

# Breastfeeding pathologies: analysis of prevalence, risk and protective factors

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**Abstract.** *Background and aim of the study:* Breastfeeding is essential for the health of mothers and newborns, and it is recommended by WHO-UNICEF as the sole source of nutrition and protection for the first 6 months of life and beyond. In order to fully promote this practice, it is important to recognize early conditions that can lead to pathological breastfeeding. *Aim:* The study aims to analyze the prevalence and the possible risk or protective factors concerning the pathology of breastfeeding. *Methods:* For this observational study were consulted the medical records and the files of the Breastfeeding clinic of 1065 puerperal women, of the University Hospital of Modena, from January to August 2016. The data were processed with the SPSS Software. *Results:* In our study population, 532 (50%) puerperal women presented a breastfeeding-related disease, of which 330 (31%) had a disease affecting the mother (breast engorgement, fissures, a-/hypo-galactia, discontinuation of breastfeeding, galactoceles, mastitis and candidiasis), 105 (9.9%) of the newborn (inadequate suction, neonatal jaundice, pathological weight loss, need for admission to NICU) and 97 (9.1%) of both the mother and the newborn. *Discussions:* It is evident from the results that the predicting factors of pathology in breastfeeding are present in pregnant women who give birth in an early gestational age and with high age, birth rate and nationality. *Conclusions:* staff training courses are essential to respond to WHO-UNICEF recommendations and to improve the continuity of care for the mother-child dyad. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** breastfeeding, breastfeeding pathology, breastfeeding risk factors, mothers, baby, observational study

## Introduction

Worldwide, the most important international organizations, such as WHO, UNICEF-OMS (1,2) and the Italian Ministry of Health (3), express unanimous consensus on the importance of exclusive and prolonged breastfeeding in the promotion of health, with positive effects on physical, psychological, social and economic well-being, for mothers, children, families, the community and the healthcare system. The World Health Organization recommends, when it is possi-

ble, exclusive breastfeeding for the first six months of a child's life and to continue it, as a supplement to solid foods, for at least the first two years and beyond (4). The benefits of breastfeeding go far beyond the nutritional aspect. It has been associated with reduced risk to develop infections for the baby and moreover it regulates and improves the physiological systems of mother and the newborn, promoting the bonding (1, 2). In fact, early onset of breastfeeding has numerous maternal and child health benefits (4-6).

### *The benefits for mothers*

Skin-to-skin contact (7) between mother and baby immediately after delivery and the early breastfeeding help to improve multisensory stimulation and a prolonged lactation period. Skin-to-skin contact (7), tactile stimulation of the nipple and sucking, promote the release of oxytocin and endorphins resulting in an improvement in the mother's mood tone. Oxytocin increases blood flow in the chest and in the nipple area, raising the skin's temperature and creating a warm and comfortable environment for the baby (8).

Breastfeeding increases the mother's attention to the needs of the child, it accelerates uterine involution after delivery and reduces the risk of postpartum bleeding. For example, a study of a sample of breast-feeding women (in two obstetrics departments and an independent birth center in New South Wales Australia) suggests that skin-to-skin contact and breastfeeding immediately after birth can be effective in reducing postpartum bleeding rates (9). Moreover, breastfeeding reduces the risk ovarian cancer, breast cancer and type II diabetes (10). It also has long-term anti-stress effects: during each feeding in mothers, blood pressure and cortisol levels are lowered; moreover, the peaks of this hormone, normally released in response to physical stress, are more contained than bottle-feeding. Early termination of breastfeeding has been associated with an increased risk of maternal postpartum depression (10).

### *The benefits for the newborn*

Breast milk guarantees optimal macronutrients and micronutrients (fat, lactose, proteins) which promote growth, development and provide comprehensive protection (biochemical and cellular components) from infection (11). Term-born babies who receive breast milk show significant improvements in nutritional status, gastrointestinal maturity and neurological development, in addition to a lower predisposition to infections and chronic diseases (9), compared to those fed with formula, which instead may have these characteristics. Premature babies who receive breast milk have additional benefits, such as a lower risk of necrotizing enterocolitis (12), enteral food intoleranc-

es, chronic lung diseases (9). From the development point of view breastfeeding offers children different benefits, including superior neurological development and better behavioral assessments, as well as a reduced risk of obesity and type II diabetes in adulthood (6). Furthermore, it favors the normal oro-facial growth and it improves the teething (6). The delayed onset of lactogen II among new mothers is related to maternal obesity and to factors associated with ineffective breastfeeding. It is more common in primiparous women and increases the risk of neonatal weight loss (11). Although breastfeeding may can't be the right choice for every parent, when it is possible it is the right choice for every child (13, 14). To this end, personalized information and much support for the mother and the family help the successful outcome of breastfeeding (13, 15).

The Polyclinic Hospital-University of Modena, in Italy, on the basis of the Guidelines for the protection, promotion and support of breastfeeding supported by several studies, (12-19) starting from November 2015 set up a breastfeeding clinic "Let's breastfeed together", for advice and support of breastfeeding after discharge from the hospital to ensure continuity of care. It is a free service, where the midwife (20) promotes the consolidation of breastfeeding techniques learned by the child during the hospitalization, it provides support and promotion of exclusive breastfeeding, thanks to a short-term follow-up programmed by the midwives of the puerperium at the time of discharge. The "Breastfeeding Chart", filled in the inpatient ward, is used and then used by the midwives of the clinic as a reference to the path taken by each child (22). At each access to the clinic, the documentation is given to the woman. This advice is also available to the pediatrician who will take care of the child. In case of need the midwife can alert the neonatologist who, if deemed necessary, has the possibility to take charge of the child and a gynecologist in case of maternal breast pathologies. This counseling service is important for providing information, suggestions related to breastfeeding and to prevent the onset of lactation diseases in women such as: fissures, abscesses, engorgement, candidiasis and mastitis.

## Aim

The main purpose of our study is the analysis of the prevalence of breastfeeding pathologies and the search for possible risk or protective factors among the population of the Breastfeeding Clinic of the University Hospital of Modena.

## Method

In the observational study 1065 puerperal women were included in the "Let's breastfeed together" clinic at the Polyclinic Hospital-University of Modena, from January to August 2016. Data were collected retrospectively from: medical records during hospitalization, from the "Breastfeeding Chart" filled out in the ward and subsequently used by the midwives of the clinic as a reference to the path taken by each patient. In the "Breastfeeding Chart", the main clinical records of women who recently gave birth and their newborns are included, such as: age of the mother, schooling, gestational age, nationality, parity, potential dysfunctions regarding breastfeeding and the Apgar score, type of delivery and potential neonatal pathologies.

The age of the mother, the gestational age (expressed in days) and the Apgar score were continuous variables, whereas the nationality (comparing the Italian nationality with all the others), the type of delivery (considering the spontaneous delivery as a reference point), all the other pathologies of maternal relevance in the breastfeeding (a-/ipo-galactia, galactoceles, mastitis, mammary engorgement, fissure) and of neonatal relevance (ineffective suction, jaundice, and other pathologies which require an hospitalization in the NICU) were discrete variables.

## Data analysis

The descriptive statistics were expressed as mean  $\pm$  standard deviation or as a number and a percentage. The continuous variables (age of the mother, schooling, gestational age, nationality, parity, potential dysfunctions regarding breastfeeding and the Apgar score, type of delivery and potential neonatal pathologies)

are all described separately with the Kruskal-Wallis variance analysis. The association of predictors with maternal and neonatal pathologies related to lactation, as outcomes, was evaluated by a multivariate logistic regression. The data were processed with the SPSS Software (Statistical Package for Social Science).

## Results

In the sample, 532 cases (50%) presented a related breastfeeding disorder (Figure 1).

Of these, 330 (31%) had a disease in the mother, 105 (9.9%) in the newborn and 97 (9.1%) in both the mother and the newborn. The main diseases affecting the mother were a- / ipo-galactia (16.3%), mammary engorgement (11.8%), fissures (3.7%), discontinuation of breastfeeding with cabergoline (3.7%), galactoceles (1.8%), mastitis (3.2%) and candidiasis (1.1%). The main neonatal conditions that caused breastfeeding problems were inadequate suction (8.7%), neonatal jaundice (0.8%), pathological weight loss (5.3%), need for neonatal intensive care unit (NICU) (2.7%). Most of the recorded pathology cases presented an overlap between different pathologies.

There were 677 patients of Italian nationality (63.6%). Among the foreigners the most represented nationalities are Moroccan (7.8%), Albanian (4.3%), Romanian (3.2%), Tunisian (2.6%) and Ghanaian (2.3%).

The Table 1 shows the indicators in relation to physiological and pathological pregnancies.

The maternal age of the patients with pathological breastfeeding was slightly higher than those with physiological lactation ( $33.48 \pm 5.35$  Vs.  $31.52 \pm 5.56$   $p < 0.00001$ ). The maternal mean age of subjects with maternal pathology was  $33.38 \pm 5.44$ , statistically greater than healthy patients.

In the subpopulation of patients with pathology, 218 (41.4%) were spontaneous deliveries, 6 (1.1%) were driven deliveries, 53 (10.1%) were induced deliveries, 75 (14.2%) were operative vaginal deliveries and 175 (33.2%) were cesarean sections.

On the other hand, in patients with physiological lactation, the spontaneous deliveries were 329 (62.2%), the augmented labors were 13 (2.5%), the induced de-

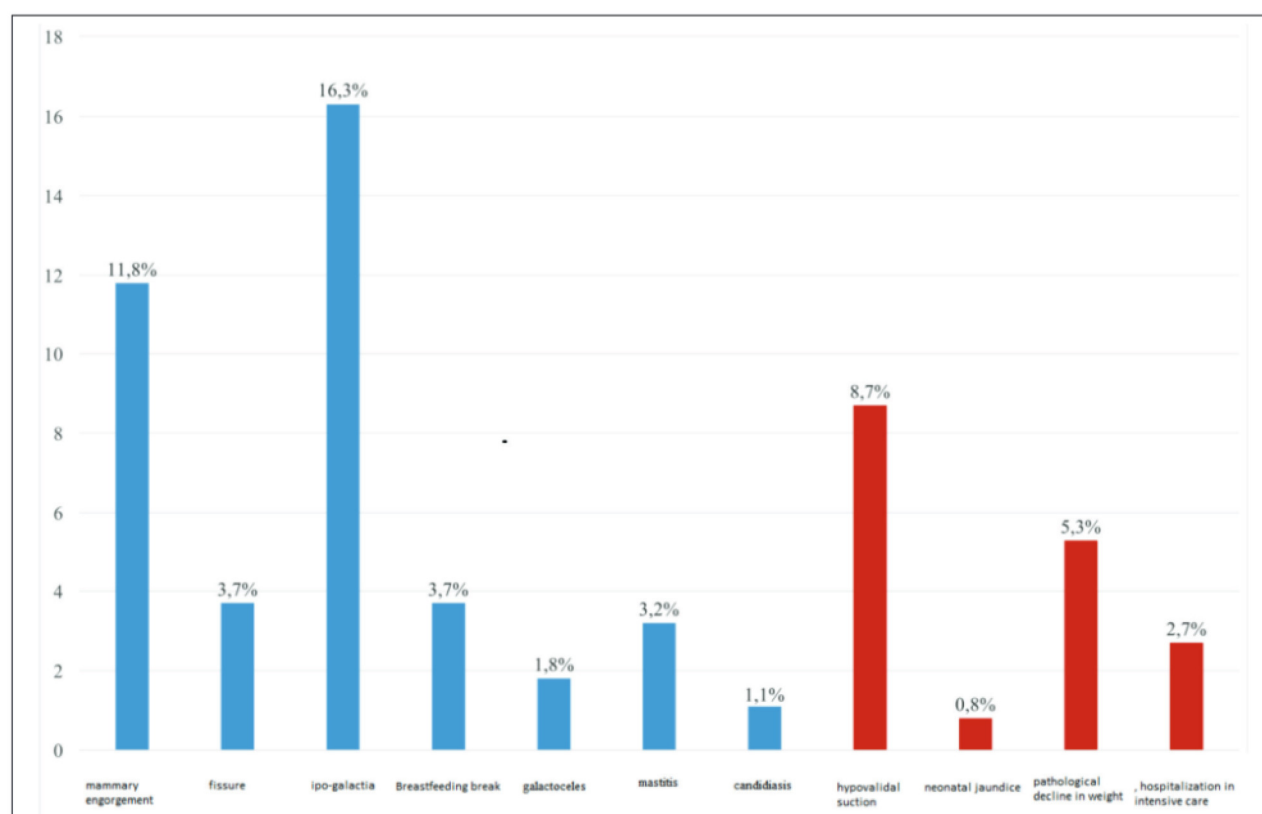


Figure 1. The main pathologies of the mother and the newborn

Table 1. Indicators in relation to physiological and pathological pregnancies

| Indicators               | Physiology             | Pathology              | p value |
|--------------------------|------------------------|------------------------|---------|
| Age (year)               | 31,52 (25,95-37,08)    | 33,48 (28,14-38,83)    | <0,0001 |
| Gestational Age (day)    | 275,72 (266,45-284,98) | 271,28 (255,44-287,12) | 0,0003  |
| 1° minute Apgar score    | 8,92 (8,15-9,68)       | 8,61 (7,40-9,82)       | <0,0001 |
| Born at the end          | 1,67 (0,85-2,49)       | 1,56 (0,76-2,36)       | 0,007   |
| Abortions                | 0,14 (-0,25-0,53)      | 0,17 (-0,28-0,62)      | ns      |
| Live births              | 1,55 (0,83-2,27)       | 1,41 (0,78-2,03)       | 0,002   |
| Delivery                 |                        |                        |         |
| Spontaneous              | 218 (41,4%)            | <0,0001                |         |
| Driven                   | 13 (2,5%)              | 6 (1,1%)               | <0,0001 |
| Inducted                 | 50 (9,5%)              | 53 (10,1%)             | <0,0001 |
| Operative                | 41 (7,8%)              | 75 (14,1%)             | <0,0001 |
| Cesarian                 | 96 (18,1%)             | 175 (33,3%)            | <0,0001 |
| Postpartum bleeding (ml) | 339,70 (90,27-589,13)  | 410,15 (91,85-728,44)  | 0,0003  |

liveries were 50 (9.5%), the operative vaginal deliveries were 41 (7.8%) and the cesarean sections were 96 (18.1%).

The 68.6% of all caesarean sections, the 69% of all operative delivery and 53.4% of the induced delivery

were performed in patients who developed a breastfeeding-related diseases.

The majority of patients who performed augmentation of labor (68.4%) and spontaneous delivery (59.6%) presented a physiological course of lacta-

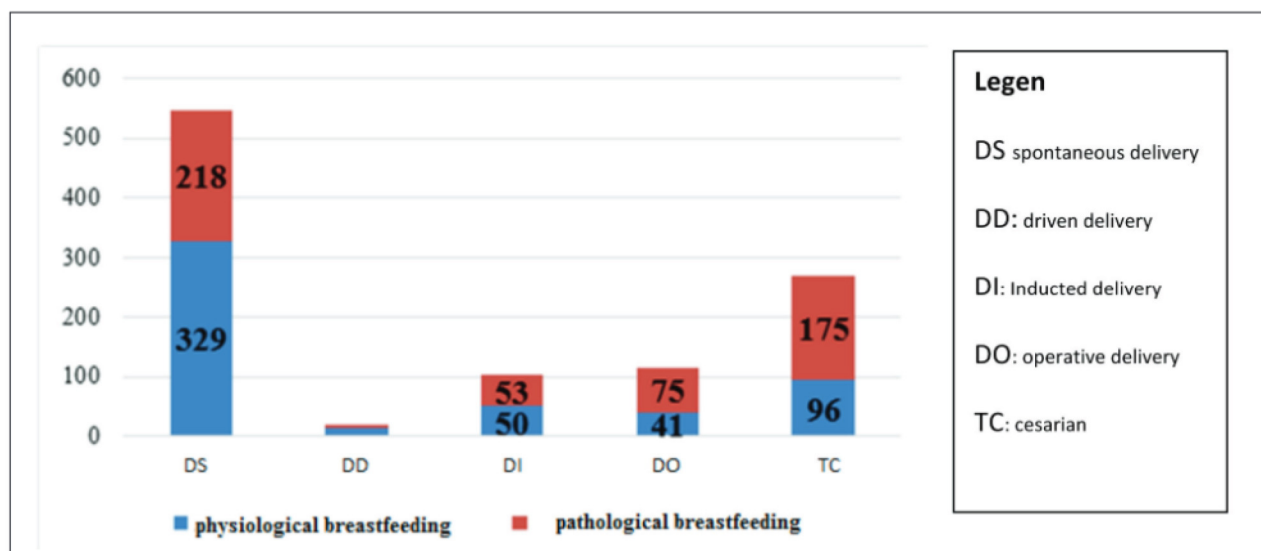


Figure 2. Physiological and pathological breastfeeding related to the type of childbirth

tion. These differences were statistically significant ( $p < 0.00001$ ).

The Figure 2 shows the physiological and pathological breastfeeding related to the type of childbirth.

In the studied population, exclusive breastfeeding was 56.9%, formula milk (4.6%), breast pump use (11.2%), breastfeeding + formula milk (7.4%), breastfeeding + breast pumping (11%), use of breast pump + artificial milk (8.9%).

The Table 2 shows the Multivariate Logistic Regression about the predictors of pathological and not pathological breastfeeding.

In the multivariate logistic model, the predictors of pathological breastfeeding were:

- maternal age (OR = 1.05  $p = 0.0003$  95% CI [1.02-1.08]),
- the operative delivery (OR = 2.37  $p = 0.0002$  95% CI [1.50-3.76])
- cesarean delivery (OR = 1.80  $p = 0.001$  95% CI [1.25-2.45])

Instead, the protective factors of a good breastfeeding were:

- gestational age (OR = 0.98  $p = 0.0002$  95% CI [0.96-0.99])
- the number of live births (OR = 0.71  $p = 0.002$  95% CI [0.57-0.88]),
- the Italian nationality (OR = 1.40  $p = 0.03$  95% CI [1.03-1.90])

Table 2. Multivariate Logistic Regression as predictor of an aggregate outcome of the breastfeeding dysfunctions

| Predictors            | OR    | p value | 95% CI      |
|-----------------------|-------|---------|-------------|
| Maternal Age          | 1,052 | 0,0003  | 1,023-1,081 |
| Delivery              |       |         |             |
| Spontaneous           | 1     | /       | /           |
| Driven                | 0,511 | ns      | 0,174-1,498 |
| Inducted              | 1,391 | ns      | 0,881-2,196 |
| Operative             | 2,371 | 0,0002  | 1,495-3,76  |
| Cesarian              | 1,755 | 0,001   | 1,255-2,454 |
| Gestational Age       | 0,975 | 0,0002  | 0,962-0,988 |
| Live births           | 0,712 | 0,002   | 0,574-0,884 |
| Italian nationality   | 1,395 | 0,033   | 1,027-1,897 |
| 1° minute Apgar score | 0,765 | 0,001   | 0,653-0,895 |

- the 1° minute Apgar score (OR = 0.77  $p = 0.001$  95% CI [0.65-0.90]).

The Pilot Delivery and the Induced Childbirth were not significant, because the confidence interval crosses the 1.

## Discussion

Pathological breastfeeding turned out to be a condition concerning the half of the studied population, in the study population, a higher maternal age was observed (23) in cases of pathological breastfeeding and a smaller gestational age at delivery (24, 25). Some methods of delivery, such as operative delivery

and caesarean section (26), a high maternal age and Italian nationality were risk factors.

On the contrary, a birth at a higher gestational age, a high number of live births and a higher Apgar score at the first minute were protective factors. Early onset of breastfeeding reduces neonatal and infant mortality (27) early both through increased rates of exclusive breastfeeding and through additional mechanisms. In sum, the study confirms the results of the international literature, for the inherent factors, birth weight (28), the type of breasts and nipples (29), as well as maternal anxiety or stress (30) that may affect the first phase of breastfeeding and possibly delaying the milk supply. The study could be a reference for future researches to verify if the results can be effective to detect early or risk factors of breastfeeding pathologies. In fact, an early identification of risk factors for pathological breastfeeding may enable preventive intervention to reduce the prevalence of disease as well as risk stratification could be useful to plan a more effective intervention.

## Conclusion

In addition to highlighting the prevalence and research of any risk or protective factors concerning the pathology of breastfeeding breast, this study was oriented to foster, where possible, an exclusive breastfeeding, according to the guidelines of the WHO, UNICEF, European Union and promoted by Italian Ministry of Health also.

Stressful moments during childbirth and in the hours and days following birth can affect the timing of lactogeny and long-term results of breastfeeding. In these situations, the modalities of childbirth and the hospital practices have a significant impact on the first experience of breastfeeding.

The continuity of assistance to the dyad provided by the midwife as a means of guaranteeing female reproductive empowerment is strongly underlined by the modifications to the Italian Midwife Code of Ethics also (33). The midwife, in fact, facilitates the development of self-esteem and self-enhancement of the dyad, through the strengthening of skills and abilities in the care and feeding of the child.

The public health programs should promote and effective lactation policies, and staff training courses should be implemented, to recognize the importance of breastfeeding, and to encourage a feeding based on signals of the child on request, with close feeds (8-12 in the 24 hours) (21). These are essential for the protection and support lactation, for the rooming-in and for the promotion of standardized protocols for the management of breastfeeding (20, 32, 33).

**Conflict of interest:** None to declare

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