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The role of breastfeeding promotion in German hospitals for exclusive breastfeeding duration

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Abstract

Breastfeeding promotion and support in hospitals is expected to have a positive impact on maternal breastfeeding outcomes. The objective of this study is to examine the association between breastfeeding promotion in maternity hospitals in Germany and exclusive breastfeeding (EBF) rates during the first 4 months. Thus, a nationwide cross-sectional web-based survey of breastfeeding promotion was conducted in 103 hospitals. Mother–infant pairs ($n = 962$) were recruited at these hospitals for a prospective web-based survey of breastfeeding status at five-time points, that is, during a hospital stay, at discharge as well as after 0.5, 2, and 4 months. The hospital analysis was based on the "10 Steps to Successful Breastfeeding" of the World Health Organization and the United Nations Children's Fund, adapted for Germany. Their degree of implementation was stratified by a breastfeeding promotion index (BPI) as low (≤5 steps), medium (6–8 steps), and high (≥9 steps). The association between the BPI and the odds of EBF at each of the five-time points was estimated by multivariable regression models, adjusting for various maternal factors. At all time points, the proportion of EBF among mothers from high BPI hospitals exceeded the proportion of those from medium or low BPI hospitals. A high BPI was associated with higher odds of EBF during the hospital stay and at discharge, while maternal factors for EBF such as breastfeeding experience and no early use of a pacifier persisted beyond. The high commitment of hospitals and tailored support of mothers is essential for EBF.

KEYWORDS

breastfeeding determinants, breastfeeding duration, breastfeeding promotion, exclusive breastfeeding, maternity hospitals, WHO/UNICEF ten steps

1 | INTRODUCTION

Breastmilk is the gold standard for infant nutrition due to its unique nutritional composition along with a multitude of bioactive substances (Ballard & Morrow, 2013). Breastfeeding provides infants with short- and long-term protection against various diseases, depending in part on the intensity and duration of breastfeeding (Horta et al., 2013; Victora et al., 2016). It also offers short- and long-term health benefits to mothers (Victora et al., 2016) and, in addition, breastfeeding is practical.

Exclusive breastfeeding (EBF) is recommended for the first 6 months of life, followed by partial breastfeeding along with age-appropriate complementary feeding (Agostoni et al., 2009; Koletzko et al., 2013; World Health Organisation [WHO] & United Nations Children's Fund [UNICEF], 1990, 2003).

In 1989, the WHO and UNICEF announced a list of interventions called the "Ten Steps to Successful Breastfeeding" (10 steps) to protect, promote, and support breastfeeding in facilities providing maternity and newborn services worldwide (WHO] & UNICEF, 1989). In 2018, an updated implementation guideline was published (WHO & UNICEF, 2018). Implementing the 10 Steps is supposed to significantly improve breastfeeding rates (WHO & UNICEF, 2018).

In addition to breastfeeding promotion and support in the hospital, breastfeeding success also depends on a variety of demographic, psychological, biomedical, and environmental determinants that can play a role, both, pre- and postnatally (Yngve & Sjöström, 2001).

Although most mothers initiate breastfeeding, they often breastfeed shorter than recommended (Victora et al., 2016). In Germany, breastfeeding rates have improved over the last 20 years as shown by the two nationwide studies on breastfeeding and infant nutrition named "SuSe," conducted in 1997–1998 (SuSe I) (Dulon et al., 2003; Kersting & Dulon, 2002) and in 2017–2019 (SuSe II) (Hockamp et al., 2021). In SuSe II, rates for EBF were about 73% during the first 2 weeks after birth, decreased to 68% by 2 months, and then sharply from 57% to 9% between 4 and 6 months (Hockamp et al., 2021), the latter period reflecting the recommended time for introducing complementary feeding in Europe (Fewtrell et al., 2017; Kersting, 2001). Nevertheless, the breastfeeding rates observed in the SuSe II study, whether EBF or breastfeeding at all, were found to be in the upper range in the 11 European countries compared in a survey on national breastfeeding data and monitoring systems (Theurich et al., 2019).

In view of the current relatively high level of breastfeeding in Germany in the SuSe II compared with the SuSe I study, the objective of the present refined analysis was to investigate to what extent and for how long breastfeeding promotion and support in hospitals is relevant for maternal EBF. In addition, potential demographic, psychological, biomedical, and environmental determinants of breastfeeding were considered. Breastfeeding promotion in hospitals was evaluated based on the WHO/UNICEF and German recommendations; breastfeeding was documented repeatedly as EBF during the first 4 months after birth.

Key messages

- A high breastfeeding promotion index (BPI) favours exclusive breastfeeding (EBF) in the hospital environment, while maternal factors persisted beyond.
- Even in a country with a high level of maternal and child care, breastfeeding promotion in hospitals plays a significant role in the successful start of breastfeeding.
- Maternal factors, primarily breastfeeding experience and no early use of a pacifier, were persistent and stronger predictors of EBF than the BPI.
- The steps that need to be improved most refer to breastfeeding information, early breastfeeding initiation, and alternative feeding methods.
- High hospital commitment complemented by tailored, individualised postdischarge support of mothers are critical components for sustained breastfeeding success.

2 | METHODS

2.1 | Study design

SuSe is the abbreviation of the German title of the study *Stillen und Säuglingsernährung (breastfeeding and infant nutrition)*. SuSe II (2017–2019) followed 20 years after SuSe I, maintaining the core structure of the study design to allow data comparison (Hockamp et al., 2021). Thus, the SuSe II study comprises two collectives: Maternity hospitals and mother–infant pairs recruited in the participating hospitals. A cross-sectional survey on breastfeeding promotion was conducted in the hospitals. In addition, a prospective survey on breastfeeding and infant nutrition followed with repeated assessments during the infant's first year of life, most of them during the first 4 months. A detailed description of the study design was published earlier (Hockamp et al., 2021), a brief overview is given below. The study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures were approved by the Ethics Committee of the Medical Faculty of the Ruhr University Bochum. Written informed consents were obtained from hospitals and mothers.

2.2 | Study samples

In September 2017, all hospitals in Germany providing maternity services, hereafter referred to as "hospitals," were invited to participate by postal letter. In case of missing feedback, they were additionally contacted by phone call, fax, and video invitation of the study head. The hospitals were asked to complete a web-based questionnaire on their breastfeeding conditions and to support the study team in recruiting mothers for the follow-up survey. From January to March 2018, a predefined 14-day recruitment period was set for each participating hospital to recruit mothers. The hospital ward staff was requested to document selected basic information of all births. An information letter was handed out if the following inclusion criteria were met: healthy, full-term newborn (birthweight ≥ 2500 g, gestational age ≥ 37 weeks, and no admission to a newborn intensive care unit), sufficient maternal knowledge of the German language for study participation as assessed by the staff, access to a telephone, and the availability of an e-mail address.

2.3 | Assessment of breastfeeding promotion

To evaluate the promotion of breastfeeding in hospitals, the hospital questionnaire was based on the 10-step program of the WHO/UNICEF (2018) and the adapted recommendations for Germany (Bundesinstitut für Risikobewertung, 2007; WHO & UNICEF, 2018).

Similar to the earlier analysis of the SuSe I study, but in a more refined version, a breastfeeding promotion index (BPI) was generated, consisting of 10 items that covered the different areas (Dulon et al., 2003). Each item scored 1 for practicing and 0 for not practicing the particular step (Dulon et al., 2003).

A BPI value between 0 and 10 was achievable. Using the percentiles P_{25}, P_{50}, and P_{75} as cut points, the index was categorised into low (≤5), medium (6–8), and high (≥9) levels of achievement.

2.4 | Assessment of breastfeeding

Participating mothers received an online questionnaire 2 weeks, and 2, 4, 6, and 12 months postpartum (pp). The first questionnaire assessed infant nutrition at 2 weeks and, retrospectively, during the hospital stay and at discharge. This questionnaire additionally assessed maternal and infant characteristics including socio-demographic and feeding information. The follow-up questionnaires on current nutrition remained the same until the age of 12 months.

This evaluation comprises the five-time points within the first 4 months pp as the minimum recommendation for EBF duration: during a hospital stay, at discharge, and after 0.5, 2, and 4 months. Mothers had 4 weeks to answer the questionnaires. To assess breastfeeding success at these time points, two groups were formed: mothers EBF and mothers not EBF at the respective time point. EBF was defined according to the definitions of the WHO/UNICEF meaning the infant receives no other liquids or (semi)solids except breastmilk; vitamins, minerals, or medicine as drops or syrups may be added (WHO, 2008). EBF was categorised using the response options in the maternal questionnaires as presented in Table 1. All other feeding response options were considered as non-EBF. Mothers who had not tried to breastfeed were not included in the analysis.

2.5 | Statistical analysis

Categorically coded characteristics of 916 mother–infant pairs with complete data from the first assessment 2 weeks pp were compared with national statistics if available using the Pearson–Clopper method to calculate exact binomial 95% confidence intervals (CIs). For further analyses, all mother–infant pairs with complete datasets at the considered time points were included. For each time point, the differences between EBF rates among mothers who had given birth in hospitals with high, medium, and low BPI were examined.

To assess the association of the hospital BPI with EBF success, adjusted odds ratios and their corresponding 95% CIs were calculated for each time point, considering potential confounding variables, that is, potential determinants of breastfeeding success other than the BPI.

TABLE 1 Time points assessed and categorisation of exclusive breastfeeding

Time points (pp)	Question	Answer options	Categorisation
At hospital[a]	Did your infant receive any additional fluids other than breastmilk at the hospital?	1. Yes	
		2. No	2. → *EBF*
		3. Don't know	
At discharge[a]	What kind of milk did your infant receive at discharge?	1. Formula only	
		2. Formula + breastmilk	
		3. Breastmilk + other fluids	
		4. Breastmilk only	4. → *EBF*
2 Weeks	*What does your infant receive at present?*	1. Formula only	
		2. Formula + breastmilk	
		3. Breastmilk + other fluids	
		4. Breastmilk only	4. → EBF
2 Months	How many breastmilk meals does your infant receive? + separate questions for fluids, formula, and solids	1. Number of servings/day formula, fluids, and (semi-)solid food	1. Any servings → not EBF
4 Months		2. Number of breastmilk meals day + night	2. No serving in Category 1 → EBF

Abbreviations: EBF, exclusive breastfeeding; pp, postpartum.

[a]Assessed retrospectively 2 weeks after birth.

Analyses were performed using multivariable binary logistic regression with variable selection through backward elimination according to the likelihood ratio. The target variable EBF success was coded 0 for non-EBF and 1 for EBF. The choice of potential confounders was based on literature (Kohlhuber et al., 2008; Yngve & Sjöström, 2001), results from the previous SuSe I study (Dulon et al., 2003) and an earlier basic evaluation of SuSe II (Kersting et al., 2020). To assess effects of breastfeeding promotion over time, model-based probabilities for EBF at the five-time points were calculated, stratified for low, medium, and high BPI, using a logistic mixed model including a random subject effect.

To investigate whether there were steps particularly associated with EBF, each of the 10 steps was analysed with the same multivariable models as the BPI, but the BPI was excluded. Metric independent variables such as maternal age or the hospital size (annual birth rate) were categorised to also consider potentially nonmonotonous influences of the formerly metric variables on the modelled odds.

A $p < 0.05$ was regarded as statistically significant. Data analysis was performed using the IBM® SPSS® Statistics Version 25.0 software package for Windows Version 2016 (IBM Corp.) and R Version 4.0.3 (R Core Team, 2020; R Foundation for Statistical Computing).

3 | RESULTS

3.1 | Participation and inclusion

An overview of the recruitment, participation, and inclusion of hospitals and mothers is shown in Figure 1. Of the total 692 German hospitals invited, 109 participated and 103 recruited a total of 962 mother–infant pairs who participated in the first assessment 2 weeks pp. Initially, 46 mother–infant pairs were excluded from the analysis, either because they had not tried to breastfeed ($n = 33$) or because they had not provided information about all the determinants to be considered in the analyses. In addition, eight mothers were excluded for the time points in the hospital or at discharge, because they did not know the respective breastfeeding status. Seven mothers with an outpatient birth who reported EBF at the hospital (retrospectively) and at the first assessment (2 weeks pp) were classified as EBF at discharge, too. Thus, 916 mothers remained 2 weeks pp, when maternal characteristics and retrospective information on infant feeding in the hospital and at discharge were collected. Finally, 909 mother–infant pairs were included in the analysis of EBF in the hospital, 915 at discharge, 916 after 2 weeks, 830 after 2 months, and 804 after 4 months pp.

3.2 | Breastfeeding promotion in hospitals

The proportion of hospitals with an annual birth rate of more than 1000 births/year was higher in the hospital sample than in the total of maternity hospitals in Germany (50.5% vs. 41.5%) (Wissenschaftliche Information Milupa, 2017). The proportion of hospitals certified "baby-friendly" according to the WHO/UNICEF initiative "Baby-friendly" hospital initiative (BFHI) was higher in the study sample compared with the reported data for Germany (26% vs. approx. 15%) (Verein zur Unterstützung der WHO/UNICEF-Initiative "Baby-freundlich" BFHI e. V. Jahresbericht WHO/UNICEF-Initiative "Babyfreundlich," 2017) (data not shown).

An overview of the implementation of the combined WHO/UNICEF and German recommendations for breastfeeding promotion in the hospital sample ($n = 103$) is presented in Table S1. The three most frequently implemented steps (>93%) were Step 8 (*breastfeeding on demand*), Step 7 (*24-h rooming-in*), and Step 5 (*breastfeeding instruction and documentation*), the three least frequently implemented steps (<54%) were Step 3 (*breastfeeding information*), Step 2 (*regular training of health care staff*), and Step 9 (*alternative feeding methods*) (Table S1).

Initiation of breastfeeding within the first hour of life (Step 4) was enabled by 54.4% of the hospitals after both, vaginal delivery and a caesarean delivery. When specified 74 hospitals (71.8%) practiced it after a vaginal delivery and 58 hospitals (56.3%) after a caesarean delivery, others did not practice this step at all.

Hospitals implemented a median of seven steps ($P_{25} = 5$; $P_{75} = 8$), with a minimum of 2 steps (1 hospital; 1.0%) and a maximum of 10 steps (9 hospitals; 8.7%) (Table S2). Between 1 and 30, mother–infant pairs per hospital participated in the study (Table S2). Among mothers who had given birth in a hospital with a high BPI, 95.5% ($n = 236$) had stayed in certified hospitals and 4.5% ($n = 11$) in noncertified hospital.

3.3 | Sample characteristics of mothers and infants

The mother–infant sample was compared with national data as available in Table 2 (Institut für Qualitätssicherung und Transparenz im Gesundheitswesen, 2017, 2018; Statistisches Bundesamt [Destatis], 2020). Higher proportions of SuSe II mothers were in the older age categories, had a higher level of education, were more often primiparous, and had a longer hospital stay compared to national data. A lower proportion had a vaginal delivery and an infant with a birth weight between 2500 and 2999 g.

Mothers stayed in the hospital for an average of 3.5 days (median 3; range: 0–15); stratified by the type of delivery, the average was 3.1 days (3; 0–12) after a vaginal delivery and 4.3 days (4; 2–15) after a caesarean section.

3.4 | Breastfeeding rates

The rates for EBF continuously decreased after discharge from 77.4% to 58.8% 4 months pp (Table S3).

3.5 | Hospital breastfeeding promotion and maternal breastfeeding success

At all five-time points, the proportion of EBF was higher among mothers who gave birth in hospitals with a high BPI (89.0%–62.7%) compared to those with a medium (74.6%–58.3%) or low BPI

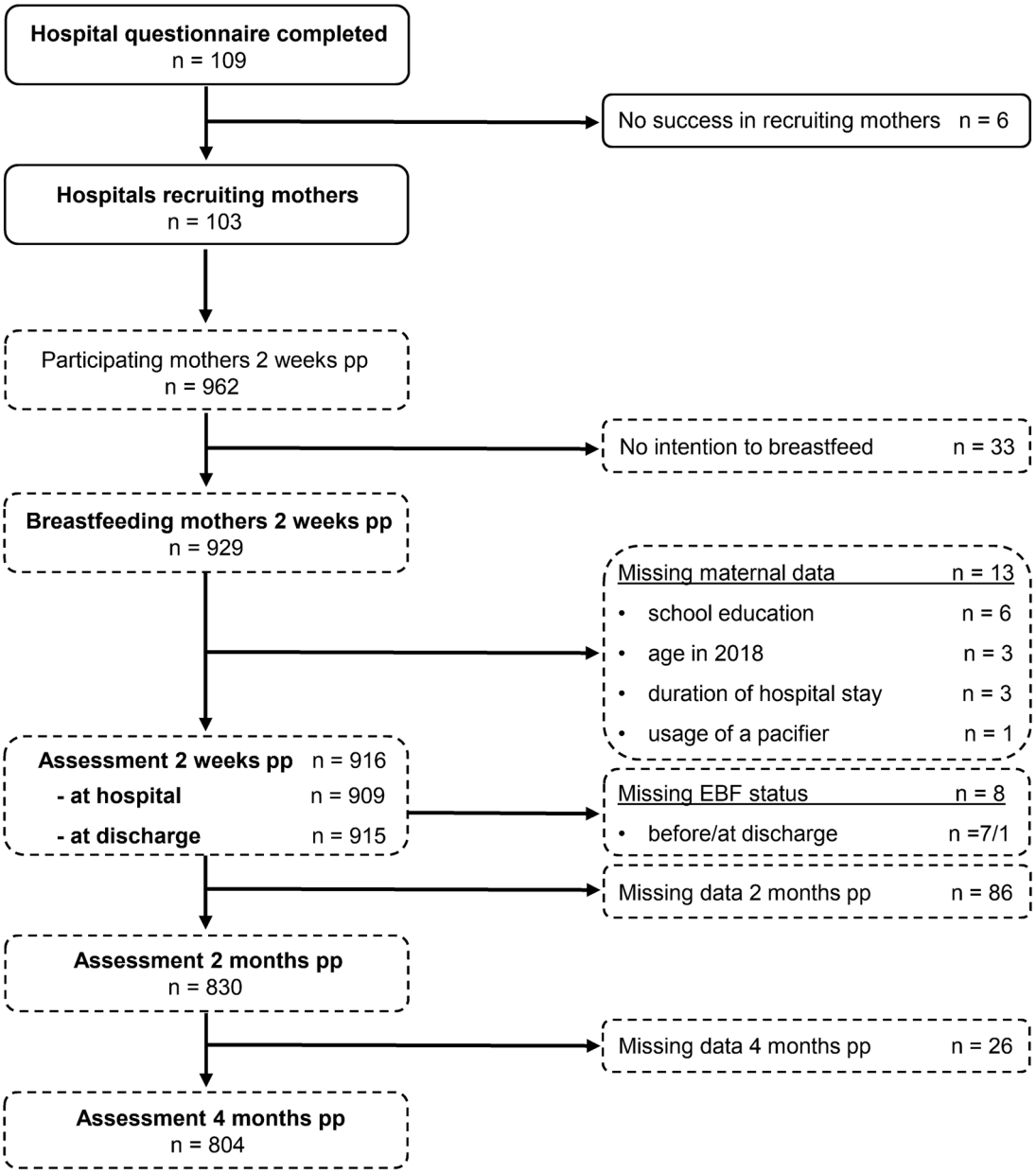

FIGURE 1 Flowchart of participation and inclusion in the study. EBF exclusive breastfeeding; pp postpartum

(73.8%–56.1%). The proportion of EBF differed only marginally between medium and low BPI, except at 2 months pp (Figure S1). Between 2 weeks and 4 months pp, rates of EBF in the high BPI group approached those in the medium and low BPI groups.

In the multivariable models, considering potential determinants for breastfeeding, the BPI level was significantly associated with EBF at the first two-time points but not anymore after the hospital stay: mothers from hospitals with a high BPI had 2–3 times higher odds of EBF in the hospital and at discharge compared to mothers from hospitals with a low BPI (Table 3).

Among maternal characteristics, having breastfeeding experience or not using a pacifier within the first 2 weeks pp was associated with higher odds of EBF for all time points examined. At four of the five-time points, vaginal delivery and no breastfeeding problems within 2 weeks pp increased the odds of EBF, whereas a low level of education and being undecided about the duration of breastfeeding decreased the odds of EBF (Table 3). Other characteristics showed no or no such consistent associations.

The short-term role of the hospital and the persistent importance of maternal factors on EBF were clearly confirmed by the logistic mixed model fit with a random subject effect (data not shown).

Only 3 out of the 10 steps were consistently significantly associated with EBF (at least two-time points consecutively) (Table 4). Surprisingly, mothers from hospitals that provided prenatal information about breastfeeding and written material at the hospital (Step 3) had 30% lower odds of EBF after discharge compared to mothers from hospitals that did not provide such information. Regarding feeding practices, early *initiation of breastfeeding* (Step 4) and provision of

TABLE 2 Sample characteristics of mothers and infants compared to national data

	Study sample[a,b] n = 916			National data[b]		
Maternal characteristics	***n***	**(%)**	**95% CI**	***n***	**(%)**	**95% CI**
Age (years)				*n* = 761,176[c]		
<18	0	(0.0)	0.00–0.40	3890	(0.5)	0.50–0.53
18–29	199	(21.7)	19.09–24.54	300,357	(39.5)	39.35–39.57
30–34	383	(41.8)	38.59–45.08	270,658	(35.6)	35.45–35.67
35–39	273	(29.8)	26.86–32.88	153,841	(20.2)	20.12–20.30
≥40	61	(6.7)	5.13–8.47	32,430	(4.3)	4.22–4.31
School education				*n* = 16,798[d]		
Higher secondary	612	(66.8)	63.66–69.86	7310	(43.5)	42.77–44.27
Secondary	244	(26.6)	23.80–29.63	4846	(28.9)	28.16–29.54
Basic + other[e]	60	(6.6)	5.04–8.35	4642	(27.6)	26.96–28.32
Country of birth				*n* = 758,614[c]		
Germany	806	(88.0)	85.71–90.03	576,825	(76.0)	75.94–76.13
Other	110	(12.0)	9.97–14.29	181,789	(24.0)	23.87–24.06
Parity				*n* = 761,176[c]		
Primipara	464	(50.7)	47.37–53.94	358,864	(47.2)	47.03–47.26
Multipara	452	(49.3)	46.06–52.63	402,312	(52.9)	52.74–52.97
Delivery				*n* = 626,830[c,f,g]		
Vaginal incl. OP	635	(69.3)	66.22–72.30	471,578	(75.2)	75.13–75.34
Caesarean section	281	(30.7)	27.70–33.78	154,850	(24.7)	24.60–24.81
Partnership				*n* = 758,614[c]		
Steady	891	(97.3)	96.00–98.23	694,629	(91.6)	91.50–91.63
Single	25	(2.7)	1.77–4.00	63,985	(8.4)	8.37–8.50
Hospital stay (days)				*n* = 761,201[c]		
0	19	(2.1)	1.25–3.22	22,471	(3.0)	2.91–2.99
1–2	140	(15.3)	13.01–17.78	208,733	(27.4)	27.32–27.52
3–6	728	(79.5)	76.71–82.05	514,861	(67.6)	67.53–67.74
>6	29	(3.2)	2.13–4.52	15,136	(2.0)	1.96–2.02
Infant characteristics						
Sex				*n* = 776,188[c,h]		
Male	460	(49.8)	46.93–53.51	378,123	(48.7)	48.60–48.83
Female	456	(50.2)	46.49–53.07	397,948	(51.3)	51.16–51.38
Birth weight category (g)				*n* = 721,641[c]		
2500–2999	114	(12.4)	10.38–14.76	120,429	(16.7)	16.60–16.77
3000–3499	359	(39.2)	36.02–42.44	521,850	(72.3)	72.21–72.42
3500–3999	339	(37.0)	33.87–40.23			
≥4000	104	(11.4)	9.37–13.59	79,362	(11.0)	10.93–11.07

Abbreviation: 95% CI, 95% confidence interval.

[a]2 Weeks postpartum.

[b]Deviations due to rounding.

[c]Institute for Quality Assurance and Transparency in Health Care 2017 for age, parity, delivery, hospital stay, infant gender, and birth weight (Institut für Qualitätssicherung und Transparenz im Gesundheitswesen, 2018), and Institute for Quality Assurance and Transparency in Health Care 2016 for country of origin, employed before maternity protection, and partnership (Institut für Qualitätssicherung und Transparenz im Gesundheitswesen, 2017).

[d]German Federal Statistical Office 2018 for school education (Statistisches Bundesamt [Destatis], 2020).

[e]Other: Polytechnic secondary school or no degree (yet).

[f]Mature singletons (37–41 weeks of pregnancy) from a regular cranial position.

[g]Other delivery (unspecified): $n = 402$ (0.06%), category excluded.

[h]Sex undefined: $n = 117$ (0.02%), category excluded.

alternative feeding methods instead of bottles (Step 9) were supportive factors for EBF, but only in the early postnatal period.

4 | DISCUSSION

In this national sample of hospitals and mothers, a high BPI level was associated with the start of EBF in the hospital environment, while various maternal factors played a longer-term role beyond discharge, as confirmed by both of our statistical models. This high engagement by hospitals was effective even in a country with a high level of maternal and child care like Germany. However, additional targeted support for mothers is required pre- and postnatally, and both individually and on a public health level. Our present analysis performed on a higher breastfeeding rate confirmed the results from the SuSe I study 20 years earlier that maternal factors were stronger predictors for EBF than the BPI.

4.1 | Hospitals

4.1.1 | Breastfeeding promotion index

In a worldwide systematic review, a dose-response relationship has been suggested between the number of supportive measures within the 10 steps, that is, the level of BPI a mother is exposed to and the likelihood of EBF at hospital discharge and the duration of EBF (Pérez-Escamilla et al., 2016). The SuSe II analysis confirmed this relationship for the hospital environment at the highest level of BPI ranking (≥9 steps), suggesting that not even a medium BPI (6–8 steps) was sufficient to adequately promote EBF in this hospital sample. The high proportion of BFHI-certified hospitals in our sample supported the analysis of a wide range of BPI levels in hospitals, which shows that exceptionally high and structured engagement of hospitals is needed and promising to get breastfeeding successfully started in a population with an overall high level of maternal care.

Recent studies from Europe (Belgium, Switzerland) (Robert et al., 2019; Spaeth et al., 2018) and the U.S. (Ducharme-Smith et al., 2021) that directly aimed to compare breastfeeding rates of mothers from BFHI certified and noncertified hospitals, used different study designs and measurement time points. However, similar to our study, they did not find convincing longer-term associations between breastfeeding promotion in hospitals and maternal EBF. The differing observations in the worldwide evaluations of BFHI implementation (Pérez-Escamilla et al., 2016; WHO & UNICEF, 2018) compared with these single studies in high-income countries suggest that the cultural context of mother–child care in a country may play an important role (Aryeetey & Dykes, 2018).

4.1.2 | Individual steps

While the 10 steps as a whole may best reflect the complexity of breastfeeding, targeted interventions require knowledge about the role of individual steps. In fact, the WHO reviewed the scientific evidence of the intervention fields for the "critical" breastfeeding outcomes and concluded that the overall quality of evidence of two of the 10 steps is partly high: for Step 4, this refers to the association of early breastfeeding initiation and neonatal mortality, while the evidence is moderate for EBF outcomes (WHO, 2017). For Step 9, the quality of evidence is high for no association between pacifier use and breastfeeding outcomes and moderate for the avoidance of bottle feeding among term infants (WHO, 2017). Interestingly, these two steps were relevant in this evaluation as well as in the Swiss study, where the implementation of the steps was reported by mothers (Spaeth et al., 2018).

The finding of our study that mothers from hospitals that implemented Step 4 (*first initiation of breastfeeding within the first hour of life*) had higher odds of EBF throughout the first 2 weeks pp shows that even under optimal health care conditions and with a low neonatal mortality rate (WHO, 2020), the awareness of early breastfeeding initiation in hospitals remains essential. As only about half of the hospitals practiced Step 4 for both, vaginal and caesarean deliveries, there is an urgent need to close this gap. This applies in particular to caesarean deliveries, as these may delay and complicate breastfeeding initiation (Economou et al., 2018; Hakala et al., 2017). Early initiation is a core indicator for monitoring breastfeeding worldwide (WHO, 2008), its implementation may be improved by including this parameter in perinatal quality management systems (Euro-Peristat 2012; Euro-Peristat Project, 2018).

Alternative feeding methods (Step 9), recommended when infants have difficulty being fed at the breast, require experienced personnel for adequate and proper guidance of the mothers. Only

TABLE 3 Factors for exclusive breastfeeding (BF) at five-time points during the first 4 months of life[a,b]

	Basic distribution *n* = 916 n (%)	At hospital *n* = 909 OR (95% CI)	At discharge *n* = 915 OR (95% CI)	2 Weeks pp *n* = 916 OR (95% CI)	2 Months pp *n* = 830 OR (95% CI)	4 Months pp *n* = 804 OR (95% CI)
Hospital BF promotion						
BPI						
High	247 (27.0)	3.86*** (2.34–6.37)	2.06** (1.27–3.35)			
Medium	390 (42.6)	1.05 (0.73–1.49)	1.06 (0.73–1.56)	///[c]	///[c]	///[c]
Low	279 (30.5)	1***	1**			
Maternal characteristics						
Education						
Basic + other	60 (6.6)	0.70 (0.36–1.36)		0.42** (0.23–0.78)	0.51 (0.26–1.01)	0.36** (0.18–0.75)
Secondary	244 (26.6)	0.55** (0.38–0.78)	///[c]	0.63* (0.43–0.91)	0.46*** (0.31–0.66)	0.62** (0.44–0.88)
Higher secondary	612 (66.8)	1**		1**	1***	1**
BF experience						
Yes	413 (45.1)	1.63** (1.16–2.30)	1.92*** (1.34–2.75)	1.77** (1.24–2.52)	2.19*** (1.54–3.13)	1.82*** (1.33–2.51)
No	503 (54.9)	1	1	1	1	1
Partner's attitude towards BF						
Positive	842 (91.9)	1.87* (1.10–3.18)	///[c]	1.99* (1.14–3.46)	1.76 (1.00–3.10)	///[c]
Other	74 (8.1)	1		1	1	
Pregnancy and birth						
BF duration intention[d]						
No idea/insecure	99 (10.8)		0.30*** (0.19–0.49)	0.17*** (0.10–0.28)	0.22*** (0.13–0.37)	0.23*** (0.13–0.40)
As long as possible	218 (23.8)	///[c]	1.00 (0.66–1.51)	0.52** (0.35–0.77)	0.70 (0.47–1.04)	0.99 (0.68–1.44)
At least 4 months	599 (65.4)		1***	1***	1***	1***
Cigarette smoking during pregnancy						
No	868 (94.8)	0.46 (0.20–1.03)	///[c]	///[c]	2.70* (1.21–6.05)	2.50* (1.08–5.79)
Yes	48 (5.2)	1			1	1
Delivery						
Vaginal incl. OP	635 (69.3)	///[c]	1.76** (1.24–2.49)	1.55* (1.09–2.20)	1.54* (1.08–2.20)	1.51* (1.09–2.11)
Caesarean section	281 (30.7)		1	1	1	1

TABLE 3 (Continued)

	Basic distribution *n* = 916 n (%)	At hospital *n* = 909 OR (95% CI)	At discharge *n* = 915 OR (95% CI)	2 Weeks pp *n* = 916 OR (95% CI)	2 Months pp *n* = 830 OR (95% CI)	4 Months pp *n* = 804 OR (95% CI)
Postnatal conditions						
Hospital stay (days)						
≤3	570 (62.2)	1.56** (1.12–2.16)	///[c]	///[c]	///[c]	///[c]
>3	346 (37.8)	1				
BF problems[e]						
No	437 (47.7)	1.89*** (1.33–2.69)	2.95*** (2.04–4.26)	2.93*** (2.04–4.20)	1.89** (1.31–2.72)	///[c]
Yes	479 (52.3)	1	1	1	1	
Nipple shield use[e]						
No	584 (63.8)	1.75** (1.24–2.47)	///[c]	///[c]	1.51* (1.06–2.15)	1.83*** (1.33–2.52)
Yes	332 (36.2)	1			1	1
Pacifier use[e]						
No	274 (29.9)	1.63* (1.11–2.40)	2.22*** (1.46–3.37)	2.60*** (1.71–3.93)	2.20*** (1.48–3.25)	2.07*** (1.46–2.92)
Yes	642 (70.1)	1	1	1	1	1

Abbreviations: 95% CI, 95% confidence interval; BPI, breastfeeding promotion index; OR, odds ratio; pp, postpartum.

[a]Adjusted ORs and their corresponding 95% CIs were calculated for each time point using multivariable binary logistic regression with variable selection through backward elimination according to the likelihood ratio.

[b]Further variables in the models with no significant associations: maternal age and hospital size (no. of births in 2016).

[c]Variable not in the final model.

[d]"Full" BF (exclusive BF including the administration of water and water-based drinks).

[e]Within the first 2 weeks pp.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE 4 Odds for exclusive breastfeeding after exposure to the individual steps of hospital breastfeeding (BF) promotion[a,b,c]

	Basic distribution *n* = 916 n (%)	At hospital *n* = 909 OR (95% CI)	At discharge *n* = 915 OR (95% CI)	2 Weeks pp *n* = 916 OR (95% CI)	2 Months pp *n* = 830 OR (95% CI)	4 Months pp *n* = 804 OR (95% CI)
Mothers exposed to individual steps						
Step 1 (*written BF policy + BF coordinator*)						
Yes	663 (72.4)	///[d]	0.70 (0.46–1.04)	///[d]	///[d]	///[d]
No	253 (27.6)		1			
Step 2 (*regular training of health care staff*)						
Yes	505 (55.1)	1.38 (0.96–1.99)	///[d]	///[d]	///[d]	///[d]
No	411 (44.9)	1				
Step 3 (*BF information*)						
Yes	440 (48.0)	///[d]	///[d]	0.70* (0.50–0.98)	0.68* (0.48–0.97)	0.73* (0.53–0.99)
No	476 (52.0)			1	1	1
Step 4 (*first initiation*)						
Yes	455 (49.7)	1.46* (1.04–2.05)	1.83** (1.29–2.59)	1.43* (1.01–2.02)	///[d]	///[d]
No	461 (50.3)	1	1	1		
Step 6 (*additional feeding only if medically indicated*)						
Yes	632 (69.0)	///[d]	///[d]	///[d]	1.50* (1.04–2.17)	///[d]
No	284 (31.0)				1	
Step 8 (*BF on demand*)						
Yes	898 (98.0)	///[d]	///[d]	///[d]	6.45** (2.10–19.78)	///[d]
No	18 (2.0)				1	
Step 9 (*use of alternative* feeding methods)						
Yes	486 (53.1)	1.91*** (1.34–2.74)	1.54* (1.07–2.24)	///[d]	///[d]	///[d]
No	430 (46.9)	1	1			

Abbreviations: 95% CI, 95% confidence interval; OR, odds ratio; pp, postpartum.

[a]Adjusted ORs and their corresponding 95% CIs were calculated for each time point using multivariable binary logistic regression with variable selection through backward elimination according to the likelihood ratio.

[b]Adjusted for the individual steps (Steps 1–10 represented in bold); further adjusted for maternal age, maternal education, BF experience, partner's attitude towards BF, "full" BF duration intention (exclusive breastfeeding including the administration of water and water-based drinks), cigarette smoking during pregnancy, delivery, hospital stay, breastfeeding problems within the first 2 weeks pp, nipple shield use within the first 2 weeks pp, pacifier use within the first 2 weeks pp, and hospital size (no. of births in 2016).

[c]Steps not in the final model at any time: Steps 5 (*BF instruction + documentation*), 7 (*24-h rooming-in*), and 10 (*ongoing BF support*).

[d]Variable not in the final model.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

about half of the hospitals offered alternative feeding methods, the remaining used bottles. Provision of alternative feeding methods in hospitals favoured EBF during hospital stay confirming that qualified breastfeeding support is essential. This is similarly relevant to increase the implementation of early breastfeeding initiation (Step 4).

Results for Step 3 (*breastfeeding information*) were unexpected. Mothers who gave birth in hospitals that had implemented Step 3 had consistently lower odds of EBF after 2 weeks pp compared with mothers from hospitals that were not fully compliant. Unfortunately, the hospital questionnaire did not specify whether educational material was combined with personal support to effectively increase breastfeeding (Wouk et al., 2017). However, it can be speculated that the prenatal information settings addressed by the hospitals may have focused on the upcoming delivery rather than on breastfeeding.

4.2 | Maternal factors

Many of the known maternal social, psychosocial, and perinatal factors (Kohlhuber et al., 2008; Sievers et al., 2003; Yngve & Sjöström, 2001)

for breastfeeding were also relevant for EBF here, but, what is new, persisted much longer than the BPI.

4.2.1 | Sociopsychological background

A lower social status decreased the odds of EBF, similar to factors like lack of breastfeeding intentions and experience. Fathers may play an additional role (Crippa et al., 2021). As peer support has been shown to be particularly effective for hard-to-reach groups (Sokol & Fisher, 2016), our results suggest that involving mothers with breastfeeding experience could complement professional assistance such as post-discharge midwifery support. The results for Step 3 (*breastfeeding information*) show the need for suitable information by the hospital as an integrated link in the information chain.

4.2.2 | Perinatal conditions

The fact that a vaginal delivery favoured EBF may be partly attributable to the early initiation of breastfeeding, as discussed for Step 4. Together with the increased odds of EBF with a shorter hospital stay, complication-free childbirth may have favoured breastfeeding.

Mothers' reported use of pacifiers during the first 2 weeks pp was a persistent risk factor for non-EBF, in line with the use of nipple shields. As breastfeeding problems in the first 2 weeks were also persistently associated with EBF, reverse causality has to be considered, that is, inappropriate pacifier use may be both, the cause and the result of breastfeeding problems. In view of the potentially protective role of pacifier use for sudden infant death (Alm et al., 2016) and the potential risk for non-EBF, pacifiers should only be used cautiously and accompanied by professional guidance especially in the phase of breastfeeding establishment (American Academy of Pediatrics, 2012; Braga et al., 2020; Buccini et al., 2017; Lubbe & Ham-Baloyi, 2017).

4.3 | Strength and limitations

A major strength of the SuSe II study is the targeted linkage of nationwide data from hospitals with comprehensive data from mothers with prospective breastfeeding assessments in the critical neonatal period. In addition, the application of international standards (WHO, 2008; WHO & UNICEF, 2018) for measuring the exposure (BPI) and the outcome (EBF) allows the results to be comparable across national borders.

A major weakness of the study is the low participation rate among hospitals (16%) and mothers (34%) (Hockamp et al., 2021), although similar to other public health studies (Gross et al., 2014; Hoffmann et al., 2018; Lange et al., 2014; Nilsen et al., 2009). The overrepresentation of certified baby-friendly hospitals together with the additional effort for the hospital staff to recruit mothers may have led to an overestimation of the breastfeeding friendliness of German hospitals. On the other hand, the certified hospitals that implemented the steps to the expected high degree helped to demonstrate that a high score plays an important role in breastfeeding success. In addition, mothers with a higher level of education who are likely to initiate and maintain breastfeeding were overrepresented (Cohen et al., 2018). Unfortunately, a direct comparison with the similar analysis in the previous study, SuSe I, conducted 20 years earlier, was not possible due to the lower BPI level (median of five steps), stratification into only two BPI categories, and full breastfeeding (EBF including water and water-based drinks) instead of EBF as the outcome variable. However, both SuSe studies show that maternal factors were stronger predictors of breastfeeding success than the BPI (Dulon et al., 2003).

5 | CONCLUSION

Even in countries with a relatively high level of breastfeeding and a high-quality mother–infant care system, it is essential to encourage hospitals to engage in breastfeeding support. Their high commitment needs to be complemented by tailored support of mothers, as a critical component for sustained breastfeeding.

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CONFLICTS OF INTEREST

Mathilde Kersting and Erika Sievers were members of the German National Breastfeeding Committee between 1994 and 2021 (Mathilde Kersting) and between 2008 and 2021 (Erika Sievers). Silvia Rudloff is a member of the Nutrition Committee of the German Society of Pediatrics and Adolescent Medicine. Other authors have reported no conflicts of interest.

AUTHOR CONTRIBUTIONS

MK designed the research and supervised the manuscript. NH conducted the research and drafted the manuscript. NH and PH analysed the data. HR supervised the data analysis. ES provided essential support for data interpretation. SR gave advice on human milk research. MK and TL had primary responsibility for the final content. All authors read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

Data are available on request from the authors.

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REFERENCES

Agostoni, C., Braegger, C., Decsi, T., Kolacek, S., Koletzko, B., Michaelsen, K. F., Mihatsch, W., Moreno, L. A., Puntis, J., Shamir, R., Szajewska, H., Turck, D., & van Goudoever, J. (2009). Breast-feeding: A commentary by the ESPGHAN Committee on Nutrition. *Journal of Pediatric Gastroenterology and Nutrition*, *49*(1), 112–125. https://doi.org/10.1097/MPG.0b013e31819f1e05

Alm, B., Wennergren, G., Möllborg, P., & Lagercrantz, H. (2016). Breastfeeding and dummy use have a protective effect on sudden infant death syndrome. *Acta Paediatrica*, *105*(1), 31–38. https://doi.org/10.1111/apa.13124

American Academy of Pediatrics. (2012). Breastfeeding and the use of human milk. *Pediatrics*, *129*(3), e827–e841. https://doi.org/10.1542/peds.2011-3552

Aryeetey, R., & Dykes, F. (2018). Global implications of the new WHO and UNICEF implementation guidance on the revised baby-friendly hospital initiative. *Maternal & Child Nutrition*, *14*(3), 12637. https://doi.org/10.1111/mcn.12637

Ballard, O., & Morrow, A. L. (2013). Human milk composition: Nutrients and bioactive factors. *Pediatric Clinics of North America*, *60*(1), 49–74. https://doi.org/10.1016/j.pcl.2012.10.002

Braga, V. S., Vítolo, M. R., Kramer, P. F., Feldens, E. G., & Feldens, C. A. (2020). Breastfeeding in the first hours of life protects against pacifier use: A birth cohort study. *Breastfeeding Medicine*, *15*(8), 516–521. https://doi.org/10.1089/bfm.2020.0054

Buccini, G. D. S., Pérez-Escamilla, R., Paulino, L. M., Araújo, C. L., & Venancio, S. I. (2017). Pacifier use and interruption of exclusive breastfeeding: Systematic review and meta-analysis. *Maternal & Child Nutrition*, *13*(3), e12384. https://doi.org/10.1111/mcn.12384

Bundesinstitut für Risikobewertung (2007). *Stillförderung in Krankenhäusern: Information der Nationalen Stillkommission vom 2. November 1998 mit aktualisiertem Kommentar aus dem Jahr 2007* [in German]. https://www.stillen.de/wp-content/uploads/2017/02/BfR-Stillf%C3%B6rderung-in-Krankenh%C3%A4usern.pdf

Cohen, S. S., Alexander, D. D., Krebs, N. F., Young, B. E., Cabana, M. D., Erdmann, P., Hays, N. P., Bezold, C. P., Levin-Sparenberg, E., Turini, M., & Saveedra, J. M. (2018). Factors associated with breastfeeding initiation and continuation: A meta-analysis. *The Journal of Pediatrics*, *203*, 190–196. https://doi.org/10.1016/j.jpeds.2018.08.008

Crippa, B. L., Consales, A., Morniroli, D., Lunetto, F., Bettinelli, M. E., Sannino, P., Rampini, S., Zanotta, L., Marchisio, P., Plevani, L., Gianni, M. L., Mosca, F., & Colombo, L. (2021). From dyad to triad: A survey on fathers' knowledge and attitudes toward breastfeeding. *European Journal of Pediatrics*, *180*, 2861–2869. https://doi.org/10.1007/s00431-021-04034-x

Ducharme-Smith, K., Gross, S. M., Resnik, A., Rosenblum, N., Dillaway, C., Orta Aleman, D., Augustin, M., Silbert-Flagg, J., & Caulfield, L. E. (2021). Exposure to baby-friendly hospital practices and breastfeeding outcomes of WIC participants in Maryland. *Journal of Human Lactation*. https://doi.org/10.1177/0890334421993771

Dulon, M., Kersting, M., & Bender, R. (2003). Breastfeeding promotion in non-UNICEF-certified hospitals and long-term breastfeeding success in Germany. *Acta Paediatrica*, *92*(6), 653–658. https://doi.org/10.1080/08035320310001572

Economou, M., Kolokotroni, O., Paphiti-Demetriou, I., Kouta, C., Lambrinou, E., Hadjigeorgiou, E., Hadjiona, V., Tryfonos, F., Philippou, E., & Middleton, N. (2018). Prevalence of breast-feeding and exclusive breast-feeding at 48 h after birth and up to the sixth month in Cyprus: The BrEaST start in life project. *Public Health Nutrition*, *21*(5), 967–980. https://doi.org/10.1017/S1368980017003214

Euro-Peristat. (2012). *Euro-Peristat list of indicators*. https://www.europeristat.com/images/doc/updated%20indicator%20list.pdf

Euro-Peristat Project. (2018). *European perinatal health report: Core indicators of the health and care of pregnant women and babies in Europe in 2015*. https://www.europeristat.com/images/EPHR2015_web_hyperlinked_Euro-Peristat.pdf

Fewtrell, M., Bronsky, J., Campoy, C., Domellof, M., Embleton, N., Fidler Mis, N., Hojsak, I., Hulst, J. M., Indrio, F., Lapillonne, A., & Molgaard, C. (2017). Complementary feeding: A position paper by the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Committee on Nutrition. *Journal of Pediatric Gastroenterology and Nutrition*, *64*(1), 119–132. https://doi.org/10.1097/MPG.0000000000001454

Gross, K., Späth, A., Dratva, J., & Zemp Stutz, E. (2014). *SWIFS—Swiss infant feeding study.Eine nationale Studie zur Säuglingsernährung und Gesundheit im ersten Lebensjahr: Executive summary* [in German]. https://www.swisstph.ch/fileadmin/user_upload/SwissTPH/Projects/SWIFS/ExecutiveSummary_SWIFS_DE.pdf

Hakala, M., Kaakinen, P., Kääriäinen, M., Bloigu, R., Hannula, L., & Elo, S. (2017). The realization of BFHI step 4 in Finland—Initial breastfeeding and skin-to-skin contact according to mothers and midwives. *Midwifery*, *50*, 27–35. https://doi.org/10.1016/j.midw.2017.03.010

Hockamp, N., Burak, C., Sievers, E., Rudloff, S., Burmann, A., Thinnes, M., Zahn, J., Lücke, T., & Kersting, M. (2021). Breast-feeding promotion in hospitals and prospective breast-feeding rates during the first year of life in two national surveys 1997-1998 and 2017-2019 in Germany. *Public Health Nutrition*, *24*, 2411–2423. https://doi.org/10.1017/S1368980021001099

Hoffmann, R., Lange, M., Butschalowsky, H., Houben, R., Schmich, P., Allen, J., Kuhnert, R., Schaffrath Rosario, A., & Gößwald, A. (2018). KiGGS Wave 2 cross-sectional study—Participant acquisition, response rates and representativeness. *Journal of Health Monitoring*, *3*, 82–96. https://doi.org/10.17886/RKI-GBE-2018-032

Horta, B. L., & Victora, C. G., World Health Organization. (2013). *Short-term effects of breastfeeding: A systematic review on the benefits of breastfeeding on diarrhoea and pneumonia mortality*. https://apps.who.int/iris/handle/10665/95585

Institut für Qualitätssicherung und Transparenz im Gesundheitswesen. (2017). *Bundesauswertung zum Erfassungsjahr 2016: Geburtshilfe. Qualitätsindikatoren* [in German]. https://iqtig.org/downloads/auswertung/2016/16n1gebh/QSKH_16n1-GEBH_2016_BUAW_V02_2017-07-12.pdf

Institut für Qualitätssicherung und Transparenz im Gesundheitswesen. (2018). *Bundesauswertung zum Erfassungsjahr 2017: Geburtshilfe. Qualitätsindikatoren* [in German]. https://iqtig.org/downloads/auswertung/2017/16n1gebh/QSKH_16n1-GEBH_2017_BUAW_V02_2018-08-01.pdf

Kersting, M. (2001). Ernährung des gesunden Säuglings. Lebensmittel- und mahlzeitenbasierte Empfehlungen [in German]. *Monatsschrift Kinderheilkunde*, *149*, 4–10.

Kersting, M., & Dulon, M. (2002). Assessment of breast-feeding promotion in hospitals and follow-up survey of mother-infant pairs in Germany: The SuSe Study. *Public Health Nutrition*, *5*(4), 547–552. https://doi.org/10.1079/PHN2001321

Kersting, M., Hockamp, N., Burak, C., & Lücke, T. (2020). *Studie zur Erhebung von Daten zum Stillen und zur Säuglingsernährung in Deutschland – SuSe II* [in German]. Deutsche Gesellschaft für Ernährung (editor): 14. DGE-Ernährungsbericht. Vorveröffentlichung Kapitel 3. http://www.dge.de/14-dge-eb/vvoe/kap3

Kohlhuber, M., Rebhan, B., Schwegler, U., Koletzko, B., [Berthold], & Fromme, H. (2008). Breastfeeding rates and duration in Germany: A Bavarian cohort study. *The British Journal of Nutrition*, *99*(5), 1127–1132. https://doi.org/10.1017/S0007114508864835

Koletzko, B., Bauer, C. P., Bronstrup, A., Cremer, M., Flothkotter, M., Hellmers, C., Kersting, M., Krawinkel, M., Przyrembel, H., Schafer, T., Vetter, K., Wahn, U., & Weißenborn, A. (2013). Säuglingsernährung und Ernährung der stillenden Mutter. Aktualisierte Handlungsempfehlungen des Netzwerks Gesund ins Leben – Netzwerk Junge Familie, ein Projekt von IN FORM [in German]. *Monatsschrift Kinderheilkunde*, *161*(3), 237–246. https://doi.org/10.1007/s00112-013-2870-2

Lange, M., Butschalowsky, H. G., Jentsch, F., Kuhnert, R., Schaffrath Rosario, A., Schlaud, M., & Kamtsiuris, P. (2014). Die erste KiGGS-Folgebefragung (KiGGS Welle 1): Studiendurchführung, Stichprobendesign und Response [in German]. *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz*, *57*(7), 747–761. https://doi.org/10.1007/s00103-014-1973-9

Lubbe, W., & Ten Ham-Baloyi, W. (2017). When is the use of pacifiers justifiable in the baby-friendly hospital initiative context? A clinician's guide. *BMC Pregnancy and Childbirth*, *17*(1), 130. https://doi.org/10.1186/s12884-017-1306-8

Nilsen, R. M., Vollset, S. E., Gjessing, H. K., Skjaerven, R., Melve, K. K., Schreuder, P., Alsaker, E. R., Haug, K., Daltveit, A. K., & Magnus, P. (2009). Self-selection and bias in a large prospective pregnancy cohort in Norway. *Paediatric and Perinatal Epidemiology*, *23*(6), 597–608. https://doi.org/10.1111/j.1365-3016.2009.01062.x

Pérez-Escamilla, R., Martinez, J. L., & Segura-Pérez, S. (2016). Impact of the baby-friendly hospital initiative on breastfeeding and child health outcomes: A systematic review. *Maternal & Child Nutrition*, *12*(3), 402–417. https://doi.org/10.1111/mcn.12294

R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria.

Robert, E., Michaud-Létourneau, I., Dramaix-Wilmet, M., Swennen, B., & Devlieger, R. (2019). A comparison of exclusive breastfeeding in Belgian maternity facilities with and without baby-friendly hospital status. *Maternal & Child Nutrition*, *15*(4), e12845. https://doi.org/10.1111/mcn.12845

Sievers, E., Haase, S., Oldigs, H.-D., & Schaub, J. (2003). The impact of peripartum factors on the onset and duration of lactation. *Biology of the Neonate*, *83*(4), 246–252. https://doi.org/10.1159/000069485

Sokol, R., & Fisher, E. (2016). Peer support for the hardly reached: A systematic review. *American Journal of Public Health*, *106*(7), e1–e8. https://doi.org/10.2105/AJPH.2016.303180

Spaeth, A., Zemp, E., Merten, S., & Dratva, J. (2018). Baby-friendly hospital designation has a sustained impact on continued breastfeeding. *Maternal & Child Nutrition*, *14*(1). https://doi.org/10.1111/mcn.12497

Statistisches Bundesamt. (2020). *Bildungsstand der Bevölkerung: Ergebnisse des Mikrozensus 2018, Ausgabe 2019* [in German]. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bildung-Forschung-Kultur/Bildungsstand/Publikationen/Downloads-Bildungsstand/bildungsstand-bevoelkerung-5210002187004.pdf?__blob=publicationFile

Theurich, M. A., Davanzo, R., Busck-Rasmussen, M., Díaz-Gómez, N. M., Brennan, C., Kylberg, E., Bærug, A., Mchugh, L., Weikert, C., Abraham, K., & Koletzko, B. (2019). Breastfeeding rates and programs in Europe: A survey of 11 national breastfeeding committees and representatives. *Journal of Pediatric Gastroenterology and Nutrition*, *68*(3), 400–407. https://doi.org/10.1097/MPG.0000000000002234

Verein zur Unterstützung der WHO/UNICEF-Initiative "Babyfreundlich" (BFHI) e. V. Jahresbericht WHO/UNICEF-Initiative "Babyfreundlich". (2017). [in German]. https://www.babyfreundlich.org/fileadmin/user_upload/download/verein_und_vorstand/Jahresberichte/WEB_Babyfreundlich_Jahresbericht_20171108.pdf

Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N., Rollins, N. C., & Lancet Breastfeeding Series, G. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, *387*(10017), 475–490. https://doi.org/10.1016/S0140-6736(15)01024-7

Wissenschaftliche Information Milupa. (2017). *Geburtenliste Deutschland 2016* [in German].

World Health Organization. (2008). *Indicators for assessing infant and young child feeding practices: Conclusions of a consensus meeting held 6-8 November 2007 in Washington D.C., USA*. https://apps.who.int/iris/bitstream/handle/10665/43895/9789241596664_eng.pdf?sequence=1

World Health Organization. (2017). *Guideline: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services*. https://apps.who.int/iris/bitstream/handle/10665/259386/9789241550086-eng.pdf?sequence=1

World Health Organization. (2020). Probability of dying per 1000 live births: Data by country. https://apps.who.int/gho/data/node.main.525

World Health Organization & United Nations Children's Fund. (1989). Protecting, promoting and supporting breastfeeding: the special role of maternity services. https://apps.who.int/iris/bitstream/handle/10665/39679/

World Health Organization & United Nations Children's Fund. (1990). Innocenti declaration on the protection, promotion and support of breastfeeding. http://worldbreastfeedingweek.org/2018/wp-content/uploads/2018/07/1990-Innocenti-Declaration.pdf

World Health Organization & United Nations Children's Fund. (2003). *Global Strategy for Infant and Young Child Feeding*. http://gbv.eblib.com/patron/FullRecord.aspx?p=284706

World Health Organization & United Nations Children's Fund. (2018). *Implementation guidance: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services—The revised baby-friendly hospital initiative*. https://www.who.int/nutrition/publications/

Wouk, K., Tully, K. P., & Labbok, M. H. (2017). Systematic review of evidence for baby-friendly hospital initiative step 3. *Journal of Human Lactation*, *33*(1), 50–82. https://doi.org/10.1177/0890334416679618

Yngve, A., & Sjöström, M. (2001). Breastfeeding determinants and a suggested framework for action in Europe. *Public Health Nutrition*, *4*(2B), 729–739. https://doi.org/10.1079/phn2001164

SUPPORTING INFORMATION

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