBF).

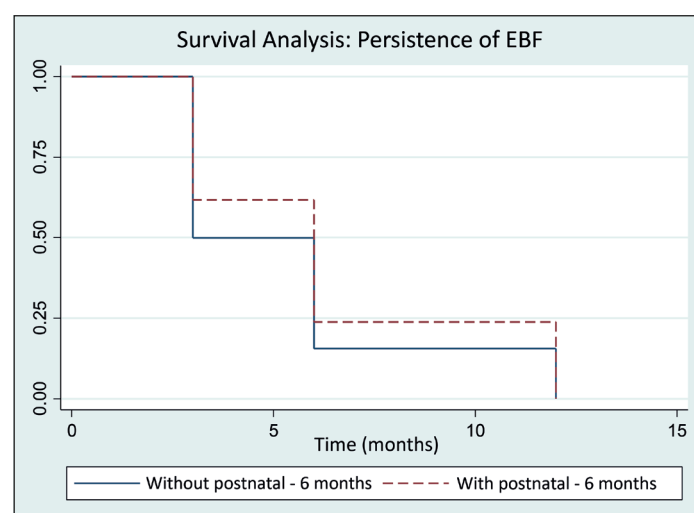
sults at the 6th and 12th month show an increase of the BF continuity in the group with extended maternity leave, with 187 patients (42%) versus 164 patients (33%) at the 6th month, and 72 patients (16%) versus 51 patients (10%) at the 12th month of age ($p = 0.004$ and 0.007 , respectively). From the follow-up of 938 patients, between 20-22 % of the recruited population were lost due to the lack of records of new health care at the 3rd, 6th, and 12th month in the reviewed clinical records.

Out of the reviewed records of the general total of clinical records ($n = 938$), data on activities carried out by mothers were only found in 771 of them, which corresponds to 82% of the total. Assigning this result to both groups (with and without extended maternity leave), the data were similar, making both populations comparable. Table 2 summarizes the maternal characteristic by type of activity.

Figure 1 shows the cease causes of BF, where the three main ones are insufficient milk production (16%), beginning of work activities (14%), and the perception of the mother that the child was still hungry (12%). There were no significant differences between both groups.

When performing the survival analysis (Figure 2),

the Kaplan-Meier curves show the EBF loss over time, with significant differences between the two types of maternity leave (p -log-rank test < 0.05). When using the Cox regression model in order to evaluate the impact of the maternity leave extension with the EBF adherence and its risk ratio, a Hazard Ratio of $= 0.852$, $p = 0.04$ (IC 95%: 0.728-0.996) is obtained.

**Figure 2.** Survival Analysis: Persistence of EBF.

Discussion

The objective of our study was to evaluate the possible changes in the adherence to BF after the implementation of the extended maternity leave, therefore, a Cox regression analysis was performed, resulting in a Hazard Ratio of < 1 (0.0852 $p = 0.04$), which could be interpreted as that the maternal leave extension positively influenced the continuity of BF. The Chinelo Obguanu et al. study had similar results (14), where the beginning and continuity of BF are followed-up in mothers who return to work between one and six weeks compared to mothers who still were on maternity leave. In that work, mothers who still were on maternity leave were more likely to start BF (OR: 1.46, 1.08-1.97 /RR: 1.13, 1.03-1.22). Women with a maternity leave of 13 weeks or more were more likely to exclusively breastfeed at the third month (OR: 2.54, 1.51-4.27 /RR: 1.99, 1.38-2.69). Similar results were described in the study of Kelsay R. et al. (8), where the intention to breastfeed longer than three months was evaluated, which was closely related to the return to work, therefore the probability of not complying with the intention to breastfeed was higher in mothers who returned to work before three months (OR: 2.25, 95% CI 1.23-4.12), between six weeks and three months (OR 1.82, 95% CI 1.30-2.56), compared to mothers who returned to work after three months. The results of Jennifer S. Pitonyak et al.¹⁵ showed that the permanence of the infants with their mothers working from home was associated with a higher adherence to the EBF at the fourth month ($p = 0.0001$). In addition, the employer support was associated with the continuity of the EBF at the fourth month or more ($p = 0.02$).

In the ENALMA survey, (7) the adherence to BF at the sixth month was 12%, considering that most of the studied population (63%) was non-working women. This is relevant in our study since the 6-month maternity leave should have a greater impact on working mothers. In our study, the proportion of working mothers recorded was 78%-80% ($\chi^2 p = 0.700$) comparing groups with and without extended maternity leave, respectively. However, the percentage of BF adherence at the sixth months in our study showed similar values to those reported in the ENALMA survey (Table 3), where the BF adherence at the

sixth month had a 9% increase (from 33% to 42%, $p = 0.04$) and 6% at the 12th month (from 10% to 16%, $p = 0.07$).

Among the main causes of BF cessation and, therefore, the beginning of feeding with milk formulas obtained in our study was the perception of the mother of insufficient milk production (16-17%), beginning of work activities (14%), the perception that the child was still hungry (11-12%). The causes of BF cessation of the ENALMA survey were different from ours, where the three main causes were 'the child was still hungry' (27%), problems with the breast or nipple (15%), beginning of academic or work activities (10%), and insufficient milk production (5.4%). These differences are probably related to certain demographic characteristics, which were not present in our study, such as educational level and socioeconomic status. There are other data that were relevant in the BF continuity, for example, the Melissa Bartick et al. study (16), who conducted an interview with a group of Latina women living in the United States, in whom the causes of BF cessation and the start of using formula were similar to those found in the literature and in our work. A qualitative analysis of the importance of the BF and its duration in the protection of the health of children and the loss of this protection when introducing milk formulas showed the lack of knowledge of mothers in this regard, but also the willingness to be educated by health professionals to learn about the BF benefits, to achieve its optimization and, secondarily, not to use artificial formula if it is not strictly necessary.

Limitations of the study

The analysis and follow-up of the newborns of this cohort were performed at different time periods (before and after the effective date of the extended maternity leave Law), assuming that the measurements at different periods had as their only difference, the presence or absence of extended maternity leave.

The collected data from the electronic clinical records did not include all the details that might have been relevant to the study, such as educational level, sociocultural status, type of working day, type of contractual agreement (labor fees, fixed term, indefinite term, etc.). On the other hand, the follow-up tracea-

Table 3. Follow-up for EBF incidence at 3, 6 and 12 months

EBF	Without Postnatal - 6 Months	With Postnatal - 6 Months	p value (pr-test)
3 months (n, %)	327 (66.06)	302 (68.17)	0.492
6 months (n, %)	164 (33.13)	187 (42.21)	0.004
12 months (n, %)	51 (10.30)	72 (16.25)	0.007

bility of a certain number of the recruited population corresponding to a 20% to 22% (187 patients) was lost after verifying only one well-child consultation at the first month of life (with presence of EBF and meeting the inclusion and exclusion criteria), but without subsequent visits to the health service, therefore it was not possible to perform the follow-up at the 3rd, 6th and 12th month as proposed in this study.

Conclusions

The extension of the maternity leave may be considered a protective factor in BF adherence. However, it is important to take into account the cost-effectiveness of implementing this benefit extensively in the population, considering important aspects that could influence its cross-cutting nature and success, such as for example, the existing gap in labor payments between men and women, a fact that today limits some women to making full use of the benefit in order not to risk their source of employment and therefore their economic income. More studies are needed to support the need to continue to increase the maternity leave days in order to optimize breastfeeding, protect the job stability of the mother, the family economy, and the costs for the country.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

Financial Disclosure

Authors state that no economic support has been associated with the present study.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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