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Perceived Infant Feeding Patterns in the Prevention of Mother-to-Child Transmission Postpartum Programmes: A Mix-method Study of Nurses, Lay Counsellors and Community Health Workers in the Rural Limpopo Province, South Africa

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Abstract

Mothers` adherence to infant feeding instructions is a major challenge for healthcare workers in the Prevention Mother-to-Child Transmission (PMTCT) Postpartum programmes. Healthcare workers` infant feeding counselling and support is very important to the success of the PMTCT programmes. Hence, this paper explores healthcare workers` perceptions on infant feeding patterns of mothers living with Human Immunodeficiency Virus (HIV) in the PMTCT postpartum programmes. The study applied both qualitative and quantitative approaches, a phenomenological and cross-sectional design respectively. In-depth interviews were conducted with 20 Community Health Workers (CHWs) in two health facilities in the Capricorn District of the Limpopo province of South Africa. Questionnaire surveys were conducted with a total population of 40 nurses and lay counsellors responsible for the implementation of PMTCT programmes in five selected health facilities in the Mopani and Capricorn District of the Limpopo province, South Africa. The findings show that CHWs believe that breastfeeding is important for HIV positive mothers and their infants. However, the CHWs believe that HIV positive mothers are mix feeding their infants with porridge, breast milk and formula milk. The CHWs struggle to monitor if mothers are following the recommended feeding methods at their homes. The CHWs maintains that mothers mix feed because their babies bite them on their breasts during breastfeeding, and other runs out of money to buy formula milk and have to wait until they get money to buy formula milk. The nurses and lay counsellors believe that the challenges that mothers experience with infant feeding is mix-feeding (80%), confusion and lack of knowledge (45%) and non-adherence to treatment (40%). Unsafe infant feeding practices can lead to Mother-to-Child Transmission (MTCT). Proper promotion of safe infant feeding needs to be emphasised through on-going awareness campaigns that provide quality information on recommended infant feeding practices. Workshops and campaigns that promote exclusive breastfeeding will demonstrate more effective ways of preventing new paediatric infections especially in rural settings.

Keywords: *Infant Feeding; Exclusive Breastfeeding; Postpartum; Mother-To-Child Transmission; South Africa*

Introduction

The World Health Organization (WHO) highly recommends breastfeeding for all mothers and exclusive breastfeeding for mothers who are exposed or infected with Human Immunodeficiency Virus (HIV) (WHO & UNICEF 2016; WHO 2016). Breastfeeding is an important feeding practice that contribute to a child`s health and development, protects the child against diseases (WHO & UNICEF 2016). Exclusive breastfeeding is a recommended feeding practices for HIV positive mothers and implies that mothers should only breastfeed their infants with no exception of any other liquids or solid foods for 6 months after birth up until the 12th month (WHO & UNICEF 2016). Exclusive formula feeding is another recommended infant feeding method that involves giving a baby only formula milk through a bottle for a duration of six months without introducing other food sources. Mothers risk HIV infections through MTCT if they mix feed their infants in the first 6 months of their infants` lives (WHO & UNICEF 2016; WHO 2016).

Exclusive formula feeding is a challenge in African countries that are in resource-poor settings because formula feeding is expensive and many Africa mothers lack access to financial opportunities, and they have poor access to clean water and hygienic material prepare formula milk properly (WHO & UNICEF 2016; UNAIDS 2018). Adherence to exclusive breastfeeding practice is very poor despite strong evidence in support of method by many countries around the world. Approximately 44% of infants aged 0-6 months were exclusively breastfed globally between the year 2015-2020 (WHO 2021). New HIV infections through MTCT are more prevalent after mothers give birth compared to when the mothers are pregnant or in labour (UNAIDS 2017; Anoje et al. 2012; Leroy et al. 2013). Globally, about half of the infants from the180,000 children were newly infected with HIV through MTCT in 2017, most of these infections were recorded in postpartum phase (UNAIDS 2017).

Relevant information about effective recommended infant feeding methods is important in preventing mix feeding and MTCT (Al-Sahab Lanes, Feldman &Tamim 2010). Failure to follow recommended infant feeding practices in the PMTCT programmes is some time influenced by lack of knowledge and poor counselling support at the health facilities (Peltzer et al. 2007; Mphego, Madiba & Ntuli 2014; Hazemba, Ncama & Sithole 2016). Acquiring knowledge and support about important PMTCT practices maximize the use of recommended infant feeding practices. In other cases, healthcare workers provide poor counselling on recommended infant feeding options and this often influences non-adherence or mix feeding pattens (Ngyende, Bucyubaruta, and Mugero 2020). Healthcare workers often causes confusion about infant practices or completely avoid the topic during counselling sessions (Coovadia and Bland 2007). Identifying and eliminating factors that influence non-adherence to recommended infant feeding methods has proven to be a challenge for HIV programme planners and providers. Hence, this study intended to explore Healthcare workers` perceptions on infant feeding patterns in the PMTCT postpartum programmes, Limpopo Province. South Africa.

Methods

Study Setting

The study setting was located in the Mopani and Capricorn Districts of the Limpopo Province, South Africa. The Mopani District is the largest district in the Limpopo Province and its population is mostly Black Africans who speak Sepedi language (45%), and Tsonga language (44%). On the other hand, Capricorn district is host to the capital city (Polokwane) of the Limpopo Province and Its population mostly black African who speak Sepedi. The Mopani District has 131 health facilities, while Capricorn district has an overall 109 health facilities. A total of five facilities were selected using purposive sampling techniques. Two facilities were selected in the Mopani district, and three were

selected in the Capricorn District. To ensure anonymity, the health facilities given code names. Clinics in the Capricorn district were coded as follow: Clinic CD1, CD2 and CD3 while clinics in the Mopani District were coded as follow: Clinic MD1 and MD2. The selected clinics offered PMTCT services, lay counsellors and the nurses and outreach services that are implemented by the CHWs. Data saturation informed the sample size of CHWs.

Research Design

In this study, both qualitative and quantitative approaches were adopted, and the research design of choice for this study are an interpretative phenomenology and cross-sectional survey designs, respectively. The cross-sectional design offered a snapshot of the variables that are included in the study at one particular point in time. This allowed the researchers to explore the association between the exposure and the outcome variable. The information that is collected includes characteristics of the respondents and potential risk factors, to determine how they are affected by non-adherences to the PMTCT post-delivery programmes. In the phenomenology design, lived experiences of the participants were explored in relation to the research phenomena, to allow the researcher to collect data from the participants who have experienced the phenomenon, and new ideas were uncovered from the phenomenon under study (Creswell & Creswell 2018). This study used interpretative phenomenological design to understand and interpret the participants' experiences with research phenomenon (Finlay 2008). The allowed the researchers to gain insight on the lived experiences of Community Health Workers (CHWs) in the PMTCT post-delivery programmes.

Study Population and Sampling

The target populations of this study were CHWs and healthcare workers responsible for the implementation of the PMTCT post-delivery follow up services at selected health facilities in the Limpopo province, South Africa. A total population of professional healthcare workers (nurses and lay counsellors) in the PMTCT programmes were included in the study from five health facilities. Purposive sampling was used to select CHWs in two selected health facilities. Respondents were all approached through clinic managers. The researcher was offered a temporary office in the facility. The researchers were introduced by the facility managers, and the purpose of the study was explained to each respondent during the recruitment process. The sample size of 20 CHWs was chosen to reduce sampling error and to avoid the use of huge resources due to limited time and funding. Two health facilities in the Capricorn District were used to sample CHWs, this sample was selected because it was feasible and manageable in terms of time and cost. Furthermore, a total population of nurses and lay counsellors was selected to participate in the study. A total of 44 respondents were included in the study, four withdrew later due to workload and there was no replacement as there were no other respondents to select. Therefore, the sample size was 40 respondents who participated in quantitative surveys. The sample size was small due unexpected circumstances. The was a limited number of healthcare personnel who qualify to work in the PMTCT programmes by the time of data collection. Therefore, the decision was made to include all the respondents (a census population) who qualified to work in the PMTCT post-delivery programmes. Thus, a census population of 40 respondents was opted for due to limited time.

Data Collection

The researchers met with the study participants and collected both qualitative and quantitative data to explore healthcare workers` knowledge about MTCT. Voice recording tapes and direct note taking tools were used to collect data. In-depth interviews conducted with CHWs to gain more information and to allow the participants to engage freely in the study. Questionnaire surveys were conducted with nurses and lay counsellors to ask a series of structured questions to gather information from the respondents in a study. The interviews and surveys were held at the clinics, lasted approximately 45 minutes and 15

minutes respectively. The language formats for the interviews were Sepedi and English for in-depth interviews with CHWs and only English healthcare workers.

Data Analysis

Thematic analysis of in-depth interviews with CHWs, audio recordings were translated from Sepedi to English and transcribed it into readable data. After cleaning and checking the transcripts for errors patterns in the data were highlighted, and codes were generated to identify the data that have a similarity. The codes were labelled and categorised for more efficient analysis to enhance the understanding and meaning of the data. The themes and sub-themes were generated to represent the data. Moreover, important and new aspects of data that make up the themes were captured and themes that make meaningful contributions to the study were selected to represent the research findings. The quantitative data were analysed Statistical Package for the Social Sciences (SPSS) analysis software. Data was entered or captured on a Microsoft Excel spreadsheet. The data was explored for errors and the missing values were added before the analysis. The data was entered on SPSS analysis software to analyse the data. Descriptive frequencies and percentages were obtained to describe the socio-demographic and clinical characteristics of the participants at the baseline. Microsoft Excel was used to compose frequency tables, pie, and bar graphs.

Ethics Approval and Consent to Participate

The proposal to conduct the study was approved by University of Johannesburg Research and Ethics Committee in South Africa. Participating respondents were asked to sign consent forms. The participants' identities were not disclosed. The authors or researchers used the coding system to identify the participants' responses and to ensure that information obtained from the participants remains confidential. During data collection, the participants were informed about the purpose of the study, and those who experienced discomfort were referred to social workers and psychologists for counselling.

Results

Demographic Characteristics of the Study Participants

All the CHWs who participated in this study were females and most of the CHWs were between the age of 46-50 (n=7), followed by 50+ (n=6). The educational level of the CHWs in this study shows that most have completed secondary school (matric) education (n=13), followed by those who have been to secondary school but have not completed matric (n=4), those with primary level education (n=2), and only one with a diploma. Moreover, most of the CHWs in this study had between 6-10 years of work experience (n=9) followed by 11-16 years (n=9) of work experience and only two had 1-2 years of work experience. The demographic information of the nurses and lay counsellors who work directly with HIV positive mothers in the ward based PMTCT programmes. Most of the respondents were females (n=35), only five of the respondents were males. Most of the respondents were between 41-45 (n=10), this was followed by the age group between 46-50 (n=9) and 50 plus (n=9). The lowest age group was between the age of 31-35 (n=5), 26-30 (n=4) and 36-35 (n=3). Most of the respondents (n=28) were nurses and only 12 were lay counsellors. Most of the respondents (n=19) hold a Nursing Diploma. This was followed by 10 respondents who graduated with a Bachelors' Degree. The respondents with the lowest qualifications hold a matric certificate (n=7) and a diploma (n=4). Moreover, the respondents' work experiences in the PMTCT programmes show most of the nurses and lay counsellors have between 6-10yrs work experience (n=14). This was followed by 1-5yrs (n=13) and 11-15yrs (n=6). The other respondents have work experience between 16-20yrs (n=3), 30-35yrs (n=1) and 36-40yrs (n=1) (see table 1).

Table 1: Demographic information for healthcare workers

Characteristics	Healthcare workers	
	Community Health Workers (n=20)	Professional Nurses & lay counsellors (N=40)
Age		
26-30	-	4
31-35	-	5
36-40	3	3
41-45	4	10
46-50	7	9
51 +	6	9
Gender		
Male	-	5
Female	20	35
Education		
Primary	2	-
Secondary (not completed)	4	-
Secondary (Matric)	13	7
FET certificate	-	4
Diploma	1	19
University degree	-	10
Employment status		
Nurse	-	28
Lay counsellor	-	12
Community health workers	20	-
Work experience		
1-5 years	2	13
6-10 years	9	14
11-15 years	9	6
16yrs-20yrs	-	2
30yrs-35yrs	-	1
36yrs-40yrs	-	1

Key findings

Themes emerged from the data and were supported by relevant extracts from individual participant and are as follow: Benefits and promotion of breastfeeding for HIV positive mothers, Recommended infant feeding method for HIV positive mothers, Perceived infant feeding patterns of HIV positive mothers, The effect of promoting recommended infant feeding methods, and Infants feeding support from health workers.

Benefits and Promotion of Breastfeeding for HIV Positive Mothers

The findings show that CHWs believe that breastfeeding is important for HIV positive mothers and their HIV exposed infants. Most of the CHWs believe that HIV positive mothers should breastfeed their infants because breastfeeding is important for the health and development of their babies. This is confirmed by a CHW who said: "*They must breastfeed because their breast milk is important"* (CHW P11). Another CHW with a similar response said:

"*It is important to breastfeed the baby because breast milk is important for defeating diseases, a baby will not be victim of other diseases or illness, when using formula milk is a problem because some they don't know how to take care of the bottle, they don't even have the brush to clean the bottle"* (CHW 17).

However, one of the CHWs was against the idea that HIV positive mothers should breastfeed their babies and was worried that they risked MTCT.

I don't want them to breastfeed their baby, in my understanding I don't support it because I'm worried that the baby will bite the breast and get infected through blood contamination, the baby will get infected (CHW P12).

Other CHWs do not support that HIV positive mothers should breastfeed their babies. As shown above, there is fear that the mothers' risk MTCT. The CHWs risk MTCT as the infants will be exposed to HIV when they bite their mothers` breast during breastfeeding, leading to infection through blood contamination.

Recommended Infant Feeding Method for HIV Positive Mothers

The quantitative findings with nurses and lay counsellors show that most of the respondents (75%) recommend exclusive breastfeeding for HIV positive mothers, followed by formula feeding (5%). The findings show that nurses and lay counsellors promote the use of exclusive breastfeeding for HIV positive mothers (see figure 1).

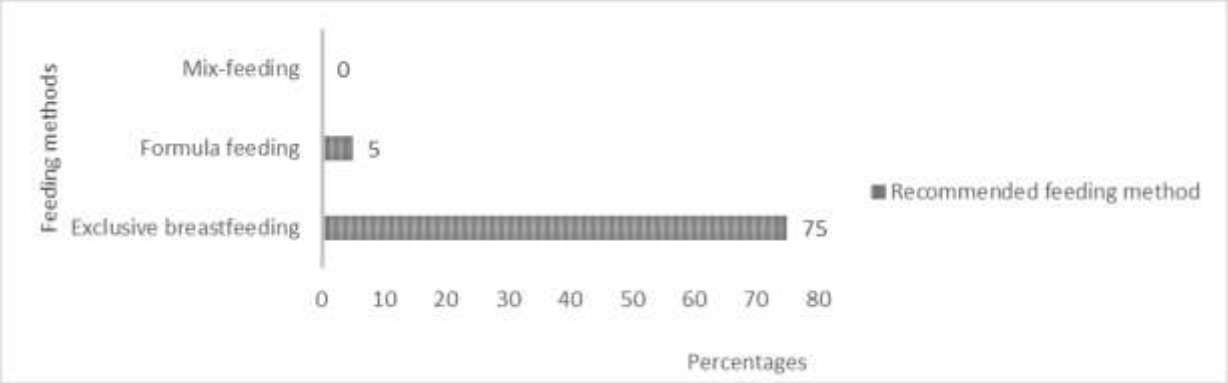


Figure 1: Feeding methods recommended for HIV positive mothers by healthcare workers

The qualitative findings with Community Health Workers show that they believe that HIV positive mothers should breastfeed exclusively for six months This is supported CHWs who said:

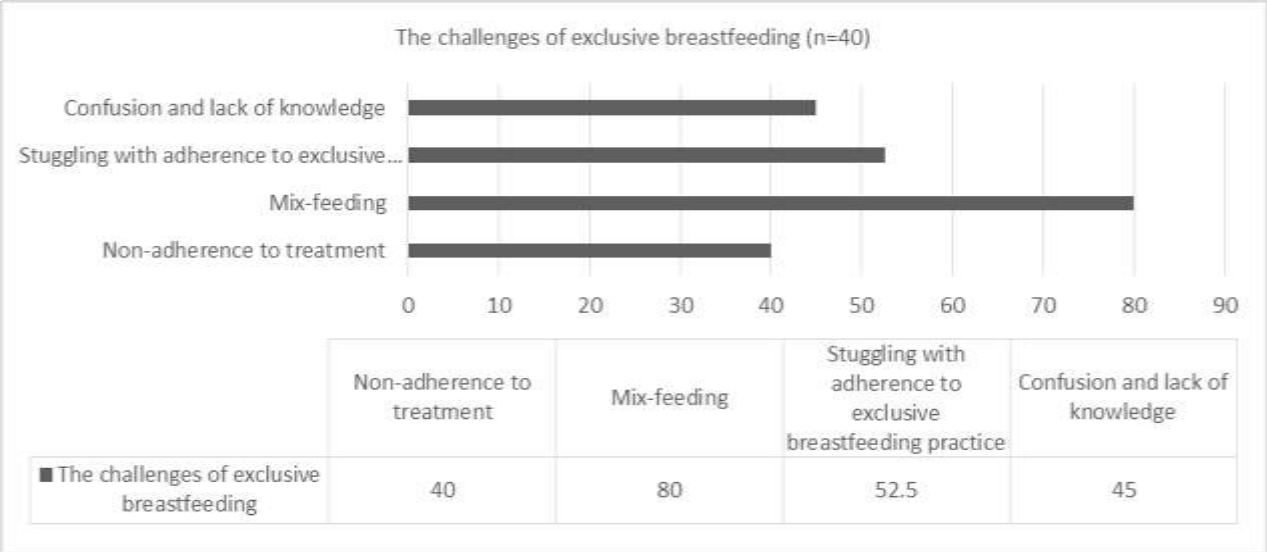
For six months, is when you are breastfeeding your baby without giving the baby any other food source. So, after six months the mother can breastfeed and give the baby other food (CHW P12).

Exclusive breastfeeding for the baby for six months because food can damage the baby's stomach, the babies are not able to digest food, they are following instructions because most of them I see when they come to the clinic (CHW P11).

The CHWs demonstrated knowledge and understanding of the exclusive breastfeeding practice. The emphases importance of mothers` adherence to infant feeding instructions from the healthcare facilities. They highlight the danger of mix feeding and the importance of avoiding infant been fed solid food for the first six months after birth.

Perceived Infant Feeding Patterns of HIV Positive Mothers

The quantitative findings with nurses and lay counsellors show that the believe HIV positive mothers' struggle with following recommended infant feeding methods (see figure 2). The nurses and lay counsellors believe the challenges that mothers experience with infant feeding is mix-feeding (80%), Struggling with adherence to exclusive breastfeeding practice (52.5%), confusion and lack of knowledge (45%) and non-adherence to treatment (40%).



	Non-adherence to treatment	Mix-feeding	Stuggling with adherence to exclusive breastfeeding practice	Confusion and lack of knowledge
The challenges of exclusive breastfeeding	40	80	52.5	45

Figure 2: The challenges of exclusive breastfeeding

The qualitative findings with CHWs show that they believe that HIV positive mothers mix feed their infants with breastmilk, formula milk, water and solid food like porridge. This what the CHWs said:

We tell them to actively breastfeed but most of the patient are mix feeding, they give them porridge so that the baby does cry" (CHW P14).

They are mixing feeding, some give their babies porridge, some mixed breast milk and formula milk. We tell them that the baby has to be exclusively breastfed for six months, but most give them formula milk. The reason is that the baby bites them on their breasts when they breastfeed, they also cannot afford formula milk, you will find that they have to wait until they get money to buy formula milk. When the formula milk runs out, they will start to prepare formula milk with a lot of water but here we tell them they should breastfeed their babies for six months without any other food sources. Then after six months they can introduce other food, but we are not sure if they are following these instructions, we don't see them at home" (CHW P13).

The CHWs believe that the mothers are mix feeding their babies, but they provide health talk for mothers to exclusively breastfeed for six months after birth. They believe that the mothers mix feed breastmilk with water, solid food and formula milk and that sometimes they do not follow the proper methods to prepare the formula milk. The extract shows that the CHWs struggle to monitor if mothers are following the recommended feeding methods at their homes.

The Effect of Promoting Recommended Infant Feeding Methods

The quantitative findings, the majority of the respondents (65%) indicated that endorsing the use of infants feeding methods such as exclusive breastfeeding and exclusive formula feeding is not the reason HIV positive mothers and their babies are loss to follow-up. However, 35% of the respondents

indicated that endorsing these methods influence loss to follow-up of HIV positive mothers in the postpartum phase (see figure 3).

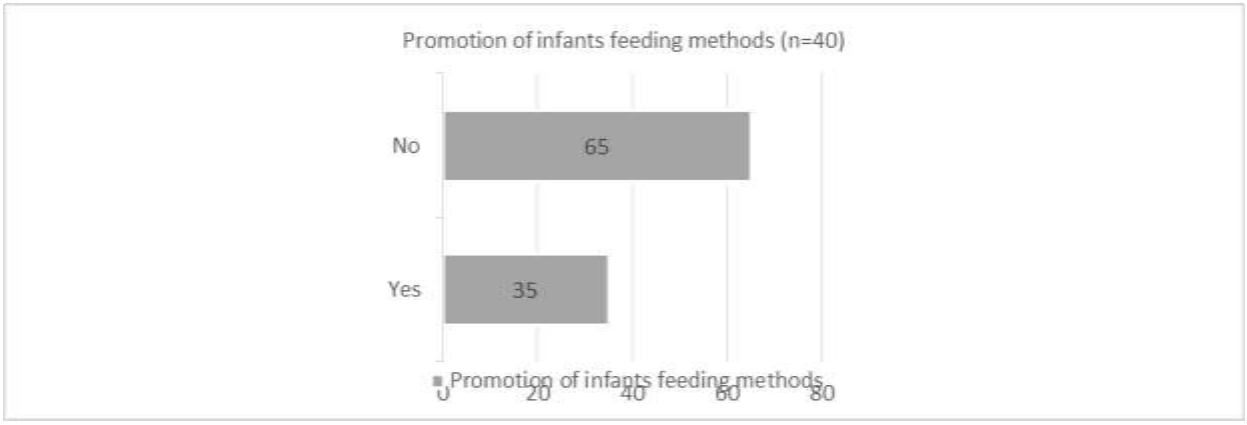


Figure 3: Promotion of recommended feeding instructions and LTFU of HIV positive mothers

Infants Feeding Support from Health Workers

The qualitative findings CHWs shows that HIV positive mothers are supported with counselling during tracking and tracing sessions to exclusively breastfeed their infants. This is what they CHWs said:

Here we tell them they should breastfeed their babies for 6 months without any other food sources then after 6 months they can introduce other food but we don't see them at home" (CHW P13).

I've spoken to them after giving birth they must exclusively breastfeed and they followed these instructions, most of the babies are healthy, they are HIV negative, we talk to them and tell them that breast milk is important and that the breast milk has everything that their baby need, that breast milk is always ready" (CHW P11).

The qualitative findings show that most of the nurses and lay counsellors 38 (97.4 %) provide infant feeding counselling for HIV positive mother. Most of the nurses and lay counsellors 33 (82.5%) believe that the community support mothers with feeding potions advised by health workers, only 7 (17.5%) of the respondents disagrees (see table 2). The findings show the health workers provides counselling and support in terms of feeding options and that the community also support mothers with their infants feeding practices advised by health workers. it has been proven that adhering to this feeding practices is difficult for HIV positive mothers.

Table 2: Infant feeding options support for HIV positive mothers

Variables	Category	N	%	Total (N)	Total (%)
Infant feeding options Counselling and support	Yes	38	97.4	40	100
	No	1	2.6	40	100
Infant feeding options Community support mothers	Yes	33	82.5	40	100
	No	7	17.5	40	100

Discussion

The World Health Organization recommends breastfeeding as an optimal feeding practice for all the mothers around the world (WHO 2016). The findings show that the Community Health workers (CHWs) believe breastfeeding is an important infant feeding practice, and HIV positive most should breastfeed their babies to ensure good health and prevent diseases. Hence, according to WHO & UNICEF (2016) report, HIV positive mothers should use exclusive breastfeeding or exclusive breastfeeding practices as an optimal feeding method to reduce the risk of HIV through MTCT. In this study, the CHWs, nurses and lay counsellors recommend exclusive breastfeeding in their sessions with HIV positive mothers. Exclusive breastfeeding implies that mothers should feed their infant breast milk with no exception of any other liquids or solid foods for 6 months up until the 12th month after birth (WHO & UNICEF 2016; WHO 2016). Exclusive formula feeding on the other hand involves giving a baby only formula milk through a bottle for a duration of six months without introducing other food sources (WHO & UNICEF 2016; UNAIDS 2018). However, the finding shows that the CHWs believe that HIV positive mothers practice mix feeding when they mix breastmilk, formula milk, other liquid and solid food sources. Other hand, nurses and lay counsellors believe that the challenges that mothers experience with recommended infant feeding practices is mix-feeding (80%), confusion and lack of knowledge (45%) and non-adherence to HIV treatment (40%).

The CHWs show that HIV positive mothers are supported with counselling during tracking and tracing sessions to exclusively breastfeed their infants. Also, the nurses and lay counsellors provides counselling and support in terms of feeding options. Mothers need to properly adhere to these feeding methods that are recommended or instructed to them by healthcare workers after giving birth (WHO 2017; WHO & UNICEF 2016). In support of the contractions among healthcare workers, a review study conducted by Coovadia and Bland (2007) found confusion about infant practices among healthcare workers had led to a complete avoidance of the topic regarding infant feeding during. Poor s quality counselling on important PMTCT practices like exclusive breastfeeding or exclusive formula feeding is one reason why mothers do not follow PMTCT practices (Hazemba, Ncama & Sithole 2016).

In this study, the nurses and lay counsellors believe that the community support mothers with their infants feeding practices that advised by health workers. In most cases, mothers feed their infants in public, which can affect adherence to feeding patterns instructed by healthcare workers; the mothers may mix feed their babies with other food sources to avoid raising suspicions among their peers or community members (Falnes et al. 2011). Furthermore, the majority of the nurses and lay counsellors (65%) believe that promoting the use of infants feeding methods such as exclusive breastfeeding and exclusive formula feeding is not the reason HIV positive mothers LTFU, and about 35% of the respondents believe that promoting recommended infant feeding methods influence LTFU of HIV positive mothers. Hazemba, Ncama and Sithole (2016) found that promoting exclusive breastfeeding was understood by mothers as important instructions or recommendation from the healthcare workers rather than the mothers' own informed decision.

Conclusion

Educational programmes on importance of exclusive breast feeding can assist reduce the spread of HIV through MTCT. Unsafe infant feeding practices such as mix feeding for the first 6 months of the birth can lead to MTCT. Therefore, proper promotion of safe infant feeding needs to be emphasised through on-going awareness campaigns that provide quality information on recommended infant feeding practices. Workshops and campaigns that promote exclusive breastfeeding will demonstrate more effective ways of preventing new paediatric infections especially in rural settings.

Abbreviations

ART	Antiretroviral therapy
ARV	Antiretroviral
HIV	Human Immunodeficiency Virus
MTCT	Mother to Child Transmission
PMTCT	Prevention of Mother to Child Transmission
UNICEF	United Nations Children's Fund
WHO	World Health Organization.

Competing Interest

The authors declare that they have no competing interests.

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