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Discontinuation of Exclusive Breastfeeding in Ghana: A Longitudinal, One-Group Observational Study of Postnatal Mothers With Children 0–6 Months old

John Kuumuori Ganle, PhD[1,2] and Vanessa-Marie Bedwei-Majdoub, MD[1]

Abstract

Background: Although exclusive breastfeeding of infants has several benefits, in Ghana only 52% of children under 6 months old are breastfed exclusively. However, researchers have not conducted longitudinal observational studies to examine exclusive breastfeeding discontinuation and determine risk factors.

Research aims: (1) To determine exclusive breastfeeding discontinuation, and (2) to examine those factors linked to discontinued exclusive breastfeeding.

Methods: A longitudinal, one-group observational study was conducted. A total of 322 mothers who had normal and full-term delivery at a district level referral hospital from January to December 2017 were recruited, followed-up every month, and subsequently interviewed after 6 months postpartum. Data were collected using validated questionnaires. Binary and multivariable Poisson regression analyses were the statistical analytical methods used.

Results: Respondents' mean age was 29.78 years ($SD = 5.20$). Among the 322 mothers who initiated breastfeeding with human milk at birth, 108 (34%) discontinued exclusive breastfeeding before 6 months postpartum. After controlling for possible covariates, attending antenatal care 4 or less times during pregnancy ($aRR = 6.54$; 95% *CI* [1.77–24.22]; $p = .005$); lack of support from family to breastfeed exclusively ($aRR = 2.41$; 95% *CI* [1.23–4.71]; $p = .010$), outside pressure to provide other food to the baby < 6 months postpartum ($aRR = 1.87$; 95% *CI* [1.01–3.46]; $p = .045$), and living in an urban area ($aRR = 2.10$; 95% *CI* [1.17-3.75]; $p = .013$) significantly increased the risks of discontinuing exclusive breastfeeding.

Conclusion: Universal exclusive breastfeeding may not be achieved without tackling the key determinants of discontinuation of exclusive breastfeeding. Health facility and community-based exclusive breastfeeding promotion interventions are therefore needed.

Keywords

breastfeeding, exclusive breastfeeding, Kangaroo Mother Care, postnatal, social support

Background

Before age 2 children's dietary quality is very important, as appropriate nutrition could enhance their physical and mental foundations (Victora et al., 2016). Initiating breastfeeding within an hour of birth, exclusively breastfeeding during the first 6 months after birth, as well as breastfeeding until the age of 2 or more, are all important optimum Infant and Young Child Feeding (IYCF) practices (Victora et al., 2016). Breastfeeding means that an infant is fed human milk and other feeds (solid or semi-solid), including non-human milk and formula milk (World Health Organization [WHO], 2017). Exclusive breastfeeding therefore implies feeding infants, from birth until 6 months postpartum, only human milk (not even water), albeit oral rehydration solution, vitamin syrups, and minerals, as well as medicines, are acceptable (WHO & UNICEF, 2018).

In low-income countries, exclusive breastfeeding has the potential to avert over 800,000 deaths annually among children under 5 years (Victora et al., 2016), and non-exclusive breastfeeding is estimated to cause 1.4 million deaths in the same age group (Black et al., 2016). Indeed,

[1]Department of Population, Family and Reproductive Health, School of Public Health, University of Ghana, Legon, Accra, Ghana
[2]Stellenbosch Institute for Advanced Study (STIAS), Wellenberg Research Centre at Stellenbosch University, Stellenbosch 7600, South Africa

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Corresponding Author:
John Kuumuori Ganle, Department of Population, Family and Reproductive Health, School of Public Health, University of Ghana, P. O. Box LG 13, Legon, Accra, Ghana.
Email: jganle@ug.edu.gh

exclusively breastfed infants have a lowered risk to infections, including gastroenteritis and pneumonia (WHO & UNICEF, 2018). They are also 14 times more likely to remain alive than their non-exclusively breastfed counterparts (WHO & UNICEF, 2018). Exclusive breastfeeding may also protect infants against diarrhea by decreasing the risk of certain bacteria present in contaminated formula, other liquids, and complementary foods during the first 6 months of life, and through the conveyance of maternal antibodies present in human milk (Lenja, Demissie, Yohannes, & Yohannis, 2016). Additionally, exclusive breastfeeding may protect infants from obesity and diabetes in later life, and it may also reduce the likelihood that mothers will contract certain types of cancers (Victora et al., 2016). Mothers who exclusively breastfeed are less prone to postpartum depression and osteoporosis, and often bond better with their babies (Katsinde & Srinivas, 2016).

Indeed, breastfeeding in general, and exclusive breastfeeding with human milk in particular, have been recognized internationally as vital to attaining the child health-related Sustainable Development Goals (SDGs; WHO, 2017). Despite this recognition, worldwide, only 41% of infants under 6 months of age are exclusively breastfed (WHO & UNICEF, 2018). This proportion is far lower than the SDG's global exclusive breastfeeding target of 70% by 2030 (WHO & UNICEF, 2018). In Ghana, the most recent Demographic and Health Survey report showed that over 98% of infants are breastfed (Ghana Statistical Service [GSS], Ghana Health Service [GHS], and ICF International, 2015). However, only 52% of infants under 6 months were breastfed exclusively. The report also indicated that the proportion of children aged 0–5 months who are breastfed exclusively in Ghana has decreased from 63% in 2008 to 52% in 2014 (GSS et al., 2015). The average duration of exclusive breastfeeding for all children was 3.9 months, and this was slightly less than the 4.4 months reported in 2008.

Previous studies offer a host of factors to explain why exclusive breastfeeding may be discontinued before 6 months postpartum. The most important predictors of ceasing exclusive breastfeeding in Kinshasa were the confidence of the mother to breastfeed and whether or not her aim was to exclusively breastfeed (Babakazo, Donnen, Akilimali, Ali, & Okitolonda, 2015). The major barriers to exclusive breastfeeding in Ghana were mothers' perception of human milk alone being unable to meet their infants' nutritional requirements, shorter periods of maternity leave, and sociocultural pressures to give the child water and other foods (Ayawine & Ae-Ngibise, 2015; Diji et al., 2016). Other reasons for discontinuing exclusive breastfeeding were physicians' counseling and recommendations, exposure to advertisements about alternative infant feeding practices, and the production of inadequate human milk supply (either self-perceived or true; Thet et al., 2016).

Key messages

- Prospective cohort studies that involve following mothers from birth to 6 months postpartum to estimate rates of discontinuation of exclusive breastfeeding and determine risk factors are currently lacking in many low income settings.
- Making four or fewer antenatal care visits during pregnancy, not receiving support from family to breastfeed exclusively, feeling pressured to give baby other feed $<$ 6 months postpartum, and living in an urban area, significantly increase the risk of discontinuing exclusive breastfeeding.
- Key determinants for the discontinuation of exclusive breastfeeding need to be addressed using integrated interventions, including community-based breastfeeding education and promotion programs that address misconceptions and sociocultural barriers to exclusive breastfeeding, as well as promote active involvement of husbands/partners and mothers-in-law.

In low-income settings, a number of researchers have examined the barriers to exclusive breastfeeding or breastfeeding in general (Thet et al., 2016; Kavle, LaCroix, Dau, & Engmann, 2017; Khatun et al., 2018). In Ghana, too, a number of researchers have explored awareness and knowledge about exclusive breastfeeding as well as the factors that influence exclusive breastfeeding (Ayawine & Ae-Ngibise, 2015; Diji et al., 2016; Dun-dery & Laar, 2016). These researchers have provided important insights into awareness, knowledge, and perceptions about exclusive breastfeeding as well as the risk factors for exclusive breastfeeding in Ghana. Nevertheless, many of these previous studies are cross-sectional in design and often take a retrospective approach. This makes it harder to determine the exact timing of initiation and discontinuation of exclusive breastfeeding, due to recall bias—an important limitation in such retrospective cross-sectional studies (Kavle et al., 2017; Khatum et al., 2018). Furthermore, previous researchers have largely neglected the determinants of discontinuation of exclusive breastfeeding. While "discontinuation of exclusive breastfeeding" is not conceptually different from "barriers to exclusive breastfeeding," a focus on discontinuation allows for the identification of specific risk factors that predispose women to stop exclusive breastfeeding. Also, due to sociocultural differences, the factors identified elsewhere may or may not be the same in our study context (Babakazo et al., & Okitolonda, 2015). Without a clear understanding of contextually-relevant risk factors, it may be difficult to implement appropriate interventions to support exclusive breastfeeding in different international contexts. The aims of this study were to (1)

determine exclusive breastfeeding discontinuation, and (2) examine those factors related to discontinued exclusive breastfeeding in a local district of Ghana.

Methods

Design

A longitudinal, one-group observational study was conducted. This design was chosen because previous researchers in Ghana have used retrospective cross-sectional study designs (see, for example, Ayawine & Ae-Ngibise, 2015; Diji et al., 2016; Dun-dery & Laar, 2016). A major limitation of these previous designs was the difficulty in determining the exact timing of initiation and discontinuation of exclusive breastfeeding (Kavle et al., 2017; Khatum et al., 2018). This difficulty arose mainly from participants' recall bias (Kavle et al., 2017; Khatum et al., 2018). To address this limitation in existing research in Ghana, we used a longitudinal, one-group observational study design, in which mothers were recruited at the birth of their child and followed-up every month to document the exact timing of initiation and discontinuation of exclusive breastfeeding.

The Ghana Health Service Ethical Review Committee gave ethical approval for this study (GHS-ERC Number: GHS-ERC 02/01/2017).

Setting

Empirical data were collected in Shai-Osudoku District, one of the administrative districts in the Greater Accra region of Ghana. The District has an estimated population of 59,658 (Shai-Osudoku District Health Directorate, 2017). Christianity and Islam are the most dominant religions. The majority of the population lives in rural communities where agriculture (subsistent farming and fishing) is the main livelihood source. The district is one of the poorest in the region.

The district shares similar sociocultural organizational characteristics to other parts of Ghana. Generally, patrilineal descent and clan ideologies inform the sociocultural organization of people in the district: property rights and succession to traditional positions are based largely on paternal ties. The extended family system remains a common practice, and most married couples live together, often in an extended family house or compound. Generally, men play important roles as heads of their households, custodians of their lineage, and bread winners. They also control land and other economic resources. Women are generally the primary caregivers within the domestic set-up, albeit decisions about family planning, child feeding, child spacing, and family size are often made by husbands and mothers-in-law. In general, perceptions about women are still negative and most of the communities follow strict gender role differentiation. Women take care of children in addition to performing more household chores than men. The combined effect of this situation is that the majority of women have a lower socioeconomic status than their male counterparts.

In terms of health, the district's infant mortality rate in 2017 was 4.2 per 1000 live births (Shai-Osudoku District Health Directorate [DHD], 2017). The top five outpatient department morbidities in 2017 were malaria, upper respiratory tract infection, anaemia, diarrheal diseases, and rheumatism/other joint pains. The district has several health centers and clinics, which provide primary healthcare services including uncomplicated child birth services. In addition, several functional community-based health planning and services (CHPS) zones offer basic primary healthcare and other child welfare services on a regular, but not 24 hr, basis. These CHPS zones are also occasionally used to deliver outreach healthcare services in the community, including vaccination and child welfare services.

The Shai-Osudoku District Hospital is the main referral health facility in the district, where 24 hr comprehensive maternal and child healthcare services are provided (Shai-Osudoku DHD, 2017). A child welfare clinic is held on every weekday for mothers with children aged between 2 weeks and 2 years. At these clinics, parents receive breastfeeding information, including education about exclusive breastfeeding as well as information about general child health (Shai-Osudoku DHD, 2017). Complementary and supplementary feeding education and counseling is also provided during these clinic sessions (Shai-Osudoku DHD, 2017).

Sample

Mothers aged 15–49 years old who had normal and full-term delivery at the Shai-Osudoku District Hospital during the period January–December 2017 were recruited, followed-up every month via telephone and home visits in a few cases, to document initiation and discontinuation of exclusive breastfeeding. We excluded mothers with the following characteristics: twin births; preterm birth or complications requiring neonatal intensive care admission; infants with cleft lip, palate, or any other medical condition that could hinder suckling; and mothers who had medical or obstetric related conditions requiring admission after delivery, including mastitis, active tuberculosis, or breast abscess. Mothers who did not initiate breastfeeding with human milk for no apparent reason(s) were also excluded. Also, HIV-positive mothers (eight cases) were excluded as our initial engagement with midwives suggested that such mothers were often advised not to breastfeed because of the possibility of transmitting the virus to the infant via human milk.

A total of 375 women gave birth at the Shai-Osudoku District Hospital between January and December, 2017. After screening the 375 mothers, 48 mothers had characteristics that fit our exclusion criteria. Five mothers who met the inclusion criteria declined to participate. A total of 322 mothers who had initiated breastfeeding with human milk

at birth were therefore included in the study. Based on a recent systematic review of 48 studies, which examined barriers to exclusive breastfeeding in developing countries (Kavle et al., 2017), and other recent studies from Ghana (see Diji et al., 2016; Dun-dery & Laar, 2016), we believe our sample size is adequate for statistical associations to be meaningfully examined.

Mothers were conveniently sampled: They were first identified at the maternity unit of the Shai-Osudoku District Hospital immediately after giving birth. Two research assistants were trained and stationed at the maternity unit. Between January 1 and December 31, 2017, the research assistants visited the maternity unit every day. Working in collaboration with the principal midwife, mothers who had normal and full-term delivery and were discharged were approached by the research assistants. They were individually told about the purpose of the study, and the study procedures. Those who could read (in English) were immediately provided with information leaflets about the study. The research assistants took the names and contact details of the mothers they approached. Each mother was given 2 weeks to decide on participation. We re-contacted each mother via telephone or personal visit after the 2-week period. Those who agreed to participate were enrolled in the study and subsequently followed-up every month via telephone, and home visits in some cases. The main purpose of the follow-ups was to document the exact timing of exclusive breastfeeding initiation and discontinuation. After 6 months postpartum, each mother was re-contacted and tentative individual interview dates were arranged.

Measurements

Data were collected using structured questionnaires. The questionnaires were prepared using validated breastfeeding and infant feeding related questions from the 2014 Ghana Demographic Health Survey questionnaire. Other questions were extracted from the Food and Agriculture Organization's (2004) manual for assessing nutrition-related knowledge, attitudes, and practices. The questionnaires were, however, pre-tested on 20 mothers with children aged 0–6 months at Agomeda Health Centre, a public health facility located in the same district. All necessary corrections were made before the questionnaires were used to document background characteristics, breastfeeding practices, and the determinants for the discontinuation of exclusive breastfeeding. We tested the reliability of the questionnaire and realized a Cronbach's alpha coefficient of 0.89. This level of reliability or internal consistency of our data collection tool is considered in literature to be good (Tavakol & Dennick, 2011).

Regarding the measurements of variables, "Discontinuation of Exclusive Breastfeeding" was our main outcome variable, which we operationalized as the introduction of any solid or liquid meal/drink apart from human milk (excluding oral rehydration salt, vitamins syrups, minerals, and medicines) before 6 months postpartum for mothers who initiated breastfeeding at birth. This was measured as a dichotomous outcome, and coded as "1" if exclusively breastfeeding and "2" if exclusive breastfeeding had been discontinued. A number of other variables were also defined and measured as follows:

(a) Age in completed years of participants was measured as a continuous variable. For easy comparison, ages were reclassified into four categories: 18–24 years as 1, 25–29 as 2, 30–34 years as 3, and 35–39 years as 4.
(b) Participants' highest educational status was defined as the highest formal education a participant had attained. It was measured and coded into four categories as follows: 1 if none or primary education, 2 if junior high school, 3 if senior high school, and 4 if tertiary. Participants' husband's/partner's educational status were similarly measured.
(c) Participants' marital status was measured as married, single, divorced, separated, cohabiting and widowed. For ease of comparison however, we recoded this variable as 1 if single (comprising single, divorced, separated, and widowed), and 2 if married (comprising married and cohabiting).
(d) Religion was measured and coded as 1 if Christianity, 2 if Islam, 3 if traditional religion (i.e., religious and spiritual worship of smaller gods and ancestral spirits), and 4 if other religion, including Hinduism, Buddhism, and Syncretism.
(e) Area of residence: This was used as an indicator for accessibility to healthcare services and a marker of social change, and was measured and coded as a dichotomous variable: 1 if rural, and 2 if urban.
(f) Participants' employment status: This was measured as a dichotomous variable, and coded as 1 if the participant was employed in the informal sector (i.e., self-employment or temporary employment in informal economic and social activities that either earns a daily wage or other in-kind benefits, without social security benefits), and 2 if the participant was in formal employment (i.e., employment in the public, private, or non-profit sectors that earns a monthly wage with social security benefits).
(g) Parity: This was defined by how many children each woman had given birth to. It was measured and coded as 1 if the participant had one child, 2 if the participant had two children, 3 if the participant had three children, 4 if the participant had four children, and 5 if the participant had more than four children.
(h) Number of antenatal care (ANC) visits. This was defined as the number of visits the woman made to health facilities to receive ANC during her most recent pregnancy before the survey. It was coded 1

if the participant had had less than four visits, and 2 if the participant had had four or more visits.

(i) Place of delivery: This was measured as a dichotomous variable, and coded as 1 if the participant delivered at home, and 2 if the participant delivered in a health facility.

(j) Exposure to media advertisement on formula milk: This was measured as a dichotomous variable and coded as 1 if the participant had seen or heard media advertisements on formula milk at least once after delivery, and 2 if the participant did not see or hear any.

(k) Support from family to exclusively breastfeed: This was measured as a dichotomous variable and coded as 1 if the participant received any family support including encouragement from spouses and mothers-in-law to exclusively breastfeed, and 2 if no support was received.

(l) Pressure to give the baby other feed: This was defined as a participant receiving pressure from peers and family members or being encouraged to give the baby other feed apart from human milk less than 6 months into the postpartum period. It was measured as a dichotomous variable and coded as 1 if the participant felt pressured, and 2 if the participant felt no pressure.

(m) Counseling/education received about exclusive breastfeeding during ANC: This was measured as a dichotomous variable and coded as 1 if the participant received any form of counseling/education from healthcare providers, and 2 if the participant did not receive any counseling/education.

Data collection

The data were collected between January, 2017 and May, 2018. Before their interview, each participant gave an informed written (signed or thumb printed) consent. Each participant was informed in a language she understood that participation was entirely voluntary and that they could withdraw their participation at any time.

All participants were interviewed just after 6 months postpartum. Actual data collection occurred alongside recruitment. This process continued until the last participant was interviewed around mid-May, 2018. Interviews were conducted at different places, including the homes of mothers, market centers, and child welfare clinics. The two research assistants conducted all interviews under the supervision of the second author. The questionnaires were designed in English but participants were interviewed in English and three other local dialects (Ga-Dangme, Ewe, and Twi). Participants who could read and write in English were given the questionnaires to read, record their responses by themselves, and return the completed questionnaire to the research assistants. For participants who only spoke English but could not read or write in English, the research assistants read out the questions and recorded participants' responses in English. For all non-English speaking participants, the research assistants translated and asked the questions in Ga-Dangme, Ewe, or Twi depending on the dialect the participant spoke. Responses were then recorded on the questionnaires in English.

Confidentiality was maintained by interviewing participants in private spaces where no third-party persons could hear the conversation. Also, confidentiality was ensured by using unique study identification numbers for each of the participants. All the study records were stored with restricted access.

Data Analysis

Completed questionnaires were manually assessed and coded, and then independently entered in Epi info Version 7 by the two research assistants. The authors then independently compared the two data entries. Data completeness and accuracy were ensured by running and comparing frequencies on each variable from the two data sets. All errors were discussed and rectified, and a single database was created and agreed upon before the data were exported into Stata (Version 15.0; StataCorp, 2015) for further cleaning and analysis.

To achieve the study's first aim (i.e., to examine exclusive breastfeeding discontinuation), descriptive statistical methods including frequencies and proportions were used. To achieve the second aim (i.e., to examine those factors associated with discontinued exclusive breastfeeding), a bivariate analysis was first done using a chi-square test of independence to examine the relationship between discontinuation of exclusive breastfeeding and categorical variables. Binary and multivariable Poisson regression analyses with robust standard error tests were then used to estimate Relative Risk Ratios for discontinuation of exclusive breastfeeding. The confidence level was set at 95% and $p < .05$ was taken as demonstrating statistical significance.

Results

Background Characteristics of Respondents

Table 1 shows selected background information of the 322 participants. The age range was 18–39, and mean age was 29.78 ($SD = 5.20$).

Study Aim 1: Determining Discontinuation of Breastfeeding

This study's first aim was to determine exclusive breastfeeding discontinuation among the 322 participants who initiated breastfeeding with human milk after delivery. Results show that 108(34%) participants discontinued

Table 1. Socio-Demographic Characteristics of Respondents ($N = 322$).

Characteristics	*n* (%)
Age (years)	
18–24	56 (17.39)
25–29	95 (29.50)
30–34	106 (32.91)
35–39	65 (20.18)
Mother's education	
None/primary	51 (15.83)
Junior high school	137 (42.54)
Senior high school	55 (17.08)
Tertiary	79 (24.53)
Marital status	
Married	264 (81.99)
Single	58 (18.01)
Employment status	
Employed in informal sector	284 (88.20)
Employed in formal sector	38 (11.80)
Religion	
Traditional	18 (5.73)
Christianity	133 (41.26)
Islam	120 (37.26)
Others	51 (15.76)
Partner's education	
None/primary	21 (6.43)
Junior high school	96 (29.78)
Senior high school	93 (28.92)
Tertiary	89 (27.50)
Area of residence	
Rural	160 (49.68)
Urban	162 (50.32)

Note. Twenty-four (7.37%) participants had information missing about their partner's educational status. Formal employment = employment in the public, private-for-profit, and private-not-for-profit sectors that earns a monthly wage with social security benefits. Informal employment = self-employment or temporary employment in informal economic and social activities that either earns a daily wage or other in-kind benefits, without social security benefits. Traditional religion = religious and spiritual worship of smaller gods and ancestral spirits. Other religions include Hinduism, Buddhism, and Syncretism.

exclusive breastfeeding before 6 months. Age in months before exclusive breastfeeding discontinuation is represented in Figure 1. The mean age at which exclusive breastfeeding was discontinued was 3.6 ($SD = 1.27$) months.

Study Aim 2: Examining Factors Related to Discontinued Exclusive Breastfeeding

This study's second aim was to examine those factors that are related with discontinued exclusive breastfeeding. To do this, we first conducted chi-square tests of independence to determine associations between a total of 26 socio-demographic, maternal, health facility, home/family, and work-related factors and the discontinuation of exclusive breastfeeding. From this initial analysis, 11 factors were statistically associated with the discontinuation of exclusive breastfeeding. These factors were further examined using binary and multivariable Poisson regression models with robust standard error analysis to determine factors that significantly predicted the discontinuation of exclusive breastfeeding after accounting for potential confounders. Table 2 contains the results. After accounting for potential covariates, making 4 or less ANC visits during pregnancy (aRR = 6.54; 95% *CI* [1.77–24.22]; $p = .005$); not having had support from family to breastfeed exclusively ($aRR = 2.41$; 95% *CI* [1.23–4.71]; $p = .010$), feeling pressured to give the baby other feed < 6 months postpartum ($aRR = 1.87$; 95% *CI* [1.01–3.46]; $p = .045$), and living in an urban area ($aRR = 2.10$; 95% *CI* [1.17–3.75]; $p = .013$) significantly increased the relative risks of discontinuing exclusive breastfeeding before 6 months postpartum. While the risk of discontinuation of exclusive breastfeeding appeared to decrease with an increase in age, the risk increased with increases in maternal education, albeit neither relationship was statistically significant.

Discussion

This study is one of the few to have used a longitudinal, one-group observational study design to examine the discontinuation of exclusive breastfeeding and associated determinants in Ghana. Several aspects of the results deserve further reflection. To begin, the rate of discontinuation of exclusive breastfeeding before 6 months postpartum is similar to other recent studies from Africa. For example, in the Democratic Republic of Congo, all 422 (100%) mothers initiated breastfeeding at birth but discontinuation before 6 months postpartum was 413 (97.2%; Babakazo et al., 2015). The discontinuation rate in this study is, however, lower than rates found in other recent studies in Ghana (Diji et al., 2016; Dun-dery & Laar, 2016). Together with previous research in Ghana and elsewhere, our results indicate that the WHO's recommendations for exclusive breastfeeding during the first 6 months after birth are not being realized in many contexts.

ANC attendance emerged as one of the strongest predictors for the discontinuation of exclusive breasting. This is consistent with recent findings from northwest Ethiopia (Tariku et al., 2017). While the number of ANC visits may not always lead to the practice of exclusive breastfeeding, limited ANC attendance could affect breastfeeding in several ways. For instance, limited ANC attendance means that many of the interventions and services routinely provided to pregnant women at the ANC clinic could be delayed or completely missed (Ganle et al., 2019). In particular, education and counseling given on exclusive breastfeeding during ANC visits could be missed if mothers had limited contact with healthcare providers. This is likely to be the case because previous studies showed that advice, education, and counseling about exclusive breastfeeding during ANC visits significantly

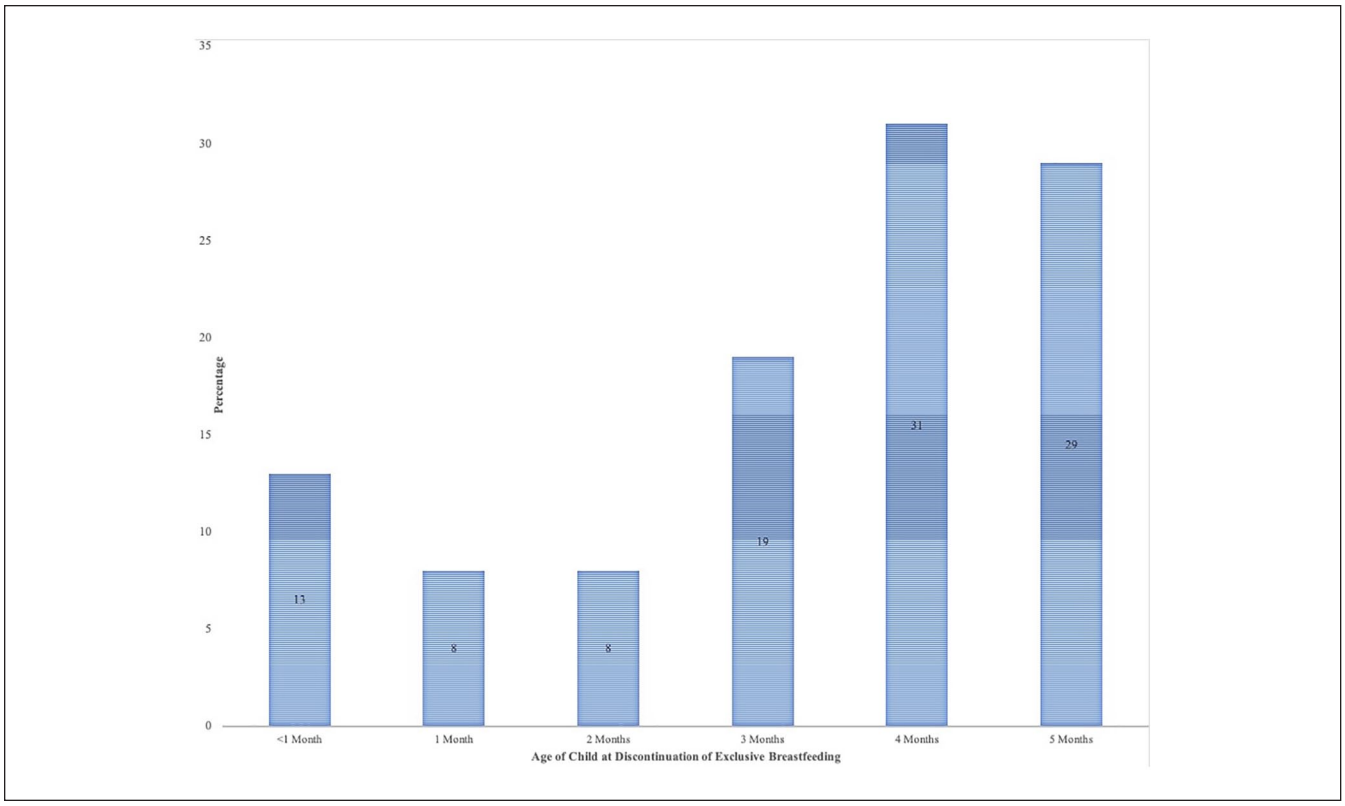

Figure 1. Age of child at discontinuation of exclusive breastfeeding among mothers who initiated breastfeeding at birth ($N = 108$).

improved breastfeeding (Shifraw, Worku, & Berhane, 2015). Similarly, mothers who received counseling about infant feeding were 2 times more likely to exclusively breastfeed compared to those who did not (Arage & Gedamu, 2016).

While more research is required in different contexts to fully understand the relationship between ANC attendance and exclusive breastfeeding, the results from our study indicate that encouraging mothers to have regular contact with the healthcare system during pregnancy may have positive benefits for exclusive breastfeeding. This is yet another good reason to support the implementation of the recent WHO's (2016) guidelines recommending eight ANC visits—an increase from the four contacts previously recommended. We acknowledge that increasing the number of ANC contacts may come with practical challenges, such as the need for additional financial and human resources. Similarly, health education and counseling about exclusive breastfeeding may not automatically lead to the desired behavior change. However, we think more ANC visits may help with mothers having a positive pregnancy experience. It may also provide an avenue for proper counseling to be carried out, especially in the presence of a spouse or other family members, and this could ensure that mothers exclusively breastfeed until 6 months postpartum.

Lack of family support to breastfeed exclusively, and pressure to give the baby other feed $<$ 6 months postpartum were two interrelated factors that significantly increased the relative risk of discontinuing exclusive breastfeeding. These findings are consistent with findings in other studies that showed that mothers who experienced lack of partner or family support had higher odds of stopping exclusive breastfeeding before the recommended 6 months postpartum (Ogbo et al., 2016). This suggests a need for health facility and community-level interventions in our study context to be targeted at educating not just mothers but also husbands/partners, and family members, especially mothers-in law, about the relevance of early initiation and continued exclusive breastfeeding for at least 6 months. In this connection, there is a need to address misconceptions and sociocultural barriers in our study context, including perceptions that babies may not be satisfied only on human milk or cultural practices that require giving water and other liquids or solid feeds to babies before 6 months postpartum.

Not surprisingly, mothers from urban areas had more than twice the risk of discontinuing exclusive breastfeeding compared to those from rural areas. While the quantitative nature of our study did not permit further exploration of this result, several mechanisms may work to explain this difference. Compared to rural areas, urban settings in Ghana and elsewhere are environments likely to be characterized by reduced extended family support, tight work schedules, and exposure to alternative infant feeding practices. These factors could easily lead to the discontinuation of exclusive breastfeeding. Also, mothers with better education and who are in paid

Table 2. Predictors of Discontinuity of Exclusive Breastfeeding (Multivariable Poisson Regression Analysis) ($N = 322$).

Characteristics	Discontinuity of Exclusive Breastfeeding: No *n* (%)	Yes *n* (%)	uRR [95% CI]	*p*-value	aRR [95% CI]	*p*-value
Age (years)						
18–24	33 (58.93)	23 (41.07)	ref		ref	
25–29	61 (64.21)	34 (35.79)	0.98 [0.76–1.74]	.515	0.95 [0.65–3.82]	.319
30–34	70 (66.04)	36 (33.96)	0.95 [0.65–1.39]	.786	0.89 [0.93–3.63]	.081
35–39	50 (76.92)	15 (23.08)	0.64 [0.38–1.08]	.098	0.86 [0.40–1.86]	.706
Education (maternal)						
None/primary	41(80.39)	10 (19.61)	ref		ref	
Junior high school	80 (58.39)	57 (41.61)	1.55 [0.81–2.97]	.186	1.45 [0.67–5.63]	.219
Senior high school	38 (69.09)	17 (30.91)	1.58 [0.80–3.12]	.191	1.52 [0.10–3.73]	.599
Tertiary	55 (69.62)	24 (30.38)	2.12 [1.18–3.83]	.013	3.53 [0.99–12.56]	.052
Marital status						
Married	188 (71.21)	76 (28.79)	ref		ref	
Single	22 (37.94)	36 (62.06)	2.52 [1.39–3.70]	.001	1.90 [0.79–4.56]	.152
Employment status						
Employed in informal sector	207 (72.89)	77 (27.11)	ref		ref	
Employed in formal sector	7 (18.18)	31 (81.82)	6.66 [0.82–54.21]	.076	1.94 [0.92–4.07]	.080
Seen or heard media advertisement on formula milk at least once after delivery						
No	145 (68.40)	67 (31.60)	ref		ref	
Yes	69 (63.30)	41 (36.70)	1.16 [0.85–1.59]	.355	1.14 [0.38–1.45]	.380
Number of antenatal care visits						
> 4	204 (69.63)	89 (30.37)	ref		ref	
4	10 (34.48)	19 (65.52)	7.24 [1.77–24.22]	.000	6.54 [1.77–24.22]	.005
Place of delivery						
Home	12 (54.55)	10 (45.45)	ref		ref	
Health facility	202 (67.33)	98 (32.67)	0.72 [0.44–1.17]	.183	0.77 [0.34–1.72]	.520
Mode of delivery						
Spontaneous vaginal delivery	135 (63.98)	76 (36.02)	ref		ref	
Caesarean section	79 (71.17)	32 (28.83)	0.80 [0.57–1.13]	.204	0.62 [0.26–1.48]	.282
Had support from family to breastfeed exclusively						
Yes	174 (73.11)	64 (26.89)	ref		ref	
No	40 (47.62)	44 (52.38)	2.55 [1.45–2.61]	.000	2.41 [1.23–4.71]	.010
Felt pressured to give baby other feed $<$ 6 months postpartum						
No	152 (71.03)	62 (28.97)	ref		ref	
Yes	62 (57.41)	46 (42.59)	2.68 [1.50–3.92]	.003	1.87 [1.01–3.46]	.045
Area of residence						
Rural	137 (85.62)	23 (14.38)	ref		ref	
Urban	77 (47.53)	85 (50.47)	2.95 [1.33–4.69]	.000	2.10 [1.17–3.75]	.013

Note. uRR = unadjusted Relative Risk; aRR = adjusted Relative Risk; Ref = reference category.

formal-sector employment are likely to be residing in urban areas. Although educational attainment and employment status did not statistically predict discontinuation in this study, the relative risk of discontinuation tended to be higher for urban mothers and those employed in the formal sector. The discussion here would suggest targeting mothers in urban environments in our study context with supportive systems including long work break periods, extended paid maternity leave, and the creation of nurseries within workplace settings to facilitate continued breastfeeding. Also, other successful interventions that have been implemented in similar urban contexts including the Ten Steps to Successful Breastfeeding, and the combined individual and group counseling approach (Ward, Williamson, Burke, Crawford-Hemphill, & Thompson, 2017) should be considered. Indeed, future research in Ghana could use experimental and quasi-experimental research designs to test whether implementation of the Ten Steps to Successful Breastfeeding or the Combined Individual and Group Counselling Approach, does increase the rate of exclusive breastfeeding in urban contexts.

Taken together, our findings have national and international policy and intervention delivery relevance. At the national level, the findings suggest a need for Ghana's Ministry of Health, Ghana's Health Service, and other stakeholders in Ghana's health sector, including United Nations Children's Fund (UNICEF) and United Nations Population Fund (UNFPA), to focus on addressing not only individual level factors like awareness and knowledge gaps in relation to exclusive breastfeeding, but also other health facility and community-level factors that increase the risk of discontinuing exclusive breastfeeding. Apart from interventions to promote more contact with healthcare providers during pregnancy, efforts to engage husbands/partners and mothers-in-law to increase support for exclusive breastfeeding are critical. Community-based breastfeeding promotion programs must remain a priority in our study context, with a continued emphasis on the exclusiveness and extended duration of breastfeeding. Educational interventions to address misconceptions and sociocultural barriers to exclusive breastfeeding in our study context are also essential.

Our results suggest that achieving the international exclusive breastfeeding target of 70% by 2030, as envisaged under the Sustainable Development Goals, may not be feasible without targeted interventions to improve exclusive breastfeeding in low-income settings like Ghana.

Limitations

This study has some limitations. Only structured questionnaires were used to collect the data. This did not permit further exploration and understanding of the mechanisms behind key predictors of the outcome. This suggests that qualitative studies might be considered in the future to complement findings from the present study. Recall bias may have been introduced as some information about breastfeeding was sought from the participants 6 months into the postpartum. Also, there was no sample size calculation, hence the results need to be interpreted with that in mind. Finally, although participants were generally told at the time they were recruited that the purpose of the study was to understand how they practice breastfeeding as well as the challenges they face, it is possible that this knowledge could have affected some participants' decision to practice exclusive breastfeeding.

Conclusion

This study provides further insights into the population level risk factors for the discontinuation of exclusive breastfeeding in a local district in Ghana. The results and discussion indicate that universal exclusive breastfeeding may not be sustainably achieved without tackling the key determinants for the discontinuation of exclusive breastfeeding identified in this study and elsewhere.

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ORCID iD

John Kuumuori Ganle https://orcid.org/0000-0002-8382-3437

Supplemental Material

Supplementary Material may be found in the "Supplemental material" tab in the online version of this article.

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