



# Infant and young child feeding in four departments in Haiti: mixed-method study on prevalence of recommended practices and related attitudes, beliefs, and other determinants

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## ABSTRACT

**Objective.** To determine and describe the prevalence and patterns of three recommended practices for infant and young child feeding—exclusive breastfeeding (EB), continued breastfeeding (CB), and achievement of minimum dietary diversity—in four regions in Haiti, and to identify the attitudes and beliefs that inform these practices and any other factors that may facilitate or impede their implementation.

**Methods.** This study utilized a mixed-methods approach consisting of 1) a cross-sectional survey ( $n = 310$ ) and 2) 12 focus group discussions among women  $\geq 18$  years old with children  $\leq 2$  years old. Multivariable logistic regression analyses were conducted to identify factors associated with 1) EB during the first six months of life, 2) CB for children  $\geq 2$  years old, and 3) receipt of a diverse variety of complementary foods. Qualitative data were recorded, transcribed verbatim, and analyzed for common themes. Data were collected in June and July 2013 in four departments in Haiti: Artibonite, Nippes, Ouest, and Sud-Est.

**Results.** Prevalence of EB, CB, and achievement of minimum dietary diversity was 57.0%, 11.9%, and 21.2% respectively. EB was statistically significantly associated with infant's age when controlling for annual household income, location of most recent birth, or receipt of CB counseling (odds ratio (OR) = 0.67 (95% CI: 0.47–0.97)). CB was not statistically significantly associated with rural place of residence, receipt of CB counseling, parity, or infant's age. Meeting minimum dietary diversity was not significantly associated with parity, receipt of postnatal care, rural place of residence, location of most recent birth, receipt of infant and young child feeding counseling, or level of schooling. Beliefs surrounding the relationship between the mother's health and her diet on the quality of breast milk may prohibit EB and CB. Qualitative data revealed that dietary diversity may be low because 1) mothers often struggle to introduce complementary foods and 2) those that are traditionally introduced are not varied and primarily consist of grains and starches.

**Conclusions.** Prevalence of the three recommended infant and young child feeding practices examined in this study is suboptimal, particularly CB and achievement of minimum dietary diversity. Future communication and programming efforts should address the misunderstandings and concerns identified through the qualitative methods used in this research.

## Key words

Nutrition, public health; infant nutrition; child nutrition; feeding; feeding methods; breast feeding; diet; Haiti.

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Adequate nutrition during the first months and years of life is crucial to ensure child health. To promote optimal infant and young child feeding (IYCF),

the World Health Organization (WHO) and United Nations' Children Fund (UNICEF) recommend that 1) infants be exclusively breastfed for the first six

months of life, 2) diverse complementary foods (CFs) be introduced at 6 months of age, and 3) breastfeeding continue for  $\geq 2$  years (1). Early breastfeeding, exclusive breastfeeding (EB), and continued breastfeeding (CB) have the potential to reduce disease incidence, improve nutrition and development status, and reduce infant mortality in low-resource settings (2, 3). In addition to breastfeeding practices, appropriate complementary feeding is essential to the health of the child and can help build on the gains made through early and exclusive breastfeeding (4, 5).

Haiti has struggled to reduce its high child mortality rates, which have stagnated since 2000 (6). In Haiti, 22% of children under 5 years old suffer from chronic malnutrition, as measured by a height-for-age z-score (HAZ)  $\geq$  two standard deviations (SDs) below the median (6). Severe chronic malnutrition is also a problem; 8% of children had a HAZ  $\geq$  three SDs below the median.

Little mixed-methods research has been conducted to better understand the prevalence of and beliefs and determinants related to IYCF practices in Haiti. One study estimated the prevalence and factors associated with EB and minimum dietary diversity (MDD) but did not attempt to explain their findings using qualitative methods (7, 8). A mixed-method study evaluated the effect of the 2010 earthquake on IYCF practices but did not utilize multivariable regression techniques to identify determinants of the key practices (9). Another study described a system in which IYCF practices and decisions are made based on traditional practices and beliefs about the relationship between the health of the mother and breast milk quality.<sup>3</sup> Understanding not only the prevalence of key practices but also the long-standing beliefs that influence them is important as Haiti aims to improve IYCF.

The objective of this analysis was to 1) determine and describe the prevalence and patterns of three recommended IYCF practices—CB, EB, and achievement of MDD—in four regions in Haiti and 2) identify the attitudes and beliefs that inform these practices and any other factors that may facilitate or impede their implementation.

## MATERIALS AND METHODS

### Study design

The study took place in four Haitian departments (Artibonite, Nippes, Ouest, and Sud-Est) chosen at the direction of Haiti's Ministry of Health and Population (*Ministère de la Santé Publique et de la Population*, MSPP) and UNICEF-Haiti, based on previously low EB levels (6). The study utilized a mixed-method, triangulation approach (10). The quantitative component consisted of a cross-sectional survey that assessed IYCF knowledge, attitudes, and practices among women  $\geq 18$  years old with children  $\leq 2$  years old. The qualitative component included focus group discussions (FGDs) conducted among a subgroup of the survey participants. Group discussions were chosen because the group context often results in a wider range of collected information, building on common experiences and social norms (11).

### Sampling procedure

The survey aimed to be representative of the four departments collectively rather than individually. The sample size ( $n = 310$ ) was calculated using an expected EB prevalence of 24.1% among children up to 6 months old (6) and a desired precision of 5.0%.

**Cluster selection.** A one-stage cluster design was used (12). Enumeration areas (*Sections d'énumération*, SDEs) created by the Haitian Institute of Statistics and Informatics (*Institut Haïtien de Statistique et d'Informatique*, IHSI) were the primary sampling unit (13). Using population proportional to size (PPS) sampling (12), 33 SDEs were randomly selected. A total of 10 houses in each SDE were visited. A total of 31 SDEs were surveyed, resulting in a sample size of 310 participants.

**Household selection.** The Expanded Programme on Immunization (EPI) method of household selection was used (14). Only one respondent per household participated in the survey. If no respondent was available at the selected household, field workers moved to the next-nearest household.

**Focus group participant recruitment.** Twelve FGDs lasting approximately one

hour each were held with 4–14 participants. Participants were recruited from survey subjects in each SDE using a convenience sample. After survey completion, respondents were invited to participate in a FGD held that same day. Discussions were typically held in a local school or church and were conducted in Creole and led by a moderator trained for this study, following a standardized discussion guide.

### Data collection

Data were collected between 13 June and 14 July 2013 by a team of three field workers and one supervisor. A pretest of the questionnaire and household selection method was performed in a reserve SDE selected for that purpose. Questionnaires were administered face-to-face in a private location by field workers using paper surveys. Questions were asked in Creole and recorded in French.

### Data entry and analysis

Quantitative data were entered using Epi Info™ version 3.5.1 (15) and analyzed using STATA/SE version 13.1 (16). Descriptive statistics were computed to determine the prevalence of various IYCF indicators based on international guidelines (17, 18). Mothers of infants  $< 6$  months old who had been fed no other liquids or solids apart from breast milk the day preceding the survey were categorized as practicing EB (17). Among mothers with children 20–24 months old, those who breastfed the day preceding the survey were classified as practicing CB (18). Dietary diversity scores were calculated among women with children 6–24 months old based on the child's consumption of foods from seven food groups (17). Those who consumed food from four or more food groups were categorized as having achieved MDD. Data were also collected on the following independent variables: maternal household income, education, place of residence, parity, location and type of attendance at most recent birth, and receipt of postnatal care and IYCF messages. To identify variables potentially associated with the outcome variables (EB, CB, and MDD), bivariate analyses were conducted between all independent variables and each outcome variable. All independent variables with a Student's *t*-test or chi-square  $P \leq 0.2$  were examined for collinearity using

<sup>3</sup> Alvarez MD, Murray GF. Socialization for scarcity: child feeding beliefs and practices in a Haitian village. Unpublished report. 1981. 229 pp.

**TABLE 1. Socio-demographic and economic characteristics of women  $\geq 18$  years old with infants  $\leq 2$  years old ( $n = 310$ ), Artibonite, Nippes, Ouest, and Sud-Est, Haiti, 2013**

Characteristic	No.	%
Department		
Ouest	200	64.5
Artibonite	70	22.6
Nippes	20	6.5
Sud-Est	20	6.5
Place of residence		
Urban	160	51.6
Rural	150	48.4
Maternal age (years)		
18–22	58	18.8
23–27	89	28.8
28–31	77	24.9
32–36	44	14.2
37–42	29	9.4
43–47	9	2.9
48–52	2	0.6
Missing data	2	0.6
Education level completed		
None	57	18.4
Primary	123	39.7
Secondary	115	37.1
Higher	15	4.8
Missing data	2	0.6
Employed outside the home	38	12.3
Hours worked outside the home per day		
1–3	6	15.8
3.1–6	12	31.6
6.1–9	10	26.3
9.1–12	10	26.3
Annual household income <sup>a</sup>		
< 13 500	158	51.0
13 500–27 000	65	21.0
> 27 000–40 500	28	9.0
> 40 500	30	9.7
Don't know	29	9.4
Attendant at most recent birth		
Doctor	122	39.4
Nurse	61	19.7
Midwife	58	18.7
Traditional healer	33	10.7
Traditional birth attendant (qualified)	12	3.9
No one	15	4.8
Family / friend	7	2.3
Traditional birth attendant (non-qualified)	1	0.3
Other	1	0.3
Location of most recent birth binary		
Facility	190	61.3
Home	120	38.7
Location of most recent birth		
Public hospital	143	46.1
Home	120	38.7
Private hospital	16	5.2
Public health center	13	4.2
Other	12	3.9
Public maternity ward	6	1.9
	Mean (SD <sup>b</sup> )	
Age of youngest child (months)	11.4	
Parity	2.5	

<sup>a</sup> In Haitian gourdes (HTG) based on exchange rate for 13 June 2013 (first day of data collection) (43.20 HTG per US\$1).

<sup>b</sup> Standard deviation.

Spearman's correlation. If independent variables were found to be highly correlated ( $P \leq 0.05$ ), only one was selected for inclusion in the multivariable model. To identify independent variables associated with each outcome, three multivariable logistic regression models were constructed.

The qualitative data were recorded in Creole and transcribed into French for directed content analysis (19). Data were read carefully and categorized into a thematic framework informed by previous research and created prior to data collection using MAXQDA™ software (20). Data that could not be categorized with the a priori coding scheme were given a new code. The data were then summarized by thematic area and presented alongside quantitative data as a means of triangulation. Quotations were presented verbatim as illustrations of common themes and ideas.

### Ethical considerations

This study was completed in accordance with research ethical principles reviewed by Emory University's institutional review board (IRB) and was determined to meet the exemption criteria. Local IRB approval was determined to be unnecessary by the MSPP. All respondents completed an oral informed consent process that explained the nature of the study and their involvement as participants. Surveys were administered in a private location. To guarantee anonymity, all collected data were free of identifying information. Only study staff had access to the database, completed survey, and consent forms.

## RESULTS

### Description of study participants

Data analysis included all 31 SDEs and 310 women. The data from the pretest were included because no questions were added or deleted following the pretest and changes consisted of minor word changes. Based on experiences from previous surveys in this population (21), maternal age was measured in four-year intervals to avoid misreporting. The majority of participants (72.5%) were 18–31 years old (Table 1). The mean age of the most recent child was 11.4 months and the mean number of births was 2.5. Maternal educational

status included 1) no formal education (18.4%), 2) completion of primary school (39.7%), and 3) completion of secondary school (37.1%). The most recent birth of most participants was attended by either a physician (39.4%) or a nurse (19.7%). The most recent births occurred in a public hospital (46.1%) or in a home (38.7%).

### Prevalence of recommended IYCF practices

Breastfeeding was nearly universal. Most of the women surveyed (94.8%) reported having breastfed their most recent child at least once (not shown). Despite near universal breastfeeding, prevalence of other optimal IYCF practices varied (Table 2). More than half (57.0%) of children < 6 months old had EB the day preceding the survey. However, EB prevalence fell to 44.1% among children 4–5 months old. It is recommended that children be introduced to CFs at the age of 6 months. Among women with children 9–24 months old, nearly half (49.7%) reported initiating CFs between 6–9 months of age. In addition to timely introduction, nutrient-rich and diverse CFs are recommended. Based on data collected about foods and liquids consumed during the 24 hours preceding the survey, 21.2% of children  $\geq 6$  months old met the MDD standard of consumption of four or more food groups. CB for children  $\geq 2$  years old is recommended to supplement CFs. The majority of women did not continue breastfeeding until their children were 2 years old; only 11.9% of children 20–24 months old were breastfed on the day preceding the survey.

### Exclusive breastfeeding: attitudes, beliefs, and other determinants

When controlling for annual household income, location of most recent birth, and receipt of CB counseling, younger infants were more likely to receive EB (odds ratio (OR) = 0.67 (95% CI: 0.47–0.97)) (Table 3). Qualitative findings suggest there are two primary barriers to optimal duration of EB among women who initiate early mixed feeding instead. The first is the belief that it is necessary to administer a purgative to an infant during the first few days of life. The second is the mother's belief

**TABLE 2. Ideal and current infant and young child feeding practices by indicator<sup>a</sup> for women ≥ 18 years old with infants ≤ 2 years old, Artibonite, Nippes, Ouest, and Sud-Est, Haiti, 2013**

Ideal practice	Indicator	Current practice (%)	n
All infants breastfed for first time within one hour of birth	% of children 0–24 months old breastfed for first time within one hour of birth	44.5	310
All infants not fed anything other than breast milk during first 3 days of life	% of children 0–24 months old not fed anything other than breast milk during first 3 days of life	75.8	310
All infants fed colostrum	% of children 0–24 months old fed colostrum	88.1	310
All infants and young children breastfed on demand, day and night	% of children 0–24 months old breastfed on demand	90.9	209
All infants < 6 months old exclusively breastfed	% of children 0–6 months old who consumed breast milk but no water, other liquids, or foods the previous day	57.0	79
	% of children 0–1 month old who consumed breast milk but no water, other liquids, or foods the previous day	80.0	20
	% of children 2–3 months old who consumed breast milk but no water, other liquids, or foods the previous day	56.0	25
	% of children 4–5 months old who consumed breast milk but no water, other liquids, or foods the previous day	44.1	34
	% of children 0–3 months old who consumed breast milk but no water, other liquids, or foods the previous day	66.7	45
All infants fed semi-solid complementary foods at 6 months old	% of children 9–24 months old who began complementary feeding with solid foods or semi-solid foods between 6–9 months old	49.7	183
All children 6–24 months old who achieved minimum dietary diversity (MDD) <sup>b</sup>	% of children 6–24 months old who received foods from ≥ 4 food groups	21.2	231
	% of children 6–11 months old who received foods from ≥ 4 food groups	17.1	82
	% of children 12–17 months old who received foods from ≥ 4 food groups	21.3	75
	% of children 18–24 months old who received foods from ≥ 4 food groups	25.7	74
All children breastfed through age 2 years old or older	% of children 20–24 months old breastfed the previous day	11.9	42

<sup>a</sup> All indicators (except achievement of MDD for children 6–24 months old) adapted from (21).  
<sup>b</sup> This indicator adopted from (20).

**TABLE 3. Multivariable logistic regression showing determinants of exclusive breastfeeding<sup>a</sup> among infants < 6 months old (n = 79), Artibonite, Nippes, Ouest, and Sud-Est, Haiti, 2013**

Variable	OR <sup>b</sup>	SE <sup>c</sup>	P <sup>d</sup>	95% CI <sup>e</sup>
Annual household income <sup>f,g</sup>				
13 500–27 000	2.31	1.53	0.20	0.63–8.43
> 27 000–40 500	2.74	2.68	0.30	0.40–18.59
> 40 500	0.54	0.52	0.53	0.08–3.60
Don't know	7.59	9.18	0.09	0.71–81.15
Location of recent birth (facility) <sup>h</sup>	0.40	0.23	0.12	0.12–1.27
Counseled on continued breastfeeding <sup>i</sup>	5.60	5.06	0.06	0.95–32.96
Infant's age	0.67	0.12	0.03	0.47–0.97

<sup>a</sup> Defined status of children 0–6 months old who were being breastfed and had not had any other liquids, semi-solids, or solids the day preceding the survey.  
<sup>b</sup> Odds ratio.  
<sup>c</sup> Standard error.  
<sup>d</sup> Two-tailed (Wald chi-square test of the null hypothesis that the odds ratio = 1).  
<sup>e</sup> Confidence interval.  
<sup>f</sup> In Haitian gourdes (HTG) based on exchange rate for 13 June 2013 (first day of data collection) (43.20 HTG per US\$1).  
<sup>g</sup> Reference group: those with reported annual household incomes < 13 500 HTG.  
<sup>h</sup> Reference group: those who gave birth outside a facility (i.e., at their home or another's home).  
<sup>i</sup> Reference group: those who reported never having received counseling on optimal duration of breastfeeding (≥ 2 years).

that her breast milk has become unsuitable and that she must therefore introduce CFs to her infant before he/she is 6 months old.

Within their first three days of life, 23.9% of infants received a liquid other than breast milk (not shown). Purgative or *manje kabann* was the most common of these liquids and was typically pre-

pared with castor oil, water, nutmeg, and sugar. In explaining how and why a purgative should be administered, one woman from Sud-Est said it helped “clean the child’s body,” which had “a black tar on the inside.” She described the process as follows: “After we wash the castor-oil plant, we make the oil; then we boil it with alcohol and sugar, and we

give [*lok de la muscade* or nutmeg purgative], and it cleans. It is in this way that we prepare it.”

A more widespread belief that influences EB practices is the idea that a mother’s health, both physical and mental, can affect the quality of her breast milk. The superior quality of breast milk and its value are widely appreciated, as one mother in Artibonite explained: “Breast milk has vitamins; it is the best of all the milks.” Another described breast milk as a “restorative for the child . . . a treasure.”

Despite the belief that breast milk is superior to other milks and foods, women said that if their milk became weak or “dirty” they were obligated to stop breastfeeding or introduce CFs. Women believe that milk becomes weak if a mother has not eaten well. As one mother from Artibonite explained, “I feel that [if] I haven’t eaten well, my milk has become too weak for the child.” Another Artibonite mother added, “If you practice exclusive breastfeeding, you must be well fed. If you are not well fed, the child won’t find anything in the breast; the milk [will be] like water; it can’t do anything for

the child. We can give him the milk and he cries nonstop—the milk can't do anything for him."

Women believe milk becomes weak from a poor diet and "dirty" as a result of illness. "Dirty" milk is thought to lead to infant mortality, as explained by a study participant from Artibonite: "If the mother had a first child, and that one died, and the second one as well, then the mother has a problem with her milk . . . the milk is dirty." In addition to physical illness, psychological distress, anger, and stress are believed to spoil milk. Among the survey respondents, 38.8% said women should not breastfeed if they were stressed, and 35.2% said breastfeeding should not be done if a woman was upset (not shown). Another participant from Artibonite explained that "the child will drink bad milk, because when [the mother] is mad the milk won't be good." This idea is related to the concept of mothers' "bad blood," which is believed to pass to the child through breast milk and cause itching and sores.

### Continued breastfeeding: attitudes, beliefs, and other determinants

Rural place of residence, receipt of CB counseling, parity, and infant's age were not statistically significantly associated with CB (Table 4).

As with EB, maternal diet and health (physical and psychological) affected a mother's ability to practice CB. Few mothers knew that optimal duration of breastfeeding was two years. Just 25.0% reported having received information about optimal breastfeeding duration, compared to 89.0% who received counseling on optimal EB duration (not shown). During the FGDs, most mothers recommended weaning (discontinuing breastfeeding entirely) at 1 year or 18 months of age. Some mothers from Artibonite said they must "stop breastfeeding [because of] the parasites; the child has breastfed too much and one must take [the breast] away." It is believed that children who are breastfed past 1 year or 18 months of age will be susceptible to viruses and parasites. Mothers' decision to wean, however, is sometimes linked with wealth. One mother from Artibonite said, "I didn't have the means; I breastfed them [her children] for two years." Mothers believe that weaning before 2 years of age is best, but

only if they feel they are able to provide enough solid foods to replace the milk.

### Minimum dietary diversity: attitudes, beliefs, and other determinants

Meeting MDD was not statistically significantly associated with parity, receipt of maternal postnatal care, rural place of residence, location of most recent birth, receipt of IYCF counseling following the most recent birth, or school level attended (Table 5). To account for a possible interaction between child age and dietary diversity, a stratified analysis was performed. When stratified by age, the association between receipt of postnatal care and achievement of MDD

became statistically significant among children >12–24 months old (OR = 6.73 (95% CI: 1.09–4.55)) (not shown).

The qualitative findings indicated that mothers often have trouble introducing CFs successfully. One woman from Artibonite said, "I have my child; he doesn't want to eat; he prefers the breast and so I give it to him. It wasn't until 12 months of age that I gave him things to eat." FGDs also indicated that some foods are seen as inappropriate for young children. As another mother from Artibonite explained, "When the child begins to eat foods, you must give him light foods, because [he/she] just stopped exclusively breastfeeding . . . during this time you can't [give boiled] banana for

**TABLE 4. Multivariable logistic regression showing determinants of continued breastfeeding<sup>a</sup> among children 20–24 months old (*n* = 42), Artibonite, Nippes, Ouest, and Sud-Est, Haiti, 2013**

Variable	OR <sup>b</sup>	SE <sup>c</sup>	<i>P</i> <sup>d</sup>	95% CI <sup>e</sup>
Rural <sup>f</sup>	0.09	0.14	0.14	0.00–2.23
Counseled on continued breastfeeding <sup>g</sup>	2.89	4.37	0.48	0.15–55.89
Parity	1.58	0.43	0.10	0.92–2.71
Infant's age	0.51	0.29	0.24	0.16–1.57

<sup>a</sup> Defined status of children 20–24 months old who were breastfed on the day preceding the survey.

<sup>b</sup> Odds ratio.

<sup>c</sup> Standard error.

<sup>d</sup> Two-tailed (Wald chi-square test of the null hypothesis that the odds ratio = 1).

<sup>e</sup> Confidence interval.

<sup>f</sup> Reference group: those living in urban households.

<sup>g</sup> Reference group: those who reported never having received counseling on optimal duration of breastfeeding (≥ 2 years).

**TABLE 5. Multivariable logistic regression showing determinants of minimum dietary diversity (MDD)<sup>a</sup> among children 6–24 months old (*n* = 231), Artibonite, Nippes, Ouest, and Sud-Est, Haiti, 2013**

Variable	OR <sup>b</sup>	SE <sup>c</sup>	<i>P</i> <sup>d</sup>	95% CI <sup>e</sup>
Parity	0.86	0.13	0.34	0.64–1.17
Received postnatal care <sup>f</sup>	3.06	2.12	0.11	0.79–11.92
Rural <sup>g</sup>	0.74	0.28	0.42	0.35–1.55
Location of recent birth (facility) <sup>h</sup>	1.17	0.50	0.71	0.51–2.69
Received IYCF <sup>i</sup> counseling after birth <sup>j</sup>	1.20	0.56	0.69	0.48–2.99
School attended <sup>k</sup>				
Primary	2.53	2.08	0.26	0.50–12.69
Secondary	4.40	3.53	0.07	0.91–21.23
Higher	2.97	3.16	0.31	0.37–23.88

<sup>a</sup> Consumption of a minimum of four out of seven food groups (grains, roots, and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables) in the past 24 hours, regardless of quantity. The cutoff of four was chosen because it has been shown to be associated with better quality diets (20).

<sup>b</sup> Odds ratio.

<sup>c</sup> Standard error.

<sup>d</sup> Two-tailed (Wald chi-square test of the null hypothesis that the odds ratio = 1).

<sup>e</sup> Confidence interval.

<sup>f</sup> Reference group: those who did not receive any postnatal care following their most recent birth.

<sup>g</sup> Reference group: those living in urban households.

<sup>h</sup> Reference group: those who gave birth outside a facility (i.e., at their home or another's home).

<sup>i</sup> Infant and young child feeding.

<sup>j</sup> Reference group: those who reported never having received IYCF counseling.

<sup>k</sup> Reference group: those who never attended school.

the child; no rice, no yams.” When introducing CFs, most women begin with porridges made from various flours or starches mixed with fresh or powdered milk or water and often sugar and cinnamon. A brand of prepackaged, iron- and protein-enriched pudding distributed at local pharmacies (*Nourisoy*) is often purchased. However, as one woman from Artibonite explained, “Not everyone has the financial means to give their children *Nourisoy*.” In lieu of *Nourisoy*, women often use inexpensive, packaged crackers as the base for the porridge. One woman from Sud-Est described how to make a local banana variety that is sometimes used: “We put [the banana] in the sun and then pound it so that it will become a flour to give to the child . . . for the gas and to help the child to grow.” A woman from Ouest explained that starch, typically created from cassava, is also a common CF because it “serves as a refreshment; it is good for the insides of children . . . it cleans them.”

## DISCUSSION

This study is unique in Haiti in that it applies both multivariable logistic regression analysis and qualitative methods. The authors assessed the prevalence of three key IYCF practices; attitudes and beliefs related to the prevalence of the practices, using qualitative methods; and other factors associated with them, using quantitative methods. Prevalence of EB, CB, and achievement of MDD were 57.0%, 11.9%, and 21.2% respectively. Multivariable regression analysis showed that infant’s age was statistically significantly associated with EB, but no statistically significant determinants were identified for CB or MDD achievement.

Qualitative data revealed several beliefs that may limit implementation of optimal IYCF practices. Women in some communities felt it was necessary to administer purgatives shortly after birth to cleanse the child’s body. A poor diet is believed to weaken breast milk, making it inadequate in terms of quality and/or unsatisfying to the child. Illness is thought to make breast milk “dirty” and unsafe for the child. In addition to these beliefs about breast milk, women view CB as a possible risk for infections among older children and thus prefer earlier weaning. MDD achievement appears limited by difficulties mothers ex-

perience when introducing CFs, and the low diversity of traditional, grain-based CFs.

## Comparison of results

Previous IYCF studies conducted in Haiti have primarily used large, nationally representative surveys. One study examined trends in EB using data from three recent Demographic and Health Surveys (DHS) (7). EB among children 0–6 months old increased from 1.1% in 1995–1996 to 41.2% in 2005–2006. The most recent DHS (2012) estimates EB prevalence at 39.7%. The study reported here estimated EB prevalence at 57.0%, higher than the 2012 DHS estimates but in line with recently observed trends of increased rates in Haiti (6, 22–24). However, this indicator may 1) be particularly susceptible to small sample sizes, because of the narrow age ranges used in both the denominator and numerator and 2) overestimate the proportion of children who receive EB, as some children who are no longer exclusively breastfed but do not receive liquids other than breast milk on the day before the survey may be classified as still practicing EB (17). In addition to prevalence, some researchers used multivariable regression methods to identify child’s age and department as significant EB predictors (7). While the authors of the study reported here also found infant’s age to be a significant predictor, they did not evaluate the relationship between the department and outcome variables because the data were not considered representative at the department level.

Another study conducted in eight Latin American and Caribbean (LAC) countries (25) estimated changes in breastfeeding duration. The authors found that mean breastfeeding duration increased in all countries except Haiti, where it fell from 19.4 months in 1995 to 18.2 months in 2005. CB estimates from the 2012 DHS (6) among children 20–24 months old was 30.8%, higher than the estimate found in the study reported here (11.9%). They also found that, in LAC, changes in breastfeeding duration varied by socio-demographic characteristics; rural, uneducated women were more likely to experience only small increases or decreases in breastfeeding duration. The authors of the current study found that rural place of residence, parity, infant’s age, and receipt

of breastfeeding counseling were not significantly associated with CB.

In a second analysis of 2005–2006 DHS data for Haiti (8), researchers examined complementary feeding practices, including MDD. They found that 29.2% of children 6–24 months old achieved MDD, which is close to the prevalence found in the current study (21.2%). They identified increased age of child, wealth, maternal overweight, and department of residence as significant predictors of achieving MDD. The current study did not identify those or any other factors as significant determinants of this practice.

Qualitative findings from a study by Dörnemann et al. (9) of breastfeeding practices in Léogâne, a post-earthquake area of Haiti, were consistent with those from the current study, which sampled one SDE from the same area. Specific beliefs related to diet, illness, psychosocial state, and pregnancy status of the mother appeared to be barriers to CB and optimal duration of EB. The authors also found that “eating well” was seen as a requirement to ensure good-quality breast milk. If a mother’s diet or health was compromised, her breast milk was believed to become spoiled or weak. Alvarez and Murray<sup>3</sup> hypothesized that the “spoiled milk” concept was developed as an excuse to rely more heavily on supplementation or early weaning, despite firm beliefs in breast milk’s superiority. In addition to these barriers, the current authors, like Dörnemann et al. (9), found that effective CB is limited by the belief that continuing it beyond 12 or 18 months can cause the child to become ill. Women also appeared to view CB as a last resort—something that is done only if CFs are not available or affordable.

## Strengths and limitations

This study’s strengths lie in the study population and in the mixed-methods approach. This approach allowed quantitative results to be explained through qualitative methods and led to a more in-depth understanding of the beliefs and attitudes that influence IYCF practices in Haiti. To the best of the authors’ knowledge, no previous studies have used both multivariate logistic regression methods and qualitative methods to identify determinants of IYCF practices among the general Haitian population.

Study limitations include the use of data extrapolated from the most recent (2003) census data for the cluster sampling. These data may not represent changes in the population distribution over the last 10 years, particularly those resulting from the 2010 earthquake (13). In addition, the narrow age ranges used to calculate each outcome indicator limited the power to detect statistically significant associations when creating the logistic model.

## Conclusions

Despite the suboptimal prevalence of some IYCF practices, some components of prior IYCF education and counseling have been effective in increasing knowledge and changing attitudes among the study population. Many women who had received counseling said they no

longer used certain traditional practices (e.g., administering a purgative shortly after birth and throwing away colostrum). Women have a good understanding of the importance and value of breast milk and are aware of EB recommendations.

Continued promotion of recommended IYCF practices is crucial, along with adaptation of messaging to address common misunderstandings and concerns identified through the use of qualitative methods in this and previous studies. Women rarely reported receiving counseling information from midwives or traditional practitioners, and although many were aware of recommendations for EB duration, few knew that CB was recommended for children up to two years old and older. Messaging about EB, CB, and appropriate complementary feeding must be improved. Efforts

to engage traditional practitioners and midwives may have a significant impact as 38.7% of survey respondents most recently gave birth at home.

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**Conflicts of interest.** None.

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## RESUMEN

**Alimentación de los lactantes y niños pequeños en cuatro departamentos de Haití: un estudio con diseño de método mixto sobre la prevalencia de las prácticas recomendadas y las actitudes, las creencias y otros determinantes relacionados**

**Objetivo.** Determinar y describir la prevalencia y los modelos de tres prácticas recomendadas para la alimentación de los lactantes y los niños pequeños (la lactancia materna exclusiva [LME], la lactancia materna continuada [LMC] y el logro de una diversidad alimentaria mínima, en cuatro regiones de Haití, y determinar las actitudes y creencias en las que se basan estas prácticas y otros factores que puedan facilitar o impedir su implantación.

**Métodos.** Este estudio utilizó un diseño de método mixto que consistió en 1) una encuesta transversal (n = 310) y 2) 12 grupos de discusión formados por mujeres de  $\geq 18$  años de edad o mayores con niños de  $\leq 2$  años de edad o menores. Se llevaron a cabo análisis de regresión logística multivariable para determinar los factores asociados con 1) la LME durante los seis primeros meses de vida, 2) la LMC en niños de  $\geq 2$  años de edad o mayores, y 3) el aporte de una amplia variedad de alimentos complementarios. Se registraron, se transcribieron al pie de la letra y se analizaron los datos cualitativos referentes a temas comunes. Estos datos se recopilaron en junio y julio del 2013, en cuatro departamentos de Haití: Artibonite, Nippes, Oeste y Sudeste.

**Resultados.** Las prevalencias de la LME, la LMC y el logro de una diversidad alimentaria mínima fueron de 57,0, 11,9 y 21,2%, respectivamente. La LME se asoció de manera estadísticamente significativa con la edad del lactante si se controlaban las variables de ingresos familiares anuales, ubicación del parto más reciente, o provisión de orientación en materia de LMC (razón de posibilidades [OR] = 0,67 [IC de 95%:0.47–0.97]). La LMC no se asoció de una manera estadísticamente significativa con la residencia en un entorno rural, la provisión de orientación en materia de LMC, la paridad o la edad de lactante. El logro de una diversidad alimentaria mínima no se asoció significativamente con la paridad, la provisión de atención posnatal, la residencia en un entorno rural, la ubicación del parto más reciente, la provisión de orientación en materia de alimentación de los lactantes y los niños pequeños, o el nivel de escolarización. Las creencias con respecto a la relación entre la salud de la madre y su régimen alimentario con la calidad de la leche materna pueden limitar la LME y la LMC. Los datos cualitativos revelaron que la diversidad alimentaria puede ser escasa como consecuencia de que 1) las madres a menudo se esfuerzan por introducir los alimentos complementarios, y 2) los que se introducen tradicionalmente no son variados y consisten principalmente en cereales y féculas.

**Conclusiones.** Las prevalencias de las tres prácticas de alimentación de los lactantes y los niños pequeños recomendadas analizadas en este estudio son subóptimas, en particular las correspondientes a la LMC y al logro de una diversidad alimentaria mínima. Las futuras iniciativas de comunicación y programación deberían abordar los malentendidos y las inquietudes detectadas mediante los métodos cualitativos utilizados en esta investigación.

**Palabras clave**

Nutrición en salud pública; nutrición del lactante; nutrición del niño; alimentación; métodos de alimentación; lactancia materna; dieta; Haití.