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Maternal and Child Health Journal (2020) 24:127–134
https://doi.org/10.1007/s10995-019-02848-8

BRIEF REPORTS

Breastfeeding Practices Among Women Living with HIV in KwaZulu-Natal, South Africa: An Observational Study

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Published online: 12 December 2019
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Abstract

Introduction Exclusive breastfeeding (EBF) is the safest infant feeding option in resource-limited settings, though women living with HIV have the lowest rates of EBF. Barriers to EBF in the absences of a formal intervention in women living with HIV in KwaZulu-Natal, where the prevalence of HIV among pregnant women is among the highest in the world, are understudied. Thus, this study sought to describe barriers to EBF and examine differences in social support, disclosure status, mood, and HIV-related stigma among women with different feeding methods.

Methods Women living with HIV enrolled in preventing mother-to-child transmission treatment ($n = 156$) were interviewed postpartum ($M = 13.1$ weeks) at a district hospital and self-reported infant feeding method, reasons not breastfeeding (if applicable), and HIV disclosure status. Mood, HIV-related stigma, functional social support, and HIV-related social support were also assessed.

Results No participants reported mixed feeding, 30% reported EBF, and 70% reported exclusive formula feeding. Commonly reported reasons for not breastfeeding included fear of HIV transmission to the infant and being away from the infant for extended periods of time. Social support ($p = 0.02$) and HIV-related social support ($p < 0.01$) were significantly higher in women who had attempted breastfeeding compared to women who never attempted breastfeeding.

Discussion Rates of EBF in this sample are lower than in other recent studies, suggesting this sample experiences multiple barriers to EBF. Healthcare providers should seek to correct misconceptions regarding HIV transmission and breastfeeding practices. Social and logistical support for EBF may be important considerations for future interventions.

Keywords Breastfeeding · South Africa · HIV-positive · Infant feeding method

Significance

What is already known on this subject? Exclusive breastfeeding is important to maternal and infant health among women living with HIV and HIV-exposed infants. Adherence is low for such health behaviors in this population, and potential barriers are widespread.

What this study adds? Fear of HIV transmission and being away from the infant for extended periods of time were identified as the primary reasons for not initiating EBF. Both general and HIV-related social support were higher in women who had attempted breastfeeding. Social support and logistical aid may be key targets for future interventions.

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Introduction

With an HIV prevalence of 14%, South Africa has the highest number of individuals living with HIV globally (South African National AIDS Council 2017). Women in the province of KwaZulu-Natal are among the most affected by HIV, with pregnant women bearing a particularly high burden. Approximately 30% of pregnant women in KwaZulu-Natal are living with HIV, and in some districts this rate is as high as 46% (South Africa National Department of Health 2013). With the advent of highly active antiretroviral therapy (HAART), rates of mother-to-child transmission of HIV in sub-Saharan Africa are low (between 1.4 and 5.9%, with an average of 3.5%) (Goga et al. 2012). However, efforts to prevent vertical transmission do not end after birth; the mother must ensure access to antiretroviral prophylaxis for her baby, test the infant for HIV, and adhere to breastfeeding guidelines (World Health Organization 2016).

In South Africa and other resource-limited settings, the World Health Organization (WHO) recommends exclusive breastfeeding (EBF) regardless of HIV status until 6 months old (Office E 2011; WHO 2016). Infants who are never breastfed (i.e., formula fed since birth), or who are mixed fed (i.e., formula and breastfed) have a sevenfold greater risk of death compared to infants who are EBF as a result of diarrhea, pneumonia, malnutrition, and infections due to either unreliable water sources and/or not receiving protective antibodies from breastfeeding (Cournil et al. 2013). With respect to HIV, the rate of transmission at least doubles with mixed feeding as compared to EBF (Kuhn et al. 2007). There is also a large body of evidence supporting the benefits of breastfeeding to both mother and infant, including lower risk of infant medical issues (e.g., gastrointestinal, respiratory), lower risk of sudden infant death syndrome, increased mother/infant attachment, potential increases in cognitive development, and lower risk of postpartum depression (Binns et al. 2016).

Despite the multitude of benefits of EBF, uptake of recommendations is not universal. A recent large observational study of 4172 mothers or caregivers of 14 week-old infants in KwaZulu-Natal indicated lower than optimal rates of EBF (Horwood et al. 2018). Slightly more than half of women living with HIV were practicing EBF (54.5%) at 14 weeks, at similar rates to women not living with HIV (51.0%). However, when compared to women not living with HIV, women living with HIV were less likely to ever attempt breastfeeding, suggesting that this population has unique barriers to EBF initiation (Horwood et al. 2018). Key barriers noted in the literature to date include social support, disclosure of HIV status, and HIV-related stigma. Women describe experiencing pressure from their mothers or grandmothers to engage in formula or mixed feeding and similarly report that older generations are the primary decision-makers for one's own infant feeding method (Tuthill et al. 2014). As recently as 2010, the WHO promoted formula feeding as the safest option for women living with HIV, which may contribute to continued misunderstanding of safe infant feeding practices among older generations. Relatedly, disclosure of HIV status to one's partner and/or family is a facilitator of EBF (Madiba and Letsoalo 2013; Onono et al. 2014). Though the exact mechanism is unclear, disclosure of HIV status may help women living with HIV receive support enabling them to EBF. Another potential barrier to EBF, supported by preliminary evidence, is HIV-related stigma (i.e., believing people with HIV are "unclean"). HIV-related stigma is passed down through generations and contributes to fears of HIV transmission through breastfeeding, further discouraging EBF (Tuthill et al. 2014).

Other potential barriers to EBF in women with and without HIV include logistical support and maternal psychological wellbeing. Women returning to work or school were less likely to practice EBF at 14 weeks as compared to women not returning to work or school, suggesting that there may be logistical barriers to EBF (Kimani-Murage et al. 2015). Maternal psychological wellbeing has been shown to affect adherence to other HIV-related health behaviors, although it has received less research attention to date as a specific barrier to EBF (Hodgson et al. 2014).

Adherence to postpartum health behaviors such as EBF among women living with HIV is critical for maternal and infant health. There are low rates of EBF in women living with HIV in urban environments such as KwaZulu-Natal, suggesting that there may be unique barriers for this population. To our knowledge, there is an absence of studies attempting to quantitatively examine multiple logistic and psychosocial barriers to EBF in women living with HIV in KwaZulu-Natal. This study therefore seeks to fill this gap by describing the most frequently endorsed barriers to EBF in this population and by examining differences in proposed barriers and key psychosocial processes between women who practice different infant feeding methods.

Methods

Participants and Procedures

Between May 10, 2013 and June 2, 2014, 200 participants were recruited from a district hospital in a large urban township in KwaZulu-Natal, South Africa as part of a larger study on adherence to prevention of mother-to-child transmission behaviors (K23MH096651). Participants underwent eligibility screening by a research

assistant fluent in isiZulu and English. Inclusion criteria included: (1) female sex; (2) age between 18 and 45; (3) HIV-positive, as confirmed by chart review; (4) at least 28 weeks pregnant; (5) currently receiving antenatal care at the hospital; (6) primary language isiZulu or English; (7) access to a cellular phone and willingness to be contacted; and (8) able to give informed consent. There were no exclusion criteria with respect to parity or gravity. At baseline (pregnancy), all 200 participants self-reported taking HAART. At the postpartum interview, 121 reported continuing to take HAART, and 33 reported discontinuing HAART. Written informed consent was obtained prior to the interview. Interviews were conducted by racially/ethically concordant female study staff members who were fluent in both English and isiZulu. Interviewers were trained in the conduct of psychosocial interviews by the principle investigator (CP) and project director (NM).

Of the 200 participants enrolled at baseline, 156 returned for a postpartum interview. Of these 156 participants, two had missing data regarding infant feeding practices, yielding a sample of 154 for the present study. On average, interviews were conducted at 13.1 weeks postpartum ($SD = 5.9$) and lasted 45–60 min. Participants were interviewed in a private room in isiZulu or English, and then compensated 70 ZAR (approximately $10 USD) after each interview. Interviews were scheduled around immunization visits for the infant and/or the maternal 6 week check-up whenever possible. All participants provided informed consent prior to participation and all study procedures were approved by the research ethics committee/institutional review boards at University of the Witwatersrand and Massachusetts General Hospital, and by the district hospital and KwaZulu-Natal Provincial Department of Health and are therefore, performed in accordance with the ethical standards laid in the 1964 Declaration of Helsinki and its later amendments. Table 1 reports participant demographics.

Measures

Measures that were unavailable in isiZulu were independently translated and back-translated. For all scales, higher scores indicate higher levels of the variable measured.

Sociodemographic Data and Infant Feeding Practices

Participants self-reported age, race, occupation, employment status, and monthly income. Participants were asked about their infant feeding practices, both past ("Did you ever breastfeed your baby?") and present ("Are you currently breastfeeding your baby?"), including, if applicable, the main reason that they were not currently breastfeeding ("What is the main reason you are not breastfeeding your baby?"). Participants were asked to indicate to whom they have disclosed their HIV status.

Functional Social Support

A modified 10-item version of the Duke-UNC Functional Social Support Questionnaire (FSSQ) evaluated availability of emotional and material support (Antelman et al. 2001). Scores range from 10 to 40. This scale has been used to measure perceived social support among pregnant and postpartum women in the United States, Europe and sub-Saharan Africa (Antelman et al. 2001; Gutiérrez-Zotes et al. 2015; Harley and Eskenazi 2006) and has demonstrated good internal consistency ($\alpha = .86$; Antelman et al. 2001).

Table 1 Demographics

Demographic characteristic		*M* (SD)/*n* (%)
Age		28.1 (5.3)
Race	Colored/mixed	2 (1.3)
	Black South African	120 (77.9)
Employment status	Full time employed	26 (16.6)
	Part-time employed	16 (10.4)
	Unemployed	114 (74.0)
HIV disclosure (who disclosed status to)	Anyone	152 (98.7)
	No one	2 (1.3)
	Current partner	127 (82.5)
Monthly income (Rand) (1 Rand ≈ 0.08 USD)	0–999	109 (70.9)
	1000–1999	29 (18.8)
	2000–2999	9 (5.8)
	3000–5000	7 (4.5)

Table 2 Feeding practices

		n (%)
Breastfeeding practice at time of postpartum assessment	Mixed feeding	0 (0)
	Exclusive breastfeeding (EBF)	44 (28.2)
	Exclusive formula feeding	110 (71.4)
Ever attempted breastfeeding	Yes	70 (45.5)
	No	84 (54.5)

HIV-Related Social Support

A 4-item version of the UCLA Social Support Inventory (UCLA-SSI) measured HIV-related social support (Ashton et al. 2005; Dunkel-Schetter et al. 1986). Items are averaged to obtain a total score; scores range from 1 to 7. This measure has shown good internal consistency in populations living with HIV ($\alpha = 0.87$) (Ashton et al. 2005).

HIV-Related Stigma

The Internalized AIDS-Related Stigma Scale (IA-RSS) is a six-item questionnaire, scored dichotomously as "agree" (1)/"disagree" (0), that measures HIV-related stigma (Kalichman et al. 2009). Scores range from 0 to 6. This scale has been validated in multiple settings, including among people living with HIV in Cape Town, South Africa and has demonstrated good internal consistency ($\alpha = .75$) (Tsai et al. 2013).

Depression

This study utilized a modified version of the Hopkins Symptom Checklist-25 (HSCL-25) Depression Subscale (Bolton et al. 2004). The depression subscale consists of 15 items, which are averaged to obtain a total score; scores range from 1 to 4. This scale has been used to assess depression in the general population and among people living with HIV in sub-Saharan Africa (Derogatis et al. 1974; Gupta et al. 2010; Kaida et al. 2014; Psaros et al. 2015; Tsai et al. 2013). It has been validated as a screening tool for depression among pregnant women living with HIV in Tanzania (Kaaya et al. 2002).

Statistical Analyses

All data were collected and managed using the Research Electronic Data Capture (REDCap) system. SPSS v24 was utilized for all analyses. Chi square and independent samples *t* tests were conducted to compare participants who had never breastfed to participants who had ever breastfed and participants currently breastfeeding to participants currently formula feeding. The IA-RSS contained two participants with item-level missing data ($n = 1$ with two items missing, $n = 1$ with one item missing), which were replaced by the average of the rest of the participants' item-level scores to calculate a sum. The parent study required 180 participants in order to detect a minimum hypothesized difference on the primary outcome with more than 90% power (Psaros et al. 2014). Observed power was calculated for the present study using G*Power software (Faul et al. 2007). There was 10% power to detect a small effect size for the Chi square tests and 30% power to detect a small effect size for the independent *t* tests.

Table 3 Reasons not breastfeeding

Main reported reason not breastfeeding	n (% of 110)
Afraid of HIV transmission to baby	35 (31.8)
Away from child (school, work, don't live with baby)	27 (24.5)
Medical (sores in breast, couldn't produce milk)	13 (11.8)
Afraid of mix feeding	6 (5.5)
Did not want to/did not like breastfeeding	2 (1.8)
Other	3 (2.7)
Did not indicate reason	24 (21.8)

Results

Over 50% of participants never attempted breastfeeding, and the rate of current EBF was 28.9% (Table 2). Reasons for not currently breastfeeding are described in Table 3. The most frequently reported reason was fear of HIV transmission to the child (31.8%). The second most frequently reported reason for not currently breastfeeding was being away from one's child for most of the day (24.5%).

Comparisons of proposed barriers between infant feeding methods are reported in Table 4. Participants who had ever breastfed had higher functional social support ($M = 38.4$, $SD = 3.03$, range 27–40) compared to participants who had never breastfed ($M = 36.55$, $SD = 6.32$, range 10–40; $p = 0.02$), and higher HIV-related support ($M = 6.72$, $SD = 0.47$, range 5.25–7) than participants who had never breastfed ($M = 6.32$, $SD = 1.14$, range 2.25–7; $p = 0.004$). Participants who were currently EBF had higher HIV-related support ($M = 6.71$, $SD = 0.44$, range 5.5–7) compared to participants currently exclusively formula feeding ($M = 6.42$, $SD = 1.04$, range 2.25–7; $p = 0.02$). There were no significant differences

Table 4 Comparisons between mothers of different feeding practices

Measure	Ever breastfed *M* (SD) or *n* Range N = 70	Never breastfed *M* (SD) or *n* Range N = 84	Test statistic	Currently breast-feeding *M* (SD) or *n* Range N = 44	Currently formula feeding *M* (SD) or *n* Range N = 110	Test statistic
Employment	Not employed 54 Part-time 5 Full time 13	Not employed 60 Part-time 11 Full time 13	χ^2 (1, N = 154) = 0.01	Not employed 79 Part-time 13 Full time 18	Not employed 35 Part-time 3 Full time 6	χ^2 (1, N = 154) = 1.16
Disclosure to current partner[a]	Yes 58 No 12	Yes 69 No 15	χ^2(1, N = 154) = 0.03	Yes 38 No 6	Yes 89 No 21	χ^2 (1, N = 154) = 0.65
Disclosure to immediate family	Yes 54 No 16	Yes 66 No 18	χ^2 (1, N = 154) = 0.05	Yes 35 No 9	Yes 85 No 25	χ^2 (1, N = 154) = .09
Internalized HIV stigma	1.86 (1.64) 0–6	1.77 (1.62) 0–6	$t(152) = 0.30$	1.86 (1.64) 0–6	1.79 (1.64) 0–6	$t(152) = 0.24$
Functional social support	38.4 (3.03) 27–40	36.55 (6.32) 10–40	$t(123.9) = 2.38$*	37.1 (0.35) 27–40	38.02 (3.46) 10–40	$t(152) = -0.96$
HIV-related social support	6.72 (0.47) 5.25–7	6.32 (1.14) 2.25–7	$t(114) = 2.90$**	6.71 (0.44) 5.5–7	6.42 (1.04) 2.25–7	$t(151.6) = 2.45$***
Depressive symptoms	1.36 (0.31) 1–2.56	1.39 (0.42) 1–3.13	$t(152) = -0.57$	1.41 (0.34) 1–2.56	1–36 (0.38) 1–3.13	$t(152) = 0.66$

*$p = 0.02$

**$p = 0.004$

***$p = 0.016$

[a]$n = 2$ cases this was not the father of the baby, and the pattern of results was the same when differences were tested by disclosure status to father of the baby

between participants with different feeding practices with regard to employment status, disclosure status, depressive symptoms, or HIV-related stigma.

Discussion

This study examined differences in barriers to EBF among women living with HIV in KwaZulu-Natal, South Africa. Of note, the rates of infant feeding practices in this sample differ from a recent large study of women living with and without HIV in KwaZulu-Natal (Horwood et al. 2018). In Horwood et al. (2018), 65.9% of women living with HIV reported EBF at 13–16 weeks, compared to only 28.9% reporting EBF in the present study. The majority (68.5%) of participants in the Horwood et al. study were from a rural area, whereas the present study recruited from an urban township. These differences suggest that EBF rates may vary greatly across districts and the sample utilized in this study may be disproportionately affected by barriers to EBF.

The most frequently cited reason for not breastfeeding in the present study was fear of HIV transmission to the child. This finding demonstrates misinformation and/or misunderstanding within the community about the safety of breastfeeding and the risks associated with formula feeding. In a large study of women living with and without HIV, only 17.1% reported receiving advice regarding infant feeding practices during the perinatal period (Horwood et al. 2018). Healthcare providers may need to specifically address these concerns with women living with HIV prior to childbirth to ensure that recommendations are fully understood. Health care providers such as nurses, lay health workers, or social workers may also need to deliver specific education on safety and importance of continuation of HAART during regular postpartum visits. Interpersonal health counseling and mHealth interventions may be helpful in increasing knowledge of and improving adherence to HIV-related health behaviors (Mabuto et al. 2017; Sutton et al. 2017).

The second most commonly reported barrier to breastfeeding was separation from the infant. South Africa has few resources to support breastfeeding in the workplace beyond 4 months of maternity leave, which is typically unavailable for individuals with informal or part-time occupations (Republic of South Africa 1997). Most of the current sample (74%) was unemployed, suggesting that women of low socioeconomic status who spend extended periods of time away from their infants may face other logistical barriers, such as a lack of reliable electricity for refrigeration of expressed milk or access to breast pumps. Several interventions have attempted to increase EBF in women living with HIV in resource-limited areas with mixed results. Two studies demonstrated no difference in EBF rates after intervention (e.g.,

assigned feeding buddies, brief motivational interviewing sessions) (Reimers et al. 2018; Tuthill et al. 2017). Two other studies demonstrated improved rates of EBF after high intensity interventions (e.g., pregnancy and postpartum home visits) as compared to non-intervention control groups (Ijumba et al. 2015; Tomlinson et al. 2014). However, rates of EBF in the intervention groups at 12 weeks were still low, at approximately 30%. Though some of the interventions provided logistical support for general infant and child care, none offered financial or logistical support specifically for breastfeeding equipment, which may account for these results.

The Ijumba et al. (2015) and Tomlinson et al. (2014) studies both took place in urban settings in or near the Durban municipality of the KwaZulu-Natal province, similar to the present study. The present study found 28.2% of women interviewed to be practicing EBF (without intervention) and Ijumba et al. (2015) and Tomlinson et al. (2014) reported approximately 30% rates of EBF after intervention. In the study by Horwood et al. (2018), with primarily women from rural townships, 65.9% of women living with HIV were practicing EBF without any intervention. Overall, it appears that women living with HIV in urban environments in South Africa have lower rates of EBF even with intervention and may have additional barriers not present in a rural environment.

A previous study of women in Nigeria found that women in urban settings who had a spontaneous vaginal delivery had lower rates of pre-lacteal feeding, as compared to women who had a caesarean delivery (Berde et al. 2017). Delivery mode was also an independent predictor of early breastfeeding cessation in a Western Australian sample (Hauck et al. 2011). Authors posited that pain or discomfort, longer mother–infant separation after birth, and longer stays in the hospital where there may be other feeding methods available are all associated with caesarean sections and may negatively impact uptake of EBF (Berde et al. 2017; Hauck et al. 2011). Literature demonstrates higher rates of caesarean delivery in urban Nigeria as compared to rural Nigeria (Rai et al. 2012). While it is unclear if the rates similarly differ between settings in South Africa, it may be that a higher density of health care providers in urban areas contributes to higher rates of caesarean deliveries in general, which may negatively impact uptake of EBF in low-resource settings.

This study demonstrated that women who ever attempted breastfeeding had higher rates of both general and HIV-related social support compared to women who never attempted breastfeeding and that currently breastfeeding women had higher HIV-related support than women not currently breastfeeding. Importantly, rates of HIV disclosure did not differ between infant feeding practices; most women had disclosed their status to an immediate family member and/or current partner. Women in previous studies reported feeling pressure to not breastfeed from older family members who share childcare responsibilities; therefore, it is possible that older generations do not understand the benefits of and new guidelines around breastfeeding, and thus do not specifically support EBF. Fear of HIV transmission through breastfeeding may also be communicated from one generation to the next, further discouraging EBF (Tuthill et al. 2014). Social support may be a key variable for future interventions.

Limitations and Future Directions

This study had several limitations. First, this is a cross-sectional observational study and causality cannot be established. Also, while this study extended the assessment further into the postpartum period than several previous surveys and studies, the average time point of the interview was 3.25 months after infant birth (recommendations are to EBF to 12 months). To address these limitations, future studies should seek to study breastfeeding longitudinally from the prenatal period to 1 year after birth. This study found that many women living with HIV never attempt breastfeeding; therefore, understanding barriers beginning in the prenatal period is key to supporting long term adherence to recommendations. Additional limitations include absence of gold-standard translation procedures, and that not all measures had established reliability and validity parameters for the target sample, nor did we assess these constructs in our sample.

A comprehensive intervention promoting EBF in the health system, community, and environment may be well-equipped to address the barriers to EBF in KwaZulu-Natal (Sinha et al. 2015). Aspects may include training of healthcare providers to offer psychoeducation about the risks and benefits of EBF and provision of financial or logistical support for EBF. Health care providers and access may also differ by setting. Future studies should seek to understand the differences in EBF by geographical area and how best to facilitate EBF across settings. It may also be beneficially to identify the potential strengths of rural environments that may facilitate breastfeeding and the potential barriers to breastfeeding in urban environments to better promote EBF. Additionally, key variables identified here, such as social support, may need to be targeted to improve EBF rates. Several studies intervened with fathers to promote EBF with promising results, and future studies may benefit from incorporating multiple generations of women who are influencers of infant feeding decisions (Tadesse et al. 2018).

Conclusions

Reported barriers to EBF include fear of HIV transmission to and separation from one's infant. Healthcare providers should offer information to women on the overall safety

risks related to not breastfeeding. Future interventions may wish to consider providing logistical and/or financial support for breastfeeding. Finally, the finding that women who practice EBF have greater levels of social support suggest that this may be a key factor to assess and promote in future interventions.

Acknowledgements Funding for this study came from National Institute of Health K23MH096651. Additional author support was provided by National Institute of Drug Abuse K24DA040489. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Mental Health, the National Institute of Drug Abuse, or the National Institutes of Health.

Compliance with Ethical Standards

Conflict of interest The authors have no conflicts of interest to declare.

References

Antelman, G., Smith Fawzi, M. C., Kaaya, S., Mbwambo, J., Msamanga, G. I., Hunter, D. J., et al. (2001). Predictors of HIV-1 serostatus disclosure: a prospective study among HIV-infected pregnant women in Dar es Salaam, Tanzania. *AIDS, 15*(14), 1865–1874. https://doi.org/10.1097/00002030-200109280-00017.

Ashton, E., Vosvick, M., Chesney, M., Gore-Felton, C., Koopman, C., O'Shea, K., … Spiegel, D. (2005). Social support and maladaptive coping as predictors of the change in physical health symptoms among persons living with HIV/AIDS. *AIDS Patient Care and STDs*, *19*(9), 587–598. https://doi.org/10.1089/apc.2005.19.587.

Berde, A. S., Yalcin, S. S., Ozcebe, H., Uner, S., & Caman, O. K. (2017). Determinants of pre-lacteal feeding practices in urban and rural Nigeria; a population-based cross-sectional study using the 2013 Nigeria demographic and health survey data. *African Health Sciences, 17*(3), 690–699. https://doi.org/10.4314/ahs.v17i3.11.

Binns, C., Lee, M., & Low, W. Y. (2016). The long-term public health benefits of breastfeeding. *Asia-Pacific Journal of Public Health, 28*(1), 7–14. https://doi.org/10.1177/1010539515624964.

Bolton, P., Wilk, C. M., & Ndogoni, L. (2004). Assessment of depression prevalence in rural Uganda using symptom and function criteria. *Social Psychiatry and Psychiatric Epidemiology, 39*(6), 442–447. https://doi.org/10.1007/s00127-004-0763-3.

Cournil, A., De Vincenzi, I., Gaillard, P., Cames, C., Fao, P., Luchters, S., … Kesho Bora Study Group. (2013). Relationship between mortality and feeding modality among children born to HIV-infected mothers in a research setting: The Kesho Bora study. *AIDS (London, England)*, *27*(10), 1621–1630. https://doi.org/10.1097/QAD.0b013e32835d5226.

Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins Symptom Checklist (HSCL): A self-report symptom inventory. *Behavioral Science, 19*(1), 1–5.

Dunkel-Schetter, C., Feinstein, L., & Call, J. (1986). *UCLA Social Support Inventory (UCLA-SSI)*. Retrieved April 27, 2018, from http://health.psych.ucla.edu/CDS/files/UCLA%20SSI%201986.doc.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. https://doi.org/10.3758/BF03193146.

Goga, A., Dinh, T., Jackson, D., & for the SAPMTCTE study group. (2012). *Evaluation of the effectiveness of the National Prevention of Mother-to-Child Transmission (PMTCT) Programme measured at six weeks postpartum in South Africa, 2010*. South African Medical Research Council, National Department of Health of Health of South Africa and PEPFAR/US Centers for Disease Control and Prevention.

Gupta, R., Dandu, M., Packel, L., Rutherford, G., Leiter, K., Phaladze, N., … Weiser, S. (2010). Depression and HIV in Botswana: A population-based study on gender-specific socioeconomic and behavioral correlates. *PLoS ONE*, *5*(12), e14252.

Gutiérrez-Zotes, A., Labad, J., Martín-Santos, R., García-Esteve, L., Gelabert, E., Jover, M., … Sanjuan, J. (2015). Coping strategies and postpartum depressive symptoms: A structural equation modelling approach. *European Psychiatry: The Journal of the Association of European Psychiatrists*, *30*(6), 701–708. https://doi.org/10.1016/j.eurpsy.2015.06.001

Harley, K., & Eskenazi, B. (2006). Time in the United States, social support and health behaviors during pregnancy among women of Mexican descent. *Social Science & Medicine (1982), 62*(12), 3048–3061. https://doi.org/10.1016/j.socscimed.2005.11.036.

Hauck, Y. L., Fenwick, J., Dhaliwal, S. S., & Butt, J. (2011). A Western Australian survey of breastfeeding initiation, prevalence and early cessation patterns. *Maternal and Child Health Journal, 15*(2), 260–268. https://doi.org/10.1007/s10995-009-0554-2.

Hodgson, I., Plummer, M. L., Konopka, S. N., Colvin, C. J., Jonas, E., Albertini, J., … Fogg, K. P. (2014). A systematic review of individual and contextual factors affecting ART initiation, adherence, and retention for HIV-infected pregnant and postpartum women. *PloS One*, *9*(11), e111421. https://doi.org/10.1371/journal.pone.0111421.

Horwood, C., Haskins, L., Engebretsen, I. M., Phakathi, S., Connolly, C., Coutsoudis, A., et al. (2018). Improved rates of exclusive breastfeeding at 14 weeks of age in KwaZulu Natal, South Africa: What are the challenges now? *BMC Public Health, 18*(1), 757. https://doi.org/10.1186/s12889-018-5657-5.

Ijumba, P., Doherty, T., Jackson, D., Tomlinson, M., Sanders, D., Swanevelder, S., et al. (2015). Effect of an integrated community-based package for maternal and newborn care on feeding patterns during the first 12 weeks of life: A cluster-randomized trial in a South African township. *Public Health Nutrition, 18*(14), 2660–2668. https://doi.org/10.1017/S1368980015000099.

Kaaya, S. F., Fawzi, M. C. S., Mbwambo, J. K., Lee, B., Msamanga, G. I., & Fawzi, W. (2002). Validity of the Hopkins Symptom Checklist-25 amongst HIV-positive pregnant women in Tanzania. *Acta Psychiatrica Scandinavica, 106*(1), 9–19. https://doi.org/10.1034/j.1600-0447.2002.01205.x.

Kaida, A., Matthews, L., Ashaba, S., Tsai, A., Kanters, S., Robak, M., … Bangsberg, D. (2014). Depression during pregnancy and the postpartum among HIV-infected women on antiretroviral therapy in Uganda. *J Acquir Immune Defic Syndr*, *67 (Suppl 4)*, S179–S187. https://doi.org/10.1097/QAI.0000000000000370.

Kalichman, S. C., Simbayi, L. C., Cloete, A., Mthembu, P. P., Mkhonta, R. N., & Ginindza, T. (2009). Measuring AIDS stigmas in people living with HIV/AIDS: The Internalized AIDS-Related Stigma Scale. *AIDS Care, 21*(1), 87–93. https://doi.org/10.1080/09540120802032627.

Kimani-Murage, E. W., Wekesah, F., Wanjohi, M., Kyobutungi, C., Ezeh, A. C., Musoke, R. N., … Griffiths, P. (2015). Factors affecting actualisation of the WHO breastfeeding recommendations in urban poor settings in Kenya. *Maternal & Child Nutrition*, *11*(3), 314–332. https://doi.org/10.1111/mcn.12161.

Kuhn, L., Sinkala, M., Kankasa, C., Semrau, K., Kasonde, P., Scott, N., … Thea, D. M. (2007). High uptake of exclusive breastfeeding and reduced early post-natal HIV transmission. *PLoS ONE*, *2*(12), e1363. https://doi.org/10.1371/journal.pone.0001363.

Mabuto, T., Charalambous, S., & Hoffmann, C. J. (2017). Effective interpersonal health communication for linkage to care after HIV

diagnosis in South Africa. *Journal of Acquired Immune Deficiency Syndromes (1999), 74*(Suppl 1), S23–S28. https://doi.org/10.1097/QAI.0000000000001205.

Madiba, S., & Letsoalo, R. (2013). HIV disclosure to partners and family among women enrolled in prevention of mother to child transmission of HIV program: Implications for infant feeding in poor resourced communities in South Africa. *Glob J Health Sci, 5*(4), 1–13. https://doi.org/10.5539/gjhs.v5n4p1.

Office E. (2011). The Tshwane declaration of support for breastfeeding in South Africa. *South African Journal of Clinical Nutrition, 24*(4), 214.

Onono, M. A., Cohen, C. R., Jerop, M., Bukusi, E. A., & Turan, J. M. (2014). HIV serostatus and disclosure: Implications for infant feeding practice in rural south Nyanza, Kenya. *BMC Public Health, 14,* 390. https://doi.org/10.1186/1471-2458-14-390.

Psaros, C., Haberer, J., Boum, Y., Tsai, A., Martin, J., Hunt, P., … Safren, S. (2015). The factor structure and presentation of depression among HIV-positive adults in Uganda. *AIDS and Behavior*, *19*(1), 27–33. https://doi.org/10.1007/s10461-014-0796-x.

Psaros, C., Mosery, N., Smit, J., Luthuli, F., Gordon, J., Greener, R., … Safren, S. (2014). PMTCT adherence in pregnant South African Women: The role of depression, social support, stigma, and structural barriers to care. Presented at the First annual HIV Research for Prevention (HIVR4P) Conference, Cape Town, South Africa.

Rai, R. K., Singh, P. K., & Singh, L. (2012). Utilization of maternal health care services among married adolescent women: Insights from the Nigeria Demographic and Health Survey, 2008. *Women's Health Issues: Official Publication of the Jacobs Institute of Women's Health, 22*(4), e407–414. https://doi.org/10.1016/j.whi.2012.05.001.

Reimers, P., Israel-Ballard, K., Craig, M., Spies, L., Thior, I., Tanser, F., et al. (2018). A cluster randomised trial to determine the efficacy of the "feeding buddies" programme in improving exclusive breastfeeding rates among HIV-infected women in rural KwaZulu-Natal, South Africa. *AIDS and Behavior, 22*(1), 212–223. https://doi.org/10.1007/s10461-017-1865-8.

Republic of South Africa. (1997). *Basic Conditions of Employment Act 75 of 1997.* Retrieved October 20, 2019, from http://www.labour.gov.za/DOL/downloads/legislation/acts/basic-conditions-of-employment/Act%20-%20Basic%20Conditions%20of%20Employment.pdf.

Sinha, B., Chowdhury, R., Sankar, M. J., Martines, J., Taneja, S., Mazumder, S., … Bhandari, N. (2015). Interventions to improve breastfeeding outcomes: A systematic review and meta-analysis. *Acta Paediatrica (Oslo, Norway: 1992)*, *104*(467), 114–134. https://doi.org/10.1111/apa.13127.

South Africa National Department of Health. (2013). *The National Antenatal Sentinel HIV Prevalence Survey, South Africa*. Retrieved April 27, 2018, from https://www.health-e.org.za/wp-content/uploads/2016/03/Dept-Health-HIV-High-Res-710201 5.pdf.

South African National AIDS Council. (2017). *National Strategic Plan for HIV, TB, and STIs 2017-2022*. Retrieved April 27, 2018, from http://sanac.org.za/wp-content/uploads/2017/05/NSP_FullDocument_FINAL.pdf.

Sutton, R., Lahuerta, M., Abacassamo, F., Ahoua, L., Tomo, M., Lamb, M. R., et al. (2017). Feasibility and acceptability of health communication interventions within a combination intervention strategy for improving linkage and retention in HIV care in Mozambique. *Journal of Acquired Immune Deficiency Syndromes (1999), 74*(Suppl 1), S29–S36. https://doi.org/10.1097/QAI.0000000000001208.

Tadesse, K., Zelenko, O., Mulugeta, A., & Gallegos, D. (2018). Effectiveness of breastfeeding interventions delivered to fathers in low- and middle-income countries: A systematic review. *Maternal & Child Nutrition*. https://doi.org/10.1111/mcn.12612.

Tomlinson, M., Doherty, T., Ijumba, P., Jackson, D., Lawn, J., Persson, L. Å., … Chopra, M. (2014). Goodstart: A cluster randomised effectiveness trial of an integrated, community-based package for maternal and newborn care, with prevention of mother-to-child transmission of HIV in a South African township. *Tropical Medicine & International Health: TM & IH*, *19*(3), 256–266. https://doi.org/10.1111/tmi.12257.

Tsai, A., Weiser, S., Steward, W., Mukiibi, N., Kawuma, A., Kembabazi, A., … Bangsberg, D. (2013). Evidence for the reliability and validity of the internalized AIDS-related stigma scale in rural Uganda. *AIDS and Behavior*, *17*(1), 427–433. https://doi.org/10.1007/s10461-012-0281-3.

Tuthill, E. L., Butler, L. M., Pellowski, J. A., McGrath, J. M., Cusson, R. M., Gable, R. K., et al. (2017). Exclusive breast-feeding promotion among HIV-infected women in South Africa: An information-motivation-behavioural skills model-based pilot intervention. *Public Health Nutrition, 20*(8), 1481–1490. https://doi.org/10.1017/S1368980016003657.

Tuthill, E., McGrath, J., & Young, S. (2014). Commonalities and differences in infant feeding attitudes and practices in the context of HIV in sub-Saharan Africa: A metasynthesis. *AIDS Care, 26*(2), 214–225. https://doi.org/10.1080/09540121.2013.813625.

World Health Organization. (2016). *Guideline updates on HIV and infant feeding*. Retrieved April 27, 2018, from http://apps.who.int/iris/bitstream/handle/10665/246260/9789241549707-eng.pdf;jsessionid=EE88CA4B12F6F8312988AE6E0B003966?sequence=1.

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