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RESEARCH ARTICLE



Pathways linking social support, self-efficacy, and exclusive breastfeeding among women in northern Uganda

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ABSTRACT

Despite improvements in infant feeding practices over the past two decades, the prevalence of exclusive breastfeeding (EBF) is below global targets. Social support can create an enabling environment for recommended infant feeding practices such as EBF, but the types of social support most important for sustained EBF and their potential mechanisms of action have not been thoroughly characterized. We therefore aimed to assess the relationship between EBF-specific social support, EBF self-efficacy, and EBF at 1 and 3 months among postpartum women in northern Uganda. Women ($n = 238$, 36.2% living with HIV) were recruited during pregnancy. EBF, social support, and EBF self-efficacy were assessed at 1 and 3 months postpartum. Path analysis was used to assess relationships between these factors. Most mothers exclusively breastfed to 1 (80.8%) and 3 months postpartum (62.9%). EBF-specific, but not general, social support differed by EBF status. EBF-specific social support was associated with higher odds of EBF, which was almost fully mediated by EBF self-efficacy. That is, there was evidence that social support primarily influences EBF through its association with self-efficacy. In sum, EBF-specific social support and self-efficacy likely promote EBF and are modifiable factors that can be intervened upon.

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Caregiver resources;
exclusive breastfeeding; HIV;
self-efficacy; social support

Introduction

Optimal breastfeeding practices – initiation of breastfeeding within the first hour of birth, exclusive breastfeeding (EBF) for the first six months after delivery, and continued breastfeeding for at least two years – could save an estimated 823,000 lives each year and provide multiple short- and long-term health benefits for mothers and children (Victora et al., 2016). But only 42% of children aged

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0–5 months globally are exclusively breastfed. In many countries, EBF remains low despite high rates of any breastfeeding. For example, 98% of mothers in Uganda initiate breastfeeding, but by 4–5 months of age, only 43% of infants are exclusively breastfed (Uganda Bureau of Statistics & ICF, 2018). Factors that contribute to the early introduction of foods and liquids other than breastmilk include perceptions that breastmilk does not provide adequate nutrition as infants age, lack of support for EBF from family members, workplaces that are not supportive of breastfeeding, limited counseling from health workers, and social norms that promote non-exclusive breastfeeding (Ickes et al., 2017; Rujumba et al., 2020; Wataka et al., 2021).

Adequate caregiver resources are critical for providing optimal infant feeding and care, including EBF (Engle et al., 1999; Ickes et al., 2018; Matare et al., 2020; Surkan et al., 2007). Resources and capabilities for caregiving include physical and mental health, knowledge and education, autonomy, and adequate time (Engle et al., 1999; Matare et al., 2015). Given that infant feeding occurs within a ‘network of social relationships’ (Schaefer et al., 1981), social support – the receipt or perceived availability of resources and interpersonal relationships that can influence an individual’s ability to practice a behavior or cope with a problem (Heaney & Israel, 2008; Tay et al., 2013; Uchino, 2004) – is an additional resource for EBF. Categories of social support include emotional support (e.g. trust, caring, understanding), informational support (e.g. advice, suggestions), and instrumental support (e.g. aid, goods, services, physical support) (Heaney & Israel, 2008).

Evidence, primarily from high-income countries, demonstrates that greater peer and professional social support can reduce barriers to EBF (Kassianos et al., 2019; Meedya et al., 2010; Raj & Plichta, 1998). But in a systematic review examining psychosocial correlates of EBF, only one study reported a positive association between social support and EBF duration (Jager et al., 2013). It has been suggested that null associations are related to how each study measured social support, as breastfeeding support is theorized to be distinct from general social support (Semenic et al., 2008). That is, the impacts of social support on infant and young child feeding practices may vary by the types of support offered.

Few quantitative studies have examined the relationship between social support and infant feeding in low- and middle-income countries. A study in Nigeria found that support from female family members was associated with an average 1.08-month increase in EBF duration, but husband’s support was not associated with EBF (Olayemi et al., 2009). A study in South Africa found that women living with HIV who practiced EBF reported higher HIV-specific social support (Remmert et al., 2020) and another reported a positive association between social support at 6 months and EBF (Roux et al., 2014). In contrast, relationships between social support and EBF were not observed in studies conducted in Nicaragua (Ziaei et al., 2015), Vietnam (Tuan et al., 2014), Bangladesh, Ethiopia (Basnet et al., 2021), or Zimbabwe (Matare et al., 2020). These seemingly divergent findings may be due to differences in the way social support is conceptualized and measured.

Breastfeeding self-efficacy – the belief in one’s ability to initiate and continue breastfeeding (Dennis, 2003; Dennis & Faux, 1999) – is another critical caregiver resource associated with EBF initiation and duration (Meedya et al., 2010; Tuthill et al., 2016) (Figure 1). Yet few studies have examined breastfeeding self-efficacy in the context of sub-Saharan Africa. To date, breastfeeding self-efficacy has been found to be associated with EBF in studies conducted in the Democratic Republic of Congo (Babakazo et al., 2015), Ethiopia (Minas & Ganga-Limando, 2016), and South Africa (Tuthill et al., 2017), but not Kenya (Tuthill et al., 2020) or a study measuring mothering self-efficacy in Zimbabwe (Matare et al., 2020). Although social support and self-efficacy are plausibly interconnected – social cognitive theory suggests that individuals receiving greater tangible and emotional support are likely to feel more empowered (Bandura, 1989) – none of these studies, to our knowledge, examined both factors concurrently.

EBF-specific measures of social support and self-efficacy are needed to better understand determinants of infant feeding in communities with high rates of *any*, but not *exclusive*, breastfeeding. In such settings, individuals may believe that non-breastmilk foods and liquids are needed to meet the nutritional needs of infants younger than 6 months. Given that members of women’s social

Caregiver resources and capabilities

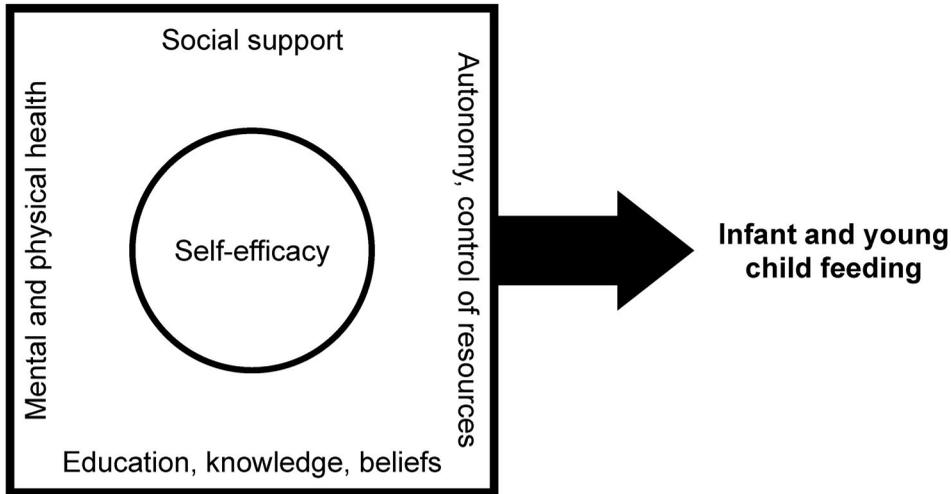


Figure 1. Conceptual framework demonstrating that caregiver resources and capabilities, including social support and self-efficacy, underpin infant and young child feeding practices. Adapted from (Matare et al., 2015).

networks are likely to support local normative beliefs and practices, women with high general social support in such contexts may be supported to practice non-exclusive breastfeeding. Similarly, high self-efficacy for any breastfeeding is not necessarily equivalent to high EBF self-efficacy. To address this need, we examined relationships between EBF-specific social support, EBF-specific self-efficacy, and odds of EBF at 1 and 3 months in northern Uganda.

Methods

Study design & participants

Data are from the Prenatal Nutrition and Psychosocial Health Outcomes Study (PreNAPS, NCT02922829) and Postnatal Nutrition and Psychosocial Health Outcomes Study (PostNAPS, NCT02925429) set at Gulu Regional Referral Hospital, Uganda. Gulu is in northern Uganda, which experienced a 20-year period of armed conflict that ended in 2006. The sociopolitical unrest resulted in an influx of internally displaced people and contributed to high levels of poverty and HIV infection (Westerhaus et al., 2011). The purpose of these studies was to explore relationships between nutritional status, psychosocial characteristics, food insecurity, and HIV status among mothers and their infants. These studies have been described in detail elsewhere (Familiar et al., 2018; Lane et al., 2020; Natamba et al., 2015, 2017; Widen et al., 2017). Briefly, pregnant women were recruited from the antenatal clinic at Gulu Regional Referral Hospital in Uganda, which provides antenatal care and HIV prevention of mother-to-child transmission services free of charge.

Eligibility criteria for enrollment included 10–26 weeks gestation (based on last menstrual period), known HIV status, and living within 30 km of the hospital. Study participants were sampled to achieve a 1:2 ratio of individuals living with and without HIV. Women who delivered a live singleton infant were eligible to enroll in the postpartum continuation study. Participants were followed from pregnancy to 12 months postpartum, with postpartum visits at 1 week and 1, 3, 6, 9, and 12 months. The 6-month survey was conducted when complementary foods should be introduced and EBF is no longer recommended. As such, we were unable to reliably calculate EBF to 6 months and therefore restrict our analyses to data from 1 and 3 months postpartum.

Data collection

Primary outcome: Exclusive breastfeeding

Infant feeding practices were assessed at all postpartum visits. Dietary recalls assessed any foods or liquids given to infants in the previous 24 h (WHO IYCF indicators), as well as whether index infants had ever received non-breastmilk foods or liquids (study questionnaires included as Supplementary Note 1). Infants were classified as exclusively breastfed if they had never received any foods or liquids other than breast milk or medicines prescribed by a health care provider.

Primary exposures

To measure EBF-specific social support, we used the 16-item Exclusive Breastfeeding Specific Social Support Scale, which asks respondents whether they received adequate support for various tasks (e.g. preparing meals) or circumstances (e.g. made to feel good when sad or depressed) in the prior month. The tool was developed and validated for use in this population and contains instrumental, emotional, and informational subdomains (Boateng et al., 2018). The three sub-domains were used independently and a hierarchical factor created from the three domains was assessed as unidimensional and used to depict an overarching score for EBF social support. Participants were also asked to list up to two people within their social network who approved of EBF, two who helped the most with EBF, two who did not approve of EBF, and the most helpful support for EBF they received. Additionally, participants were asked about any advice received from the baby's father about infant feeding, if they met with other women in their community to discuss infant feeding, or if they experienced problems from people in their community for exclusively breastfeeding.

The 9-item Breastfeeding Self-Efficacy Scale to Measure Exclusive Breastfeeding, which is adapted from the Breastfeeding Self-Efficacy-Short Form (Dennis & Faux, 1999) and validated for use in this population (Boateng et al., 2019), asks individuals their confidence in their ability to complete different tasks (e.g. can tell when infant is finished breastfeeding). The scale has cognitive and functional subdomains (Boateng et al., 2019). A hierarchical factor was developed from the two domains and found to be unidimensional. As such, we used the composite score of these 9 items to represent total breastfeeding self-efficacy. We assessed perceived breast milk sufficiency by asking participants if they considered their milk to be 'enough' or 'not enough' for feeding their infant.

Other covariates

Sociodemographic characteristics including age (continuous), marital status (married or not), number of children (continuous), highest level of education completed (categorical), urban/rural residence (binary), and household assets were collected at enrollment. Principal components analysis was used to derive a continuous household asset index based on self-report of household assets similar to the Ugandan National Panel Survey 2009/2010 (Uganda Bureau of Statistics, 2010); higher scores denote greater wealth. Food insecurity in the prior month was assessed using the Individual Food Insecurity Access Scale, which was developed and validated in this cohort (Natamba et al., 2015). Possible scores range from 0 to 27, with higher scores denoting greater food insecurity.

General functional social support was assessed using a 10-item questionnaire (range: 0–20) based on the Duke-UNC Functional Social Support Questionnaire (Broadhead et al., 1988), which has been used to measure perceived social support in East Africa (Antelman et al., 2001). Depressive symptomatology in the prior month was measured using the Center for Epidemiological Studies Depression Scale-20 (range: 0–60), which was validated for use in this setting (Natamba et al., 2014). Experiences with physical and sexual violence were assessed through two questions: 'In the last year, has anyone in your household pinched, hit, slapped, kicked, shaken, punched, or done anything else to hurt you physically or sexually?' and 'In the last year has anyone else

you know hit, slapped, kicked, shaken, punched or done anything else to hurt you physically or sexually?’

Statistical methods

Descriptive statistics (chi-square, *t*-tests) were used to identify differences in maternal characteristics by EBF behavior at 1 and 3 months postpartum. Pearson correlation with a test of significance was used to assess the association between general social support and EBF-specific social support.

We first explored the relationship between EBF and both the exposure and potential mediator of interest (EBF social support and EBF self-efficacy, respectively) at 1 and 3 months using logistic regression. If there was evidence of an association, we then used path analysis to assess mediation. Given that there can be a causal chain relating an exposure and outcome in the absence of an association, we also used tests of joint significance to assess the potential mediating role of EBF self-efficacy (Fairchild & McDaniel, 2017). Proposed pathways were developed *a priori* based on current theoretical and empirical evidence: EBF social support was hypothesized to have a direct effect on EBF and an indirect effect through its relationship with EBF self-efficacy. Linear regressions were used to model EBF self-efficacy and logistic regression models were used for the other pathways. All models adjusted for confounders identified using a directed acyclic graph developed based on prior theoretical and empirical literature about social support and breastfeeding (Supplementary Figure 1). We report the unstandardized coefficients for each path. The Karlson–Holm–Breen method was used to decompose across discrete and continuous variables to estimate the proportion of the association between EBF social support and EBF that was explained by EBF self-efficacy (Kohler et al., 2011). Analyses were completed using Stata 17.0 (StataCorp, College Station, TX, USA).

Ethical approvals

The Institutional Review Boards at Cornell University (Protocol ID #1302003634) and Gulu University (Reference Number: GU/IRC/02/02/13) approved study procedures for PreNAPS and PostNAPS. Weill Cornell Medical College also approved study procedures for PostNAPS. Permission to carry out the study in Uganda was granted by the Ugandan National Council for Science and Technology (HS1261).

Results

Cohort characteristics

A majority of mothers exclusively breastfed to 1 and 3 months postpartum (80.8% and 62.9%, respectively). A greater proportion of mothers who exclusively breastfed were living with HIV compared to mothers who did not exclusively breastfeed (e.g. 36.3% vs. 21.7% at 1 month postpartum) (Table 1). Food insecurity, depressive symptomatology, and general social support did not differ by breastfeeding behavior, although the prevalence of reported domestic violence was, on average, more than 10 percentage points higher among women who did not exclusively breastfeed. Further, a greater proportion of mothers who exclusively breastfed perceived their breast milk to be of sufficient quantity and quality to meet infant needs compared to those who did not (84.5% vs. 65.2% at 1 month, 83.2% vs. 66.7% at 3 months).

Direct associations

General social support at 1 month was weakly associated with total EBF-specific social support at 1 ($r = 0.30$) and 3 months postpartum ($r = 0.26$). The types of EBF-specific social support associated

Table 1. Maternal and household characteristics at one (n = 239) and three months postpartum (n = 237) among a cohort of women of mixed HIV status in northern Uganda, by EBF.

	Exclusively breastfed until 1 month (n = 193)	Did not exclusively breastfeed until 1 month (n = 46)	Exclusively breastfed until 3 months (n = 149)	Did not exclusively breastfeed until 3 months (n = 88)
Demographics				
Age, mean (sd)	25.1 (5.2)	26.0 (5.7)	25.4 (5.3)	25.1 (5.4)
Married, %	86.5	87.0	87.4	80.0
More than primary education, %	42.5	52.2	41.6	53.4
Residence, %				
Rural	19.7	23.9	20.1	20.5
Urban	80.3	76.1	79.9	79.6
Wealth, %				
Low	33.7	37.0	34.2	31.8
Moderate	36.3	28.3	36.2	31.8
High	30.1	34.8	29.5	36.4
Dependency ratio, mean (sd)	0.6 (0.2)	0.6 (0.2)	0.6 (0.2)	0.6 (0.2)
Health characteristics				
Primigravid, %	20.7	30.4	18.1	31.8
Living with HIV, %	36.3	21.7	36.9	28.4
Maternal BMI, mean (sd)	22.6 (2.6)	23.4 (2.9)	22.6 (3.0)	23.0 (2.9)
IFIAS (0–27), mean (sd)	6.4 (5.0)	7.0 (5.2)	7.0 (5.1)	6.7 (4.9)
CES-D score (0–60), mean (sd)	18.3 (10.6)	19.3 (12.0)	19.0 (11.0)	18.8 (10.9)
General social environment				
Experienced domestic violence, %	28.0	47.8	26.2	40.9
General social support (0–20), mean (sd)	9.1 (4.1)	9.1 (4.8)	–	–
Breastfeeding support and behaviors				
Meet with other women to discuss breastfeeding, %	12.6	23.9	24.2	9.1
Experience problems from community if EBF, %	7.9	15.2	13.5	10.2
Total EBF social support (0–32), mean (sd)	9.6 (6.5)	8.6 (6.3)	13.1 (7.0)	10.3 (6.6)
Emotional EBF social support (0–16), mean (sd)	5.4 (3.7)	4.3 (3.4)	7.9 (3.9)	6.0 (3.5)
Informational EBF social support (0–10), mean (sd)	2.4 (2.3)	2.3 (2.3)	3.3 (2.9)	2.3 (2.6)
Instrumental EBF social support (0–6), mean (sd)	1.7 (1.7)	1.9 (1.8)	2.0 (1.7)	2.0 (1.8)
EBF self-efficacy (0–36), mean (sd)	22.6 (6.9)	17.6 (7.3)	24.6 (5.9)	18.1 (7.3)
Perceived breast milk sufficiency, %	84.5	65.2	83.2	66.7

EBF = exclusive breastfeeding; BMI = body mass index; IFIAS = Individual Food Insecurity Access Scale; CES-D = Center for Epidemiologic Studies Depression Scale.

with EBF behavior differed across time (Table 2). At 1 month, only greater emotional EBF-specific social support was associated with higher odds of exclusively breastfeeding (OR: 1.09; 95% CI: 0.99, 1.08). At 3 months, both emotional (OR: 1.15; 95% CI: 1.06, 1.23) and informational EBF-specific social support (OR: 1.14; 95% CI: 1.03, 1.26) were associated with higher odds of exclusively breastfeeding. Greater EBF self-efficacy was positively associated with EBF at both 1 and 3 months postpartum.

Table 2. Direct associations between EBF social support, self-efficacy, and EBF to one (n = 239) and three months postpartum (n = 237) among a cohort of women of mixed HIV status in northern Uganda.[†]

	EBF to one month			EBF to three months		
	OR	95% CI	p	OR	95% CI	p
EBF social support (0–32)	1.03	0.97, 1.09	0.294	1.07	1.03, 1.12	0.002
Emotional EBF social support (0–16)	1.09	0.99, 1.21	0.074	1.16	1.07, 1.25	<0.001
Informational EBF social support (0–10)	1.03	0.89, 1.20	0.679	1.16	1.04, 1.30	0.009
Instrumental EBF social support (0–6)	0.93	0.75, 1.16	0.524	0.98	0.84, 1.16	0.844
EBF self-efficacy (0–36)	1.09	1.04, 1.14	<0.001	1.16	1.10, 1.21	<0.001

EBF = exclusive breastfeeding.

[†]Models adjust for a minimally sufficient set of confounders identified using a directed acyclic graph: maternal HIV status, general social support, marital status, primigravida, and household wealth (Supplementary Figure 1).

Mediation

All forms of EBF-specific social support were associated with EBF self-efficacy at 1 and 3 months (Table 3). Magnitudes of association within types of EBF-specific social support were similar across time points, although emotional EBF-specific social support had the strongest association with self-efficacy in standardized models. For instance, a one-standard deviation increase in EBF-specific social support was associated with a 0.45-standard deviation increase in EBF self-efficacy at 1 month postpartum, compared with a 0.23-standard deviation increase for instrumental EBF-specific social support.

The mediating role of EBF self-efficacy was evidenced by the generalized linear models (Table 3) and tests of joint significance (Supplementary Tables 1 and 2). The direct associations between all forms of EBF-specific social support and EBF were almost entirely explained by the mediating

Table 3. Path analysis demonstrating the relationships between EBF social support and EBF behavior, both directly and as mediated through EBF self-efficacy, among a cohort of women of mixed HIV status in northern Uganda.[†]

		One month postpartum (n = 237)			Three months postpartum (n = 237)		
		Coefficient [‡]	95% CI	p	Coefficient	95% CI	p
Total	Total EBF social support (0–32) → EBF self-efficacy (0–36)	0.50	0.37, 0.64	<0.001	0.48	0.36, 0.61	<0.001
	Total EBF social support (0–32) → EBF	0.98	0.91, 1.04	0.462	1.01	0.95, 1.06	0.820
	EBF self-efficacy (0–36) → EBF	1.10	1.04, 1.16	<0.001	1.15	1.09, 1.22	<0.001
Emotional	Emotional EBF social support (0–16) → EBF self-efficacy (0–36)	0.88	0.65, 1.11	<0.001	0.79	0.57, 1.00	<0.001
	Emotional EBF social support (0–16) → EBF	1.01	0.90, 1.13	0.885	1.05	0.96, 1.15	0.256
	EBF self-efficacy (0–36) → EBF	1.09	1.03, 1.15	0.001	1.14	1.09, 1.20	<0.001
Informational	Informational EBF social support (0–10) → EBF self-efficacy (0–36)	1.10	0.72, 1.48	<0.001	1.17	0.87, 1.47	<0.001
	Informational EBF social support (0–10) → EBF	0.91	0.77, 1.08	0.275	0.98	0.87, 1.12	0.816
	EBF self-efficacy (0–36) → EBF	1.10	1.05, 1.16	<0.001	1.16	1.10, 1.22	<0.001
Instrumental	Instrumental EBF social support (0–6) → EBF self-efficacy (0–36)	0.97	0.39, 1.55	0.001	0.56	0.03, 1.10	0.038
	Instrumental EBF social support (0–6) → EBF	0.84	0.67, 1.06	0.142	0.89	0.74, 1.07	0.225
	EBF self-efficacy (0–36) → EBF	1.10	1.05, 1.15	<0.001	1.16	1.11, 1.22	<0.001

EBF = exclusive breastfeeding.

[†]Models adjust for a minimally sufficient set of confounders identified using a directed acyclic graph: maternal HIV status, general social support, marital status, primigravida, and household wealth.[‡]Beta coefficients reported for EBF self-efficacy as an outcome and odds ratios for EBF as an outcome.

pathway with EBF self-efficacy. For example, when not adjusting for EBF self-efficacy, each point increase in emotional EBF-specific social support was associated with 1.09 times the odds (95% CI: 0.99, 1.21) of exclusively breastfeeding until 3 months (Table 2). In the mediation analysis, greater emotional EBF-specific social support was associated with greater self-efficacy (B: 0.88; 95% CI: 0.65, 1.11), which in turn was associated with higher odds of exclusively breastfeeding to one month (OR: 1.09; 95% CI: 1.03, 1.15) (Table 3). The mediating pathway accounted for 90.0% of the association between emotional EBF-specific social support and EBF to 1 month, such that there did not appear to be substantial residual association between emotional EBF-specific social support and EBF.

Sources and types of social support

Across time points, the most reported sources of EBF support were male partners and infants' grandmothers. Sources of EBF support at 1 month were similar between mothers who did and did not exclusively breastfeed. A greater proportion of individuals who were exclusively breastfeeding at 3 months, however, received EBF support from male partners (48.3% vs. 37.2%), grandmothers (43.0% vs. 31.4%), and other female relatives (18.1% vs. 10.3%) (Figure 2). At both 1 and 3 months, a greater proportion of individuals who did not exclusively breastfeed reported that grandmothers disapproved of EBF compared to mothers who did exclusively breastfeed at those times (21.7% vs. 17.2% at 1 month, 22.7% vs. 15.4% at 3 months). Instrumental support, such as providing food, was the most common type of support offered at 1 and 3 months postpartum. A greater proportion of individuals who did not exclusively breastfeed up to 1 month received assistance with childcare compared to those who did exclusively breastfeed (18.9% vs. 1.8%). Among those who received assistance with childcare, 90% were working at 1 month. At 3 months, 32.9% of women who were not exclusively breastfeeding reported receiving no breastfeeding support, compared to 19% of women who were exclusively breastfeeding. Notably, almost one-third (31.2%) of participants reported no support for EBF at 1 month regardless of EBF status.

Discussion

We explored associations between EBF-specific social support, EBF self-efficacy, and EBF at 1 and 3 months among postpartum mothers in northern Uganda using path analysis. At least 90% of the

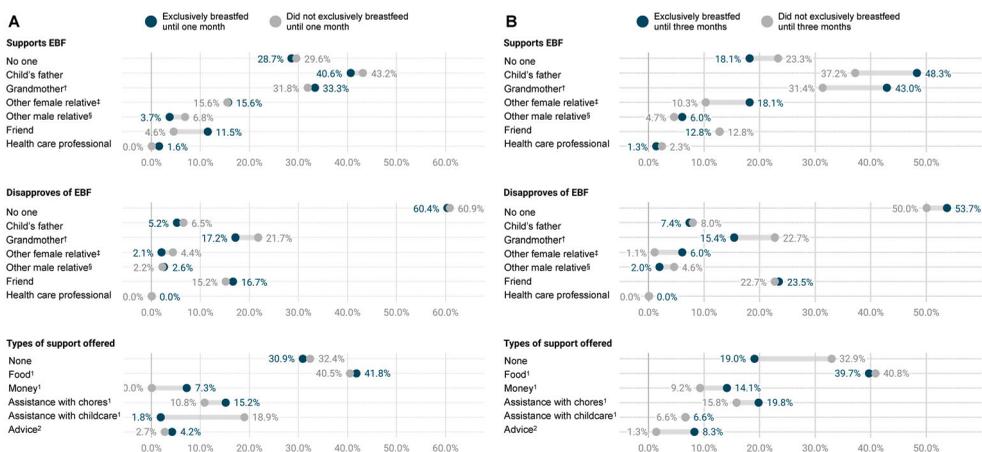


Figure 2. Sources and types of EBF support among mothers in northern Uganda at (A) one month and (B) three months. Notes: EBF = exclusive breastfeeding. †Includes mother, mother-in-law, aunt, and grandmother. ‡E.g. sister-in-law and niece. §E.g. brother-in-law and nephew. ¶Instrumental support. ²Informational support.

positive association between EBF-specific social support and odds of EBF was explained by the mediating role of EBF self-efficacy at each time point. All forms of EBF social support (i.e. emotional, informational, instrumental) were associated with greater EBF-specific self-efficacy.

Self-efficacy is a critical component of many health behavior change theories and the relationship between breastfeeding self-efficacy and breastfeeding practices is well established (Brockway et al., 2017). Prior work has concluded that encouragement from others can lead to the development of increased self-efficacy (Dennis & Faux, 1999; Jager et al., 2013). Our analysis supports this finding: EBF-specific social support, and emotional EBF-specific social support in particular, contributes to EBF-specific self-efficacy, which is associated with higher odds of EBF. Our findings are consistent with studies in other contexts outside of sub-Saharan Africa, which have reported a positive relationship between social support and breastfeeding self-efficacy (Jager et al., 2013; Mercan & Selcuk, 2021). Levels and sources of social support (e.g. partner, infant's grandmother) have been positively associated with breastfeeding self-efficacy in studies conducted in Vietnam (Ngo et al., 2019), Iran (Maleki-Saghooni et al., 2019), and Turkey (Cinar et al., 2015; Mercan & Selcuk, 2021).

In our analysis, EBF-specific, but not general, social support was associated with EBF. This is consistent with other research finding no association between general social support and optimal breastfeeding practices (Ickes et al., 2018; Matare et al., 2020). In a context where breastfeeding is common, like Uganda, measures of *exclusive* breastfeeding-specific social support and self-efficacy appear to be more useful for predicting infant feeding practices. Given that most studies have used measures of general social support, the lack of specificity may explain the inconsistent relationships previously reported between social support and EBF (Jager et al., 2013).

More women who reported receiving support for childcare at 1 month did not exclusively breastfeed. This may reflect women working outside of the home, which can limit women's time to breastfeed on-demand or control how their infants are fed. Engaging in paid work impacts women's time availability, which is another critical resource for caregiving (Engle et al., 1999). Limited time availability and engaging in work has been associated with sub-optimal breastfeeding practices in a study in Uganda (Nankumbi & Muliira, 2015) and globally (Oddo & Ickes, 2018). Ultimately, while employment outside the home has meaningful benefits (e.g. greater income generation), it can also undermine EBF without adequate support or protections for caregivers (Ickes et al., 2018). Health care workers can counsel mothers on strategies to manage work and EBF, and employers can create spaces and policies that support EBF.

Identifying determinants of EBF is necessary for intervention design (Tuthill et al., 2014). The results from this analysis suggest that interventions should seek to increase EBF-specific social support and EBF self-efficacy. Interventions that begin in pregnancy and continue postpartum are the most effective and can be tailored to meet the changing needs of mothers (Dennis & Dowswell, 2013). Further, multilevel, multicomponent interventions that include interpersonal counseling and mass media can improve psychosocial factors, including breastfeeding self-efficacy and social norms that support EBF (Nguyen et al., 2016). Additionally, given that family members influence breastfeeding practices (Theodorah & Mc'Deline, 2021), engaging family members can increase EBF-specific social support (Raj & Plichta, 1998) and improve EBF (Martin et al., 2020; Young et al., 2020).

Strengths of this research include the use of EBF-specific measures of social support and self-efficacy that were validated for use in this population (Boateng et al., 2018, 2019) as well as concurrent assessment of HIV status. One limitation, though, is the lack of longitudinal data for all covariates. For instance, while general social support is not likely to change over short periods of time, we did not measure it at 3 months, such that we may have missed meaningful associations with this exposure and EBF at later time points. Additionally, our sample was limited to women who sought antenatal care from a health facility. Although health services are free of charge, individuals with less social support may have been under-sampled if they were unable to find transport to the hospital or lacked other resources necessary for seeking care. Further, it is also possible that women in the study received humanitarian aid, including food aid or other support (e.g. education,

breastfeeding promotion.), that we did not collect data on. Our estimates may therefore be biased due to residual confounding given that receipt of humanitarian aid may influence both the exposure and outcome of interest.

In conclusion, EBF-specific social support was positively associated with EBF at 1 and 3 months among women in northern Uganda, and this relationship was mediated by EBF-specific self-efficacy. This illustrates the importance of specificity when examining the relationships between EBF and social support or self-efficacy. Furthermore, these findings suggest that social support and self-efficacy are resources for caregiving that should be the target of social and behavioral interventions. When combined with other strategies to create an enabling environment for optimal infant feeding, interventions that seek to enhance social support and self-efficacy are likely to improve EBF. Future studies should measure EBF-specific social support and EBF-specific self-efficacy to understand the pathways by which interventions and policies impact infant feeding practices.

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