

Impact of a Formal Antenatal Breastfeeding Education Program on the Acceptance and Attitudes
towards Exclusive Breastfeeding among Mothers and Grandmothers in Rural Haiti

by

Sangi Naomie Kadima

Duke Global Health Institute
Duke University

Date: _____

Approved:

David Walmer, Supervisor

Joseph Egger

Aunchalee Palmquist

Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health Institute
in the Graduate School
of Duke University

2018

ABSTRACT

Impact of a Formal Antenatal Breastfeeding Education Program on the Acceptance and Attitudes
towards Exclusive Breastfeeding among Mothers and Grandmothers in Rural Haiti

by

Sangi Naomie Kadima

Duke Global Health Institute
Duke University

Date: _____

Approved: _____

David Walmer, Supervisor

Joseph Egger

Aunchalee Palmquist

An abstract of a thesis submitted in partial
fulfillment of the requirements for the degree
of Master of Science in the Duke Global Health Institute
in the Graduate School of
Duke University

2018

Copyright by
Sangi Naomie Kadima
2018

Abstract

Background: Exclusive breastfeeding for the first 6 months of life reduces infant mortality and morbidity. A systematic review concluded that when an infant's grandmother had a positive attitude towards breastfeeding, the mothers were 1.6 to 12.4 times more likely to exclusively breastfeed or refrain from early complimentary feeding. Evidence shows that mothers are not the sole decision makers when deciding whether to exclusively breastfeed or not. Despite widespread knowledge that grandmothers have the potential to influence a mothers exclusive breastfeeding decision, most breastfeeding education programs are only targeted towards mothers. In this study, we aim to investigate the impact of a formal antenatal breastfeeding education program on the acceptance and attitudes towards exclusive breastfeeding among mothers and grandmothers in rural Haiti. **Methods:** A convenience sample of pregnant women (16 years of age and older), who were attending the Carmelle Voltaire Women's Clinic in Fondwa, Haiti between June-July of 2017, participated in a breastfeeding education program and completed a 17-item Infant Exclusive Breastfeeding Attitudes Questionnaire together with the infant's grandmother. Data was collected at baseline, post-intervention, and one week after the intervention. **Results:** The Infant Exclusive Breastfeeding Attitudes Questionnaire was completed by 25 expectant mothers, and 10 maternal grandmothers. The Family member with the greatest influence on expectant mother's breastfeeding practices according to expectant mothers, were maternal grandmothers. The formal antenatal breastfeeding education program had a positive impact on expectant mothers and grandmothers breastfeeding attitudes. **Conclusion:** This finding suggests that targeting grandmothers and expectant mothers through breastfeeding promotion programs may be an effective means of increasing exclusive breastfeeding rates in rural Haiti.

Dedication

This thesis is dedicated to my family, and the children in Congo who have not had the opportunity to pursue an education. When one comes from a developing country, you learn to appreciate education, especially when one must decide between sending their children to school and eating. I am the daughter of a man who was raised in a village in Kasai-Oriental, one of the poorest provinces in the world, but despite this, my father was able to send me to Duke University. I do not take any of the sacrifices my family has made for granted, and I will continue to make them proud.

GOD gets all the glory.

Contents

Abstract	iv
List of Tables	viii
List of Figures	ix
Acknowledgements.....	x
1. Introduction.....	1
1.1 Global assessment of breastfeeding	1
1.2 Current recommendations for optimal breastfeeding.....	1
1.3 Risks of mixed feeding and its impact on child survival	2
1.4 Barriers to exclusive breastfeeding	2
1.5 Critical Need of Breastfeeding intervention in Haiti.....	4
1.6 Previous research on exclusive breastfeeding in rural Haiti	4
1.7 Study Objectives.....	5
2. Methods.....	6
2.1 Setting.....	6
2.2 Participants	7
2.3 Procedures	8
2.3 Breastfeeding Education Program.....	8
2.4 Data Collection.....	9
2.4 Data Analysis	10
3. Results.....	11
3.1 Socio-Demographic Characteristics	11
3.2 Acceptance of Exclusive breastfeeding.....	14

3.3 Attitudes and Exclusive breastfeeding	16
4. Discussion	20
4.1 Implications for Policy and Practice	24
4.2 Implications for further research	24
4.3 Study Strengths and Limitations	25
5. Conclusion	25
Appendix A.....	26
Socio-demographic and breastfeeding history form	26
Version: Expectant Mother	26
Version: Family Member	27
Appendix B	29
Infant Exclusive Breastfeeding Attitudes Questionnaire	29
Version: Expectant Mother	29
Version: Family member.....	31
References	33

List of Tables

Table 1: Socio-demographic characteristics and breastfeeding history of expectant mothers and grandmothers in rural Haiti.....	13
Table 2: Expectant mother’s commitment to exclusive breastfeeding at three different time points	15
Table 3: Grandmothers support of expectant mother’s decision to exclusively breastfeed at three different time points.....	15
Table 4: Expectant mother’s attitudes towards exclusive breastfeeding using the IEBA questionnaire in Fondwa, Haiti.....	18
Table 5: Grandmother’s attitudes towards exclusive breastfeeding using the IEBA questionnaire in Fondwa, Haiti.....	19

List of Figures

Figure 1: Map of Léogâne Commune, Haiti.....	6
Figure 2: Family member with the greatest influence on expectant mother's breastfeeding practices according to expectant mothers	14

Acknowledgements

Firstly, I would like to express my sincere gratitude to the staff of Family Health Ministries, Carmelle Voltaire Women's Clinic, and especially my advisor Dr. David Walmer for his motivation, patience, and guidance. My field research would not have come to realization if he did not encourage and allow me to explore this interesting research project, as well as, add my own twist to it. Through this project, I was able to translate the knowledge I was taught in the classroom into practice.

I would also like to thank Dr. Joseph Egger and Dr. Aunchalee Palmquist who kindly helped me refine my research proposal. Both professors were always willing to make time to answer any questions when I ran into trouble spots. I am grateful for their passionate participation and input through every step of the way.

Finally, I would like to thank my participants, for welcoming me into their community and sharing their stories with me in our discussions. This accomplishment would not have been possible without them, and this is an experience that I will never forget.

1. Introduction

1.1 Global assessment of breastfeeding

The importance of breastfeeding on a child's survival, nutrition, and development, especially in low resource settings, is life changing.¹ Despite this, no country in the world fully meets recommended standards for breastfeeding.² In 2016, 5.6 million children under the age of five died, however, compared with other preventive interventions optimal breastfeeding had the greatest potential impact on child survival with the potential to avert over 800,000 deaths a year in children under five.^{1,3} Breastfeeding alone provides the ideal nourishment for infants for the first six months of life as it provides all the nutrients, immune bioactives, hormones, and minerals an infant needs for optimal growth and development.^{1,4} Breastfeeding provides more than the basic nutritional requirements for infants; mothers who breastfeed have a reduced risk of cervical and breast cancer, which are the two leading causes of death among women.⁴ It is evident that international efforts are needed to promote breastfeeding and ensure that it becomes a global priority in order to save lives and achieve sustainable development goals (SDG 2-4).²

1.2 Current recommendations for optimal breastfeeding

The World Health Organization (WHO) and UNICEF recommend that infants be exclusively breastfed (EBF) until 6 months of age, followed by nutritious complementary foods and continued breastfeeding up to the age of two.⁴ This recommendation is encouraged even in countries with high rates of HIV, due to the evidence that exclusive breastfeeding can be successfully supported in HIV-infected women, as well as, early mixed feedings association with an increased HIV transmission risk.⁵

EBF is defined as giving breast milk only to infants from 0-6 months, excluding water or any liquids and solids from their diet, except for vitamins and or supplements as recommended by

a health professional.^{6,7} Mixed feeding is defined as breastfeeding and giving infants foods and solids from 0-6 months of age.² Despite such recommendations that have shown positive outcomes, globally, only 40% of children younger than six months are breastfed exclusively.²

1.3 Risks of mixed feeding and its impact on child survival

The risks of initiating complementary feeding in infants younger than 6 months, are often detrimental and can cause irreversible damage to an infant, particularly in low-income countries, fragile contexts, and resource-limited settings.² A random effects meta-analysis estimated the increased risk of cause-specific morbidity and mortality in relation to four patterns of breastfeeding in children between 0-6 months (exclusive breastfeeding, complementary breastfeeding, not breastfeeding, and predominantly breastfeeding).⁶ The results showed that compared with exclusive breastfeeding, the relative risk of all-cause mortality was 2.85 (95% CI 1.59-5.1) times greater among partially breastfed infants.⁶ Earlier studies have shown that both partial breastfeeding and no breastfeeding are significant risk factors for persistent diarrhea, gastrointestinal infections, acute otitis media, acute respiratory infection, and even chronic conditions later on in life such as obesity.^{2,7-9}

1.4 Barriers to exclusive breastfeeding

Some factors that are associated with mixed feeding in infants <6 are medical, cultural, political- economic factors, and psychological influences.^{10,11} The association between these factors and breastfeeding rates, however causes vary between mothers living in developed and developing countries, as well as, urban and rural communities.¹¹ For example, a survey conducted on all mothers delivering infants at a University medical center hospital in the US, showed that lack of social support can be a barrier to breastfeeding. Most notably, the supportive individual (mother, male partner, friend) that influenced the mothers breastfeeding decision varied by ethnic

group.¹² In contrast, in rural Haiti food taboos and other beliefs related to humoral medicine and vodou¹ may lead to disruption of EBF and earlier than recommended weaning.¹³ Within a community of Haitian cultivators in Cul-de- Sac Plain, breastmilk is perceived as a forceful substance.¹⁴ The women in this community use their perception of breastmilk to determine if the mothers regime is poor or if she may be stricken with a culture-bound syndrome called *move san* or ‘bad blood’.^{14,15} In conditions where the mother has ‘bad blood’ early complementary feeding is introduced to protect the infant.¹⁵ It is evident that exploring women’s experiences across the globe, including barriers and facilitators, that may be tied to cultural influences, are pivotal in order to improve exclusive breastfeeding interventions. Understanding the social ecological factors that affect infant feeding patterns may be particularly important in developing countries similar to Haiti, where infants and children are disproportionately affected by poor health care, poverty, lack of clean water, and malnutrition.^{16,4}

¹ Haitian vodou: a syncretic religion practiced chiefly in Haiti and the Haitian diaspora

1.5 Critical Need of Breastfeeding intervention in Haiti

According to UNICEF, Haiti has the highest mortality rate for infants and children under the age of 5 in the Western Hemisphere.¹⁷ One of the most powerful interventions to this global problem is accessible, affordable, and sustainable, however, it is being underutilized. While we know that exclusive-breastfeeding during the first six months of life reduces the risk of infant and childhood mortality, the 2012 Haitian Demographic and Health Survey (HDHS) reported that this was a reality for only 40% of infants in the nation.¹⁸

In rural Haiti, a recent Demographic and Health Survey found that 97.6% of infants were breastfed¹⁹. Therefore breastfeeding is not the problem, however, mixed feeding from infancy is the norm in Haiti due to socio-economic hardships, as well as, cultural and traditional practices that have been adopted and passed down for generations.^{19,13} The median duration of exclusive breastfeeding is estimated at 1.8 months, with 20% of infants receiving solids and liquids within three days post-delivery.¹⁹ The risks of early complementary feeding however, are disparaging; strategies need to be implemented to target this issue for improved health outcomes.²

1.6 Previous research on exclusive breastfeeding in rural Haiti

In 2015, MSc-GH candidate Lauren Zalla began studying exclusive breastfeeding as a strategy for birth spacing and decreasing infant and maternal morbidity.²⁰ Zalla initiated focus groups discussions to identify socio-cultural and institutional barriers to exclusive breastfeeding in rural Haiti.²⁰ Zalla discovered that women within this community seemed to be interested in improving their infant's growth and intellect with exclusive breastfeeding for 6 months, but encountered 3 major barriers when thinking about putting the practice into action: (1) Lack of support and family influence, especially grandmothers and community elders (2) Concerns that women had about the impact of malnutrition on the quality of breastmilk (3) Pressures to return to

the market, where infants are not usually taken.²⁰ These factors show that it is not simply “cultural belief systems” but broader systems of political-economic hardship that also limit mothers’ ability to breastfeed as recommended.

Various studies have provided evidence that family members beliefs, knowledge, support, and attitudes towards breastfeeding can influence feeding practices and duration, specifically, mothers with no breastfeeding experience and mothers cohabiting with grandmothers²¹⁻²³; formal breastfeeding education programs in Haiti often solely focus on mothers, and ignore the role and influence of extended family members.²⁴ In rural Haiti, it is clear that in order to close the identified gaps and improve the well-being of both mothers and infants; breastfeeding education programs need to engage family members, specifically grandmothers.

1.7 Study Objectives

The findings of Lauren Zalla’s thesis inspired the present study. The main goal of the study was to integrate a formal antenatal breastfeeding education program into the social dynamics of families to target those who may have the greatest influence over a mother’s early infant feeding decisions. The main objective of this study was to investigate the impact of the formal antenatal breastfeeding education program at the Carmelle Voltaire Women’s Clinic, specifically looking at the acceptance of and attitudes towards EBF among mothers and grandmothers in rural Haiti.

2. Methods

2.1 Setting

Fondwa is a small community village in the 10th rural section of Léogâne.²⁵ Léogâne is in the West Department of Haiti and lies approximately 32 km west of the capital city Port-au-Prince (**Figure 1**).²⁵ Due to Fondwa's geographical proximity to the epicenter of the earthquake in 2010, the disasters of the earthquake heavily ravished this community that was already suffering from poverty and poor infrastructure.²⁶ Currently, approximately 11,200 women in this region are of reproductive age, and in Haiti the birth rate is 23 births/ 1000 people.²⁸ The majority of men and women who live in the study area farm and sell items in the market for living; however, most do not yield enough food to sustain households with children, who are disproportionately affected with malnutrition.²⁶ Among children under 5, the prevalence of chronic malnutrition in Haiti is estimated at 24.7%.²⁷

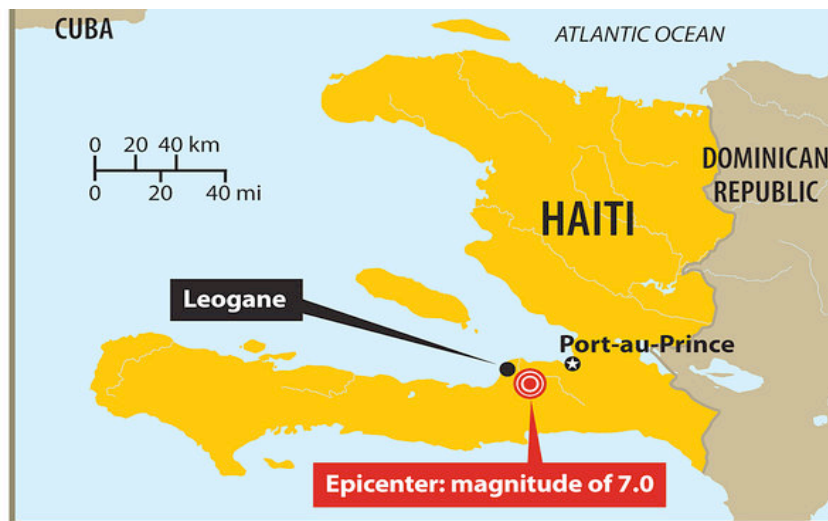


Figure 1. Map of Léogâne Commune, Haiti. Source: U.S. Geological Survey

Prior to the opening of the Carmelle Voltaire Women's Clinic in 2016, the local health sector was nonexistent; there were no permanent healthcare facilities in Fondwa.²⁸ This gap in healthcare in health care infrastructure translated into high rates of home births without skilled birth attendants, medication, or even indoor running water.²⁸ In the event that a mother was in need of medical attention, she would most likely be carried on a wood plank from her home onto the nearest main road in hopes of finding a tap-tap (local transportation) that could bring her to the closest healthcare facility down the mountains.²⁸ It is evident that access to women's health, poverty, health education, and food insecurity are the driving forces that affect positive health outcomes for women and children living within this community.

2.2 Participants

Eligible participants included all expectant mothers ages 16 and older living in Fondwa and receiving antenatal care at the Carmelle Voltaire Women's Clinic. Participants were recruited with the assistance of community healthcare workers and nurses at the clinic who disseminated information about the study to the patients. Each participant was encouraged to enroll in the study with a family member, preferably a maternal grandmother and or an elder female living within their household (e.g. aunts, cousins, siblings). Expectant mothers who could not breastfeed due to medical complications and were advised not to from a health professional were excluded from the study. Mothers who did not wish to participate in the study but chose to attend the education sessions could participate but were not included in the study results. To encourage participant attendance, participants were compensated with food items equivalent to water, snacks, and hygiene products. This is consistent with local expectations for participation in research studies in Fondwa. A total of 25 pregnant mothers and 10 grandmothers agreed to participate in this study.

2.3 Procedures

Prior to the data collection, this study was approved by the United States Institutional Review Board at Duke University and the Haitian Institutional Review Board (Misyon Sante Fanmi Ayisyen). In addition to this, all the questionnaires were translated to Haitian Creole and back translated to English by a Haitian Creole native speaker who is fluent in both languages. The back translation was conducted to verify and assure translation accuracy.

In order to conduct in depth interviews and questionnaires a translator was chosen to assist me (Sangi Naomie Kadima). This translator had worked with previous Family Health Ministries projects and was familiar with the scope of the project, as well as, the community. Before the commencement of the study, the translator received one week of supplemental training on conducting questionnaires and breastfeeding education. Once the training was complete, the translator and I organized two mock interviews with two nurses at the Carmelle Voltaire Clinic to obtain feedback on the acceptability and clarity of the educational program and questionnaires. The feedback offered by the nurses were the following: (1) Define support to participants (2) Change some wording to improve clarity (3) Three education sessions should be condensed into one and the assessments should take place in a span of one week to prevent loss to follow up. The feedback was assessed with the study supervisor and revisions were made accordingly.

2.3 Breastfeeding Education Program

The breastfeeding education program was developed and adapted from the *WHO Infant and Young Child feeding Counselling: An integrated course* and the *Abbotts Nutrition Breastfeeding Education Program*. The education program was augmented with visual aids, and put into PowerPoint format that was projected onto a screen in the education room at the clinic. Although the forms and questionnaires were conducted individually with each mother and

grandmother, during the education modules all the expectant mothers and grandmothers were assigned to small groups. The education modules were supplemented with small group discussions in which the participants asked questions and chose to share their experiences.

2.4 Data Collection

The two data collection instruments were a socio-demographic and breastfeeding history questionnaire (SBHQ), and an Infant Exclusive Breastfeeding Attitude questionnaire (IEBAQ). The SBHQ included demographic information on age, education, marital status, breastfeeding history, housing status, and acceptance of exclusive breastfeeding. In this study acceptance is defined as the expectant mother's willingness to experience exclusive breastfeeding (commitment), and the grandmother's willingness to support a mother's decision to exclusively breastfeed (support). To ensure that the information was accurate all the questionnaires in this study were read out loud to each participant and filled out by the translator (Haitian Creole questionnaire) and the interviewer (English questionnaire).

The IEBAQ was used to assess expectant mothers and grandmother's attitudes towards exclusive breastfeeding. In this study attitude was defined as beliefs about exclusive breastfeeding and breastfeeding in general. This questionnaire is a 17-item scale in which some of the breastfeeding attitude questions were adapted from the Iowa Infant Feeding Attitude Scale (IIFAS)²⁹. Although this questionnaire had not been used in Haiti before, it was the most appropriate validated tool available at this time that had been used in diverse populations and low-income women.³⁰⁻³² Additional attitude questions were related to the Haitian breastfeeding culture and context.^{20, 33-34} The questions covered nutrition (e.g., "Breastmilk is more nutritional than formula"), cost of infant feeding (e.g., "Breastfeeding is a good way to decrease family expenses"), and convenience (e.g., "Exclusive breastfeeding for 6 months will make my family

member lose interest in sex) to name a few. Respondents were asked to indicate the extent to which they agree with each statement, on a five-point Likert scale ranging from "strongly disagree=1" to "strongly agree=5." Approximately half of the questions that were worded in manner unfavorable to exclusive breastfeeding were reverse scored. Total attitude scores range from 17 to 85 with higher scores reflecting attitudes more positive towards exclusive breastfeeding. Scores were put into conceptual ranges for attitude; (17-50) reflect negative attitudes towards exclusive breastfeeding, (51-67) reflect neutral attitudes towards exclusive breastfeeding, and (68-85) reflect positive attitudes towards exclusive breastfeeding. The questionnaire was administered at three different points in time: (0) pre-intervention for a baseline measurement (1) after the education modules (2) one week after the intervention (education modules). Besides the translator, the investigator was present at each interview to take notes and ask and answer additional questions. The full IEBA is included in Appendix A.

2.4 Data Analysis

Data were entered into an electronic spreadsheet at the end of each day, and entries were double checked for inaccuracies. The data were then exported into and analyzed using Stata statistical software (version 14) for analysis. Descriptive statistics and cross-tabulations were employed to summarize the socio-demographic characteristics and breastfeeding history of the participants, as well as, each item in the IEBA questionnaire. The primary outcome of interest was change in acceptance of and attitudes towards exclusive breastfeeding over time (0,1,2). Although the outcomes were measured at three different time points, the primary endpoint was time=1 where we expected the greatest impact. We continued to measure at time=2 to see if attitudes and acceptance of EBF changed after the participants returned home. To analyze acceptance, the proportion of expectant mothers willing to experience EBF

and the proportion of grandmother's willing to support expectant mother's decision to EBF, as well as, the mean (SD) months of commitment over time were measured. The mean scores for each item on the 17-item IEBA questionnaire for expectant mothers and grandmothers was measured, and total mean scores were also calculated. Followed by a one-factor within-subjects ANOVA to detect an overall difference between the related total mean scores, and a post-hoc analysis using the Sidak method for a pairwise comparison among the three means. Prior to the analyzing the data, because of the limited sample size we knew beforehand that we were going to be underpowered to detect moderately large effect sizes and very underpowered to detect small effect sizes.

3. Results

3.1 Socio-Demographic Characteristics

In this study, expectant mothers were encouraged to participate with a grandmother to form mother-grandmother pairs. Due to reasons, such as transportation, death, immobility, distance, and willingness there was only a total of 10 mother-grandmother pairs, and 15 individual mothers who participated in this study (Total Maternal Grandmother N=10 and Expectant Mothers N=25). Descriptive statistics of the expectant mothers and maternal grandmothers in the study sample are displayed in Table 1. Approximately, 64% of all expectant mothers were under the age of 25, and only 16% of the mothers were married. None of the expectant mothers in this study surpassed a secondary education, while, 90% of the grandmothers had no education at all. In this study sample, most the women were unemployed; about 72% for expectant mothers and 80% for grandmothers. Furthermore, over 50% of expectant mothers had never given birth before. The mothers who had given birth before were asked about the type of food given to their infant prior to breastmilk to assess early initiation of food sources, and

although 60% said that they only started with breastmilk, 25% of the women gave their children purgatives (*lok*) before breastfeeding. All the grandmothers in this study sample chose breastfeeding as the preferred feeding option over formula feeding for infants, this does not imply EBF for six months. Figure 2 shows that according to the expectant mothers in this study, maternal grandmothers compared to any other family member have the greatest influence on the mother's breastfeeding practices.

Table 1. Socio-demographic characteristics and Breastfeeding history of expectant mothers and grandmothers in rural Haiti

Demographic Variables	Group	Frequency	Percentage (%) or mean (SD)
<i>Maternal Characteristics</i>			
Age in years	≤19	6	24.0
	20-25	10	40.0
	26-30	6	24.0
	≥31	3	12.0
Marital Status	Married	4	16.0
	Single	10	40.0
	Other	11	44.0
Education	No education	---	---
	Less than primary	---	---
	Primary Education	9	36.0
	Secondary Education	16	64.0
	Degree and above	---	---
Occupation	Unemployed	18	72.0
	Market Seller	7	28.0
	Paid Employment	---	---
Head of Household	Husband	5	20.0
	Self	1	4.0
	Grandfather	4	16.0

	Grandmother	5	20.0
	Partner	5	20.0
	Other	5	20.0
Number of occupants in home	All expectant mothers	25	4.6 (2.3)
Number of Children	<1	13	52.0
	1-3	9	36.0
	≥4	3	12.0
Food given to infant prior to breastmilk for mothers who have previously given birth	Breastmilk only	8	66.7
	Water	---	---
	Tea	---	---
	Juice	---	---
	Purgative (lok)	3	25.0
	Formula milk	1	8.3
	Other	---	---
<i>Grandmother Characteristics</i>			
Age in years	≤50	2	20.0
	50-60	2	20.0
	≥61	6	60.0
Occupation	Unemployed	8	80.0
	Market Seller	2	20.0
	Paid Employment	---	---
Education	No education	9	90.0
	Less than primary	1	10.0
	Primary Education	---	---
	Secondary Education	---	---
	Degree and above	---	---
Breastfeeding as preferred feeding option for newborn	Yes	10	100.0
	No	---	---

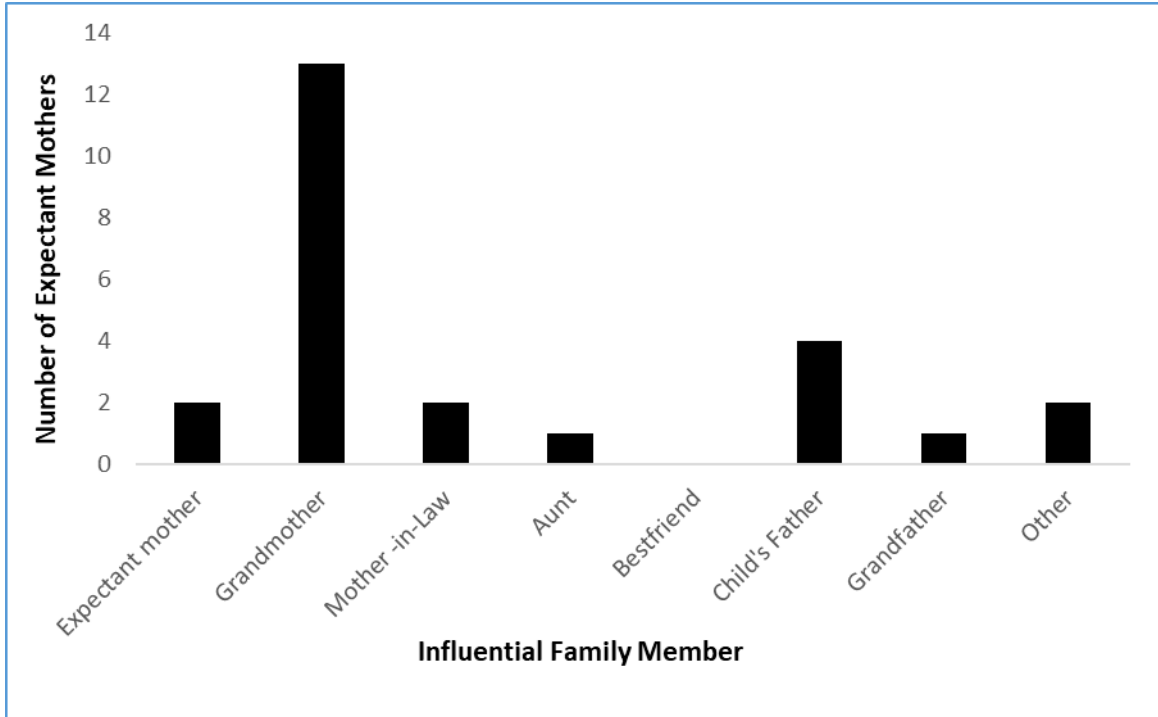


Figure 2. Family member with the greatest influence on expectant mother’s breastfeeding practices according to expectant mothers

3.2 Acceptance of Exclusive breastfeeding

In this study acceptance is defined as the expectant mother’s willingness to experience exclusive breastfeeding, and the grandmother’s willingness to support a mother’s decision to exclusively breastfeed. Table 2 shows the expectants mothers commitment to exclusively breastfeed at baseline (time=0), after the intervention (time=1), and one week after the intervention (time=2). At baseline the proportion of mothers committed to EBF was 80%, at the primary endpoint (time=1) the proportion increased by 8% and continued to rise thereafter. The

baseline proportion of 80% of mothers willing to exclusively breastfeed, is two times greater than the 40% of mothers who put it into practice and exclusively breastfeed for 6 months that was reported from the 2012 DHS.¹⁸ The mean duration of exclusive breastfeeding that expectant mothers were willing to commit to was 4.2 (2.5) at baseline and increased by 1 month at the primary endpoint with a continuous rise as expected.

Table 2. Expectant mother’s commitment to exclusive breastfeeding at three different time points

Commitment to exclusive Breastfeeding	Proportion	Binomial Exact [95% Conf. Interval]	Months willing to commit to exclusive breastfeeding Mean (SD)
Time=0 No Yes	0.20 0.80	[0.59-0.93]	4.2 (2.5)
Time=1 No Yes	.12 0.88	[0.69-0.97]	5.2 (2.0)
Time=2 No Yes	.08 0.92	[0.74-0.99]	5.3 (1.9)

Table 3. Grandmothers support of expectant mother’s decision to exclusively breastfeed at three different time points

Support of exclusive Breastfeeding decision	Proportion	Binomial Exact [95% Conf. Interval]	Months willing to commit to exclusive breastfeeding Mean (SD)
Time=0 No Yes	0.20 0.80	[0.44-0.97]	4.4 (2.1)

Time=1 No Yes	0.10 0.90	[0.55-0.99]	5 (1.2)
Time=2 No Yes	0 1.00	[0.69 -1.00]	5.4 (1.9)

3.3 Attitudes and Exclusive breastfeeding

The mean overall attitude scores at all three time points (0,1,2) for expectant mothers and grandmothers lay in the range of ‘positive exclusive breastfeeding attitudes’. The mean values for responses to each item were compared at three different time points to assess the impact of the formal breastfeeding education program on attitudes over time (Table 4 and Table 5). The expectant mothers and grandmothers placed a high value on breastfeeding attitudes associated with improving child health. On the Likert scale, breastmilk was valued for being the best source of nutrition for the baby, with all mean values ≥ 4 among grandmothers and expectant mothers at all three time points (Table 4 and Table 5). At baseline for item 1 regarding the supplementation of *lok* in the first 6 months of life for the health of the baby, grandmothers and expectant mothers both mean score of 3.0 ± 2.1 (mean \pm standard deviation) and 3.7 ± 1.6 reflect a neutral attitude regarding the use of this purgative. As for the convenience of exclusive breastfeeding, for item 8 (breastfeeding for 6 months is too long) grandmothers and expectant mothers both showed positive attitudes from baseline (time=0) with an unceasing increase one week after the intervention (time=2).

The average score of the IEBA questionnaire for grandmothers at time=0 was 73.8 ± 6.3 , 78.7 ± 3.9 at time= 1, and 80.9 ± 3.3 at time=2 (Table 5). These scores lay in the range of positive attitudes, and increases from baseline to the primary endpoint (time=1) as expected. The average

score of the IEBA questionnaire for expectant mothers at time=0 was 70.2 ± 9.5 , 72.6 ± 10.0 at time= 1, and 75.5 ± 8.1 at time=2 (Table 4). A one-factor within-subject's ANOVA was conducted on n=25 expectant mothers who participated in the education session to detect an overall difference between the related mean scores. The design used their attitude scores that were measured at three points in time (0=baseline, 1= after intervention, 2= one week after the intervention) so there was a total of three observations per subject. Using the Huynh-Feldt adjustment ($\epsilon = 1.03$) to correct for potential lack of sphericity, the omnibus F test was significant [$F(2, 48) = 5.67$, P value=0.006]. Since the p value was < 0.05 , indicating that there was a significant difference between the related mean scores, this warranted a subsequent post-hoc analysis. The post-hoc analysis was conducted and all pairwise comparisons were made among the 3 means. The p value threshold was adjusted using the Bonferroni correction and the significance level was adjusted to $\alpha = 0.016$. When comparing the mean at time=0 and time=1, time=2 and time=0, as well as, time=2 and time=1, none of the differences were statistically significant and all comparisons resulted in p values that were > 0.016 . The one-factor within-subject's ANOVA test was not conducted for the n=10 grandmothers because the small sample size significantly reduces the power of the test, and thus the ability to make statistical inferences.

Table 4. Expectant mother's attitudes towards exclusive breastfeeding using the IEBA questionnaire in Fondwa, Haiti (n=25)

Scale Item	Baseline Mean \pm SD	After Intervention Mean \pm SD	One week after Intervention Mean \pm SD
1. Breastfeeding within the first 6 months of life should be supplemented with <i>lok</i> for the health of my baby*	3.7 \pm 1.6	4.8 \pm 0.9	5.0 \pm 0
2. Breastfeeding within the first 6 months of life should be supplemented with tea for the health of my baby*	3.9 \pm 1.7	4.9 \pm 0.8	5.0 \pm 0
3. Breastmilk is the best source of nutrition for the baby	4.8 \pm 0.8	5.0 \pm 0	5.0 \pm 0
4. Friends and family do not approve of exclusive breastfeeding for the first 6 month of life*	3.8 \pm 1.5	3.9 \pm 1.4	4.2 \pm 1.4
5. I am comfortable exclusively breastfeeding with my mother or mother-in-law present	4.0 \pm 1.5	4.4 \pm 1.2	4.2 \pm 1.5
6. Culture (self-defined) does not recommend exclusive-breastfeeding for 6 months*	3.2 \pm 1.5	3.6 \pm 1.4	3.8 \pm 1.3
7. Exclusive breastfeeding for 6 months is too long*	4.3 \pm 1.4	4.3 \pm 1.4	4.6 \pm 1.0
8. Managing to keep up with my infants breastfeeding demands for 6 months will not be possible*	4.6 \pm 1.0	4.2 \pm 1.5	4.6 \pm 1.0
9. Exclusive breastfeeding for 6 months will make me lose interest in sex*	4.1 \pm 1.3	4.0 \pm 1.4	4.3 \pm 1.2
10. Breastmilk is more nutritional than formula	4.9 \pm 0.2	4.8 \pm 0.8	5.0 \pm 0
11. Exclusive for the first 6 months of life breastfeeding brings the mother and child closer	4.5 \pm 1.0	4.6 \pm 1.0	4.8 \pm 0.9
12. If the mother feeds the baby breastmilk exclusively for 6 months, the father will feel ignored*	3.9 \pm 1.5	4.1 \pm 1.4	4.1 \pm 1.4
13. It is difficult for exclusively breastfeeding mothers to care for family*	3.6 \pm 1.8	3.9 \pm 1.8	4.0 \pm 1.7
14. Breastfeeding has no negative effect on marital relationships	4.2 \pm 1.4	4.3 \pm 1.4	4.4 \pm 1.2
15. If I were to choose to exclusively breastfeed for 6 months my family would not have a positive attitude regarding my choice*	3.8 \pm 1.3	3.7 \pm 1.5	4.3 \pm 1.3

16. Breastfeeding is a good way to decrease family expenses	4.4±0.9	4.5±0.8	4.6±1.0
17. If I choose to exclusively breastfeed for 6 months, but my family members do not accept, I will not do so *	4.3±1.4	3.7±1.9	3.6±1.9
Mean score	70.2 ± 9.5	72.6±10.0	75.5±8.1

Note. Items marked with asterisk are reverse scored and the scored for each item are then summed. Higher scores indicate more positive attitudes towards exclusive breastfeeding.

Table 5. Grandmother's attitudes towards exclusive breastfeeding using the IEBA questionnaire in Fondwa, Haiti (n=10)

Scale Item	Baseline (n=10) Mean ± SD	After Intervention (n=10) Mean ± SD	One week after Intervention (n=10) Mean ± SD
1. Breastfeeding within the first 6 months of life should be supplemented with <i>lok</i> for the health of the baby*	3.0±2.1	5.0±0	5.0±0
2. Breastfeeding within the first 6 months of life should be supplemented with tea for the health of the baby*	4.2±1.4	5.0±0	5.0±0
3. Breastmilk is the best source of nutrition for the baby	5.0±0	5.0±0	5.0±0
4. Breastmilk is more nutritional than formula	4.9±0.3	4.6±1.3	4.9±0.3
5. Exclusive for the first 6 months of life breastfeeding brings the mother and child closer	4.4±1.3	4.6±1.3	4.0±1.6
6. Culture (self-defined) does not recommend exclusive-breastfeeding for 6 months*	4.0±1.4	3.4±1.2	4.2±1.0
7. Family and friends generally do not approve of breastfeeding for the first 6 months of life*	4.4±1.0	4.6±0.8	4.8±0.6
8. Breastfeeding for 6 months is too long*	4.5±1.1	5.0±0	5.0±0
9. Managing to keep up with breastfeeding demands for 6 months will not be possible for my family member*	4.4±1.1	4.4±0.7	4.8±0.4
10. Exclusive breastfeeding for 6 months will make my family me lose interest in sex*	3.7±0.9	4.1±1.2	4.6±0.8
11. If the mother feeds the baby breastmilk exclusively for 6 months, the father will feel ignored*	4.4±1.3	4.8±0.6	5.0±0

12. It is difficult for exclusively breastfeeding mothers to care for family*	3.8±1.7	4.6±1.3	4.2±1.6
13. Breastfeeding has no negative effect on marital relationships	4.6±0.8	5.0±0	4.8±0.6
14. If my family member were to choose to exclusively breastfeed for 6 months I would have a positive attitude regarding her choice	4.9±0.3	5.0±0	5.0±0
15. Breastfeeding is a good way to decrease family expenses	5.0±0	5.0±0	5.0±0
16. I am comfortable being present as my family member exclusively breastfeeds for 6 months	4.4±1.3	4.7±0.9	5.0±0
17. If my family member decided to exclusively breastfeed for 6 months, and I do not accept, she should not do so *	4.2±1.4	3.9±1.8	4.6±1.2
Mean score	73.8 ± 6.3	78.7±3.9	80.9±3.3

Note. Items marked with asterisk are reverse scored and the scored for each item are then summed. Higher scores indicate more positive attitudes towards exclusive breastfeeding.

4. Discussion

This study investigated the impact of a formal breastfeeding education program on the acceptance and attitudes towards exclusive breastfeeding among mothers and grandmothers in rural Haiti. Furthermore, the present study assessed which family member had the greatest influence over an expectant mother's infant feeding decision. The findings of this study provide evidence that a formal prenatal breastfeeding education program targeted towards expectant mothers and grandmothers may positively impact exclusive breastfeeding attitudes and acceptance. This study suggests that, in a population at risk of chronic undernutrition and high child mortality rates, formal prenatal breastfeeding education programs targeted towards grandmothers and expectant mothers may encourage exclusive breastfeeding practice and ultimately improve health outcomes. Previous studies have found a direct correlation between a

mother's positive attitude toward breastfeeding and optimal exclusive breastfeeding practice.^{35,36,37} A systematic review on the influence of grandmothers on breastfeeding rates, revealed that a grandmothers positive breastfeeding opinion had the potential to influence a mother up to 12% more likely to initiate breastfeeding.³⁸ Additionally, this systematic review concluded there was a significant positive impact on exclusive breastfeeding when grandmothers of the infants were positively inclined towards breastfeeding resulting in effects between 1.6 to 12.4 times more likely to exclusively breastfeed or refrain from early complimentary feeding.³⁷⁻⁴¹

In this study over 50% of the expectant mothers stated that the maternal grandmothers were the most influential family member in making their decision to breastfeed or not. The in-depth interviews with expectant mothers revealed the importance of shifting the focus of breastfeeding educational programs from mothers only, to mothers and extended family members because breast-feeding decisions are often made jointly.

In the previous research study Zalla reported that expectant mothers were interested in improving their infant's growth and intellect with exclusive breastfeeding for 6 months but lacked support from the infant's grandmother when thinking about putting the practice into action.¹⁸ This present study revealed that at baseline 80% of expectant mothers were willing to commit to EBF, and 80% of grandmothers were willing to support the expectant mothers if they chose to EBF for 6 months; thus, our results were inconsistent with Zalla's findings.¹⁸ Also, the DHS reported that the national average of EBF in Haiti is 40%, whereas willingness in this sample is double this number.¹⁸ This indicates that either the rate of breastfeeding in this population is higher than the national average or their self-report does not match their actions. When the mothers who chose not to commit at all or chose not to commit for the full 6 months were asked to elaborate their reasoning at baseline the answers were as follows: (1) "I do not have enough money to feed myself, so since I will not be fully nourished my milk will not be good" (2) "I have to return to

the market and cannot commit to breastfeeding for 6 months” (3) “I will have twins and cannot keep up with the breastfeeding demands” (4) “My family does not approve”. Answer 1, 2, and 4 were consistent with the findings of Lauren Zalla’s focus group discussions in Fondwa, Haiti.¹⁸ This may be an indication that there is a need for a more ecological approach to breastfeeding interventions to ensure implementation because making a decision is one thing, sustaining a decision to breastfeed is another; so maybe implementation is so low because we fail to address broader societal constraints such as community, workplace, and wider cultural contexts.

The mean overall attitude scores at all three-time points for expectant mothers and grandmothers lay in the range of ‘positive exclusive breastfeeding attitudes’. The findings for expectant mothers was expected and consistent with Lauren Zalla’s findings where the mothers expressed interest in exclusive breastfeeding but were unable to put it into practice due to social and cultural barriers.^{18,20} The one-factor within-subject’s ANOVA test showed that there was a statistically significant difference between the related mean attitude scores for expectant mothers. This indicates that although the baseline attitude scores were positive, the education program may still have had a positive impact on exclusive breastfeeding attitudes over time. Although, the present study demonstrated positive attitudes towards exclusive breastfeeding for grandmothers and expectant mothers, the individual item scores indicate room for improvement in breastfeeding education and promotion in Fondwa, Haiti. For example, item 1 scores at baseline for both expectant mothers and grandmothers show neutral attitudes towards the following statement “Breastfeeding within the first 6 months of life should be supplemented with *lok* for the health of my baby”. Traditionally in Haiti, a common practice is to withhold food from the infant until the meconium is passed.¹⁴ As a result, because of people’s belief that the “first milk” (colostrum) is bad, dirty, contaminated, and even poisonous, infants are given *lok* after birth which is a purgative made to replace colostrum and expel the meconium.¹⁴ This purgative is made with

castor oil, sugar and garlic, cinnamon, pork fat, grated nutmeg, and water; none of these ingredients make up the natural antibodies and immunoglobins found in colostrum that help protect the newborn from bacterial and viral infections.¹⁴ Although the practice of giving infants lok after birth has declined in some communities in recent decades, the neutral attitudes towards item 1 reveal that cultural beliefs can dictate attitudes and strategies are needed to tackle cultural beliefs that deter women from practicing exclusive breastfeeding.

In this study, 72% of the expectant mothers were unemployed and 28% were market sellers. Therefore, 72% of the women did not have any pressures to return to the selling market, though they may have had other responsibilities that could cause them to separate from the infants for an extended period of time. This is significant, because Zalla's qualitative study indicated that a major barrier that the women faced when putting EBF into action were pressures to return to the market. In this study, only 1 out of 8 women who were market sellers reported to not commit to EBF at all three time points because of pressures to return to the market where children are not usually taken. The results do not indicate that pressures to return to work is not a barrier, because studies support this, and have shown that when workplace policies and practices promote and support continued breastfeeding this has been associated with longer duration of breastfeeding.^{39,40} In Haiti however if the government were to extend for example, maternal leave this structural change would most likely not have an effect on market sellers in Fondwa so the solution is not simple. Further questions and qualitative studies are needed to assess the perceptions and practices of breastfeeding in the work environment, political-economic hardships, as well as barriers and enabling factors to combining breastfeeding and work in the markets.

4.1 Implications for Policy and Practice

This study has important implications for future interventions and can contribute to the existing body of breastfeeding research in several ways. The results of this study revealed that 50% of expectant mothers stated that grandmothers had the greatest influence on infant feeding decision. However, breastfeeding interventions need to identify the other 50% of influencers and integrate them into breastfeeding education programs while tailoring the programs to the local context.^{34,36,39} The Haitian government also has a major role to play, and although they need to make structural changes they need to understand that not all structural changes have an effect on those who live in rural areas. For example, if the government were to increase maternity leave this would have no effect on the women in this study. However, if the government were to make structural changes to the health system by investing in training health professionals, specifically midwives and community health workers to make it standard procedure to inform patients of EBF benefits this could affect the women in this study.

4.2 Implications for further research

Subsequent research can further the understanding of expectant mothers and grandmother's acceptance and attitudes towards exclusive breastfeeding. Family Health Ministries will continue to tackle the 3 EBF barriers because one is insufficient to achieve a successful EBF program. Currently, FHM is focused on a research study looking at malnourished vs. non-malnourished women and breastmilk quality. It is also critical to investigate the challenges and dilemmas faced by grandmother and health educators in their supportive role to identify other potential barriers to EBF. Additionally, a follow up study using an RCT study design and a two-group pre-test/post-test design to evaluate this formal breastfeeding education

program with a larger and more diverse sample size over a 12-month period might yield more meaningful results.

4.3 Study Strengths and Limitations

The strengths of the present study reside both in the methodology and sample. Firstly, this longitudinal study design enabled change to be analyzed at the micro level over three different points in time and highlighted not only the degree of change but also the direction over time. This study operated within the known limits of the instrumentation (structured questionnaires) employed which captured a wide range of variables. This study involved repeated contact with the participants and had 0 loss to follow up or attrition, which is crucial for making reliable inferences. Secondly, sampling error was reduced as the study remained with the same sample over time and this enables clear recommendations for interventions to be made.

This study is not without limitations. This study has limitations that limit the generalizability of its findings. The sample size was small, especially for grandmother mothers $n=10$ limiting the statistical tests that could be employed due to low power. Thus, this has the potential to limit the conclusions that can be drawn from this study. Additionally, although the IEBA questionnaire was pretested and adapted from reliable and valid instruments, the reliability and validity of the IEBA questionnaire to ensure internal consistency and reliability of instrument scores had not been established. This could pose a possible threat to the measurement process, as well as, social desirability bias.

5. Conclusion

This study provides evidence that grandmothers have the capacity to influence exclusive breastfeeding, and that a formal prenatal breastfeeding education program targeted towards expectant mothers and grandmothers may positively impact exclusive breastfeeding attitudes.

Although the proportion of grandmothers and mothers who accepted exclusive breastfeeding for 6 months increased over time, there was no statistical evidence to support this effect. This finding suggests that targeting grandmothers through breastfeeding promotion programs may be an effective means of increasing exclusive breastfeeding rates, and thus, reducing infant and child mortality in rural Haiti.

Appendix A

Socio-demographic and breastfeeding history form

Title: Socio-demographic and Breastfeeding History form

Version: Expectant Mother

Date of Administration: _____

Identification Number: _____

Pregnancy and Breastfeeding Information

1. Number of Children _____
2. Age of youngest child _____
3. Are you currently breastfeeding? _____
 - A. Yes
 - B. No

If you answered yes to the previous question, and or have breastfed before please answer the following:

4. What did you give the baby before you started breast milk?
 - A. Water
 - B. Nothing
 - C. Tea
 - D. Juice
 - E. Purgative
 - F. other
 - G. milk
5. How will you be feeding your baby when you get your baby home?

- A. With formula
 - B. Breastfeeding
 - C. Tea
 - D. *Labouyi*
 - E. Other, please specify _____
6. Which of all the following people are most important in influencing you to exclusively breastfeed or bottle feed your baby?
- A. Yourself
 - B. Maternal Grandmother
 - C. Aunt
 - D. Best friend
 - E. Your male partner
 - F. Grandfather
 - G. Mother-in-law
 - H. Other, please specify _____

Title: Socio-demographic and breastfeeding history form

Version: Family Member

Date of Administration: _____

Identification Number: _____

1. Age _____
2. Year born _____
3. Gender _____
4. Marital status
 - A. Married
 - B. Single
 - C. Other, please specify _____
5. Occupation
 - A. Housewife
 - B. Seller/market
 - C. Paid Employment, please specify _____
 - D. Unemployed

6. Education

- A. No education
- B. Some Primary Education
- C. Secondary Education
- D. Some University
- E. Graduated University
- F. Technical or professional training, please specify _____

7. What is your relationship to _____ (Identification number)?

8. What should your family member use to feed the baby when the baby comes home?

- A. Formula
- B. Breastmilk
- C. Tea
- D. *Labouyi*
- E. Other, please specify _____

Appendix B

Infant Exclusive Breastfeeding Attitudes Questionnaire

Study: Infant Exclusive Breastfeeding Attitudes Questionnaire

Version: Expectant Mother

Identification Number:

Before you begin please answer the following:

I am committed to exclusively breastfeeding for ____ weeks and/or ____ months

Description

We would like to know more about your attitudes towards exclusive breastfeeding. For each statement below please indicate how much you agree or disagree with each statement. (Circle the number which best reflects your opinion about each item.)

- 1: I strongly disagree
- 2: I disagree somewhat
- 3: I don't know/unsure
- 4: I agree somewhat
- 5: I strongly agree

1. Breastfeeding within the first 6 months of life should be supplemented with *lok* for the health of my baby
1 2 3 4 5
2. Breastfeeding should be supplemented with tea within the first 6 months of life for the health of my baby
1 2 3 4 5
3. Breast milk is the best source of nutrition for the baby
1 2 3 4 5
4. Friends and family do not approve of exclusive breastfeeding for the first 6 months of life
1 2 3 4 5
5. I am comfortable exclusively breastfeeding with my mother or mother-in-law present
1 2 3 4 5

6. Culture(self-defined) does not recommend exclusive breastfeeding for 6 months
1 2 3 4 5
7. Exclusive breastfeeding for 6 months is too long
1 2 3 4 5
8. Managing to keep up with my babies breastfeeding demands for up to 6 months will not be possible
1 2 3 4 5
9. Exclusive breastfeeding for 6 months will make me lose interest in sex
1 2 3 4 5
10. Breast milk is more nutritional than formula
1 2 3 4 5
11. Exclusive breastfeeding brings the mother and child closer together
1 2 3 4 5
12. If the mother feeds the baby breast milk exclusively for 6 months, the father will feel ignored
1 2 3 4 5
13. It is difficult for exclusively breastfeeding mothers to care for family
1 2 3 4 5
14. Breastfeeding has no negative effect on marital relationships
1 2 3 4 5
15. If I were to choose to exclusively breastfeed for 6 months my family would not have a positive attitude regarding my choice
1 2 3 4 5
16. Breastfeeding is a good way to decrease family expenses
1 2 3 4 5
17. If I choose to exclusively breastfeed for 6 months, but my family members do not accept, I will not do so
1 2 3 4 5

Study: Infant Exclusive Breastfeeding Attitudes Questionnaire

Version: Family member

Identification Number:

Before you begin please answer the following:

Would you support your family member if they were to decide to commit to 6 months of exclusive breastfeeding? (yes/no) if so, for how long? _____

Description

We would like to know more about your knowledge and attitudes towards breastfeeding. For each statement below please indicate how much you agree or disagree with each statement. (Circle the number which best reflects your opinion about each item.

- 1: I strongly disagree
- 2: I disagree somewhat
- 3: I don't know/unsure
- 4: I agree somewhat
- 5: I strongly agree

1. Breastfeeding within the first 6 months of life should be supplemented with *lok* for the health of the baby

1 2 3 4 5

2. Breastfeeding should be supplemented with tea within the first 6 months of life for the health of the baby

1 2 3 4 5

3. Breast milk is the best source of nutrition for the baby

1 2 3 4 5

4. Breast milk is more nutritional than formula

1 2 3 4 5

5. Exclusive breastfeeding brings the mother and child closer together

1 2 3 4 5

6. Culture(self-defined) does not recommend exclusive breastfeeding for 6 months

1 2 3 4 5

7. Friends and family generally do not approve of breastfeeding for the first 6 months of life

1 2 3 4 5

8. Breastfeeding for 6 months is too long
1 2 3 4 5
9. Managing to keep up with breastfeeding demands for 6 months will not be possible for my family member
1 2 3 4 5
10. Exclusive breastfeeding for 6 months will make my family member lose interest in sex
1 2 3 4 5
11. If the mother feeds the baby breast milk exclusively for 6 months, the father will feel ignored
1 2 3 4 5
12. It is difficult for breastfeeding mothers to care for family
1 2 3 4 5
13. Breastfeeding has no negative effect on marital relationships
1 2 3 4 5
14. If my family member were to choose to exclusively breastfeed for 6 months, I would have a positive attitude regarding her choice
1 2 3 4 5
15. Breastfeeding is a good way to decrease family expenses
1 2 3 4 5
16. I am comfortable being present as my family member exclusively breastfeeds for 6 months
1 2 3 4 5
17. If my family member decided to exclusively breastfeeds for 6 months, and I do not accept, she should not do so
1 2 3 4 5

References

1. Rollins, Nigel. C. et al. (2016) | Why invest, and what it will take to improve breastfeeding practices? *Lancet* 387 (10017) 491-504
2. United Nations Children's Fund (2015). Breastfeeding report. New York.
3. Coovadia, Hoosen M., et al. "Mother-to-Child Transmission of HIV-1 Infection during Exclusive Breastfeeding in the First 6 Months of Life: An Intervention Cohort Study." *The Lancet*, vol. 369, no. 9567, Mar. 2007, pp. 1107–16, doi:10.1016/S0140-6736(07)60283-9.
4. Black, Robert E., et al. "Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences." *The Lancet*, vol. 371, no. 9608, Jan. 2008, pp. 243–60, doi:10.1016/S0140-6736(07)61690-0.
5. Muchacha, Munyaradzi, and Edmos Mtetwa. "Social and Economic Barriers to Exclusive Breast Feeding In Rural Zimbabwe." *International journal of MCH and AIDS* 3.1 (2015): 16–21. Print.
6. Mølbalk K, Jensen H, Ingholt L, Aaby P. Risk factors for diarrheal disease incidence in early childhood: A community cohort study from Guinea-Bissau. *Am J Epidemiol* 1997;146:273–2.
7. Prell, Christine, and Berthold Koletzko. "Breastfeeding and Complementary Feeding: Recommendations on Infant Nutrition." *Deutsches Ärzteblatt International* 113.25 (2016): 435–444. *PMC*. Web. 31 Jan. 2018.
8. Kakute, P. N., Ngum, J., Mitchell, P., Kroll, K. A., Forgwei, G. W., Ngwang, L. K. and Meyer, D. J. (2005), Cultural Barriers to Exclusive Breastfeeding by Mothers in a Rural Area of Cameroon, Africa. *The Journal of Midwifery & Women's Health*, 50: 324–328. doi:10.1016/j.jmwh.2005.01.005
9. Ingram, J., Cann, K., Peacock, J. and Potter, B. (2008), Exploring the barriers to exclusive breastfeeding in black and minority ethnic groups and young mothers in the UK. *Maternal & Child Nutrition*, 4: 171–180. doi:10.1111/j.1740-8709.2007.00129.x
10. Baranowski T, Bee D, Rassin D, Richardson J, Brown J, Guenther N, Nader P. "Social support, social influence, ethnicity and the breastfeeding decision". *Social Science & Medicine*. (1983): vol 17. No.21, pp. 1599-1611
11. Dornemann, J., & Kelly, A. H. (2012). "It is me who eats, to nourish him": a mixed/ method study of breastfeeding in post/earthquake Haiti. *Maternal and Child*

- Nutrition*, 9, 74–89. <http://doi.org/10.1111/j.1740/8709.2012.00428.x>
12. Alvarez, M. D., & Murray, G. F. (1981). *Socialization for Scarcity: Child Feeding Beliefs and Practices in a Haitian Village*
 13. Farmer, P. (1988). Bad blood, spoiled milk: bodily fluids as moral barometers in rural Haiti. *American Ethnologist*, 15(1), 62–83.
<http://doi.org/10.1525/ae.1988.15.1.02a00050>
 14. VanDerslice J, Popkin B, Briscoe J. Drinking-water quality, sanitation, and breastfeeding: Their interactive effects on infant health. *Bull WHO* 1994;72:589–601.
 15. Jacobs, Lee D, Thomas M Judd, and Zulfiqar A Bhutta. “Addressing the Child and Maternal Mortality Crisis in Haiti through a Central Referral Hospital Providing Countrywide Care.” *The Permanente Journal* 20.2 (2016): 59–70. *PMC*. Web. 2 Feb. 2018.
 16. *DHS Program (2012). The Haitian Demographic and Health Survey Final Reports.*
 17. Cayemittes, M., Busangu, M. F., Bizimana, J. de D., Barrère, B., Sévère, B., Cayemittes, V., & Charles, E. (2013). *Enquête Mortalité, Morbidité et Utilisation des Services, Haïti, 2012*. Calverton, Maryland.
 18. Zalla L. “The Prevalence and Social Determinants of Exclusive Breastfeeding and Implications for Infant Growth in Rural Haiti: A Mixed-Methods Study” (2015)
 19. World Health Organization. (2013). Breastfeeding education for increased breastfeeding duration. Geneva
 20. Kang NM, Choi YJ, Hyun T, Lee JE. Associations of Breastfeeding Knowledge, Attitude and Interest with Breastfeeding Duration: A Cross-sectional Web-based Study. *J Korean Acad Nurs*. 2015 Jun;45(3):449-458.
 21. Persad M, Mensinger J. “Maternal Breastfeeding Attitudes: Association with Breastfeeding Intent and Socio-Demographics Among Urban Primiparas”. *J Community Health*. (2008). 33 (2) 53-60
 22. Kerr R, Dakishoni L, Shumba L, Msachi R, Chirwa M. “We Grandmothers Know Plenty”: Breastfeeding, complementary feeding and the multifaceted role of grandmothers in Malawi. *Social Science & Medicine*. (2008). Vol 66:5, pp. 1095-1105

23. APF. (2015). University of Fondwa: History. Retrieved December, 2017, from <http://ufondwa.org/about/history/>
24. FHM. (2016). Family Health Ministries: About us: Mission. Retrieved December 2017, from <http://familyhealthministries.org/about-us/mission/>
25. Ayoya, Mohamed Ag et al. "Child Malnutrition in Haiti: Progress despite Disasters." *Global Health, Science and Practice* 1.3 (2013): 389–396. *PMC*. Web. 16 Mar. 2018.
26. FHM. (2016). Family Health Ministries: Our Work in Haiti. Retrieved December 2017, from <http://familyhealthministries.org/ourworkinhaiti/>
27. De la Mora A, Russell D, Dungy C, Losch M, Dusdieker L: The Iowa Infant Feeding Attitude Scale: Analysis of reliability and validity. *J Appl Soc Psychol.* 1999, 29: 2362-2380.
28. Scott JA, Shaker I, Reid M: Parental attitudes toward breastfeeding: their association with feeding outcome at hospital discharge. *Birth.* 2004, 31 (2): 125-131. 10.1111/j.0730-7659.2004
29. Sittlington J, Stewart-Knox B, Wright M, Bradbury I, Scott JA: Infant-feeding attitudes of expectant mothers in Northern Ireland. *Health Educ Res.* 2007, 22 (4): 561-570. 10.1093/her/cyl113.
30. Chambers JA, McInnes RJ, Hoddinott P, Alder EM: A systematic review of measures assessing mothers' knowledge, attitudes, confidence and satisfaction towards breastfeeding. *Breastfeed Rev.* 2007, 15 (3): 17-25.
31. Heidkamp, R., Ayoya, M. A., Teta, I. N., Stoltzfus, R. J., and Marhone, J. P. (2015) Breastfeeding practices and child growth outcomes in Haiti: an analysis of data from Demographic and Health Surveys. *Maternal Child Nutrition*, 11: 737–748. doi:
32. Lesorogol C, Bond C, Dulience SJL, Iannotti L. Economic determinants of breastfeeding in Haiti: The effects of poverty, food insecurity, and employment on exclusive breastfeeding in an urban population. *Maternal Child Nutrition.* 2017; e12524.
33. Dungy CI, McInnes RJ, Tappin DM, Wallis AB, Opreescu F. Infant feeding attitudes and knowledge among socioeconomically disadvantaged women in Glasgow. *Matern Child Health J*, 2008; 12:313-22

34. Hurley KM, Black MM, Papas MA, Quigg AM. Variation in breastfeeding behaviours, perceptions, and experiences by race/ethnicity among a low-income statewide sample of special supplemental nutrition program for women, infants and children (WIC) participants in the United States. *Matern Child Nutr*, 2008; 4:95-105.
35. Persad MD, Mensinger JL. Maternal breastfeeding attitudes: association with breastfeeding intent and sociodemographics among urban primiparas. *J Community Health*, 2008; 33:53-60.
36. Negin, Joel, et al. "The Influence of Grandmothers on Breastfeeding Rates: A Systematic Review." *BMC Pregnancy and Childbirth*, vol. 16, no. 1, Apr. 2016, p. 91, doi:10.1186/s12884-016-0880-5.
37. Chen TL, Tai CJ, Chu YR, Han KC, Lin KC, Chien LY. Cultural factors and social support related to breastfeeding among immigrant mothers in Taipei City, Taiwan. *J Hum Lact*. 2011;27(1):41–8. [View ArticlePubMedGoogle Scholar](#)
38. Dashti M, Scott JA, Edwards CA, Al-Sughayer M. Predictors of breastfeeding duration among women in Kuwait: results of a prospective cohort study. *Nutrients*. 2014;6(2):711–28. [View ArticlePubMedPubMed CentralGoogle Scholar](#)
39. Duong DV, Binns CW, Lee AH. Breast-feeding initiation and exclusive breast-feeding in rural Vietnam. *Public Health Nutr*. 2004;7(6):795–9. [View ArticlePubMedGoogle Scholar](#)
40. Duong DV, Binns CW, Lee AH. Introduction of complementary food to infants within the first six months postpartum in rural Vietnam. *Acta Paediatr*. 2005;94(12):1714–20. [View ArticlePubMedGoogle Scholar](#)
41. Victora, Cesar G. et al. (2016) Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect, *Lancet* 387(10017): 475-490
42. World Health Organization. (2017). *Babies and mothers worldwide failed by lack of investment in breastfeeding*. Geneva.
43. Tiedje, Linda Beth et al. (2002) An ecological approach to breastfeeding. *MCN* 27(3): 154-161