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Do Baby-Friendly Hospitals Influence Breastfeeding Duration on a National Level?

Sonja Merten, MD, MPH; Julia Dratva, MD; and Ursula Ackermann-Liebrich, MD, MSc

ABSTRACT. *Objectives.* **In Switzerland, the Baby-Friendly Hospital Initiative (BFHI) proposed by the United Nations Children's Fund (UNICEF) was introduced in 1993 to promote breastfeeding nationwide. This study reports results of a national study of the prevalence and duration of breastfeeding in 2003 throughout Switzerland and analyzes the influence of compliance with UNICEF guidelines of the hospital where delivery took place on breastfeeding duration.**

Methods. **Between April and September 2003, a random sample of mothers who had given birth in the past 9 months in Switzerland received a questionnaire on breastfeeding and complementary feeding. Seventy-four percent of the contacted mothers ($n = 3032$) participated; they completed a 24-hour dietary recall questionnaire and reported the age at first introduction of various foods and drinks. After excluding questionnaires with missing information relevant for the analyses, we analyzed data for 2861 infants 0 to 11 months of age, born in 145 different health facilities. Because it was known whether each child was born in a designated baby-friendly hospital (45 hospitals) or in a health facility in the process of being evaluated for BFHI inclusion (31 facilities), we were able to assess a possible influence of the BFHI on breastfeeding success. For this purpose, we merged individual data with hospital data on compliance with the UNICEF guidelines, from a data source collected on an annual basis for quality monitoring of designated baby-friendly hospitals and health facilities in the evaluation process. Information on actual compliance with the guidelines allowed us to investigate the relationship between breastfeeding outcomes and compliance with UNICEF guidelines. We were also able to compare the breastfeeding results with those for non–baby-friendly health facilities. The comparison was based on median durations of exclusive, full, and any breastfeeding calculated for each group. To allow for other known influencing factors, we calculated adjusted hazard ratios by using Cox regression; we also conducted logistic regression analyses with the 24-hour dietary recall data, to calculate adjusted odds ratios for validation of results from the retrospectively collected data.**

Results. **In 2003, the median duration of any breastfeeding was 31 weeks at the national level, compared with 22 weeks in 1994, and the median duration of full breastfeeding was 17 weeks, compared with 15 weeks in 1994. The proportion of exclusively breastfed infants 0 to 5 months of age was 42% for infants born in baby-friendly hospitals, compared with 34% for infants born elsewhere. Breastfeeding duration for infants born in baby-friendly hospitals, compared with infants born in other hospitals, was longer if the hospital showed good compliance with the UNICEF guidelines (35 weeks vs 29 weeks for any breastfeeding, 20 weeks vs 17 weeks for full breastfeeding, and 12 weeks vs 6 weeks for exclusive breastfeeding). To control for differences in the study population between the different types of health facilities, hazard and odds ratios were calculated as described above, taking into account socioeconomic and medical factors. Although the analysis of the retrospective data showed clearly that the duration of exclusive and full breastfeeding was significantly longer if delivery occurred in a baby-friendly hospital with high compliance with the UNICEF guidelines, whereas this effect was less prominent in other baby-friendly health facilities, this difference was less obvious in the 24-hour recall data. Only for the duration of any breastfeeding could a positive effect be seen if delivery occurred in a baby-friendly hospital with high compliance with the UNICEF guidelines. Known factors involved in the evaluation of baby-friendly hospitals showed the expected influence, on the individual level, on duration of exclusive, full, and any breastfeeding. If a child had been exclusively breastfed in the hospital, the median duration of exclusive, full, and any breastfeeding was considerably longer than the mean for the entire population or for those who had received water-based liquids or supplements in the hospital. A positive effect on breastfeeding duration could be shown for full rooming in, first suckling within 1 hour, breastfeeding on demand, and also the much-debated practice of pacifier use. After controlling for medical problems before, during, and after delivery, type of delivery, well-being of the mother, maternal smoking, maternal BMI, nationality, education, work, and income, all of the factors were still significantly associated with the duration of full, exclusive, or any breastfeeding.**

Conclusions. **Our results support the hypothesis that the general increase in breastfeeding in Switzerland since 1994 can be interpreted in part as a consequence of an increasing number of baby-friendly health facilities, whose clients breastfeed longer. Nevertheless, several alternative explanations for the longer breastfeeding duration for deliveries that occurred in baby-friendly hospitals can be discussed. In Switzerland, baby-friendly hospitals actively use their certification by UNICEF as a promotional asset. It is thus possible that differences in breastfeeding duration are attributable to the fact that mothers who intend to breastfeed longer would choose to give birth in a baby-friendly hospital and these mothers would be more willing to comply with the recommendations of the UNICEF guidelines. Even if this were the case, however, this selection bias would not explain the differences in breastfeeding duration between desig-**

From the Institute of Social and Preventive Medicine, University of Basel, Basel, Switzerland.

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Address correspondence to Sonja Merten, MD, MPH, Institute of Social and Preventive Medicine, University of Basel, Steinengraben 49, CH-4051 Basel, Switzerland. E-mail: sonja.merten@unibas.ch

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nated baby-friendly health facilities with higher compliance with the UNICEF guidelines and those with lower compliance. Especially this last point strongly supports a beneficial effect of the BFHI, because mothers do not know how well hospitals comply with the UNICEF program. The fact that breastfeeding rates have generally improved even in non–baby-friendly health facilities may be indirectly influenced by the BFHI; its publicity and training programs for health professionals have raised public awareness of the benefits of breastfeeding, and the number of professional lactation counselors has increased continuously. Breastfeeding prevalence and duration in Switzerland have improved in the past 10 years. Children born in a baby-friendly health facility are more likely to be breastfed for a longer time, particularly if the hospital shows high compliance with UNICEF guidelines. Therefore, the BFHI should be continued but should be extended to include monitoring for compliance, to promote the full effect of the BFHI. *Pediatrics* 2005;116:e702–e708. URL: www.pediatrics.org/cgi/doi/10.1542/peds.2005-0537; *breastfeeding, Baby-Friendly Hospital Initiative, health promotion.*

ABBREVIATIONS. BFHI, Baby-Friendly Hospital Initiative; UNICEF, United Nations Children's Fund; HR, hazard ratio.

Breastfeeding has numerous beneficial health effects,[1] but in many industrialized countries only a minority of infants are exclusively breastfed for 6 months, as recommended by the World Health Organization. The Baby-Friendly Hospital Initiative (BFHI) and the 10 Steps to Successful Breastfeeding proposed by United Nations Children's Fund (UNICEF) have been shown to increase breastfeeding duration and prevalence in different settings[2–5] but, to date, the long-term effects of the BFHI on the national level have not been demonstrated in a Western country.

In Switzerland, the BFHI was introduced in 1993. Although breastfeeding has been promoted actively on a large scale for the past 10 years, the specific influence of the BFHI on breastfeeding rates remains unclear. The last national breastfeeding survey was conducted in 1994.[6] The survey was repeated in 2003, to investigate changes in breastfeeding prevalence and duration and to assess the effect of the BFHI on breastfeeding rates on a national level. This study investigated changes in the prevalence and duration of exclusive, full, and any breastfeeding since 1994 and the extent to which breastfeeding rates are influenced by hospital practices, as measured on the basis of compliance with the 10 steps of the BFHI.

METHODS

Study Design and Participants

Between April and September 2003, a randomly selected sample of mothers who had given birth within the past 9 months in their communes were recruited through 183 regional, community-based, mother-child health services and 2 hospitals. Combined questionnaires were sent once to the selected mother-child pairs, including a 24-hour dietary recall questionnaire (cross-sectional study) and a questionnaire asking for detailed information about the introduction of various foods and drinks for the same infants (retrospective cohort study). In addition, information on the hospital where delivery occurred and on pregnancy, birth, and practices on the maternity ward relevant for breastfeeding initiation was obtained from the mother.

Of 4114 mothers who were included in the study, 3032 (74%) returned the questionnaire, accounting for 3087 infants (55 pairs of twins) born between June 22, 2002, and September 27, 2003. Of these infants, 226 were excluded from the analysis for the following reasons: 17, incomplete questionnaires; 11, mothers recruited twice; 99, questionnaires with missing information regarding the age of the child or with the child born outside the study period; 41, questionnaires with missing information regarding infant feeding; 58, questionnaires with missing information regarding the health facility where the delivery took place. Therefore, 2861 infants between 0 and 11 months of age remained for the analysis (Table 1).

The definitions to describe the type of nutrition were based on World Health Organisation definitions, as follows: exclusively breastfed infants received nothing except breast milk, predominantly breastfed infants received additional water-based liquids, full breastfeeding included exclusive and predominant breastfeeding, and any breastfeeding was defined as full breastfeeding or the combination of breast milk and any other supplement (liquid or solid).[7] With the combined design (24-hour recall and age-specific introduction of different foods), we were able to calculate accurate breastfeeding rates for different age groups of infants 0 to 11 months of age and to compare them with the last national breastfeeding survey, conducted in 1994 (another retrospective cohort study), by calculating the median duration of exclusive, full, and any breastfeeding. To estimate the extent of possible recall bias, the results from the analysis of the retrospective data were validated with those from the analysis of the 24-hour recall data. The more accurate 24-hour recall data provided information for each age group of infants but with less statistical power because of age stratification, compared with the retrospective data, for which all infants were included. Mothers provided information on the hospital where delivery occurred and on their experience during their stay. This information was used to examine on an individual level the influence of BFHI factors on breastfeeding outcomes. In addition, the influence of the BFHI was tested by merging aggregated hospital data from another data source. This was possible because we knew which hospitals had introduced the UNICEF guidelines. Forty-five health facilities, of a total of 146, were designated baby-friendly by UNICEF, and 31 were in the process of being evaluated for inclusion in the BFHI. For 57 of these 76 hospitals, information on actual compliance with the 10 steps was available from annual quality monitoring. To assess the degree of long-term compliance with the 10 steps (not merely their introduction) of these health facilities, the results of the continuous BFHI quality control monitoring in 2002 were used. The data included the following information: breastfeeding results and supplement use, rooming in, timely first suckling, and use of pacifiers.[8] A BFHI compliance score was formed with the following 4 monitoring results: mean prevalence of (1) exclusively breast milk-fed infants in the respective health facility, (2) rooming in, (3) timely first suckling, and (4) use of pacifiers. If a hospital was performing above average, then it was assigned 1 point for each criterion. Therefore, a health facility could be assigned a maximum of 4 points for all 4 criteria used for the score. A score of 3 or 4 was defined as high compliance with the BFHI. This score was then introduced into our dataset to replace the exact hospital where delivery occurred.

In our sample, 1142 (38%) children were born in 45 certified baby-friendly hospitals, 630 (22%) additional children were born in 31 hospitals that were in the process of applying for UNICEF certification, and the remaining 1089 children were born in 70 hospitals that had not (yet) introduced the 10 steps. In total, 519 infants were born in designated baby-friendly health facilities with high compliance and 737 in designated baby-friendly health facilities with lower compliance with BFHI criteria. For the remaining 516 children, no data on compliance were available. The large proportion of births occurring in only 45 baby-friendly hospitals can be explained by the fact that most of the large university hospitals in Switzerland were UNICEF certified at that time.

Statistical Analyses

Proportions of exclusively and fully breastfed infants for different age groups of infants were calculated from the 24-hour recall data, and median durations of exclusive, full, and total breastfeeding were calculated from the information regarding the time of introduction of different foods and drinks. Associations

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TABLE 1. Characteristics of the Survey Population

	No.	%	Swiss Average, %
Initial and final survey population			
Contacted mothers	4114	100	
Returned questionnaires	3032	74	
Questionnaires including 55 twins	3087		
Excluded infants (including 6 twins)	226		
Analyzed questionnaires	2861		
Mothers			
Total	2812		
Mean maternal age, y (SD)	32 (4.5)		30*
<20 y	13	0.5	1.5
20–29 y	755	27	42
30–39 y	1909	68	54
≥40 y	120	4	2.6
Married mothers	2485	89	86
University degree for father	553	20	13
University degree for mother	381	14	8
Swiss nationality	2258	81	73
Foreign	538	19	27
Employed before delivery	2152	77	NA
Primiparous	1493	53	45 (only married mothers)
Multiple births (pairs of twins)	49	2	1.5
Children			
Total	2861	100	Total births in 2003, 71 372
0–1 mo	163	6	
2–3 mo	597	21	
4–5 mo	760	27	
6–7 mo	738	26	
8–9 mo	497	17	
10–11 mo	106	4	
Mean birth weight, g (SD)	3210 (545)		
Birth weight <2500 g	184	6	
Birth weight >4500 g	31	1	
Health facility			
Born in baby-friendly hospital (or in evaluation)	1772	62	54†
Born in baby-friendly hospital, high compliance	519	18	18
Born in baby-friendly hospital, low compliance	737	26	23

NA indicates not available.
* Data concerning mothers are for 2001.
† Data concerning health facilities are for 2003.

between individual hospital experience and breastfeeding characteristics were tested with both the retrospective and 24-hour recall data. Survival time analysis was conducted for exclusive, full, and any breastfeeding; hazard ratios (HRs) for different factors were calculated with multivariate Cox regression analysis with the data on time of introduction of foods and drinks, controlling for medical problems before, during, and after delivery, type of delivery, well-being of the mother, maternal smoking, maternal BMI, nationality, education, work, and income.

Multivariate logistic regression analysis was conducted to calculate the odds ratios for different factors for a certain age group of infants to be exclusively, fully, or at all breastfed. For this analysis, the 24-hour recall data were used, controlling for the same factors as in the former analysis.

Then, the population was stratified according to the degree of compliance with the UNICEF criteria of the baby-friendly hospital where delivery occurred, whereby the compliance of every hospital as high or low was defined with the BFHI compliance score explained above. Prevalence and duration of different types of breastfeeding were calculated for each compliance category.

Description of Population

The mothers in our population sample were slightly older, better educated, and more likely to be Swiss than those in the national birth statistics (Table 1). The proportion of primiparous women was also higher in our sample.

RESULTS

Prevalence and Duration of Breastfeeding

The median duration of breastfeeding was 31 weeks, compared with 22 weeks in 1994, with 17 weeks for full breastfeeding in 2003, 2 weeks more than in 1994. Six percent of the infants had never been breastfed.

Figure 1 shows a comparison of results obtained from the 24-hour recall with those from the retrospective survey for the duration of exclusive, full, and any breastfeeding. The curves for the duration of full and any breastfeeding were not statistically different from those obtained from the 24-hour recall, which indicates high accuracy of the retrospectively collected information regarding the introduction of liquids other than breast milk and solids. The difference in the case of exclusive breastfeeding might be explained by the fact that some infants temporarily received water-based liquids. Therefore, the Kaplan-Meier survival estimates might reflect exclusive breastfeeding since birth and underestimate the proportion of exclusively breastfed infants at a later time point.

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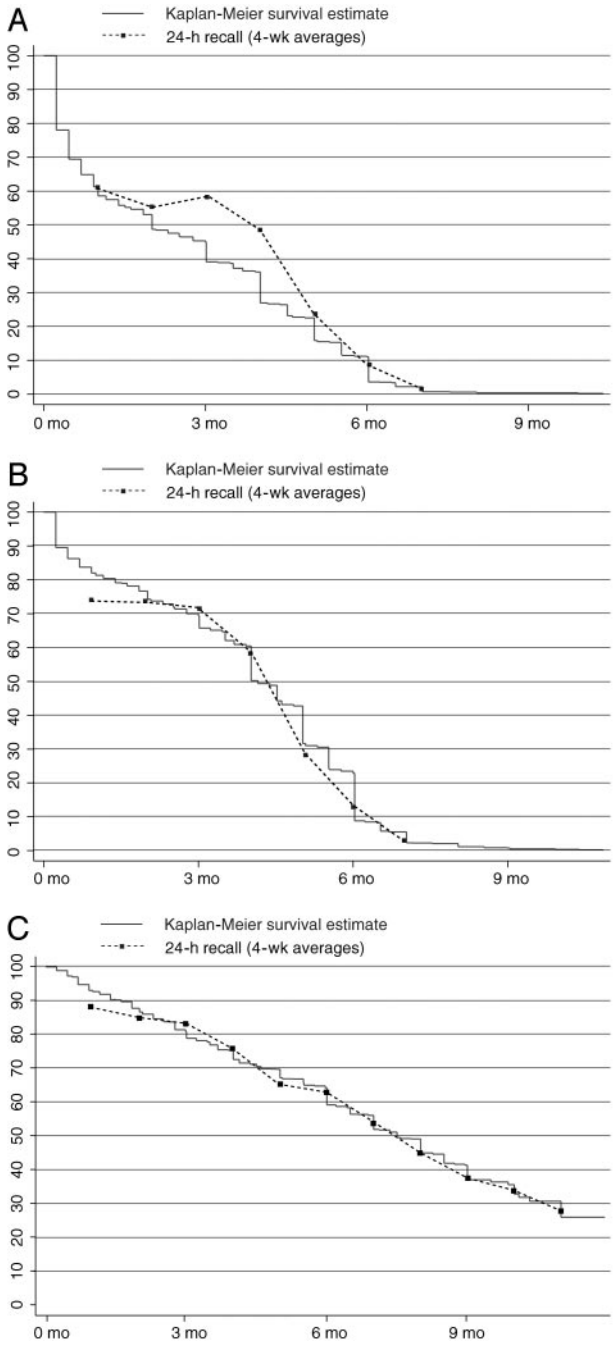

Fig 1. Comparison of 24-hour recall and retrospective data regarding duration of exclusive breastfeeding (A), duration of full breastfeeding (B), and duration of any breastfeeding (C) among 2697 initially breastfed infants. Solid lines indicate Kaplan-Meier survival estimates; dashed lines, 24-hour recall data (4-week averages).

Individual Factors Influencing the Duration of Breastfeeding

Table 2 shows the influence of sociodemographic factors on the median duration of exclusive, full, and any breastfeeding in our sample. As expected, maternal age, education, and income were important.

Known factors that come into the evaluation of baby-friendly hospitals also showed an expected influence, on an individual level, on the duration of exclusive, full, and any breastfeeding (Table 3). If a child had received exclusively breast milk in the hospital, then the median duration of exclusive breastfeeding after the first week was considerably longer (13 weeks) than the means for the entire population (9 weeks) and for those who had received water-based liquids in the hospital (5 weeks) or supplements (2 weeks). The same was true for full breastfeeding and for any breastfeeding, with a median duration of 35 weeks (as opposed to 31 weeks for the entire population). Positive effects on breastfeeding duration could be found for full rooming in, first suckling within 1 hour, breastfeeding on demand, and also the much-debated practice of pacifier use. Twenty-four percent of mothers reported that they had been given gifts of milk powder in the hospital, which showed a negative effect. After controlling for medical problems before, during, and after delivery, type of delivery, well-being of the mother, maternal smoking, maternal BMI, nationality, education, work, and income, all of the factors were still significantly associated with the duration of full, exclusive, or any breastfeeding (HRs are shown in Table 4). In this context, the strongest factor was obviously the introduction of infant formula in the health facility, but the introduction of water-based liquid in the hospital (for >30% of the children in the sample) was also associated with a higher risk of stopping breastfeeding. In addition, we found that the use of pacifiers in hospitals had a strong effect on the HR for ending exclusive or any breastfeeding.

Influence of the Health Facility

In the next step, children were stratified according to health facility where the delivery took place. The health facilities were divided according to whether they were baby-friendly, in the evaluation process, or not baby-friendly. Table 5 presents the data from the 24-hour dietary recall protocol, showing the proportions of children exclusively breastfed below the age of 4 months (mean age: 11 weeks) and below the age of <6 months (mean age: 17 weeks) and showing that infants born in baby-friendly hospitals were exclusively or fully breastfed more frequently. Being born in a baby-friendly hospital in the evaluation process showed an intermediate result. There was no difference in the age distribution between the groups.

In Table 6, baby-friendly hospitals are subdivided according to their compliance with the BFHI criteria. Table 6 shows significant differences in the duration of exclusive and full breastfeeding depending on whether the mother gave birth in a designated baby-friendly hospital with high or low compliance with the 10 Steps to Successful Breastfeeding. Breastfeeding results were closer to breastfeeding recommendations if mothers delivered in baby-friendly health facilities with high compliance with the 10 steps; the median duration of exclusive breastfeeding was 12 weeks for this group, compared with 8 weeks for infants born in non–baby-friendly health facilities, and that of full breastfeeding was 20 weeks, compared with 17 weeks.

To control for differences in the study population between the different types of health facilities, HRs and odds ratios were calculated in the same way as

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TABLE 2. Maternal Sociodemographic Factors and Median Duration of Exclusive, Full, and Any Breastfeeding

	Exclusive Breastfeeding, wk			Full Breastfeeding, wk			Any Breastfeeding, wk			No.
	Median	95% CI	*P**	Median	95% CI	*P**	Median	95% CI	*P**	
Maternal age										
<25 y	4	2–6		15	11–17		26	16–28		155
25–34 y	9	9–10		18	17–20		31	28–31		1876
>34 y	13	10–13	<.000	20	17–20	<.000	35	32–36	<.000	815
Maternal education										
<12 y of school	7	5–9		17	15–17		28	26–31		1148
12 y of school	12	9–13	<.000	17	17–20	.007	33	31–34	<.000	1639
Annual income										
<35 000 SFR	6	4–9		17	16–17		27	26–31		356
35 000–59 999 SFR	9	8–12		17	17–20		33	31–35		791
60 000–89 999 SFR	9	9–13		20	20–22		35	31–37		765
≥90 000 SFR	11	9–13	.003	17	17–20	.036	29	26–31	<.001	681

CI indicates confidence interval; SFR, Swiss franc.
* From log-rank test.

TABLE 3. Mothers' Individual Experience in the Hospital and Median Duration of Exclusive, Full, and Any Breastfeeding

On Maternity Ward	Exclusive Breastfeeding, wk			Full Breastfeeding, wk			Any Breastfeeding, wk			No.
	Median	95% CI	*P**	Median	95% CI	*P**	Median	95% CI	*P**	
Fed exclusively breast milk	13	13–16		22	20–22		35	32–35		1481
Fed breast milk and water-based liquids	5	4–8		19	17–20		31	28–31		886
Fed breast milk and infant formula	2	1–2	<.000	4	2–9	<.000	16	13–22	<.000	239
Rooming in	12	10–13		20	20–22		35	32–36		1183
No rooming in	8	6–9	<.000	17	17–17	<.000	28	26–30	<.000	1571
First suckling within 1 h	13	12–13		21	20–22		35	33–35		1828
First suckling later	8	6–9	<.000	17	17–17	<.000	26	24–26	<.000	422
Breastfeeding on demand	11	9–13		19	19–20		31	31–33		2254
Breastfeeding on schedule	4	4–7	<.000	15	13–17	<.000	26	20–28	<.000	244
No pacifier	13	11–13		20	20–20		33	31–35		1900
Pacifier	4	4–5	<.000	17	16–17	<.000	26	24–27	<.000	961
No free supplements	11	8–13		20	17–20		32	31–33		2105
Free infant formula supplements	4	3–6	<.000	17	15–17	<.000	26	26–28	<.000	634

CI indicates confidence interval.
* From log-rank test.

TABLE 4. Mothers' Individual Experience in the Hospital and Adjusted HRs (Retrospective Data) for Not Giving Exclusive, Full, or Any Breastfeeding

On Maternity Ward	Not Giving Exclusive Breastfeeding		Not Giving Full Breastfeeding		Not Giving Any Breastfeeding	
	Adjusted HR	95% CI	Adjusted HR	95% CI	Adjusted HR	95% CI
Fed exclusively breast milk	1		1		1	
Fed breast milk and water-based liquids	1.52	1.36–1.68	1.27	1.14–1.42	1.23	1.06–1.43
Fed breast milk and infant formula	2.11	1.78–2.50	2.34	1.97–2.78	2.23	1.82–2.74
Rooming in	1		1		1	
No rooming in	1.21	1.09–1.33	1.29	1.16–1.42	1.37	1.19–1.56
First suckling within 1 h	1		1		1	
First suckling later	1.20	1.08–1.34	1.23	1.10–1.38	1.61	1.39–1.86
Breastfeeding on demand	1		1		1	
Breastfeeding on schedule	1.30	1.11–1.53	1.28	1.08–1.51	1.37	1.11–1.69
No pacifier in first week of life	1		1		1	
Pacifier	1.38	1.25–1.52	1.34	1.21–1.48	1.61	1.41–1.85
No free supplements	1		1		1	
Free infant formula supplements	1.22	1.10–1.37	1.22	1.08–1.36	1.24	1.07–1.45

HRs were controlled for medical problems before, during, and after delivery, type of delivery, maternal smoking, maternal age, nationality, Swiss region, education, work, and income. For exclusive breastfeeding, the data for infants still exclusively breastfed were censored in the analysis (analogous procedure for full and any breastfeeding). CI indicates confidence interval.

described above, allowing for the same socioeconomic and medical factors. Although the analysis of the retrospective data showed clearly that the duration of exclusive or full breastfeeding was significantly longer if delivery occurred in a baby-friendly hospital with high compliance with the 10 steps, whereas this effect was less prominent in other baby-friendly health facilities (Table 6), this difference was

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TABLE 5. Proportions of Exclusively and Fully Breastfed Infants <4 Months of Age or <6 Months of Age, Stratified According to Deliveries in Baby-Friendly Hospitals and Other Deliveries (24-Hour Recall)

	Infants 0–3 mo of Age			Infants 0–5 mo of Age		
	No.	%	χ^2 *P*	No.	%	χ^2 *P*
Proportion of exclusively breastfed infants						
Born in baby-friendly hospital	302	60		584	42	
Born in baby-friendly hospital in evaluation process	175	51		370	36	
Born in non–baby-friendly hospital	283	49	.033	566	34	.022
Proportion of fully breastfed infants						
Born in baby-friendly hospital	302	72		584	51	
Born in baby-friendly hospital in evaluation process	175	64		370	46	
Born in non–baby-friendly hospital	283	60	.012	566	42	.015

TABLE 6. Influence of Health Facility

	Crude and Adjusted Median Duration of Exclusive, Full, or Any Breastfeeding, wk*				Adjusted HRs for Not Giving Exclusive, Full, or Any Breastfeeding†			Adjusted ORs for Not Giving Exclusive, Full, or Any Breastfeeding‡		
	No.	Median	95% CI	Median Adjusted	HR Adjusted	95% CI	*P*	OR Adjusted	95% CI	*P*
Exclusive breastfeeding										
Born in non–baby-friendly hospital	1089	6	4–9	6	1			1		
Born in baby-friendly hospital, low compliance	737	11	9–13	10	0.85	0.75–0.95	.005	0.64	0.46–0.89	.008
Born in baby-friendly hospital, high compliance	519	12	9–13	12	0.79	0.70–0.90	.000	0.65	0.45–0.95	.026
Born in baby-friendly hospital, no data available	516	11	9–13	13	0.83	0.72–0.94	.004	0.72	0.5–1.02	.072
P value§			.019							
Full breastfeeding										
Born in non–baby-friendly hospital	1067	17	17–18	17	1			1		
Born in baby-friendly hospital, low compliance	723	20	17–20	17	0.90	0.79–1.01	.082	0.62	0.44–0.86	.004
Born in baby-friendly hospital, high compliance	508	20	17–22	21	0.78	0.67–0.89	.000	0.62	0.43–0.90	.011
Born in baby-friendly hospital, no data available	507	20	17–22	19	0.87	0.76–1.00	.050	0.78	0.54–1.11	.171
P value§			.022							
Any breastfeeding										
Born in non–baby-friendly hospital	1002	29	27–31	28	1			1		
Born in baby-friendly hospital, low compliance	699	31	28–33	30	0.91	0.77–1.07	.270	0.99	0.80–1.20	.926
Born in baby-friendly hospital, high compliance	486	35	32–36	34	0.74	0.61–0.89	.002	0.76	0.60–0.97	.030
Born in baby-friendly hospital, no data available	489	31	28–33	33	0.92	0.76–1.1	.350	0.97	0.76–1.24	.782
P§			.045							

In retrospective data analysis for exclusive breastfeeding, the data for infants still exclusively breastfed were censored in the analysis (analogous procedure for full and any breastfeeding). CI indicates confidence interval; OR, odds ratio.

* Adjusted median duration controlling for medical problems before, during, and after delivery, type of delivery, maternal smoking, maternal age, nationality, Swiss region, education, work, and income (retrospective data, all infants included; $n = 2861$).

† Cox regression controlling for medical problems before, during, and after delivery, type of delivery, maternal smoking, maternal age, nationality, Swiss region, education, work, and income (retrospective data, all infants included; $n = 2861$).

‡ Logistic regression for exclusive and full breastfeeding (24-hour recall data for infants 0–5 months of age; $n = 1520$) and for any breastfeeding (24-hour recall data for all infants; $n = 2861$), controlling for medical problems before, during, and after delivery, type of delivery, maternal smoking, maternal age, nationality, Swiss region, education, work, and income.

§ Log-rank test.

less obvious in the 24-hour recall data. For any breastfeeding, however, a positive effect could be seen only if delivery occurred in a baby-friendly hospital with high compliance with the 10 steps.

DISCUSSION

A longer duration of breastfeeding can influence positively the health of infants even in industrialized countries[1] and may have a profound public health

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impact. The duration of breastfeeding has improved considerably among mothers delivering in non–baby-friendly health facilities, compared with 1994, but not as much as among mothers delivering in baby-friendly health facilities implementing the 10 steps successfully.

The combined study design allowed us to assess both the prevalence of exclusive and full breastfeeding for different age groups and the duration of exclusive, full, and any breastfeeding. With respect to the assessment of different influence factors, the estimates of Cox and logistic regression analyses corresponded; although it is often suggested that retrospective data are less accurate, breastfeeding duration calculated from retrospective and 24-hour recall data showed similar results for full and any breastfeeding. Results differed according to the method used only for exclusive breastfeeding, probably because of the different indicator definitions.

There are several alternative explanations for the longer breastfeeding duration for deliveries that occurred in baby-friendly hospitals. In Switzerland, baby-friendly hospitals actively use their certification by UNICEF as a promotional asset. It is thus possible that differences in breastfeeding duration are attributable to the fact that mothers who intended to breastfeed longer would choose to give birth in a baby-friendly hospital and that these mothers would be more willing to comply with the recommendations of the 10 steps program. Even if this were the case, however, a selection bias would not explain the differences in breastfeeding duration between designated baby-friendly health facilities with higher compliance with the 10 steps and those with lower compliance. Especially this last point strongly supports a beneficial effect of the BFHI, because mothers do not know how well hospitals comply with the UNICEF program. Maternal characteristics (educational level, income, and nationality) and the age distribution of the infants were comparable between baby-friendly hospitals with high compliance scores and other health facilities. Nevertheless, we cannot completely exclude the possibility that the longer breastfeeding duration of infants born in baby-friendly hospitals with high compliance is attributable to health facility or mother-child factors for which we did not account.

Our results indicate that the general increase in breastfeeding in Switzerland since 1994 can be interpreted in part as a consequence of an increasing number of baby-friendly health facilities, whose clients breastfeed longer. The fact that breastfeeding rates have generally improved even in non–baby-friendly health facilities may be influenced indirectly by the BFHI. Its publicity and training programs for health professionals have raised public awareness of the benefits of breastfeeding, and the number of professional lactation counselors has increased continuously. Contrary to earlier findings of experimental studies in Swiss health facilities, this study strongly supports a beneficial effect of the BFHI in Switzerland on the national level. [9]

CONCLUSIONS

Breastfeeding rates in Switzerland have generally increased since 1994, when breastfeeding was promoted on a national scale. Despite these improvements, however, additional efforts are needed if the recommendation to exclusively breastfeed infants for 6 months unless contraindicated is to be met.

Infants born in baby-friendly hospitals were more likely to be breastfed for a longer time than were those born in non–baby-friendly facilities. The duration of breastfeeding was associated significantly with the degree of compliance of the respective health facility with the 10 steps, which suggests that improvement of compliance with the 10 Steps to Successful Breastfeeding in health facilities could contribute to improved breastfeeding results. Therefore, monitoring of compliance in designated hospitals is indispensable for promoting the optimal effects of the BFHI.

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