Determinants of exclusive breastfeeding among Haitian children under 6 months of age

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ABSTRACT

Objective. To identify the determinants of exclusive breastfeeding (EBF) among children under 6 months of age from three regions in the South and Grand'Anse Departments of Haiti.

Methods. Data were pooled from three cross-sectional surveys conducted yearly from 2017 to 2019 with the guardians of 638 children under 6 months of age. A non-quantitative 24-hour dietary recall was used to assess EBF the day before the survey. Using unadjusted and adjusted prevalence ratios, associations were assessed between EBF and several explanatory factors: infant's age and sex; maternal age, educational attainment, mid-upper arm circumference (MUAC), dietary diversity, number of children under 5 years of age, responsibility for the main or secondary source of income of the household, initiation of breastfeeding within one hour, knowledge of EBF duration; household severe food insecurity, socioeconomic status, dependency ratio, region, and residential zone (urban/rural).

Results. Prevalence of EBF was 68% in the study sample. From the fully adjusted model, prevalence of EBF was statistically significantly higher among younger infants, mothers with larger MUAC, who met or exceeded Minimum Dietary Diversity for Women (MDD-W), who initiated breastfeeding within one hour, who were knowledgeable of the recommendations for EBF duration, and living in the Jérémie region.

Conclusions. The main determinants of EBF identified in this study attest to the importance of breastfeeding mothers' access to nutritious food for the practice and maintenance of EBF and the need for geographically equitable access to health services and education that support breastfeeding.

Keywords   Breast feeding; epidemiologic factors; child nutrition sciences; Haiti.

Breast milk is uniquely tailored to support the growth and development of infants and young children, and breastfeeding practices recommended by the World Health Organization (WHO) have several short-, medium-, and long-term benefits for the mother and child. WHO recommends exclusive breastfeeding (EBF) for the first six months of life of the infant, followed by the introduction of age-appropriate complementary foods in combination with continued breastfeeding up to 2 years of age or more (1). Despite this, only 42% of infants under 6 months are exclusively breastfed (2). This level remains below the World Health Assembly Global Nutrition Target of 50% by 2025 (3).

Factors associated with the adherence to EBF recommendations include socioeconomic status, maternal education, knowledge of recommended practices, maternal physical and mental health, parity, and access to skilled antenatal care (ANC) (4, 5). On the other hand, lack of support from peers and family members, increasing age of the infant, and women's return to work under conditions that do not support breastfeeding (lack of breaks, pumping rooms, adequate milk storage, and proximity of daycare) interfere with EBF (6, 7).

Although breastfeeding has always been revered in the Haitian tradition, and in that of their African ancestors, EBF (a modern biomedical concept recommended by WHO since the early

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1990s) has never been part of these cultures. Medicinal herbs were traditionally used at birth, and complementary foods were introduced very early in the life of the infant (8). In 1995, EBF was estimated to be practiced by less than 1% of mothers in Haiti (9). In 2000 and 2006, following an intensive national EBF promotional campaign in the late 1990s by the Haitian Government and its nongovernmental partners (10), the EBF rates increased substantially to 24% and 40%, respectively (11, 12), which has since remained unchanged (13, 14). The rise in EBF prevalence in Haiti in the last decade (+16 percentage points between 2006 and 2016) far exceeds the observed 10-year increase among low-income countries around a similar year range (+7.1 percentage points). Nevertheless, in 2016, EBF rates in Haiti (40%) were still below the average for low-income countries (45%) (15).

Determinants of EBF were assessed in a secondary analysis of the 2005–2006 Demographic and Health Survey (DHS). Results show statistically significantly higher prevalence of EBF in the North, North-West, and North-East departments (around 50%) compared to the predominantly urban Ouest Department (30%), which includes the national capital (Port-au-Prince). Although urban–rural differences for EBF prevalence were not statistically significant at the national level, the authors point to the generally lower rates of EBF in urban areas worldwide to explain these differences. Nevertheless, very low rates of EBF were also found in mostly rural areas, such as the South and South-East departments (12%–15%). The authors suggest the following explanation: "Differences in both EBF and ErIBF [early initiation of breastfeeding] at department level may reflect differences in coverage, quality and intensity of non-governmental organisation (NGO) and MOH-led maternal child health and nutrition activities in these areas. Individual NGOs develop and receive funds to implement programmes that are targeted to specified sub-regions of the country." They also acknowledge: "Although included in Haitian health policy and protocols, these interventions [education and peer support during antenatal care (ANC)] have weak coverage." Otherwise, age was the only other factor that emerged as a determinant of EBF, where younger infants were more likely to be exclusively breastfed. Associations with wealth, maternal body mass index (BMI), education, working status, number of ANC visits, and sex of the infant were not statistically significant (10).

Other studies in Haiti examined EBF determinants on a smaller scale. In rural Léogâne, a commune situated about 40 km west of Port-au-Prince, EBF duration was significantly higher in infants who were put to the breast within one hour after birth and whose mothers were unemployed (16). This finding was echoed in urban Petite Anse, where paternal unemployment was also associated with increased EBF (17). In qualitative assessments of barriers to EBF conducted in Haiti, the most notable barriers to EBF mentioned by participants were mothers' employment, new pregnancy, fear of breasts sagging, influence of relatives and close friends, lack of knowledge, and mothers' inadequate diet (18–20).

The "Appui prénatal, périnatal, postnatal et nutritionnel (A3PN) en Grand'Anse et au Sud d'Haïti" project, which translates as "Prenatal, perinatal, postnatal and nutritional support in the Grand'Anse and South departments of Haiti" is a four-year maternal and infant health initiative, which took place from April 2016 to March 2020 in eight communes within Haiti's South and Grand'Anse departments. Saint-Jean-du-Sud, Camp-Perrin, and Chantal were the three communes that

participated in the South Department. They are situated less than 25 km from the town of Les Cayes, one of Haiti's major port cities. The other five communes are in the Grand'Anse department: Moron, Roseaux, and Corail are within 45 km distance from the town of Jérémie, which is the largest, although relatively isolated, city in the Grand'Anse Department, and Anse d'Hainault and Les Irois are in the Anse d'Hainault region, situated at the most western tip of Haiti's Tiburon Peninsula.

In the three regions where A3PN project activities occurred, which will henceforth be referred to as Les Cayes, Jérémie, and Anse d'Hainault, the main sources of income of the poorest residents (45% to 65% of the population), are drawn from working on the land of wealthier families, working in the fishing industry, or via small jobs such as selling firewood and coal (21). Apart from main cities in these departments, the state of roads is generally poor and becomes increasingly so toward the Tiburon Peninsula. According to the DHS, 43% of people living in Grand'Anse are in the lowest wealth quintile, compared to 26% in the South Department (14), which is likely due to Grand'Anse being much more remote and inaccessible.

The A3PN project used a community mobilization approach to improve families' knowledge, attitudes, and practices related to breastfeeding, nutrition, hygiene, and gender equity, and to improve families' access to financial resources, food, and essential perinatal and health services. Project activities included mothers' support groups, community presentations, collective kitchens, mobile health clinics, follow-up home visits, home gardening initiatives, and solidarity funds. Solidarity funds, which were among the most appreciated A3PN activities, gave participating families the ability to save and invest their money, as well as access to loans and donations which could in turn be used for essential health services, education, and income-generating activities.

All A3PN project regions were affected by Hurricane Matthew, a Category 5 hurricane which devastated the South and Grand'Anse departments in early October 2016, with most significant destruction in the Anse d'Hainault region. The hurricane was followed by sociopolitical unrest and the depreciation of the local currency (the gourde) in 2018 and 2019, which perpetuated food insecurity throughout the country and likely had considerable effects on habitual EBF practices in the regions of study (22).

The objective of the current study is to identify the determinants of EBF among children under 6 months of age living in regions participating in the A3PN project in the South and Grand'Anse departments of Haiti.

MATERIALS AND METHODS

Data collection

Cross-sectional data were collected on an annual basis during the summer harvest season in the eight participating communes in the South and Grand'Anse departments of Haiti to measure the evolution of maternal and infant health and nutrition indicators throughout the lifespan of the A3PN project. Baseline, mid-, and post-intervention data collections were performed from 4 July to 5 September 2017, 21 July to 30 August 2018, and 15 July to 24 August 2019.

The study employed a cluster sampling approach. Enumeration Sections were the sampling units, based on the 2003 Haitian census (23). The clusters were stratified by commune

and type of region (15% urban and 85% rural, in accordance with the true population distribution). Sampling of clusters was proportional to population size, based on the 2013 population estimates (24). Within clusters, a starting location and direction were randomly selected, then each nearest household from the starting point in the selected direction was invited to participate in the study.

Women aged 15–49 years with at least one child aged under 5 years that were able to provide informed consent were eligible to participate in the study. All children under 5 years of age in the participating household were included in the study until the quota of 10 children for each age group (0–5 months, 6–23 months, 24–59 months) was reached. On average, the household response rate for all data collection cycles was 94.2%.

Questionnaires were administered in Haitian Creole by community health workers who underwent two days of training with dietitians who were also responsible for ensuring the quality of data collection. The questionnaire contained child and maternal characteristics including age and sex of the child, and the age and education attainment of the mother, and household characteristics, including household composition, sources of revenue, access to land, livestock, food production and harvesting practices, and household food security.

The nutrition status of the mothers was assessed using mid-upper arm circumference (MUAC) as opposed to BMI, which would have necessitated pregnant mothers to recall their pre-pregnancy weight. MUAC was measured to the accuracy of 1 millimeter using a measuring tape placed around the left arm, midway between the shoulder and the elbow (25).

The diet of the mothers and children was assessed using a non-quantitative 24-hour dietary recall of all food and drinks consumed in the day prior to the survey.

Household food security was assessed using the Food Insecurity Experience Scale (FIES), a set of eight questions that are used to estimate the prevalence of food insecurity in a calibrated scale that is comparable across countries (26).

Data were collected on both paper and electronic tablets. Data collected on paper (household composition, anthropometry, and 24-hour dietary recalls) were entered into Epi Info 7.2, and secondary data entry was carried out in Microsoft Excel. Both databases were then compared using SAS 9.4 to rectify any data input mistakes. All other data were collected using the mobile version of Epi Info 1.3.4 on Lenovo A8 Android tablets.

Study sample

A total of 658 children under 6 months of age participated in all three cycles of data collection. Children with no breastfeeding or food consumption information were excluded (*n* = 2). In households where data were collected for more than one child under 6 months of age, only one child per household was randomly selected to be part of the analysis to avoid double counting determinants related to the mother and household. During this step, an additional 18 children were excluded. The final analytic sample was 638 children.

Exclusive breastfeeding

Children under 6 months were considered to be exclusively breastfed if they received breast milk and no other food or drink was declared in the 24-hour dietary recall (27).

Explanatory variables

Explanatory variables included in this analysis were: (i) infant's age and sex; (ii) mother's age, educational attainment, number of children aged under 5 years, MUAC, dietary diversity, responsibility for the main or secondary source of income for the household; (iii) household severe food insecurity, socioeconomic status, and dependency ratio; (iv) region, residential zone (rural/urban), year of data collection; and (v) initiation of breastfeeding within one hour, and maternal knowledge on the duration of EBF.

A global MUAC cutoff for assessing undernutrition in pregnant and non-pregnant women does not currently exist (28, 29), therefore MUAC values for participants in this study were split into tertiles.

Dietary diversity was estimated using the Minimum Dietary Diversity for Women (MDD-W) indicator, which is a proxy for micronutrient adequacy (30).

Data from the FIES were validated following the methods proposed by the Food and Agriculture Organization of the United Nations (FAO) and the household's probability of severe food insecurity was calculated (continuous, from 0 to near 1) (26).

Household dependency ratio was used to assess the number of social and economic dependent versus working-age adults (31), and was calculated as the number of dependents aged ≤14 years or ≥65 years divided by the number of individuals 15–64 years old in the household.

Household socioeconomic status was estimated using principal component analysis based on variables that capture living standards, such as household ownership of durable assets and household infrastructure (32). The variables included were electricity, radio, TV, cellphone, clock, bank account, mosquito net, moped or motorbike, access to land for farming, livestock, roof made from metal/cement/wood, walls made from metal/cement/rock/wood, and ratio of number of people by number of bedrooms in the household. For 2018 and 2019, the variables: household has improved source of drinking water; and has improved sanitation were also included. The index was grouped into tertiles to reflect low, medium, and high socioeconomic status.

Statistical analyses

The prevalence was estimated for EBF overall and by its potential determinants. For descriptive purposes, age of the infant (0–1/2–3/4–5 months), age of the mother (15–24/25–34/35–48 years), dependency ratio (≤1/>1) were presented as categorical in Table 1, but these variables were added as continuous in the regression analyses (Table 2).

To identify the determinants of EBF, unadjusted and adjusted prevalence ratios (PR) and their 95% confidence intervals (CI) were calculated. Cox proportional hazard models for complex surveys (PROC SURVEYPHREG in SAS 9.4) was used, assigning an equal time of follow-up to all individuals (33).

EBF (yes/no) was the dependent variable. Model 1 was unadjusted and performed for each potential determinant. Model 2 was adjusted for infant's age (continuous) and sex (female/male); mother's age (continuous), educational attainment (less than primary school/primary school or more), has more than one child under 5 years old (yes/no), MUAC (tertiles), diet meets or exceeds MDD-W (yes/no), responsibility for the

TABLE 1. Sample characteristics among children aged under 6 months (n = 638), Haiti, 2017–2019

	All children (n = 638)		% exclusively breastfed children	
	Estimate	SE	Estimate	SE
Exclusively breastfed in the previous day, %	68.0	3.0	--	--
Age, %				
0–1 months	36.3	2.2	86.5	2.3
2–3 months	33.0	2.3	69.4	4.5
4–5 months	30.7	2.0	44.7	4.9
Mean (months)	2.7	0.1	--	--
Sex, %				
Female	52.4	2.8	68.1	3.2
Male	47.6	2.8	67.9	3.7
Mother's age, %				
15–24 years	36.4	2.5	65.7	4.8
25–34 years	44.6	2.1	69.2	3.0
35–48 years	19.0	1.3	69.7	4.6
Mean (years)	28.3	0.3	--	--
Mother's educational attainment, %				
Less than primary school	38.7	2.6	72.3	4.4
Primary school or more	61.3	2.6	65.3	3.4
Mother's number of children under 5 years old, %				
1	52.2	2.6	63.6	4.0
2 or more	47.8	2.6	72.9	3.3
Mother is the main or secondary income earner for household, %				
No	83.4	1.5	67.4	3.0
Yes	16.6	1.5	71.0	5.2
Mother's arm circumference, %				
Tertile 1 (160–245 mm)	33.0	1.4	62.0	4.2
Tertile 2 (246–275 mm)	32.5	1.9	70.6	3.9
Tertile 3 (276–415 mm)	34.5	2.1	71.3	3.7
Mean (mm)	266.8	1.6	--	--
Mother's diet meets or exceeds MDD-W, %				
No	81.6	2.1	66.6	3.1
Yes	18.4	2.1	74.5	5.6
Household in severe food insecurity, mean	72.1	2.3	--	--
Household socioeconomic status, %				
Tertile 1 (lowest)	32.1	3.3	68.4	3.8
Tertile 2	33.9	2.5	69.2	4.5
Tertile 3 (highest)	34.0	3.4	66.5	3.9
Household dependency ratio, %				
≤1	59.5	2.2	63.9	3.8
>1	40.5	2.2	74.1	3.2
Mean (number of dependents/adults)	1.2	0.1	--	--
Region, %				
Jérémie	37.8	9.3	79.7	4.1
Anse d'Hainault	25.2	7.8	63.5	4.1
Les Cayes	36.9	9.6	59.1	3.1
Residential zone, %				
Rural	86.7	6.4	68.2	3.5
Urban	13.3	6.4	66.6	1.1
Year of data collection, %				
2017	33.3	4.4	63.2	5.1
2018	33.3	2.9	70.1	3.9
2019	33.3	2.4	70.8	3.5

(Continued)

TABLE 1. (Cont.)

	All children (n = 638)		% exclusively breastfed children	
	Estimate	SE	Estimate	SE
Initiation of breastfeeding within 1 hour, % (n = 424)[a]				
No	20.2	1.6	62.2	4.9
Yes	79.8	1.6	74.2	3.1
Mother knows WHO recommendation for EBF duration, % (n = 435)[a]				
No	18.9	2.2	45.9	8.7
Yes	81.1	2.2	76.1	2.6

Source: Prepared by the authors based on the study results
Notes: All estimates presented in the table are weighted estimates.
SE, standard error; MDD-W, Minimum Dietary Diversity for Women; EBF, exclusive breastfeeding.
[a] Data available only for data from summers 2018 and 2019.

main or secondary source of income for household (yes/no); household probability of severe food insecurity (continuous), socioeconomic status (tertiles), dependency ratio (continuous), region (Les Cayes/Jérémie/Anse d'Hainault), residential zone (rural/urban), and year of data collection (2017/2018/2019). Model 3, which only uses data from 2018 and 2019, included the same variables as in the model 2 plus early initiation of breastfeeding (yes/no) and mother's knowledge of EBF duration (yes/no), which were only available for these years of data collection.

All statistical analyses were weighted to account for the sampling design and unequal probability of selection, and to be representative of the Haitian population. Households where there was more than one participating child under 6 months of age were given a higher weight for the child included in the study, to account for the total number of children under 6 months of age in the household.

Alpha level was set at 0.05 and analyses were conducted using SAS 9.4.

Ethics

The A3PN project was approved by the Comité d'Éthique de la Recherche en Santé (CERES) of the Université de Montréal and the Comité National de Bioéthique in Haiti. All participants were provided with informed consent forms written in Haitian Creole, which were read to them by the interviewer. Verbal consent obtained from the participant was documented by the interviewer on the form, and a printed copy of the details of the study including staff contact information was provided to the participant. Participant names and contact information were recorded on the consent forms, which are kept in locked room at the Université de Montréal. To protect participants' anonymity, a participant number was used instead of participant names on paper and electronic data collection forms, and no individual data are presented in any form of publication or dissemination.

RESULTS

Descriptive characteristics of the study population and the prevalence of EBF by participant characteristics are presented in Table 1. The prevalence of EBF was 68.0% overall, and the distributions for age (36.3% 0–1 month, 33.0% 2–3 months) and

sex (52.4% female) of infants were balanced. As for mothers, most were 15–24 years (36.4%) and 25–34 years (44.6%), about two-thirds (61.3%) had achieved at least primary school, and about half (47.8%) had two or more children under 5 years of age. One-third (33.0%) of mothers had MUAC below 245 mm (tertile 1), and 81.6% did not meet MDD-W. More than two-thirds of homes (72.1%) were in severe food insecurity and 59.5% of households had a household dependency ratio inferior to 1. Fewer participants came from the Anse d'Hainault region, seeing as this region only includes two of the eight participating communes, and 86.7% of participants lived in rural areas. Most mothers started breastfeeding within one hour of birth (79.8%) and knew the WHO recommendation for EBF duration.

Table 2 presents the results from the regression models. From the fully adjusted model 3, prevalence of EBF was statistically significantly lower among older infants (PR 0.88; 95% CI [0.85, 0.91]), and higher among mothers with MUAC in the second (PR 1.21; 95% CI [1.07, 1.38]) and third tertiles (PR 1.15; 95% CI [1.02, 1.29]), who met or exceeded MDD-W (PR 1.20; 95% CI [1.03, 1.39]), who initiated breastfeeding within one hour (PR 1.19; 95% CI [1.05, 1.35]), and who knew the recommendation for EBF duration (PR 1.55; 95% CI [1.13, 2.14]). EBF prevalence was also significantly higher in Jérémie (Anse d'Hainault vs Jérémie PR 0.87; 95% CI [0.78, 0.97]; Les Cayes vs Jérémie PR 0.74; 95% CI [0.66, 0.83]). Number of children under 5 years of age and dependency ratio were positively associated with EBF in the unadjusted model (model 1), but these factors did not reach statistical significance in adjusted models 2 and 3.

DISCUSSION

The study results show that there are significant associations between EBF and infant's age, maternal MUAC, dietary diversity, initiation of breastfeeding within one hour, knowledge of the WHO recommendation for EBF duration, and region of residence.

The significant decline in EBF with the increasing age of the child is consistent with past studies conducted in Haiti (10) and throughout the world (5). Associations between EBF, knowledge of EBF recommendations, and early initiation of breastfeeding are also in the expected direction and are consistent with past studies conducted in Haiti (17, 18) and around the world (6, 7).

Significant differences were also observed between participating regions, with highest EBF rates in the Jérémie region. These

TABLE 2. Determinants of exclusive breastfeeding among children aged under 6 months (n = 638), Haiti, 2017–2019

	Model 1 Unadjusted (*n* = 638) PR (95% CI)	Model 2 Adjusted[a] (*n* = 638) PR (95% CI)	Model 3 Fully adjusted[b] (*n* = 423) PR (95% CI)
Age (months, continuous)	0.86 (0.82, 0.90)***	0.86 (0.82, 0.90)***	0.88 (0.85, 0.91)***
Sex			
Female	Reference	Reference	Reference
Male	1.00 (0.90, 1.10)	0.97 (0.90, 1.06)	0.96 (0.87, 1.05)
Mother's age (years, continuous)	1.01 (1.00, 1.01)	1.00 (0.99, 1.01)	1.00 (0.99, 1.01)
Mother's educational attainment			
Less than primary school	Reference	Reference	Reference
Primary school or more	0.90 (0.78, 1.04)	0.92 (0.79, 1.07)	0.93 (0.80, 1.07)
Mother's number of children under 5 years old (continuous)	1.11 (1.01, 1.23)*	1.02 (0.94, 1.12)	1.06 (0.95, 1.19)
Mother is the main or secondary income earner for household, %			
No	Reference	Reference	Reference
Yes	1.05 (0.92, 1.21)	1.08 (0.94, 1.25)	1.11 (0.94, 1.31)
Mother's arm circumference			
Tertile 1 (160–245 mm)	Reference	Reference	Reference
Tertile 2 (246–275 mm)	1.14 (0.97, 1.33)	1.12 (0.98, 1.28)	1.21 (1.07, 1.38)**
Tertile 3 (276–415 mm)	1.15 (1.02, 1.29)*	1.15 (1.06, 1.26)**	1.15 (1.02, 1.29)*
Mother's diet meets or exceeds MDD-W			
No	Reference	Reference	Reference
Yes	1.12 (0.97, 1.29)	1.22 (1.05, 1.41)**	1.20 (1.03, 1.39)*
Household probability to be in severe food insecurity (continuous)	0.97 (0.80, 1.17)	1.01 (0.84, 1.21)	1.06 (0.90, 1.25)
Household socioeconomic status			
Tertile 1 (lowest)	Reference	Reference	Reference
Tertile 2	1.01 (0.88, 1.16)	1.01 (0.90, 1.14)	1.02 (0.93, 1.13)
Tertile 3 (highest)	0.97 (0.84, 1.13)	1.03 (0.90, 1.18)	1.07 (0.93, 1.24)
Household dependency ratio (continuous)	1.08 (1.01, 1.16)*	1.07 (0.99, 1.15)	1.02 (0.94, 1.10)
Region			
Jérémie	Reference	Reference	Reference
Anse d'Hainault	0.80 (0.68, 0.94)**	0.83 (0.72, 0.97)*	0.87 (0.78, 0.97)*
Les Cayes	0.74 (0.64, 0.86)***	0.70 (0.61, 0.82)***	0.74 (0.66, 0.83)***
Residential zone			
Rural	Reference	Reference	Reference
Urban	0.98 (0.88, 1.09)	0.99 (0.83, 1.17)	0.91 (0.72, 1.15)
Year of data collection			
2017	Reference	Reference	--
2018	1.11 (0.93, 1.32)	1.05 (0.90, 1.24)	Reference
2019	1.12 (0.95, 1.32)	1.00 (0.87, 1.16)	0.96 (0.84, 1.10)
Initiation of breastfeeding within 1 hour			
No	Reference	--	Reference
Yes	1.19 (1.03, 1.38)*	--	1.19 (1.05, 1.35)**
Mother knows WHO recommendation for EBF duration			
No	Reference	--	Reference
Yes	1.66 (1.13, 2.43)*	--	1.55 (1.13, 2.14)**

Source: Prepared by the authors based on the study results.
Notes: All estimates presented in the table are weighted estimates.
[a] All variables included except "Initiation of breastfeeding within 1 hour" and "Mother knows when to start introducing solid foods."
[b] Only data from summers 2018 and 2019 included.
*<0.05 **<0.01 ***<0.001.
PR, prevalence ratio; CI, confidence interval; MDD-W, Minimum Dietary Diversity for Women; EBF, exclusive breastfeeding.

regional differences mirror the results from the secondary analysis of DHS 2005–2006 data, which pointed to the inequitable distribution of maternal and infant health activities and services to promote breastfeeding throughout Haiti as the main underlying factor for interdepartmental differences in EBF prevalence (10). Physical inaccessibility to many remote regions due to poor road conditions in Haiti, compounded with the heavy reliance on NGO-provided services, are most likely contributing to this inequity. As population needs outweigh the available resources, NGOs tend to prioritize areas with the most pressing needs. However, other key decisional points include accessibility, history of working in the region, engagement of local partners (i.e., health centers, other NGOs), the need to avoid duplicating services that are already being offered in the region, as well as external factors such as the funders' interests (L. Caron, A3PN project coordinator, personal communication, 11 March 2022). The Haitian Health Foundation has been actively engaged in the Jérémie region since the 1980s to promote exclusive and continued breastfeeding, including the "baby-friendly" certification of two villages (34). We hypothesize that the Haitian Health Foundation's interventions may have played a substantial role in increasing EBF rates in this area.

Lastly, the significant associations between EBF, maternal MUAC, and dietary diversity corroborate the concerns and difficulties experienced by malnourished breastfeeding mothers—namely the lack of strength to breastfeed and a lack of confidence in the quality and the quantity of breast milk that can be produced—as described in qualitative studies conducted in Haiti (17, 18, 20) and around the world (35).

The study results should be interpreted considering some limitations. Data collection was cross-sectional; therefore, the findings cannot be used to draw causal inferences. Data were self-reported and were subject to misreporting due to recall or social-desirability bias, particularly in the later data collection cycles as A3PN project activities promoted EBF and dietary diversity. We also used data from one single 24-hour dietary recall to measure EBF practices and the mother's diet quality, which may not be representative of usual intake. However, these sources of error are random, and the likely impact would be an attenuation of the association between EBF and the other variables included in this study. Lastly, the flat Rasch Reliability for the FIES was 0.7 for all data cycles; FAO recommends it to be above 0.7. Potential problems could be related to accuracy and nuances of translation of the questions (26).

In conclusion, the main determinants of EBF identified in this study attest to the importance of improving Haitian breastfeeding mothers' access to nutritious food for the practice and maintenance of EBF and the need for geographically equitable access to health services and education that support breastfeeding. Based on positive feedback from A3PN project staff and participants, we recommend that health centers in countries like Haiti use innovative approaches such as mobile clinics, follow-up home visits, and mothers' support groups to increase community engagement and accessibility to maternal and infant health services and education in hard-to-reach areas. We also recommend scaling up solidarity funds, which empowered mothers and their families by giving them access to investment opportunities and loans that could be used to improve the well-being of their families.

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Los determinantes de la lactancia materna exclusiva en menores de 6 meses de edad en Haití

RESUMEN

Objetivo. Determinar cuáles son los determinantes de la lactancia materna exclusiva en menores de 6 meses de edad de tres regiones de los departamentos Sur y Grand'Anse de Haití.

Métodos. Se agruparon los datos de tres encuestas transversales realizadas anualmente entre 2017 y 2019 a representantes de 638 bebés menores de 6 meses de edad. Se empleó una descripción no cuantitativa de los alimentos consumidos en las últimas 24 horas para evaluar la lactancia materna exclusiva el día anterior a la encuesta. Mediante cocientes de prevalencia ajustados y no ajustados, se evaluó la relación entre la lactancia materna exclusiva y varios factores explicativos: sobre el lactante: edad y sexo; sobre la madre: edad, nivel educativo, circunferencia del brazo media, diversidad alimentaria, número de hijos menores de 5 años y responsabilidad como fuente principal o secundaria de ingresos del hogar; inicio de la lactancia materna en un plazo de una hora después del nacimiento y conocimiento sobre la duración de la lactancia materna exclusiva; inseguridad alimentaria grave en el hogar, situación socioeconómica y tasa de dependencia; y región y zona residencial (urbana/rural).

Resultados. La prevalencia de la lactancia materna exclusiva fue de 68% en la muestra del estudio. A partir del modelo totalmente ajustado, la prevalencia de la lactancia materna exclusiva fue significativamente mayor desde un punto de vista estadístico en los bebés más pequeños, las madres con una mayor circunferencia del brazo media, la que cumplieron o excedieron la Diversidad Alimentaria Mínima para las Mujeres, las que iniciaron la lactancia materna dentro de una hora después del parto, las que conocían bien las recomendaciones sobre la duración de la lactancia materna exclusiva y las que vivían en la región de Jérémie.

Conclusiones. Los principales determinantes de la lactancia materna exclusiva identificados en este estudio confirman la importancia de que las madres lactantes tengan acceso a alimentos nutritivos para la práctica y el mantenimiento de la lactancia materna exclusiva, así como la necesidad de disponer de un acceso geográfico equitativo a los servicios de salud y la educación que respaldan la lactancia materna.

Palabras clave   Lactancia maternal; factores epidemiológicos; ciencias de la nutrición del niño; Haití.

Determinantes do aleitamento materno exclusivo entre crianças haitianas com menos de 6 meses de idade

RESUMO

Objetivo. Identificar os determinantes do aleitamento materno exclusivo (AME) entre crianças com menos de 6 meses de idade de três regiões dos departamentos Sul e Grand'Anse do Haiti.

Métodos. Agruparam-se dados de três pesquisas transversais realizadas anualmente, de 2017 a 2019, com pais e responsáveis de 638 crianças com menos de 6 meses de idade. Um recordatório alimentar não quantitativo de 24 horas foi utilizado para avaliar o AME no dia anterior à pesquisa. Usando taxas não ajustadas e ajustadas de prevalência, avaliou-se a associação entre AME e diversos fatores explicativos: idade e sexo do bebê; idade da mãe, seu nível de escolaridade, circunferência do braço (CB), diversidade da dieta, número de filhos com menos de 5 anos, responsabilidade pela fonte primária ou secundária de renda da família, início do aleitamento materno na primeira hora, conhecimento sobre a duração do AME; insegurança alimentar domiciliar grave, status socioeconômico, índice de dependência, região e zona residencial (urbana/rural).

Resultados. A prevalência de AME na amostra do estudo foi de 68%. Com base no modelo totalmente ajustado, a prevalência do AME foi maior, de forma estatisticamente significante, entre bebês mais jovens, mães com maior CB, que atendiam ou excediam a Diversidade Alimentar Mínima para Mulheres (MDD-W), que começaram a amamentar na primeira hora, que estavam familiarizadas com as recomendações sobre a duração do AME e que moravam na região de Jérémie.

Conclusões. Os principais determinantes de AME identificados neste estudo atestam a importância do acesso das lactantes a alimentos nutritivos para a prática e a continuidade do AME, e a necessidade de acesso geograficamente equitativo a educação e serviços de saúde que apoiem o aleitamento materno.

Palavras-chave   Aleitamento materno; fatores epidemiológicos; ciências da nutrição infantil; Haiti.