

Factors associated with initiation and duration of breastfeeding in Italy

E Riva¹, G Banderali¹, C Agostoni¹, M Silano¹, G Radaelli² and M Giovannini¹

Department of Pediatrics¹, San Paolo Hospital, Milan, Italy; Department of Informative Systems², University of Milan, Milan, Italy

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To evaluate factors associated with initiation and duration of breastfeeding in Italy, 1601 (73%) respondents among 2192 randomly selected mothers were interviewed within 1 mo of delivery. Mothers who started breastfeeding (85%) were followed-up for 12 mo. A compliance rate of 100% was obtained. At multiple logistic regression analysis, mother having been breastfed herself ($p < 0.01$), nursing guidance in the maternity ward ($p = 0.01$) and higher social class ($p = 0.03$) were positively associated with initiation of breastfeeding. We found that 42%, 19%, 10% and 4% mothers were still breastfeeding at 3, 6, 9 and 12 mo after delivery, respectively. Cox multiple regression analysis showed a negative association between duration of breastfeeding and pacifier use ($p < 0.01$), and a positive association with a higher level of maternal education ($p = 0.04$). Formula supplementation in the maternity ward (given to 30% of infants) was associated with a shorter duration of exclusive breastfeeding ($p = 0.03$). Mothers need support with breastfeeding, particularly those from lower social backgrounds and with lower levels of education. Early use of the pacifier should be discouraged. □ *Breastfeeding duration, breastfeeding initiation, breastfeeding practice*

M Giovannini, Department of Pediatrics, San Paolo Hospital, 8 Via A di Rudinì, I-20142 Milan, Italy

Rates of breastfeeding initiation and duration are higher in Scandinavian countries, where policies aimed at breastfeeding promotion have been implemented more than in other industrialized nations (1–5). The current prevalence of breastfeeding in Italy as a whole is unknown. No national nursing guidelines are implemented and local health authorities do not actively promote breastfeeding. Even if nursing seems to be the most frequent method of feeding at hospital discharge, the identification of factors associated with its initiation and duration might encourage its practice.

The objectives of the Puer Project were to obtain a cross-sectional assessment of breastfeeding initiation and duration in Italy and to determine the associated social and biological factors.

Subjects and methods

In total, 2400 infants were randomly selected from all live births recorded in the National Birth Register during November 1995. Italy's 20 administrative regions were surveyed. Some infants (208) were excluded for non-compliance with the following inclusion criteria: weight at birth above 2500 g (59 infants), singleton (9 infants), gestational age between 37 and 42 completed weeks (133 infants), absence of disease or congenital malformations (7 infants). Thus, 2192 eligible infants were considered. A telephone ques-

tionnaire was administered 1 mo after delivery. In total, 494 (22.5%) mothers could not be contacted (101 because of errors in telephone and/or street address, 49 did not have a telephone, 47 had moved and 297 did not respond to 3 calls at daily intervals). Out of 1698 contacted, 1601 (94.3%) mothers agreed to be interviewed. No differences in infants' gender, birth weight, gestational age, mother's age or geographical distribution were found between polled and unpolled mothers, nor between responders and non-responders. Mothers who started breastfeeding (1365) were followed up by resubmitting the questionnaire quarterly and up to 12 mo after delivery, with 100% compliance.

Italy's 20 administrative regions were grouped into 5 major regional areas (North-west, North-east, Centre, South and Islands) to allow for economical, historical and cultural differences.

From the first interview, a description of the maternity care, nursing guidance and feeding methods during the early days of life was obtained. Full demographic, social and anthropometric data for infants and parents were also collected. The maternal education level was rated by the number of school years and coded in accordance with the Italian school system, i.e. low (8 y or less), medium (9–13 y) or high (14 y or more). Social class was rated on five levels, according to the National Institute of Statistics. Mothers' weight and body mass index (BMI) were based on pre-pregnancy medical records. Nipple protractility improvement

Table 1. Regional distribution of mothers and percentage of breastfeeding initiation.

Regional area	Mothers n (%)	Breastfeeding initiation n (%)
North-west	391 (24.4)	323 (82.6)
North-east	326 (20.4)	296 (90.8)
Centre	322 (20.1)	269 (83.5)
South	384 (24.0)	342 (89.1)
Islands	178 (11.1)	135 (75.8)
Whole country	1601 (100)	1365 (85.3)

training was provided to mothers during pregnancy to build up confidence with the handling of their breasts ("breast preparation"). An infant was defined as a pacifier user if he/she started using the pacifier within the first month of life. Type of breastfeeding was classified according to WHO criteria (6).

Comparison between groups was performed by means of the Student's *t*-test for continuous variables and by the χ^2 test for discrete variables. A multiple logistic regression analysis was carried out to estimate the independent contribution and the corresponding odds ratio (OR) of each considered variable on breastfeeding initiation. Factors associated with a $p < 0.05$ at univariate analysis were analysed by multiple logistic regression together with infant's gender, mother's age and BMI, and parity. Social class was entered as a three-level factor, while smoking habits were dichotomized as "yes" or "no". OR and 95% confidence interval (CI) were calculated. The curves of the one-year breastfeeding duration were constructed according to the Kaplan-Meier method and compared by the log-rank test. The Cox regression analysis was used to determine variables associated with the duration of breastfeeding. Significance was tested by the likelihood ratio test statistic. Variables associated with a $p < 0.05$ at univariate analysis entered the multiple model together with the infant's gender, mother's age and BMI, and parity. Their rate ratio (RR) and the corresponding 95% CI were calculated. The SPSS 7.5 statistical package for Windows (SPSS Inc., Chicago, IL, USA) was used in the statistical analysis.

Results

Initiation of breastfeeding

Initiation of breastfeeding occurred in 1365 (85.3%) mother-infant pairs and in 1150 it was exclusive (supplements of clear fluids, i.e. water, tea and/or camomile without added sugar were allowed). The rate of breastfeeding ranged from 75.8% in the islands to 90.8% in the north-eastern area (Table 1). The rate in the islands was significantly lower than in the continental area (86.4%) ($p < 0.0001$).

In the first 3 days of life, 477 (29.8%) infants received maternal milk only, 414 (25.9%) received maternal

milk and clear fluids, and 474 (29.6%) maternal milk with formula supplements, while 236 (14.7%) received only formula.

Table 2 shows maternal and infant characteristics according to the type of feeding. At univariate analysis, breastfeeding mothers showed a pre-pregnancy body weight slightly lower than the non-breastfeeding ones (mean difference -1.6 kg, 95% CI $-3.1, -0.1$ kg) and a shorter stay in the maternity ward (mean difference 0.6 days, 95% CI 0.9, 0.3 days). Mothers from a more socially advantaged background were seen as more likely to initiate breastfeeding. Indeed, the higher the social class, the higher the breastfeeding rate (91.1% vs 81.2%, OR = 2.35, 95% CI 1.10, 5.18). A positive association was seen between higher breastfeeding rate and nursing guidance in the maternity ward (89.1% vs 81.2%, OR = 1.89, 95% CI 1.41, 2.54), mother having been breastfed herself (87.0% vs 78.8%, OR = 1.80, 95% CI 1.30, 2.50), breast preparation (88.8% vs 82.6%, OR = 1.67, 95% CI 1.23, 2.25) and working mother (87.5% vs 81.9%, OR = 1.54, 95% CI 1.15, 2.06). Smoking habits were negatively associated with breastfeeding initiation (86.8% in non-smokers vs 76.8% in smokers, OR = 2.06, 95% CI 1.38, 3.18). Multiple logistic regression analysis identified mother having been breastfed herself ($p = 0.009$), nursing guidance in the maternity ward ($p = 0.013$) and mother from high social class ($p = 0.031$) as variables independently and positively associated with breastfeeding initiation (Table 3).

Duration of breastfeeding

The prevalence of breastfeeding during the first year is shown in Fig. 1. At 3, 6, 9 and 12 mo of age, 41.8%, 19.4%, 9.9% and 4.0% of infants, respectively, were still breastfed. The rate of exclusive breastfeeding was 37.3%, 8.1%, 1.3% and 0.06% at 3, 6, 7 and 9 mo, respectively.

The duration of breastfeeding was significantly shorter in the islands than in the continental area both for total duration (median 2.4 vs 3.0 mo, $p = 0.005$) and exclusive breastfeeding (median 2.7 vs 3.2 mo, $p = 0.022$). Among mothers who started breastfeeding, 21.7% put their infants to the breast within 1 h of delivery, 63.6% between 1 and 24 h and 14.7% more than 24 h. The pacifier was used by 996 (73.0%) infants during the first month of life. At univariate analysis, the total duration of breastfeeding was negatively associated with the use of the pacifier (RR = 1.30, 95% CI 1.18, 1.50) and mothers' smoking habits (RR = 1.26, 95% CI 1.03, 1.54). A higher level of maternal education was positively associated with the duration of breastfeeding (RR = 0.98, 95% CI 0.97, 0.99). The same analysis performed with duration of exclusive breastfeeding showed a negative association with the use of the pacifier (RR = 1.42, 95% CI 1.24, 1.62), mother's smoking habits (RR = 1.34, 95% CI 1.10,

Table 2. Maternal, demographic, anamnestic and infants' characteristics and initiation of breastfeeding. Values are expressed as means \pm SD or percentages (number of observations).

Characteristic	Breastfeeding	Non-breastfeeding	p^a
Mother's age (y)	30.1 \pm 4.9 (1350)	30.6 \pm 4.9 (234)	0.087
Mother's weight (kg)	61.6 \pm 9.4 (1330)	63.3 \pm 11.0 (226)	0.038
Mother's height (cm)	163.2 \pm 6.1 (1347)	163.8 \pm 5.9 (231)	0.173
Mother's BMI (kg/cm ²)	23.1 \pm 3.3 (1329)	23.5 \pm 3.7 (226)	0.128
Mother's education	(1365)	(236)	
Mean level (y)	11.0 \pm 3.4	10.6 \pm 3.6	0.108
Low (<8 y)	44.5%	50.0%	
Medium (9–13 y)	44.8%	39.8%	0.196 ^b
High (>14 y)	10.7%	10.2%	
Working mother	63.3% (1336)	52.8% (229)	0.003
Social class	(1351)	(232)	
Mean class score	3.1 \pm 1.2	3.4 \pm 1.2	0.010
Class score:			
1 (high)	7.5%	4.3%	
2	31.1%	27.2%	
3	16.6%	17.2%	0.010 ^b
4	29.1%	30.2%	
5 (low)	15.7%	21.1%	
Mother's smoking habits during pregnancy	(1365)	(236)	
Cigarettes (<i>n</i> per day):			
None	86.1%	75.7%	
1–5	6.3%	9.8%	
6–15	5.8%	11.9%	< 0.001 ^b
>15	1.8%	2.6%	
Average <i>n</i> among smokers	7.9 \pm 5.8 (189)	8.0 \pm 5.5 (57)	0.846
Mother having been breastfed herself	80.3% (1305)	69.3% (225)	< 0.0001
Breast preparation during pregnancy	45.1% (1365)	33.1% (236)	< 0.001
Training course during pregnancy	37.6% (1365)	31.4% (236)	0.078
Primiparous	43.5% (1365)	49.6% (236)	0.097
Caesarean section	15.3% (1365)	19.1% (236)	0.173
Nursing information derived from the media	82.8% (1365)	78.4% (236)	0.104
Nursing guidance in the maternity ward	53.8% (1365)	38.1% (236)	< 0.0001
Rooming-in	44.5% (1365)	42.4% (236)	0.583
Duration of stay in the maternity ward (d)	4.7 \pm 1.8 (1365)	5.3 \pm 2.0 (236)	< 0.0001
Infant gender (F)	50.3% (1365)	47.9% (236)	0.546

^aStudent's *t*-test or χ^2 test.

^bOne d.f. χ^2 test for linear trend.

Table 3. Multiple logistic analysis. Variables significantly associated with breastfeeding initiation.

Variable	β	SE (β)	OR	95% CI
Mother having been breastfed herself	0.51	0.19	1.67	(1.14, 2.46)
Nursing guidance in the maternity ward	0.44	0.17	1.55	(1.10, 2.19)
Social class ^a				
High vs low	0.84	0.39	2.32	(1.08, 4.99)
Intermediate vs low	0.52	0.38	1.68	(0.79, 3.57)

^aHigh: class score 1, Intermediate: class score 2 + 3 + 4, Low: class score 5.

1.64), formula supplements given in the maternity ward (RR = 1.18, 95% CI 1.03, 1.36) and the mother's BMI (RR = 1.02, 95% CI 1.00, 1.04). There was a positive association with the level of maternal education (RR = 0.97, 95% CI = 0.96, 0.98) and mother's age (RR = 0.98, 95% CI 0.97, 1.00). At multiple Cox regression analysis, the total duration of breastfeeding was negatively associated with pacifier use ($p = 0.008$) and positively with the level of maternal education (high vs low, $p = 0.041$) (Table 4). The duration of exclusive breastfeeding was negatively associated with pacifier use ($p < 0.0001$) and the introduction of

formula supplements in the maternity ward ($p = 0.035$). A positive association was found with maternal education level (high vs low, $p = 0.010$) (Table 4).

Formula supplements

No specific investigations were planned to determine factors associated with the administration of formula in the maternity ward, and no specific information is available on why and when it should have been given. Mothers and personnel were not given particular

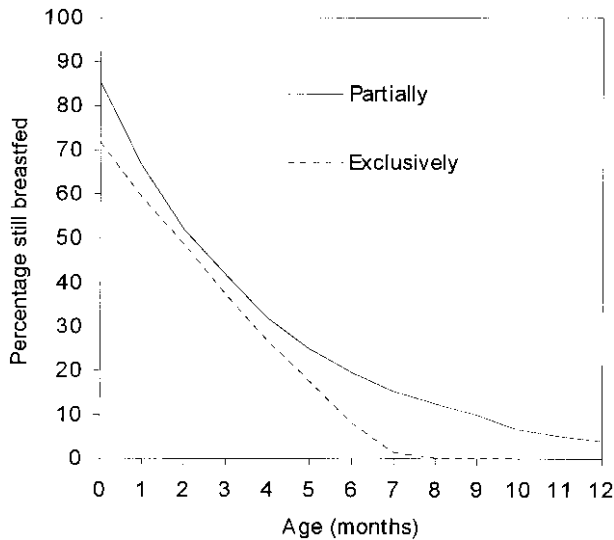


Fig. 1. Percentage of infants partially or exclusively breastfed during the first year of life.

guidelines and/or instructions. However, a multiple logistic analysis showed that infants were more likely to receive formula in the following situations: mother not having been breastfed herself, lower maternal education level, smoking mother, no nursing guidance, rooming-in not available (data not shown).

Discussion

Guidelines for the implementation of breastfeeding practice in Italy are lacking. We attempted to investigate the factors associated with rates of initiation and duration of breastfeeding to provide health authorities with reliable data. The Puer Project primarily focused on these aspects. The incidence rate of breastfeeding initiation in Italy (85.3%) is comparable with that of Spain and Germany, but below that of Scandinavian countries and Portugal (7). Prevalence of breastfeeding in Belgium, France and the United Kingdom is lower than the latter (7) and even lower in Ireland, where a goal of an overall breastfeeding initiation rate of 50% by the year 2000 has been established by the government (8). Nations outside Europe have shown an

initiation rate of 69%, 83% and 100% in Canada (9), Mexico (10) and Chile (11), respectively. In the United States, a breastfeeding initiation rate of 59% has recently been reported (12).

Our study showed a major geographical difference between the mainland area of Italy and the islands (especially Sicily), where nursing practice has still room for improvement. An independent positive association of breastfeeding initiation has been found with mothers having been breastfed themselves. This factor, still poorly investigated, has occasionally been reported (13). It might be interpreted as a marker of sociocultural and/or physical factors predisposing mothers towards breastfeeding. In this context, it should be pointed out that mothers who had been breastfed themselves had a slightly lower body weight than non-breastfed mothers (mean \pm SD, 60.9 ± 9.0 vs 62.1 ± 9.8 kg, $p = 0.047$), whereas body height was comparable in both groups (163.1 ± 5.7 vs 163.3 ± 6.1 cm, $p = 0.546$). We also emphasize the positive role of correct and appropriate information for breastfeeding initiation. While nursing guidance in the maternity ward seems to play a major role, other preparatory measures, such as pre-nursing breast preparation, show an association with the initiation of breastfeeding. Since breast care is part of the nursing training course during pregnancy, a more supportive approach to promote breastfeeding success cannot be encouraged enough (14). The positive association between breastfeeding initiation and high socioeconomic level is typical of western countries, while the opposite may be true for developing countries (15). Smokers and non-working mothers were less likely to start breastfeeding. This association, however, was not significant when adjusted for social class. We may suppose that working mothers in industrialized countries who follow a career come from higher social backgrounds and thus have higher levels of education. They may also become more motivated to adopt a healthy lifestyle, including breastfeeding.

The duration of breastfeeding shows a rapid decline. Less than 50% of mothers who started breastfeeding were still nursing their infants 3 mo later. The associations of shortened breastfeeding duration with pacifier use and lower maternal level of education have been recognized by other studies (5, 16). Association with smoking in univariate analysis suggests a link with

Table 4. Multiple Cox regression analysis. Variables significantly associated with stopping breastfeeding.

Variable	Partial breastfeeding				Exclusive breastfeeding			
	β	SE (β)	RR	95% CI	β	SE (β)	RR	95% CI
Pacifier use ^a	0.16	0.06	1.18	(1.04, 1.34)	0.30	0.06	1.35	(1.18, 1.55)
Maternal education level:								
High vs low	-0.12	0.06	0.88	(0.78, 1.00)	-0.26	0.10	0.77	(0.63, 0.94)
Medium vs low	-0.14	0.09	0.89	(0.74, 1.07)	-0.10	0.06	0.90	(0.80, 1.02)
Formula supplements in the maternity ward ^a	-	-	-	-	0.13	0.06	1.14	(1.01, 1.30)

^aYes vs no.

other sociocultural factors. Formula supplements in the maternity ward were negatively associated with the duration of exclusive breastfeeding. It is unclear whether more infants could have been successfully breastfed if not oversupplemented with formula. The question is not settled on this issue (17), as low amounts of formula supplementation have also been reported not to affect breastfeeding negatively (18). The negative association of formula supplementation with duration of exclusive breastfeeding supports the argument against its use. However, it remains controversial "whether formula supplementation *causes* breastfeeding problems or whether formula use is *an indicator* of feeding difficulties" (14, p. 521). Judgement must similarly be withheld on pacifier use.

On the whole, the rate of breastfeeding initiation in Italy may be judged satisfactory, with some geographical differences. Our data emphasize the major roles of sociocultural background and correct information about breastfeeding. Much work remains to be done in order to increase the duration of breastfeeding. Furthermore, factors associated with breastfeeding duration are also implicated in breastfeeding initiation, and various social and environmental peculiarities remain unfavourable to the widespread practice of breastfeeding. The early administration of formula supplements in the maternity ward may contribute to this unfavourable environment. Mothers should be provided continuous support to opt for and maintain nursing, and not just in the hospital environment. Campaigns aimed at improving nursing should mainly be directed towards less socially advantaged women. The improvement of information, which should include antenatal courses, nursing guidance in the ward and a paediatrician's follow-up, should be aimed at persuading more mothers to nurse and maintain breastfeeding throughout the first year of life (12).

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