

# The Influence of Perinatal Education on Breastfeeding Decision and Duration

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**Abstract:** *Objectives:* to evaluate factors influencing breastfeeding duration in an integrative model, considering both the organization of medical care and the perinatal education.

*Methods:* We conducted a cross sectional study with data collected in a face to face interview of 1,008 mothers with children aged between 9 and 14 months. The questionnaire focused on the main characteristics of a Mother-Baby Friendly Hospital initiative and the type of perinatal education received by pregnant women. Correlation and partial correlation tests, non-parametric tests and classification tests were applied. Data were processed in SPSS 12.0 software.

*Results:* The positive effects of Mother Baby Friendly Hospitals Organization initiative organization were confirmed. However, the main differentiator for breastfeeding duration was the level of formal education of pregnant mothers and the active seeking of perinatal education ( $r = 0.22$ ,  $p < 0.001$ ). The perinatal counseling was correlated with breastfeeding duration only for the subgroup participating to structured, dedicated time slot apart from the regular medical consultation ( $r = 0.079$ ;  $p = 0.014$ ), independently of mother's age, education, residence, time to first breastfeeding contact, type of birth delivery and rooming in. Our results support a broader approach to perinatal education than medical counseling during pregnancy to increase the voluntary participation of future mothers to the perinatal educational programs.

*Conclusion:* As mothers' motivation to maintain the optimum duration of breastfeeding is a determinant factor, an earlier and sustained educational process, before pregnancy and after birth delivery, is necessary in order to create a general favorability for exclusive breastfeeding.

**Keywords:** Perinatal education, rooming in, birth delivery.

## INTRODUCTION

The current WHO recommendation is the exclusive breastfeeding for 6 months after childbirth. Although there is a tendency of increasing the breastfeeding duration in many countries worldwide [1, 2], the exclusive breastfeeding rate varies between 3-44% [3], which is far from the ideal one. Public policies supporting exclusive breastfeeding, such as incentives for the development of a network of Baby Friendly Hospitals and implementation of formula marketing regulations, play an important role in this ascending trend. However, the current result indicates that barriers persist and that innovative solutions are requested.

Most frequently, the attitude of the mother regarding breastfeeding is decided in the first weeks of pregnancy and it is mainly influenced by the socio-economic and family factors [4] making the educational

efforts of the medical providers, during pregnancy and after childbirth, less efficient. There are already published studies emphasizing that education targeting future mothers is essential and that there is a need to create a general favorability pro-breastfeeding by introduction this topic in the school curricula [5] by efficiently using the internet [6] or social marketing strategies.

The aim of our study consists in assessing the factors influencing breastfeeding duration, in an integrative model, taking into consideration both factors related to the organization of the medical care and the type and context of perinatal education mothers have been involved in.

## METHODS

A cross sectional study was carried out from January 2015 to September 2016, including mothers with children aged 9-14 months, that had contacted medical services, during pregnancy and after childbirth, in family doctors' practices, specialist ambulatory services, pediatric, neonatology or gynecology hospital

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departments, The protocol of the study was approved by the Ethic Committee of the National Institute of Mother and Child "Alessandrescu-Rusescu".

Nurses from 11 counties of all Romanian regions were invited to voluntarily participate to the study. In order to get a fair geographical distribution of the mothers, each nurse received a number of questionnaires, according to the number of pregnant women that reached the medical service where she was employed in the last year.

Based on the contact data from the medical service, the midwives and nurses asked mothers, in alphabetical order, for study participation. The participation acceptance rate was 72%. All participants signed an informed consent, after being briefed about the aim and the importance of the study. Preterm born children (less than 37 weeks of gestation), or children with acute medical problems at birth and longer than 12 days postpartum hospitalization were excluded.

The questionnaire was validated by the researchers from the National Institute of Mother and Child "Alessandrescu-Rusescu" in previous studies conducted in collaboration with UNICEF and Ministry of Health. Collection of data about the child order, birth weight, type of birth (vaginal or caesarian section) was done by the midwives and nurses, in a face to face interview.

We registered general data about the mother (age, residency, education level). The education level was classified as following: elementary, school education for 0, up to junior high school for 1, high school college education for 2, bachelor + 2 years of study for 3, and university degree or higher for 4.

In terms of hospital organization, questions about the presence of the rooming in system, the time to breastfeed contact, on-demand or scheduled breastfeeding, were asked. The time of breastfeeding contact was defined as the duration from childbirth to the first breastfeed contact. Being a retrospective study, we registered the duration of the predominant breastfeeding, defined as the period of time when breast milk was the major source of nourishment, with inconstant intake of liquids (water and water based drinks, drops of syrups) and no formula or any solid food added. Based on the predominant breastfeeding duration, we divided the group in 4 subgroups of predominant breastfeeding: no breastfeeding, breastfeeding between 1 to 4 months, more than 4 months but less than 6 months, 6 months and above.

We also collected data referring to the type of perinatal information regarding breastfeeding the mother had received: the source of information, the voluntary participation (registration in a perinatal education class) or passive participation (advice received during the regular medical visits), usage of other information channels. The question: "Have you been counseled during your prenatal medical visits to breastfeed the baby" had a dichotomous answer (yes/no). The question: "By whom have you been counseled" had 6 alternative answers and a free text box.

Another question explored a total of 15 alternatives regarding the prenatal education received during pregnancy and after delivery, including medical staff, family and media and a free text box; for this question, multiple choices was allowed.

Mothers were classified, according to the perinatal education that they had chosen during pregnancy in traditionalists and active seekers. The "traditionalists" had participated to education provided by the general practitioner or specialist during visits or in a free of charge educative sessions organized in hospitals; they also took information through their existing network (family and friends). Mothers in the category of "active seekers" informed themselves through media (all forms, inclusive on line media) and enrolled themselves in paid courses of perinatal education.

Questionnaires were included in the analysis when no more than 3 of the items had any response, with the exception of items regarding the length of breastfeeding, where responses were mandatory for the inclusion of the questionnaire in the analysis. The final number of questionnaires was 1008.

We used an SPSS 12.0 (SPSS Inc., Chicago, Illinois, US) for the statistical analysis; we have applied different tests for the questionnaire variables: descriptive tests, correlation and partial correlation tests, non-parametric tests, classification tests (Tree, Two Step).

Continuous variables were tested for normal distribution by Kolmogorov Smirnov test. Tests were considered statistically significant when  $p \leq 0.05$ .

## RESULTS

The average age of mothers was of 28.66 years (median of 29 years). The main characteristics of the study group are presented in Table 1.

**Table 1: Main Characteristics of the Study Group**

Residence		
Urban	495	49%
Rural	513	51%
Education level		
Minimal	65	6%
Average	526	52%
Superior	417	41%
Parity		
Primiparous	560	56%
Multiparous	448	44%
Weight at birth (g)		
Average	3243	
Median	3250	
Type of childbirth		
Vaginal	528	52%
In labor C-section	218	22%
Pre labor C-section	262	26%
Hospital organization		
Rooming in present	631	63%
Rooming in absent	377	37%
Type of breastfeeding during hospitalization of the mother and of the child		
Breastfeeding on demand	545	54%
Fixed schedule of breastfeeding	404	40%
Breastfeeding + formula	28	3%
No breastfeeding during hospitalization	31	3%
Prenatal breastfeeding counsel		
Yes	589	58%
No	419	42%
Breastfeeding duration		
Less than 1 month	204	20%
1-4 months	234	23%
4-6 months	225	22%
6 and more than 6 months	345	34%

Breastfeeding was initiated by 945 mothers (93.75%), but only 14.8% of the infants started to breastfeed in their first hour after birth. The delay between birth and the first breastfed moment was negatively correlated with breastfeeding duration ( $r = -0.110$ ,  $p = 0.001$ ). On average, predominant breastfeeding was 3.71 months, with a median of 4.

In the first step of the analysis we have assessed the relation of the breastfeeding duration with the different variables that were significant in other studies. Because variables were either categorical, or continuous with nonparametrical distribution, we applied non-parametric Spearman rho's correlations, as shown in Table 2.

A tree classification was assessed by QUEST growing method and cross validation as validation method. The breast feeding group was considered as dependent variable and, as independent variables, were included mother's age, education, residence (rural or urban), birth order, advice to breastfeed in hospital, type of birth and rooming in. The main differentiator was mothers' level of formal education (Figure 1). The most favorable group for predominant breastfeeding at 6 months was the group of mothers with high education level; for mothers in the rural area, age over 29 was a favorable factor, and for those living in urban areas the rooming in system. For mothers with a medium level of education, the influencing factor in this model was just the rooming in system.

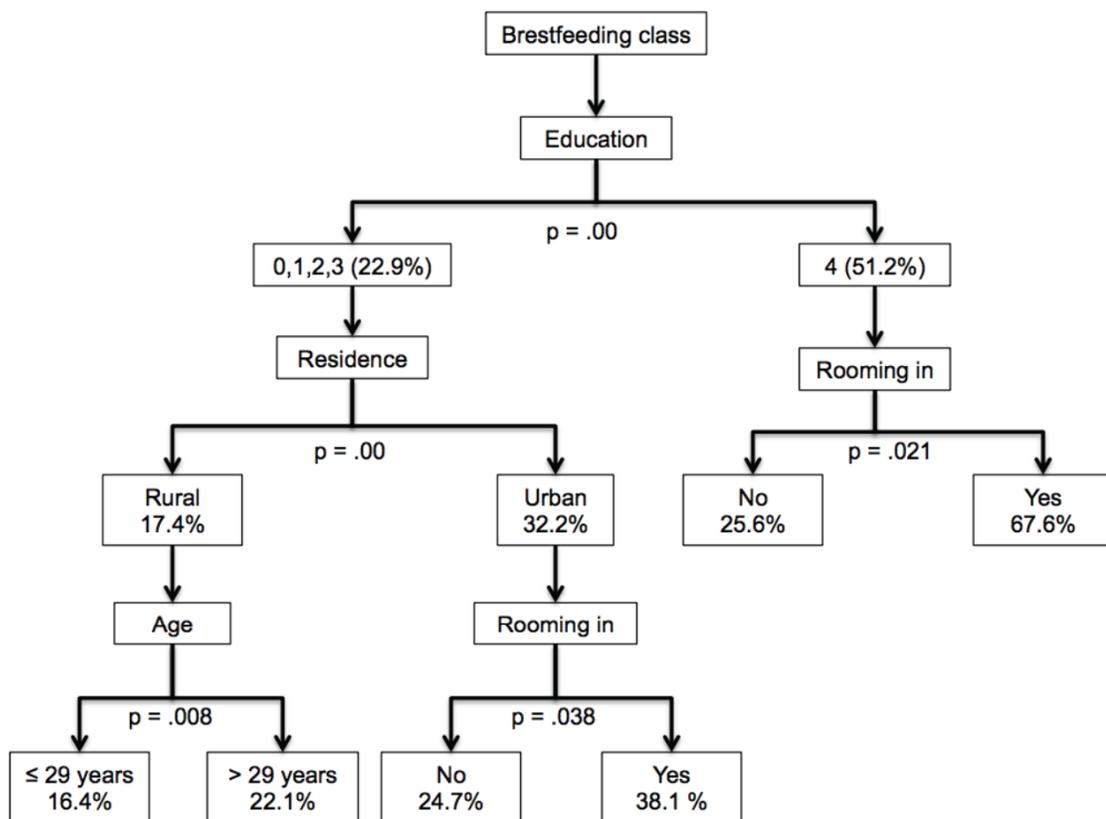
Significant differences between children born by vaginal birth and those born by caesarian section and no one between pre labor or in labor caesarian section were noticed (Table 3). Shorter time intervals from birth to the first breastfeed contact was revealed in pre labor C-section (average = 20.7 h, median = 12 h) than in labor C-section (average = 21h, median = 14h), explainable by the health problems usually encountered by the mother and the new borne in C-section by necessity. The shortest time to first breastfeeding contact was recorded for the vaginal birth (average = 7.94 h, median = 4 h).

The distribution of the time to first breastfeeding contact was wider for C-section than for vaginal birth. Comparative results for the time to breastfeed contact and breastfeed duration are presented in Figure 2 ( $\chi^2$  test,  $p = 0.91$ ). Differences were maintained, however, for residence, advice to breastfed and parity.

The prenatal counseling is correlated with breastfeeding duration only for the subgroup participating to a structured, distinct time slot from the consultation, fee for service program ( $r = 0.079$ ;  $p = 0.014$ ); the partial correlation had as control variables mother's age, education, residence, time to first breastfeeding contact to breastfeed, type of birth and rooming in. For all other forms of perinatal education provided during pregnancy, the association

**Table 2: Correlation between Breastfeeding Duration and the Characteristics of the Group**

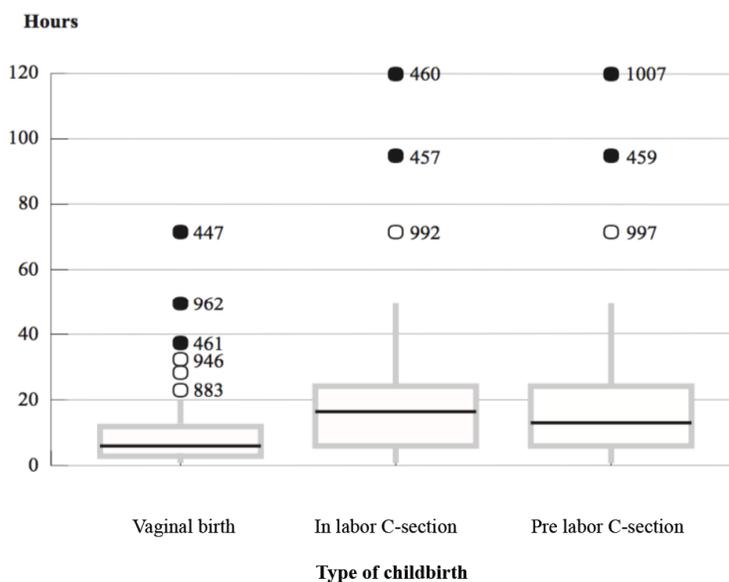
Independent variable	Breastfeeding duration	
	Corelation coefficient (Spearman's Rho)	Statistical significance (p)
Residence	.176	< .001
Mother's education level	.196	< .001
Mother's age	.067	.035
Parity	.001	.964
Type of childbirth	-.063	.048
Rooming in	.197	< .001
Breastfeeding counsel during hospitalization	-.095	.003
Time to breastfeed contact	-.095	.004



**Figure 1: Classification tree of breastfeeding.** Percents represent women from the 4 classes of breastfeeding in the respective group. Education levels are expressed by figures from 0, to 3, as following: 0 = elementary education, 1 = education level up to high school, 2 = high school, 3 = bachelor + 2 level, 4 = university degree or higher.

**Table 3: Duration of Breastfeeding According to Different Types of Delivery**

	chi2	p
Vaginal v. In labor C-section	101.4	< .001
Vaginal vs. Prelabor C-section	140.4	< .001
In labor C-section vs. Prelabor C-section	.221	.638



**Figure 2:** Average and median time to breastfeed for different types of childbirth.

is non-significant, with the exception for the gynecologist visits, where a negative correlation was found. 500 of the interviewed mothers (49.60%) used the Internet as a source of information; they were mainly primiparous, with residence in urban areas and 66.66% had a university degree. However, 37.3% of the internet users came from rural areas. The average age was significantly higher (29.64 v. 27.69 years) in the Internet users.

The analysis based on type of mother (traditionalist or active seeker) identified positive associations between the predominant breastfeeding duration and the active seeker profile ( $r = 0.22$ ,  $p < 0.000$ ). In these women, search for the online information was significantly correlated with search of the information in the print media ( $r = 0.068$ ,  $p = 0.043$ ) or TV ( $r = 0.095$ ,  $p = 0.005$ ). Negative association was identified with the advice given by relatives ( $r = -0.073$ ,  $p = 0.023$ ) or from a medical visit that was not dedicated to the perinatal counseling ( $r = -0.077$ ,  $p = 0.016$ ). The correlations were corrected for all other influencing variables (age, hospital organization, type of childbirth, breastfeeding initiation) previously identified and the association and significance level is obtained after this correction was done.

## DISCUSSION

The most important findings of our study consisted in the association between the predominant breastfeeding duration and a particular behavior profile of the pregnant women and no association between breastfeeding duration and the standard perinatal

education provided through the medical system. These are not surprising results, if we consider adult education as an interactive process, driven by the motivation of the trainee.

Most of the previous studies had focused on the medical provider. A Cochrane Meta analysis [7] showed there is no evidence regarding the improvement of the breastfeeding duration for none of the current methods of prenatal education related to breastfeeding. We also did not find an influence of the pro-breastfeeding advice during the regular medical visits and the breastfeeding duration; similar to our results, other authors have found that neither the number of prenatal visits, nor the time of the initiation of these visits (before 17 weeks of pregnancy) have influence on breastfeeding duration [8]. As literature mentioned [8,9], we found a negative association with the gynecologist visit. The regular medical visits, perceived both by the pregnant women and the medical provider as having another main scope, particularly for the more complex situations referred to the gynecologist, seems to be inefficient for the transmission or the reception of messages concerning breastfeeding. Another factor could be the low level of efficiency of the education provided by medical staff, with insufficient gain of the competencies and the communication skills concerning breastfeeding and maintenance of an ambivalent attitude regarding this recommendation [10].

We found a positive association of the prenatal education only with the structured, fee for service education, provided by midwives and nurses with

special training in breastfeeding education. The efficacy of this type of education makes the link to the other actor of the process: the pregnant women. There are few studies that have identified the profile and the adequacy of the tools to the mother's perceived needs. However, the high level of education was related, as in our study, with a longer breastfeeding duration [8,11,12] and explained by the contribution of the general education to the development of the cognitive, decision and problem solving capacity, the increase of the efficiency of the learning process, empowerment and auto control [13]. A specificity of our study population is that, in Romania, none of the formal education curricula includes any form of pre-breastfeeding education, the sole source of prenatal education being the non-formal one; from this perspective, there is no bias of the instruction level in our results.

The pregnant women web-based counseling is growing in the last decade [14]: the characteristics of our Internet users respondents are primiparity, urban residence, a university degree and an older age. The anonymity, the simplicity, freedom of choice, the quick access is sufficient reasons for the usage of this information tool [15]. The preferences for on line education include simple solutions, support for a certain activity [16], the search for the normal body modification or for the fetal development, and the comparison with other experiences, positive or negative [17].

Two step Cluster analysis, using Schwartz's Bayesian criterion as clustering criterion, has identified, from the predominant breastfeeding duration, 2 profiles: the first are the mothers engaged in an active behavior towards breastfeeding, initiating the on line search for information or who voluntarily participate to paid services. We found significant differences between the active seekers and the traditionalists.

Active seekers are mainly women with high level of education, living in urban areas, primiparous and seeking for hospitals with rooming in facilities. From the mode of birth, they tend to have more vaginal birth and pre labor C-section. The active search of information is a motivation indicator and is a good predictor of the breastfeeding duration [18].

The other profile is of the traditional mother; these mothers are influenced by their relatives, including the husband and receive counseling in a passive way, during the medical visits. The differences between the 2 behaviors are significantly reflected in the breastfeed

duration. Therefore, promotion of selected sites and encouraging the voluntary participation in educational programs during the regular medical visits could raise the favorability for breastfeeding more than the transmission of an encouraging message among other information and medical advices. The combination of the advantages of the direct encounter with the on line education is not enough studied, although positive effects have been reported, particularly in pregnancy related pathologies [15,19,20,21].

We confirm some other socio-demographical factors of influence registered in other studies: breastfeeding duration is higher in urban against rural areas and in mothers with high level of education [11,22]. These mothers are also active seekers. Age between 25-30 was associated with the maximum length of breastfeeding, as found in other studies [11].

Vaginal birth was also related to a significantly longer breastfeeding duration, as found by others [23, 24].

Pre labor C-section had a negative influence on the breast feeding duration, [23] if there is a late initiation of breastfeeding. In our study, we found differences between the pre labor and the in labor C-section, but they did not reach statistical significance. The time to breastfeeding contact varies more for C-sections, than for vaginal birth, showing that C-section, by itself, is not an impediment for breastfeed that cannot be solved. Taking in account the median time until the first breastfeeding, it seems that even in C-section cases, when delayed breastfeeding is often encountered, giving a try has good consequences, rising the chances of a longer period of breastfeeding in month to come (especially in C-section for necessity). There are significant differences on time to first breastfeeding contact between vaginal birth and all C-section births.

The breastfeeding duration and the time to breastfeeding contact is important for breastfeeding initiation [25]. In our group, we found it statistically significant only inside the group with vaginal birth. In the C-section group, the main duration between birth and time to breastfeeding contact is much higher, but there was no correlation with breastfeeding duration.

The Mother-Baby Friendly Hospital organization had a positive influence on breastfeeding duration (the rooming in system, the fast initiation of breastfeeding, breastfeeding on demand) and contributes the short and long term well known positive effects of breastfeeding [26]. Similar results have been found in

different countries [27,28] and also in another Romanian study in 2011 [29]. This hospital model from more than 6 years in many hospitals in our country gave positive results, in contrast with the findings of an Italian study that analyzed a recently implementation plan that did not showed significant improvement [30].

The shorter than recommended breastfeeding duration is, unfortunately, a conclusion of many other studies from all around the world [2, 3, 31] and of the previous national study concerning this topic [29] and remains an important public health issue to be solved. In this respect, our study confirms the average duration and highlights the necessity to increase perinatal education and breastfeeding awareness among the general population, as there are short and longterm consequences on child development and nutrition related diseases [32-35].

## LIMITATIONS

Our study registered only retrospective data. WHO recommends calculation of the exclusive breastfeeding rate using the 24 h recall for the child population between 0-6 months? This methods better reflects the exclusive breastfeeding (removing the errors related to the introduction of liquids) but is not a prevalence indicator.

Therefore, many studies have analyzed the prevalence of breastfeeding using the retrospective interview, assuming the risk of transforming the results from the exclusive breastfeeding into predominant breastfeeding [8,24]. Compared to typical food frequency questionnaires, the moment of introduction of other solid foods in the infant nutrition is better remembered by mothers and the chance of error is reduced.

On the other hand, even if only for predominant breastfeeding, our main results related to the favorable or negative associations maintain their viability.

## CONCLUSIONS

Ignoring mothers' profile could be the explanation for failure of the current pro breastfeeding medical education programs. The complementarity of the information reached via the Internet with the voluntary participation to perinatal education sessions reflects the motivation to maintain the optimum duration of the breastfeeding and are significant factors associated to longer breastfeeding duration.

Identification of the best education for increasing exclusive breastfeeding should consider not only the education of the medical personnel but also social marketing tools to promote the transformation of the future mother from a traditionalist to an active seeker. Our study implicitly supports the necessity, in terms of public health strategies, of an early education process, before pregnancy, in order to create a general favorability for exclusive breastfeeding. This favorability could create the necessary premises to the successful implementation of the healthy nutrition programs during the first year of life, a significant public health determinant.

## AUTHOR STATEMENT

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## CONFLICT OF INTEREST

The founder had no role in the study design, collection, analysis and interpretation of data. Marina Ruxandra Oțelea was employed by White Cross Foundation as lecturer in the Stand by Mums Project. None of the other authors have conflicts of interests to declare.

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