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Chapter

Supporting and Promoting Breastfeeding: The 10 Steps to Successful Breastfeeding

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Abstract

Since the launch of the BFHI (*Baby-Friendly Hospital Initiative*), the “*Ten Steps to Successful Breastfeeding*” have been the cornerstone of national and international strategies that protect and promote breastfeeding. The aim of the BFHI has been the optimization of maternity care services by focusing on the adherence of maternity care facilities to good practices to support and protect breastfeeding. Numerous studies have evaluated the impact of the “10 Steps,” employing both observational or intervention study designs, and established higher breastfeeding initiation and longer breastfeeding duration. Nevertheless, suboptimal implementation of the “10 Steps” has been reported in many countries worldwide.

Keywords: breastfeeding, exclusivity, the 10 steps to successful breastfeeding, maternity practices, skin-to-skin, rooming-in

1. Introduction

The joint WHO/UNICEF *Baby-Friendly Hospital Initiative* (BFHI) was launched in 1990 as one of the main components of the Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding. It is an international program which aimed in the improvement of maternity care services, mainly focusing on the adherence of maternity care facilities to “good practices” and specifically the implementation of the “*Ten Steps to Successful Breastfeeding*.” The “10 Steps” are the underpinning of the BFHI and describe the optimal maternity practices for supporting mothers to initiate breastfeeding. The BFHI program was reinvigorated for the first time in 2017 since it was first launched in 1989. The updated implementation guidance targets the policymakers and the institution managers at different levels to fulfill nine responsibilities through a national BFHI program. These are (1) the integration of the 10 Steps into the national policies, (2) establishing or strengthening a national coordination body, (3) ensuring the capacity of all healthcare professionals, (4) the use of external assessment to regularly evaluate the implementation of the 10 Steps, (5) providing technical assistance, (6) monitoring of the implementation, (7) continuous communication and advocacy, (8) identification and allocation of sufficient resources and (9) incentivizing change [1].

1. Have a written policy that is routinely communicated to all healthcare staff.
2. Train all healthcare staff in the skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within 1 hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants.
6. Give infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in—allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no pacifiers or artificial nipples to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center.

Source: WHO/UNICEF: *Baby-Friendly Hospital Initiative: Revised, Updated and Expanded for Integrated Care* [2].

Table 1.
The ten steps for successful breastfeeding.

2. BFHI designation and the “ten steps”

A maternity facility is awarded with the designation of Baby-Friendly Hospital when it follows the Global Criteria of the BFHI that were set as the standards for measuring adherence to the 10 Steps for Successful Breastfeeding. The Global Criteria provide guidance on the procedure that maternity care facilities have to undergo in order to be assessed and acquire certification as Baby-Friendly. In 2009, BFHI documents were revised and updated instructions and guidance required for the successful implementation and compliance to the “10 Steps” and the International Code of Marketing of Breast Milk Substitutes were offered [2]. **Table 1** below lists the “10 Steps for Successful Breastfeeding.”

A BFHI Self-Appraisal Tool (Section 4) of the ten steps is included in the BFHI package. This tool was developed in order to be used by the maternity care facilities as a means of a preliminary self-assessment of the extent to which they implement the 10 Steps. The self-assessment of maternity care practices which affect successful breastfeeding provides a framework by which a maternity care facility can identify gaps in the implementation to design potential and necessary improvements and modifications. The process follows a triple-A sequence (Assessment, Analysis, and Action). For a maternity facility to acquire the baby-friendly accreditation, it should demonstrate at least 80% compliance to all the maternity practices/Global Criteria as described in the “*Baby-Friendly Hospital Initiative: Revised, Updated and Expanded for Integrated Care*” guide [2]. Accreditation is followed by periodical, predefined re-evaluations to assess to the facility’s compliance to the Ten Steps.

3. Current status of the BFHI globally

Since the BFHI was launched, as many as 21,328 maternity care facilities that have been listed as ever been designated as Baby-Friendly in 131 (out of 198; 66%) countries [3]. These represent 27.5% of the all maternity clinics worldwide, ranging from 8.5% in developed countries to 31% in less developed settings [3].

The WHO [4] published an updated report to celebrate the 25th Anniversary since the launch of the initiative. The report provides an analysis of the current status of the BFHI worldwide. Among others, the report describes the global and country program coverage¹, the current designation process as well as reasons of discontinuation of the program in countries that reported its termination. Results of this Report were derived from 2nd Global Nutrition Policy Review (GNPR2), which was distributed to all 194 WHO member states in 2016. The members were requested to ask a series of questions in relation with the implementation of the BFHI. A total of 117 countries completed the questionnaire included in the GNPR2. WHO also obtained information from other sources for countries that did not respond or provided no coverage information to the GNPR2. The additional sources included the 2016 BFHI Network for Industrialized Countries, the 2014 American Health Organization survey on BFHI Implementation in Latin America and the Caribbean, the 2013 UNICEF Nutridash survey. Further, WHO conducted a series of interviews with national leaders in breastfeeding programs and the BFHI in order to receive additional qualitative information of the BFHI [4].

According to the report, 86% of the countries that completed the questionnaire reported that they implemented the BFHI. Overall, 71% reported that they have an operational BFHI program. The BFHI was introduced by almost half (48.8%) of the participating countries in the early 90s, whereas 11 (9.4%) and eight countries (6.8%) have initiated the implementation of BFHI in the period 2000–2009 and 2010–2017 respectively. As many as 16 countries report that they had never implemented the program and for a further 25 countries, the year when the program was actually introduced is not reported [1]. Of the 78 with an active BFHI program that completed the GNPR2 questionnaire, the majority of countries (N = 61; 78%) used the Global Criteria for the assessment of maternity facilities in BFH-designation process. Twenty-one percent (n = 16) used their own national criteria. **Table 2** presents some of the main statistics reported in the Report [4] with regard to the progress and current status of the BFHI countries globally 25 years after the launching of the Initiative.

Table 3 reports the overall percentage of births that occurred in Baby-Friendly-designated hospitals by each WHO region as well as the number of countries per

Year	Number of countries (%)
Never implemented	16 (13.7)
< 1995	34 (29.1)
1995–1999	23 (19.7)
2000–2004	8 (6.8)
2005–2009	3 (2.6)
> 2010	8 (6.8)
Unknown year	25 (21.4)

Source: WHO [1], *National Implementation of the Baby-Friendly Hospital Initiative*.

Table 2.
Number of countries that reported implementation of the BFHI by year of introduction.

¹ BFHI Coverage is the proportion of births that occur in Baby-Friendly-designated maternity facilities (as defined by the Global Nutrition Monitoring Framework).

Area	% of Births	No of countries on the basis of % BFHI coverage				Total
		None	< 20%	20–50%	> 50%	
Africa	4	15	13	5	2	35
Americas	13	10	16	1	3	30
Easter Mediterranean	17	8	8	4	1	21
Europe	36	16	9	10	12	47
Southeast Asia	3	5	4	0	2	11
Western Pacific	11	9	7	4	4	24
Total	100%	63	57	24	24	168

Source: WHO [1] National Implementation of the Baby-Friendly Hospital Initiative.

Table 3. Percentage of births that occur in facilities BF-designated maternity facilities by WHO region and number of countries on the basis of the % BFHI coverage.

region on the basis of BFHI coverage (e.g. None through to >50% of births occurring in BFH). Overall, BFHI coverage was estimated at about 10%, ranging from less than 5% in Africa and Southeast Asia to 36% in the European region [4]. However, significant between-country variability is observed, even within the European region. Only 12 (out of 47) countries in the WHO European region report that births in baby-friendly-designated hospitals exceed 50%, whereas as many as 16 countries report of no BF-designated facilities.

Among the participating countries, only 64 have reported that the “10 Steps for Successful Breastfeeding” have been incorporated into national policies or strategies. Only 39 countries (50%) reported having developed a reassessment process. Most of those (N = 21) reassessed the BF maternity facilities less frequently than 5 years and only 14 countries reported that they reassess facilities every 5 years [4].

In 2016, 23 countries reported that they had terminated the implementation of the BFHI. Among those, eight countries ceased its operation before 2005, seven countries stopped the use of the program during the period 2006–2010 and five stopped its implementation within the last 5 years [4]. The most frequently reported reason of BFHI program cessation was the termination of external funding (given by 12 countries), followed by the lack of human resources (given by seven countries), and lack of political interest (given by eight countries). Other reasons mentioned were the termination of governmental funding (given by five countries) and resistance from hospitals or healthcare system (given by five countries). The least common reasons included merging with other programs, lack of advocacy, lack of monitoring and non-adherence of the ICMBS [4].

4. Evidence on the degree of implementation of the “10 steps” and association with breastfeeding

While the original development of the 10 steps was based on clinical experience and good public health practice rather than research evidence in terms of their impact in influencing breastfeeding behavior and outcomes [1], there has been plenty of research evidence since to support the positive association (in observational studies)

and/or effectiveness (in intervention studies) of the adherence to BFHI's 10 Steps to Successful Breastfeeding on BF outcomes.

4.1 Degree of implementation of the “10 steps”

Generally, studies conducted to evaluate the impact of Baby-Friendly accredited hospitals demonstrated higher breastfeeding initiation and longer breastfeeding duration [5–7]. However, suboptimal implementation of the “10 Steps” has been reported in many countries worldwide [8–12].

Recording and assessment of the current situation in relation with the implementation of the “10 Steps” in maternity facilities is usually done at a unit level (by the answers provided from the heads/managers of the facilities) and less frequently from the perceived assessment of the facility personnel [13, 14]. The number of studies conducted to investigate the implementation of the Steps through the experiences of mothers seems to be relatively limited [14, 15].

The Maternity Experiences Survey in Canada [12] is one of the largest studies in the literature that assessed the implementation of the 10 steps based on the self-reported experience of a nationally representative sample of over 8000 women, who gave birth during 5–14 months prior to the study. The study reported that the implementation of the 10 steps was fragmented with highest degree of implementation for Step 3 (information about the benefits and management of breastfeeding) and Step 10 where as many as nine out of 10 mothers were given information about where to seek help and support after discharge from the hospital. On the other hand, only one in three mothers experienced skin-to-skin and 44.4% reported that their infant was given a pacifier or a soother within the first week after birth. In a Greek study with the participation of 312 mothers, the majority of the participants (90%) reported that their babies were fed with formula whereas only 3% initiated BF within 1 hour. About 66% of mothers reported rooming-in during their stay in the hospital, of whom all gave birth in a public hospital [9].

4.1.1 Evidence from observational studies

There have been numerous studies from several parts of the world during the last decades that have looked at the association of either the overall implementation (e.g. comparing BF-designated and non-BF-designated hospitals) or partial/select implementation of the 10 steps on BF initiation, duration and exclusivity. Overall, the findings of these studies have consistently demonstrated positive associations of the baby-friendly maternity practices on breastfeeding outcomes.

4.1.2 BF rates in BF-designated and non-BF-designated maternity facilities

This subsection provides evidence of the effect of the BF designation to maternity care facilities (overall effect of the 10 Steps to Successful BF) on BF outcomes. Studies commonly either compared BF and non-BF-designated maternity care facilities [6, 16] or compared changes in select breastfeeding indicators pre- and post-introduction of BF certification [17].

A study [17] that assessed EBF before and after the implementation of the BFHI in a University hospital in Turkey, found that there was a 1.5-fold increase in BF duration with a mean of 21.17 (SD: 0.42) months in the after BFHI group compared to 17.83 (SD: 0.6) months in the pre-BFHI group. Even though the authors found higher EBF

rates during the post-BFHI implementation period, the differences were not statistically significant.

In a survey conducted in all Scottish maternity clinics with the inclusion of 464,246 records of infants born during the period of 1995–2002, mothers who gave birth to a Baby-Friendly Hospital were about 28% more likely to initiate breastfeeding within the first week after birth after controlling for the potential effect of confounders [6]. Similar findings have been reported in other studies in terms of initiation [6, 18]. However, unlike breastfeeding initiation, evidence with regard to overall BF duration is conflicting. Whereas several studies have shown a positive effect on BF duration [7, 19], a number of studies did not identify a positive association with longer duration of breastfeeding [16]. For instance, in the Millennium Cohort study in UK with the participation of 17,359 mother-infant dyads from 248 maternity care facilities (of which 14 were BF-designated) higher breastfeeding initiation rates were reported in accredited BFHI hospitals. Nevertheless, this difference was no longer evident by the first month (adj RR: 0.96 95% CI: 0.84, 1.09).

In a different study from the US, with the participation of 29 of a total of 32 BF-designated hospitals, mean breastfeeding initiation rates were significantly higher in comparison to the overall US BF initiation rates (83.8% vs. 69.1%). In addition, mean EBF initiation rates were almost twice higher than the national EBF rates (78.4% vs. 46.3%). Interestingly, the study identified existing inaccuracies in EBF definitions as well as the lack of EBF data recording even in BF-designated hospitals. Only 16 BF hospitals (out of 29 that participated in the study) kept a record of EBF data, and of those only nine reported using the WHO definition for EBF (only breast milk). Six hospitals considered infants to be EBF, even they have also received sugar water for medical reasons and one hospital defined EBF on the basis of maternal perspective on supplementation i.e. infants fed with formula or sugar water for medical reasons were also considered as EBF. According to the hospitals' responses, Steps 3 (*Prenatal Information*), 6 (*only BM*) and 9 (*no use of pacifier or other teats*) were the most difficult to implement. Only a very small number of hospitals, specifically four out of 29, reported no problem on the implementation of the 10 Steps [20].

Implementation of the BFHI also appears to have a positive effect on BF rates in NICUs. Based on extracted data from medical records of infants born and admitted in the NICU of a BF-hospital designated in the USA, in [19]. BF outcomes were compared before the initiation of the procedure for the designation and after the hospital received the certification. The study reported that both BF and EBF initiation as well as duration during the first 6 weeks increased significantly.

4.1.3 Association between the 10 steps and BF outcomes

In a population-based study in the USA, in [21], the five practices that exhibited the strongest association with BF duration within the first 16 weeks independently of maternal socio-economic status, were: (1) initiation of BF within the first hour, (2) only breast milk (exclusive BF), (3) rooming-in, (4) no use of pacifier and (5) BF support after discharge. No association was found between the maternity practices that refer to Hospital staff providing support and information to mothers on breastfeeding (*information given on BF* (step 3); *Help given on how to BF* (Step 5); *BF on Demand* (Step 8); *No gifts or samples of BF substitutes* (ICBS)), suggesting that the type of information and support might not differ. On the contrary, BF duration was higher among mothers that experienced the following steps: *BF within the first hour after birth* (Step 4); *only BM while in the maternity clinic* (Step 6); *Rooming-in* (Step 7);

No use of a pacifier (Step 9) compared to those that they did not. When the effect of the implementation of the five maternity practices was investigated on the basis of their socio-economic status (defined as mothers whose incomes \leq 185% of the poverty level and those whose incomes were $>$ 185 the poverty level), low-income mothers reported higher BF rates between 1 and 14 weeks among those that experienced all five maternity clinics compared to those that did not (65% vs. 46%). For mothers above $>$ 185 the poverty level, BF rates among those that experience all maternity practices were significantly higher than those that did not between 9 and 12 weeks (at 12 weeks: 82% vs. 70%).

In a longitudinal study (Infant Feeding Practices Survey) conducted in the USA [22], five indicators were measured, thought to negatively affect breastfeeding outcomes to reflect the lack of implementation of good maternity care practices as described in the 10 steps, namely late BF initiation, introduction of supplementation, not rooming-in, not breastfeeding on demand, use of pacifiers. These were directly assessed by mothers who initiated breastfeeding during their stay in the maternity clinic and expressed the intention to BF for at least 2 months during pregnancy. The findings suggested a clear dose-response relationship between maternity practices and the risk of BF discontinuation before the first 6 weeks of birth. In fact, the fewer the number of “good practices” the mothers experienced during their stay, the higher the risk of BF discontinuation. Specifically, mothers who reported that they did not experience any of the maternity practices were nearly eight times more likely to discontinue BF prematurely by comparison to those who reported experienced all of the above five practices/steps (adjOR: 7.7; 95% CI: 2.3–25.8). When each “bad practice” was assessed separately, three of the five steps appeared to be more strongly associated with shorter BF duration; late BF initiation, supplementation and no BF on demand. After adjustment for other variables, late BF initiation and supplementation were identified as the stronger risk factors of early BF discontinuation. Mothers who experienced none of the maternity practices were about seven times more likely to discontinue BF within the first 6 weeks in comparison to those experienced all five practices. Among the factors that were found to be independently associated with discontinuation of BF before the sixth week were Initiation of breastfeeding (adj OR: 1.6; 95% CI: 1.1–2.3); formula supplementation (adj OR: 2.3; 95% CI: 1.5–3.3) and not BF on demand (adj OR: 1.2; 95% CI: 0.8–1.7). On the other hand, pacifier use (adj OR: 1.0; 95% CI: 0.7–1.4) and rooming-in (adj OR: 1.1; 95% CI: 0.8–1.7) were found not to be associated with BF discontinuation.

While there is clear evidence to suggest that the use of supplementation is one of the strongest independent risk factors of exclusivity as well as shorter BF duration in general, it has been suggested that even baby-friendly-designated hospitals fail to achieve its implementation. The Baby-Friendly requirement that the maternity clinics have to pay for the infant formulas, especially in countries that hospitals receive formulas from the companies for free, increases significantly the maternity clinics' expenses and becomes a barrier to the adherence of Step 6 (*Only BM*) [5].

A Swiss study [23] also confirmed the positive association between the implementation of BFHI and exclusivity as well as longer breastfeeding duration. While an improvement in BF and EBF rates was observed after accreditation of hospitals with the baby-friendly designation during 1994–2004, the authors observed significant variability in EBF rates as well as the degree of meeting the BFHI criteria, even among hospitals that acquired the designation. In the study, the authors reported that the strongest associations with shorter BF duration were observed in terms of formula supplementation in the maternity facility. Moreover, the introduction of other liquids

(not formula supplementation) was also associated with early cessation of BF. BF within the first hour after birth, full rooming-in, breastfeeding on demand and no use of pacifiers was shown to be associated with longer BF and EBF duration.

A survey in Brazil [24], as part of an immunization campaign, included 65,936 infants younger than 1 year of age and examined the association of the implementation of Baby-Friendly practices on breastfeeding outcomes. A higher proportion of mothers who delivered in a Baby-Friendly Hospital were more likely to experience the 10 steps. The experience of the 10 steps was shown to have a positive association with the duration of EBF up to the sixth month. Similar findings are confirmed by a series of studies from other countries [25, 26]. It has been suggested, however, that mothers who intend to BF longer or exclusively are more likely to choose to give birth in a Baby-Friendly hospital and are more willing to comply with the 10 Steps; hence, to some extent to which the observed differences represent a selection bias is not clear [26].

In any case, there is evidence to suggest that any effect is likely to be cumulative as the more “good practices” mothers experience the more likely they are to achieve EBF intentions [27]. Findings from the Infant Feeding study II in the USA suggest that experiencing all six practices investigated [*Initiate BF within 1 hour after birth* (Step 4); *only breast milk* (Step 6); *Rooming-In* (Step 7); *BF on Demand* (Step 8); *Use no Pacifier/Teats* (Step 9); *Provide information on how to seek support after discharge* (Step 10)] increases the odds of achieving the mother’s intended duration of EBF by nearly three times in comparison to experiencing none or only one [27]. Furthermore, compared to mothers who experienced all six baby-friendly practices, mother that had not experienced any of the practices were at 13 times greater risk to discontinue any BF [8]. As additional baby-friendly practices were implemented, a stepwise decrease of the risk was observed, suggesting a dose–response relationship between the number of the Steps and breastfeeding. Using logistic regression analysis in order to implement mutual adjustment between the maternity practices [*BF initiation within 1 hour* (Step 4); *only BM given* (Step 6), *Rooming-in* (Step 7), *BF on Demand* (Step 8); *No pacifiers given* (Step 9); *Provide information on BF* (Step 10) as well as to adjust for several socio-demographic factors (e.g. child gender, household income, marital status, parity, maternal education) and behavioral and attitudinal factors [e.g. number of friends and relatives who breastfed, maternal prenatal intentions to work after birth, prenatal attitudes toward BF (i.e. formula as good as BM)], the authors identified the three practices with the strongest positive association with BF outcomes in the first 6 weeks period after birth. These are: BF initiation within 1 hour, only breast milk given and no pacifiers or other soothers.

Another study [28] conducted in four Public hospitals in Hong Kong with a sample of 1242 mother-infant pairs investigated the effect of six maternity practices on breastfeeding duration up to the first month after birth. The maternity practices not investigated were: *Have a written BF policy* (Step 1), *Train health workers to implement the policy* (Step 2), *Inform all pregnant women about the benefits and management of BF* (Step 3) and *Support mothers on how to BF* (Step 5). Mothers who did not experience any of the good maternity care practices were about three times more likely to initiate weaning within the first 8 weeks (AdjOR: 3.13; 95% CI: 1.41–6.95). In order to identify the practices that are more strongly associated with successful breastfeeding outcomes, the authors performed a multivariable analysis. Only four of the six maternity practices investigated were associated with BF discontinuation at 8 weeks after adjustment for socio-demographic factors, mode of birth, return to work and other breastfeeding support factors. These are early BF initiation within 1 hour after birth (AdjOR: 0.65; 95% CI: 0.51–0.83), only breast milk (AdjOR: 0.47; 95% CI: 0.35–0.63),

no use of a pacifier (AdjOR: 0.66; 95% CI: 0.53–0.83), breastfeeding information and support (AdjOR: 0.67; 95% CI: 0.52–0.88). The study did not find any association between rooming-in (AdjOR: 1.13; 95% CI: 0.89–1.43) and breastfeeding on demand (AdjOR: 1.01; 95% CI: 0.78–1.31) and BF duration. When in the multivariate model, breastfeeding support variables (whether the mother BF as an infant, previous BF experience and paternal preference to BF) were also included, only EBF while in hospital stay (Step 6) was associated with BF duration.

It has to be noted that the majority of studies operationalize the extent to which the “10 steps” have been implemented based on self-report of the mothers. Furthermore, even though the set of good practices refers to 10 items, the first two items (i.e. written policy and education of maternity clinic staff) are almost always never included in the investigation since these are clinic-level rather than individual-level variables and, unlike other steps (for example, breastfeeding within 1 hour of birth, rooming-in, breastfeeding on demand and so on) cannot be reported by the participating mothers in the form of self-reported experience.

A prospective study by Pincombe et al. [11] with a sample of 317 primiparous mothers in Australia followed for the first 6 months after birth found that the use of formula supplementation, the use of pacifier/dummy or nipple shield and, interestingly, breastfeeding on demand while in the hospital were associated with shorter duration of breastfeeding. After adjusting for different socio-demographic factors, “breastfeeding on demand” remained positively associated with early initiation of weaning (adjHR: 1.71; 95% CI: 1.03–2.86). The authors concluded that the surprising association between breastfeeding on demand and shorter duration of breastfeeding was confounded by other factors such as higher self-efficacy, smoking less, education level, type of birth delivery [11].

Even though studies have varied in terms of their study design (set of steps included in the investigation, breastfeeding outcomes, length of follow-up and so on), it appears that the most consistent, and perhaps non-surprising, association with early discontinuation of exclusive breastfeeding is the provision of other non-breast milk liquids while at the clinic [11, 27], especially formula supplementation [29–31].

A US national study [32] examined the effect of the implementation of the 10 Steps for mothers to achieve their intention for EBF duration in primiparas and multiparas separately. For primiparas, four maternity practices were associated with BF intention: only breast milk (not other supplement) (adjOR: 4.4; 95% CI: 2.1–9.3), providing information on community BF support resources (adjOR: 2.3; 95% CI: 1.1–4.9); health support for BF initiation (adjOR: 6.3; 95% CI: 1.8–21.6); no use of pacifier (adjOR: 2.3; 95% CI: 1.1–4.4). For multiparas, only breast milk (adjOR: 8.8; 95% CI: 4.4–17.6) and support of BF on demand (adjOR: 3.4; 95% CI: 1.7–6.8) were the only maternity services that were statistically significant with the fulfillment of the maternal intention of EBF duration.

4.2 Evidence from intervention studies

The majority of studies assessing the association between the implementation of the “10 steps” and breastfeeding outcomes in the published literature are observational. This was also the conclusion of a systematic review on the subject [33]. Of 58 reports identified in their review, nine were based on three randomized controlled trials. The rest of the studies were quasi-experimental designs (N = 19), prospective studies (N = 11) and cross-sectional or retrospective (N = 19). Even so, the authors concluded that adherence to the Ten Steps has a positive impact on

short-term, medium-term and long-term breastfeeding outcomes with a dose-response relationship between the number of steps and the likelihood of improved BF outcomes. Interestingly, they also concluded that community support (step 10) appears to be essential for sustaining any impacts of the BFHI in the long term. The lack of intervention studies is not surprising due to the nature of the intervention and the pragmatic difficulty in randomizing units to BFHI. It is more likely that studies apply observational designs either in the form of descriptive comparative designs i.e. comparing maternity units that have implemented the BFHI to control facilities [34] or pre-post quasi-experimental designs [35, 36]. These studies have been discussed in the section above alongside the observational studies with a survey study design.

The first intervention study was the seminal and most well-cited to date PROBIT study in the Republic of Belarus [34]. This was a cluster randomized trial. The study investigated the effectiveness of BFHI by randomly assigning 31 hospitals to either the BFHI intervention or control arm. During the study period, as many as 17,046 mother-infant dyads were included in the data analysis. The prevalence of Breastfeeding and Exclusive Breastfeeding was measured at 3, 6, 9 and 12 months. The study found a higher prevalence of BF in the maternity clinics in the intervention arm compared to the control arm at the third (72.7% vs. 60%; adjOR: 0.52, 95% CI: 0.40, 0.69) and sixth month of follow-up (49.8% vs. 36.1%; adjOR: 0.52, 95% CI: 0.39, 0.71). Furthermore, the study showed differences between intervention-control arm at longer follow-up periods. The breastfeeding prevalence at 9 months among the group of women who delivered in a BFHI hospital (intervention arm) was 36.1% in comparison to 24.2% among mothers who gave birth in the control hospitals (adjOR: 0.51, 95% CI: 0.36, 0.73). At 12 months, the prevalence of BF was 19.7% in the intervention group compared to 11.4% in the control group (adjOR: 0.47, 95% CI: 0.32, 0.69).

The study demonstrated that the effectiveness of the implementation of the BFHI on improving breastfeeding was not short-lived since differences between intervention and control arms were observed both in the short term as well as the long term, and up to a period of 12 months after birth. Furthermore, the study found that the effect was not just restricted to a higher likelihood and longer duration of any breastfeeding, but also showed a significant effect of the intervention on exclusive breastfeeding. The proportion of mothers exclusively breastfeeding at 3 months was seven times higher in the experimental group than the control group (43.3% vs. 6.4%; p -value < 0.001) and more than 12 times higher at 6 months after birth (7.9% vs. 0.6%; p -value = 0.01). Of course, it should be noted that even though there was a statistically significant effect of the intervention on the likelihood of breastfeeding at 6 months after birth (49.8% vs. 36.1% in the control group), as well as the likelihood that this is exclusive by comparison to the control group, the prevalence of mothers who exclusively breastfed at 6 months was quite low even in the intervention arm (7.9% vs. 0.6%). This finding is not surprising since recommendations for EBF are for 6 months.

The other two intervention studies identified by a review [33] were conducted in Brazil. However, the aim was not to assess the BFHI 10 steps as a pack, but certain aspects of it. In a study [37], following training of the maternity care staff in the 10 steps, mothers were randomized to receive 10 postnatal home visits (step 10). The authors found that strengthening step 10 had a significant positive impact of the intervention on the prevalence of exclusive and any breastfeeding. Taddei et al. [35] randomly assigned eight hospitals in Brazil to Ten Steps training or to continue the standard of care but did not find an impact of the training of the staff on breastfeeding duration.

A quasi-experimental study [36] was conducted in the USA with the participation of 13 hospitals that received BF accreditation before 1999 or became accredited during the period 1999–2009 (participants = 11,723) and 19 non-BF-designated matched hospitals (participants = 136,040). Matching was achieved by identifying the Baby-Friendly maternity facility's "nearest neighbors," determined by calculating the Euclidian distance between standardized values of pairs of observations. These were the number of births as a proxy for the size of birth facility, the proportion of white mothers and the proportion of mothers with high education. Even though the study did not find an overall difference between the BF and non-BF-designated hospitals, the study reported a differential effect of the intervention in terms of educational attainment. In fact, the study recorded an increase of 3.8% in Breastfeeding initiation rates in designated Baby-friendly hospitals (adj coef = 0.038; 95% CI: 0.00, 0.08) and of 4.5% in EBF for 4 months or more (adj coeff = 0.045; 95% CI: 0.01, 0.08) for only among mothers of lower educational attainment. This is due to the fact that mothers with higher maternal education are more likely to be aware of the BF accreditation and thereafter choose to give birth in Baby-friendly hospitals. On the contrary, BF accreditation might help to reduce the effect of socio-economic disparities and therefore reduce the gap of health inequalities. Similar were the findings by Sherburne-Hawkins et al. [38] with the participation of a smaller number of BFHI (n = 4, participants = 915) and non-BFHI hospitals (n = 6, participants = 1099) with an increase of 8.6% in Breastfeeding initiation rates in designated Baby-friendly hospitals (adj coeff: 0.086; 95% CI: 0.01–0.16) only among mothers of lower educational attainment. Also, for each additional BF maternity practice, there was an increase in BF initiation (adj coeff, 0.146 [95% CI, 0.13–0.16]).

5. Summary

For over two decades, the "10 Steps" have been the cornerstone of national and international policies and strategies for the promotion, protection and support of BF. However, adherence to the "10 Steps" is suboptimal [10, 12, 22]. In fact, it seems that the maternity care practices which are more consistently associated with a positive impact on BF [22] appear to be the least implemented, such as the practice of early initiation of breastfeeding in skin-to-skin position and no use of a pacifier [12].

The literature that supports the beneficial effects of the adherence to the BFHI on BF outcomes, and specifically "good maternity care practices" in the model of the "10 Steps," is extensive. Observational and intervention studies have assessed the impact of implementation of the "10 Steps" on BF outcomes and have consistently shown positive effects on BF initiation, duration and exclusivity. The effect of the "10 Steps" is also apparent in the reduction of social inequalities in BF.

However, evidence of the individual effect of the "10 Steps" on BF outcomes is conflicting. While the implementation of specific maternity care practices has been consistently associated with BF outcomes, evidence is not as consistent or clear-cut for others. For example, immediate and longer skin-to-skin has been associated with higher BF initiation rates [39] as well as longer EBF and BF duration [40, 41]. Similarly, implementation of Step 9 (no pacifiers) has been acknowledged to be associated with longer BF [42–44] and EBF duration [45]. However, pacifier use might represent an outcome of a rather complex maternal behavior which is difficult to pinpoint. For instance, mothers who do not intent to breastfeed, encounter lactation problems or decide to discontinue BF are more likely to introduce a pacifier as a result.

Thus, the direction of the association between pacifier use and breastfeeding is not clear. In relation to Step 3 (education in the prenatal period), evidence on the effect of breastfeeding initiation and duration is also not clear. While a number of studies suggest a beneficial effect of prenatal information on BF outcomes, others do not [21]. The type and nature of the interventions seem to influence the effectiveness of Step 3 on BF outcomes.

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