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Factors affecting exclusive breastfeeding in Poland: cross-sectional survey of population-based samples

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Summary

Objective: To identify factors affecting exclusive breastfeeding in maternity hospital care and during the first six months after birth.

Methods: Two cross-sectional surveys form the basis of this study: the first, conducted in 1995 on maternity wards (n = 11 422 newborns) and the second, conducted in 1997 in primary care centers (n = 10 156 infants under six months).

Results: The most meaningful factors in hospital care were: cesarean section, breastfeeding initiation after 2 h, lack of skin to skin contact, use of pacifiers, separation longer than 1h/24 h and health problems of infants. After hospital discharge the most significant factors were: use of pacifiers, mothers reluctance to exclusive breastfeeding longer then four months, low level of mother and father education.

Conclusions: Most of identified factors can be modified so our results can help to introduce more effective target intervention.

Keywords: Exclusive breastfeeding – Determinants – Hospital care – Infants

The 55th World Health Assembly adopted the global strategy on infant and young child feeding which is the guide for country-specific approaches to improving infants feeding practices (WHO 2002). The document recommends that infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. For implementing that recommendation the development of comprehensive national policy based on a thorough assessment of needs was recognised as one of the high-priority actions.

In 1993–1997 a series of national level breastfeeding promotion activities were implemented in Poland with support of the Ministry of Health. They were designed as a national project aiming to increase the number of women initiating breastfeeding after birth and to expand breastfeeding duration with special concern given to exclusive breastfeeding. The first priority of the project was to adjust hospital postpartum care to promote optimal infant feeding in accordance with "Ten steps to successful breastfeeding" (WHO 1989).

The key element of intervention was the evidence-based training programme, designed for the mother and child care staff. As a result of the project, positive changes in infant feeding patterns were observed but the national goals concerning exclusive breastfeeding of newborns and infants in the first six months of life were not attained. In order to identify the barriers for implementation of more effective interventions, the analyses of factors affecting exclusive breastfeeding were undertaken.

Methods

Two sets of information gathered in country-wide independent surveys were used in the analyses: first survey of infants' hospital care after birth conducted in 1995.

Second survey of infants' feeding after hospital discharge up to six months conducted in 1997.

Maternity hospital care

Survey of newborn infant feeding and hospital practices identified in the "Ten Steps to successful breastfeeding" was carried out using special forms completed by hospital staff. The data on pregnancy, delivery, newborn status and feeding practices concerning 11 973 mother-infant pairs were collected at 427 maternity wards. The design and data collection method of the survey were describe elsewhere (Mikiel-Kostyra & Mazur 1999).

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Exclusive breastfeeding was defined in accordance with WHO criteria of feeding categories as infants receiving only breast milk (including expressed milk). Minerals, vitamins and medicines were allowed (WHO 1991).

The subsets of 11422 newborns who initiated breastfeeding (97.2% of whole sample) were included in the statistical analyses. Among them 7870 (68.9%) were exclusively breastfed. The crude odds ratio (OR) and 95% confidence interval [95% CI (OR)] and population attributable risk (PAR %) and 95% confidence interval [95% CI (PAR %)] were calculated from contingency tables to assess the risk of supplementation while in hospital.

Infant feeding pattern in the first six months after hospital discharge

Exclusive breastfeeding up to six months was promoted during the project implementation. In order to evaluate the achievements of the programme, the survey of infant feeding after discharge from hospital up to six months of life was conducted. The information on 14115 infants and their families was collected at 898 randomly selected primary child health care centres between 15 September–15 October 1997. The mothers having infants under six months, visiting the centres in the above mentioned period of time (the first visit) were interviewed by health centre staff using a uniform questionnaire. Infant feeding was assessed on the basis of the past 24-hour recording.

Breastfeeding was defined as at least one feed at the breast in the last 24-hour, exclusive breastfeeding as feeding only breast milk (see definition above). In compliance with these definitions the subsets of 10156 families with breastfed infants at different ages between hospital discharge and six months was identified. Among them 4929 (48.5%) were exclusively breastfed and 5227 (51.5%) supplemented. The socio-demographic factors and some mother and infant characteristics were analysed.

Multiple logistic regression analysis was used to calculate the OR and 95% CI. Data analyses were performed using SPSS 8.0 Software.

Results

Hospital factors

In the analysed sample 97.2% of newborn infants were breastfed and 68.9% among them exclusively breastfed in accordance with WHO definitions.

The effect of pregnancy duration, kind of delivery, newborns status and postnatal care after birth on introduction of supplemental feeding while in hospital is presented in Table 1.

All factors presented in the Table 1 were significant for the chance of exclusive breastfeeding. We found that the highest risk of supplementation was connected with caesarean section (OR = 5.33, CI: 4.76 – 5.96); initiation of breastfeeding later than 2 h after birth (OR = 5.23, CI: 4.80 – 5.70); lack of skin to skin contact after birth (OR = 4.26, CI: 3.88 – 4.68); use of pacifiers (OR = 4.97, CI: 3.83 – 6.45), separation longer than 1 h/24 h during hospital stay (OR = 3.37, CI: 3.07 – 3.69) and infants with health problems (OR = 2.85, CI: 2.59 – 3.13) in decreasing degree.

The analysis of population attributable risk enabled to estimate the percentage of supplementation which could be prevented if analysed factors not favourable to exclusive breastfeeding were eliminated. In other words it helped to identify the most effective interventions in our programme implementation. In details, it was: elimination of separation longer than 1 h/24 h during hospital stay (PAR = 44.9%, CI: 42.0 – 47.9%); early initiation (up to 2 h after birth) of breastfeeding (PAR = 41.3%, CI: 39.3 – 43.6%); skin to skin contact after birth in the delivery room (PAR = 23%, CI: 21.3 – 24.6%); rooming-in during hospital stay (PAR = 22.4%, CI: 20.1 – 24.6%), improvement of feeding practices after caesarean section (PAR = 19%, CI: 17.5 – 20.4%) and more support to feeding of infants requiring special attention (PAR = 15.3%, CI: 13.8 – 16.8%). Other important factors not favourable for exclusive breastfeeding were birth weight under 2500g (PAR = 3.1%, CI: 2.4 – 3.7%) and use of pacifiers (PAR = 3.0%, CI: 2.5 – 3.6%).

After hospital discharge factors

The pattern of infant feeding at different ages in the whole sample is presented on Figure 1.

The results of bivariate and multivariate analyses with OR and 95% CI for 18 factors is shown in Table 2. In the multivariate model some of the factors did not remain significant. Only those independently significant in the multivariate model will be discussed further.

The most influential factor was the use of pacifiers. In both models mothers who gave a pacifier to the infant have more than two times higher risk to give up exclusive breastfeeding earlier (OR = 2.38, CI: 2.17 – 2.61). The second important factor was mothers' attitude towards prolonged breastfeeding (exclusive and total). Mothers were asked to present their opinion on how long infants should be breast fed exclusively and in total. Those who accepted less than four months of exclusive breastfeeding and only six months of overall breastfeeding demonstrated more than twice higher risk of earlier supplementation (OR = 2.16 CI: 1.76 – 2.65 and OR = 2.35 CI: 1.86 – 2.96 respectively) than

Table 1 Perinatal factors and risk of supplemental feeding of infants at hospitals after birth (1995 survey, subset N = 11 422). Odds ratio (OR) and population attributable risk (PAR%) with 95% confidence intervals (CI)

Factors	N[b]	% EB[c]	Risk of supplementation			
			OR	95 % CI (OR)	PAR %	95 % CI (PAR %)
Pregnancy duration[a] (weeks)						
< 37	608	51.0	2.24	1.90–2.65	3.3	2.6–4.1
> 37	10628	70.0	1.00			
Parity[a]						
1	4409	66.0	1.25	1.15–1.35	6.0	3.8–8.2
2 and more	6924	70.8	1.00			
Delivery[a]						
complicated:	2054	39.9	4.59	4.14–5.08	20.5	18.9–22.0
cc	1637	36.3	5.33	4.76–5.96	19.0	17.5–20.4
forceps	91	56.0	2.39	1.54–3.69	0.7	0.3–1.2
normal	9368	75.3	1.00			
Birth weight[a] (g)						
< 2500	471	46.7	2.64	2.19–3.20	3.1	2.4–3.7
≥ 2500	10950	69.9	1.00			
Newborn state[a]						
with problems:	2256	49.5	2.85	2.59–3.13	15.3	13.8–16.8
	998	50.7	2.72	2.38–3.11	7.9	6.7–9.1
hiperbilirubinemia						
asphyxia	156	41.0	4.02	2.88–5.62	2.0	1.5–2.6
adaptation disorder	318	39.0	4.37	3.45–5.54	4.2	3.4–5.0
infections	267	49.8	2.82	2.19–3.62	2.5	1.8–3.2
cong. malformations	71	49.3	2.88	1.76–4.70	0.7	0.3–1.1
healthy	9166	73.7	1.00			
First breastfeeding[a]						
> 2 h after birth	4135	46.2	5.23	4.80–5.70	41.3	39.3–43.6
up to 2 h after birth	7287	81.2	1.00			
Skin to skin contact[a]						
no	2448	42.7	4.26	3.88–4.68	23.0	21.3–24.6
yes	8974	76.0	1.00			
Rooming-in[a]						
no	4452	58.0	2.28	2.10–2.47	22.4	20.1–24.6
yes	6970	75.9	1.00			
Separation[a] (per 24 h)						
> 1h	6672	58.9	3.37	3.07–3.69	44.9	42.0–47.9
< 1h	4750	82.9	1.00			
Use of pacifier[a]						
yes	283	31.8	4.97	3.83–6.45	3.0	2.5–3.6
no	11136	69.8	1.00			
Use of nipple shields[a]						
yes	172	55.2	1.81	1.32–2.48	0.7	0.3–1.0
no	11245	69.1	1.00			

[a] Chi–square $p < 0.001$
[b] Totals vary for different risk factors because of missing data
[c] % EB – % of newborns exclusively breastfed among breastfed

mothers preferring longer feeding in the two examined categories.

Furthermore, the employment status of the parents was also significant. The mothers employment in farming (OR = 1.37 CI: 1.05 – 1.80) or as manual workers (OR = 1.23 CI: 1.06 – 1.43) by comparison to working in the office and fathers unemployment (OR = 1.27 CI: 1.04 – 1.56) independently reduced the chance of exclusive breastfeeding continuation.

Parents' education and mothers' smoking behaviour were important as well. The comparison of women with university education with other groups increased the risk of earlier supplementation especially in the group with primary school education only (OR = 1.39 CI: 1.08 – 1.46). Much the same relation was observed in the fathers' education groups. Smoking mothers had a greater risk to give up exclusive breastfeeding than the never smoking group (OR = 1.29 CI: 1.08 – 1.54) whereas the mothers who smoked in the past but stopped smoking had the lowest risk. However, these differences were not statistically significant (OR = 0.93 CI: 0.81 – 1.06).

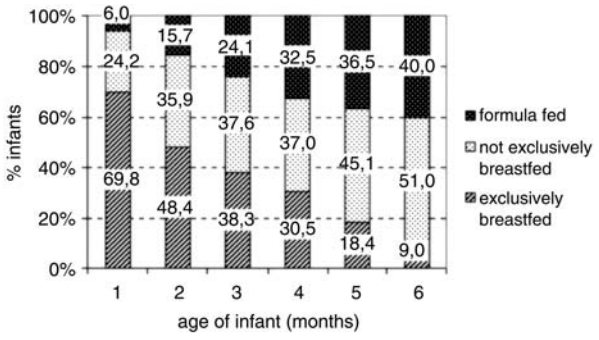

Figure 1 Percentage of infants exclusively and not exclusively breastfed and formula fed in the first 6 months of life (N = 14 115)

Mothers' older than 34 years have an increased risk of shorter exclusive breastfeeding in reference to the 25–34 years group (OR = 1.20 CI: 1.01 – 1.43).

Discussion

There is growing evidence indicating that exclusive breastfeeding of infants in the first 6 months of life is the only physiological norm (Lutter 1992; Cohen et al. 1994; Butte 1996; American Academy of Pediatrics 1997; Dewey et al. 1999). However, this kind of infant feeding is still unattainable in both developing and developed countries (Lutter 2000). The

Table 2 Factors associated with cessation of exclusive breastfeeding after hospital discharge (1997 survey, subset N = 10 156). Logistic regression analysis, bivariate and multivariate odds ratio (OR) and 95 % confidence intervals (CI)

Factors	Infants breastfed at last 24 h					
	N[b]	%	bivariate		multivariate	
			OR	95 % CI	OR	95 % CI
Sociodemographic factors						
Marital status						
concubinage	409	4.1	1.45	1.17–1.79		
single	329	3.3	1.44	1.14–1.83		
married	9220	92.6	1.00			
Place of mothers' residence						
village	3979	39.3	1.15	1.06–1.25		
city	6155	60.7	1.00			
Mothers' age (years)						
< 20	482	4.7	1.92	1.56–2.35	1.23	0.95–1.58
20–24	3580	35.3	1.26	1.15–1.38	0.98	0.87–1.10
> 34	920	9.1	1.12	0.96–1.30	1.20	1.01–1.43
25–34	5166	50.9	1.00		1.00	
Fathers' age (years)						
< 20	86	0.9	2.47	1.53–3.97		
20–24	2023	20.3	1.42	1.27–1.58		
> 34	1813	18.2	1.05	0.94–1.18		
25–34	6027	60.6	1.00			
Mothers' education						
primary	1047	10.3	1.91	1.60–2.29	1.39	1.08–1.79
vocational	3315	32.7	1.84	1.60–2.12	1.35	1.10–1.66
secondary technical	2537	25.0	1.37	1.18–1.58	1.09	0.90–1.31
secondary general	2015	19.9	1.49	1.28–1.74	1.21	1.00–1.46
university	1230	12.1	1.00		1.00	
Fathers' education						
primary	871	8.7	1.73	1.42–2.10	1.12	0.86–1.46
vocational	4946	49.6	1.86	1.61–2.15	1.33	1.08–1.64
secondary technical	2361	23.7	1.54	1.32–1.80	1.31	1.07–1.59
secondary general	700	7.0	1.39	1.13–1.70	1.11	0.87–1.40
university	1086	10.9	1.00		1.00	
Sector of mothers' work						
private sector	3055	30.3	1.17	1.06–1.30		
student	3404	33.8	1.30	1.03–1.63		
unemployed	389	3.9	1.15	1.04–1.28		
public sector	3235	32.1	1.00			
Sector of fathers' work						
private sector	3420	34.4	1.08	0.99–1.19		
student	5536	55.7	1.36	0.93–1.97		
unemployed	132	1.3	1.37	1.16–1.60		
public sector	857	8.6	1.00			

Table 2 (continued)

Factors	Infants breastfed at last 24 h					
	N[b]	%	bivariate		multivariate	
			OR	95 % CI	OR	95 % CI
Mothers' occupation						
unemployed	3549	34.9	1.31	1.18–1.46	1.06	0.92–1.21
manual	2524	24.9	1.57	1.40–1.76	1.23	1.06–1.43
own firm	374	3.7	1.10	0.87–1.38	0.98	0.75–1.29
farming	723	7.1	1.26	1.06–1.50	1.37	1.05–1.80
office worker	2986	29.4	1.00		1.00	
Fathers' occupation						
unemployed	1130	11.1	1.71	1.47–2.00	1.27	1.04–1.56
manual	5155	50.8	1.50	1.35–1.68	1.13	0.97–1.31
own firm	930	9.2	1.18	1.00–1.39	1.08	0.89–1.32
farming	845	8.3	1.18	1.00–1.41	0.81	0.63–1.05
office worker	2096	20.6	1.00		1.00	
Mothers' smoking behaviour						
smokes	810	8.0	1.48	1.27–1.73	1.29	1.08–1.54
stopped smoking	1345	13.3	1.03	0.91–1.16	0.93	0.81–1.06
never smoked	7962	78.7	1.00		1.00	
Fathers' smoking behaviour						
smokes	4738	47.6	1.14	1.04–1.24		
stopped smoking	645	6.5	1.14	0.96–1.36		
never smoked	4569	45.9	1.00			
Infants` factors						
Gender						
male	5052	49.8	1.10	1.01–1.20		
female	5100	50.2	1.00			
Birthweight (g)						
< 2000	57	0.6	1.55	0.88–2.76		
2000–2499	287	2.8	1.36	1.06–1.75		
2500–2999	1456	14.3	1.07	0.95–1.21		
≥ 3000	8352	82.3	1.00			
Pacifier use						
yes	5167	51.0	2.49	2.28–2.71	2.38	2.17–2.61
no	4957	49.0	1.00		1.00	
Maternal factors						
Order of children						
3	1294	12.8	1.05	0.92–1.21	0.98	0.85–1.15
≥ 4	784	7.7	1.28	1.08–1.51	1.17	0.96–1.42
1	4742	46.8	1.44	1.31–1.58	1.46	1.31–1.64
2	3319	32.7	1.00		1.00	
Maternal opinion on optimal breastfeeding duration (months)						
< 7	501	5.0	3.33	2.70–4.11	2.35	1.86–2.96
7–12	6784	67.1	1.54	1.40–1.70	1.45	1.30–1.60
> 12	2828	28.0	1.00		1.00	
Maternal opinion on optimal exclusive breastfeeding duration (months)						
< 4	633	6.3	2.93	2.43–3.52	2.16	1.76–2.65
≥ 4	9492	93.7	1.00		1.00	

[a] Only factors significantly ($p < 0.05$) associated with cessation of exclusive breastfeeding are shown
[b] Totals vary for different risk factors because of missing data

factors determining the duration of exclusive breastfeeding in different studies are numerous. They usually are identified as quality of newborns care, mothers characteristics and other biological agents.

In our experience the increase in exclusive breastfeeding has appeared to be the most comprehensive indicator reflecting the effect of promoting interventions. In that context it was of interest to identify the factors influencing exclusive breastfeeding in our country. The study was done on the basis of two large cross-sectional country-wide samples: newborns at maternity hospitals and population-based sample of infants under six months.

Factors shaping mother and infant care in the first days of breastfeeding initiation are crucial to the whole nursing process. The fact that many infants leave hospitals already supplemented is significantly contributing to the decline in

exclusive feeding of mother's milk. In our specific situation the improvement of feeding practices after caesarean delivery (OR = 5.33 for supplementation), infants with problems after birth (OR = 2.85) and low birth weight infants (OR = 2.64) appeared to be the first priority intervention which should be considered. Moreover, the early initiation of breastfeeding and skin to skin contact after birth with subsequent rooming-in without separation were identified as the procedures which can make the significant difference. The calculation of PAR showed that initiation of feeding in the first 2 h can increase exclusive breastfeeding in our maternity hospital by more than 40%, avoidance of separation during hospital stay by almost 45% and early mother-infant body contact by 23%. The other analyses based on the presented data disclosed that practices conducive to breastfeeding tend to cluster in one hospital, so that implementation of one supportive procedure can help to introduce others (Mikiel-Kostyra et al. 2002). In our observation the balance can be held by wider implementation to maternity hospitals care the practice of mother and infant skin to skin contact after delivery.

Continuation of exclusive breastfeeding after hospital discharge is determined by factors related to the family and environment in which they live, so it can be in great part country specific. Scientific interest in that kind of infant feeding is rather recent. For this reason there are only a few reports dealing with that problem in European countries and only selected factors were investigated (Michaelson et al. 1994, Ericsen 1999; Riva et al. 1999; Hörnell et al. 1999; Bulk-Bunschoten et al. 2001). In our study 18 factors in which the social and demographic characteristics of family, mother's attitude towards breastfeeding duration and use of pacifiers were included. These two last mentioned appeared to be the most powerful determinants of exclusive breastfeeding duration both in bivariate and multivariate logistic regression analysis. Mothers' opinion concerning the optimal duration of breastfeeding was an important factor determining exclusive breastfeeding in practice. Those who declared as optimal breastfeeding lasting up to six months and exclusive breastfeeding less than four months have a significantly greater risk of earlier supplementation (adjusted OR = 2.35 and 2.16 respectively) than those declaring longer. Other reports confirm that kind of relationship between planned period of breastfeeding and total breastfeeding duration (Scott et al. 1999; Vogel et al. 1999). Efforts focusing on motivation of the mothers to longer exclusive and total breastfeeding are still needed.

The phenomenon of pacifiers has stimulated the scientific interest since Victora et al. (1993) have identified it as an early weaning factor. More recent studies indicate that use of pacifiers shortens also exclusive breastfeeding (Aarts et al. 1999; Howard et al. 1999; Hörnell et al. 1999). It is not clear why pacifiers interfere with breastfeeding. They can only reflect other undermining breastfeeding problems like reluctance or anxiety of mothers (Barros et al. 1995; Victora et al. 1997). The exposure to an artificial nipple can also change the effectiveness of sucking at the breast as a result of nipple confusion and decrease mothers' lactation performance (Newman 1990; Neifert et al. 1995). Arts et al. (1999) conclude in their report that pacifiers shorten exclusive and total breastfeeding even among a group of mothers who were highly motivated to breastfeed.

In our study the use of pacifiers reduced exclusive breastfeeding after birth and this was the strongest determinant of exclusive breastfeeding duration after discharge from hospital. The fact of pacifier use was associated with supplementation after birth (OR = 4.97) and earlier cessation of exclusive breastfeeding after discharge (adjusted OR = 2.35). More detailed analysis of the latter data shows that the risk of supplementation increased with earlier introduction of pacifier to the infants (OR = 3.09 in the first month of exposure, 2.46 in the second month, 2.01 in the third and 1.78 in the fifth month of life). These results support the evidence that pacifiers should be discouraged for breastfed infants.

We found also other statistically significant family characteristics increasing the risk of shorter exclusive breastfeeding: low level of mothers and fathers education (OR = 1.39, OR = 1.12 respectively), active smoking mothers (OR = 1.29), mothers' employment in farming (OR = 1.37) or as manual worker (OR = 1.23) and fathers' unemployment (OR = 1.27) or employment as manual worker (OR = 1.13). In our sample those factors decreased also overall breastfeeding duration. Other studies report them as well (Aarts et al. 1999; Bulk-Bunschoten et al. 2001; Ericsen 1999; Howard et al. 1999; Hörnell et al. 1999; Michaelsen et al. 1994; Riva et al. 1999) and indicate that lower social background of the family undermine breastfeeding and need special attention.

In our study only the age of mothers beyond 34 was independently significant for diminishing the period of exclusive breastfeeding (OR = 1.20). The younger mothers under 20 also supplemented infants earlier but the OR was not statistically significant. In accordance with other reports (Michaelsen et al. 1994) the young and older mothers may need more support in exclusive breastfeeding.

In summary, the conducted studies help us to identify the risk factors affecting exclusive breastfeeding in care of mothers and infants which can be modified. This can help us to better target the intervention.

Zusammenfassung

Faktoren, die ausschliessliches Stillen in Polen beeinflussen: Querschnittsuntersuchungen auf der Bevölkerungsebene

Fragestellung: Es sollen Faktoren identifiziert werden, die das ausschliessliche Stillen in Geburtskrankenhäusern und während der ersten sechs Monate nach der Geburt beeinflussen.

Methoden: Zwei landesweite Querschnittstudien dienen als Grundlage für diese Studie: die erste wurde 1995 in Entbindungsabteilungen durchgeführt (n = 11422 Neugeborene), die zweite, durchgeführt 1997 in Institutionen zur medizinischen Grundversorgung (n = 10156 Kinder unter sechs Monate).

Resultate: Die wichtigsten Faktoren während der Krankenhausaufenthalt waren: Kaiserschnitt, erstes Stillen nach zwei Stunden, Mangel an Berührung, Gebrauch von Beruhigungsmitteln, Trennung für länger als 1 Std./24 Std. und Gesundheitsprobleme der Kinder. Die wichtigsten Faktoren nach der Krankenhausentlassung waren: Gebrauch von Beruhigungsmitteln, Widerwille der Mutter gegen ausschliessliches Stillen länger als vier Monate, niedriges Ausbildungsniveau von Mutter und Vater.

Schlussfolgerung: Die meisten identifizierten Faktoren sind modifizierbar, so dass unsere Resultate dazu beitragen können, gezielte effektive Interventionsmassnahmen zu entwickeln.

Résumé

Facteurs affectant l'allaitement maternel exclusif en Pologne: étude populationnelle transversale

Objectifs: Identifier les facteurs qui affectent l'allaitement maternel exclusif dans les maternités et durant les premiers six mois suivant la naissance.

Méthodes: Deux enquêtes ont servi de base à cette étude: la première, conduite en 1995 dans des maternités (n = 11422 nouveau-nés), la seconde, conduite en 1997 dans des centres de santé (n = 10156 enfants âgés de moins de 6 mois).

Resultats: Les facteurs ayant le plus d'importance dans les maternités sur l'allaitement exclusif se sont révélés être: une césarienne, un allaitement débuté 2 h après la naissance, le manque de contact „peau à peau", l'usage d'une sucette, la séparation durant plus de 1 h par 24 h et les problèmes de santé des nourrissons. Après avoir quitté l'hôpital, les facteurs les plus significatifs étaient: l'usage d'une sucette, le manque d'envie des mères de nourrir uniquement au sein au delà de quatre mois, le bas niveau d'éducation de la mère et du père.

Conclusions: La plupart des facteurs identifiés peuvent être modifiés. Nos résultats pourraient aider à rendre les interventions plus ciblées et donc plus efficaces.

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