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Medical Science**  
Journal homepage: [www.Sjournals.com](http://www.Sjournals.com)**Original article****Infant-feeding practices of HIV-positive mothers in the south west region of Cameroon****P. Nde-Fon<sup>a\*</sup>, J.C.N. Assob<sup>b</sup>, J. Ndzo<sup>c</sup>, E. Ngu<sup>d</sup>, G. Monekosso<sup>e</sup>**<sup>a</sup>Head of Department of Public Health and Hygiene, Faculty of Health Sciences, University of Buea, Cameroon.<sup>b</sup>Senior Lecturer, Department of Biomedical Sciences, Faculty of Health Sciences, University of Buea, Cameroon.<sup>c</sup>Medical Doctor, Programme in Medicine, Faculty of Health Sciences, University of Buea, Cameroon.<sup>d</sup>Professor of Medicine and Community Health, Faculty of Health Sciences, University of Buea, Cameroon.<sup>\*</sup>Corresponding author; Senior Lecturer, Department of Public Health and Hygiene, Faculty of Health Sciences, University of Buea, Cameroon.  
P.O. Box 63, tel. 002377615757.**ARTICLE INFO****ABSTRACT***Article history:*

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Prevention of Mother to Child Transmission (PMTCT) of HIV is of great importance, because vertical transmission, including breastfeeding, accounts for the majority of pediatric HIV infections. Appropriate infant feeding methods which are affordable, feasible, acceptable, safe and sustainable are therefore crucial to the healthy HIV-free survival of HIV exposed infants. This study aimed at determining the proportions of mothers practising the various feeding methods, determining the various factors influencing these feeding methods, and ascertaining the relationship between these factors and the chosen feeding modes. A cross-sectional observational study was carried out from April 2012 to July 2012; using structured questionnaires administered to one hundred and ten HIV positive mothers attending infant welfare clinics. Exclusive Breastfeeding (EBF) was found to be the predominant mode of feeding chosen (70%), followed by Replacement Feeding (RF) and Mixed Feeding (MF), each representing 15%. EBF and RF practices were highly influenced by mother's personal choice and secondly, the Health Care Provider (HCP). Choosing EBF during Antenatal Care (ANC) and being married were the main predictors of EBF. RF was associated with disclosure of HIV status to partner. MF commonly resulted from ignorance, financial difficulties and fear of stigmatization. Predictors of MF included maternal age  $\leq 25$ , having

an unemployed partner, non-disclosure of HIV status to family, attending ANC at Health Centre, choosing RF during ANC, and not receiving Anti-retroviral drugs during pregnancy. EBF was the most common mode of feeding, as most mothers stuck to their informed safe choices, despite the fact that good feeding practices were being challenged by social stigma. To discourage unsafe feeding practices, much needs to be done to fight stigmatization amongst HIV-infected mothers, which includes encouraging them to disclose their HIV statuses to close family partner(s), while encouraging comprehensive antenatal care.

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## 1. Introduction

The active and productive adults aged fifteen to forty-five years make up the majority of the infected population with HIV (40%) worldwide, and women of reproductive age (60%) are bearing the greatest burden (UNO, 2010). The importance of the problem is reflected by the persistently high incidence in paediatric cases, as more than 90% of HIV infections in children occur through vertical transmission-during pregnancy, childbirth and breastfeeding (Babatunde et al., 2011). According to Atashili et al. (2008), breastfeeding alone may be responsible for up to 15-20% of mother-to-child HIV transmission. Consequently, two hundred and ninety thousand HIV-related paediatric deaths were registered in 2007 and ninety per cent of these cases were found in Sub Saharan Africa (UNO, 2010).

Post-natal Mother-To-Child Transmission (MTCT) of HIV occurs mainly through breastfeeding (Atashili et al., 2008). Thus, good feeding practices alongside ARV administration have been recommended to curb paediatric rates of HIV (WHO, 2010a). The major hindrance is the fact that most children and infants in need do not have access to ARVs (WHO, 2008). Thus, there is a need to focus on appropriate and safe feeding habits, as these alone are effective preventive measures, even when ARVs are absent (WHO, 2010b).

The WHO has recommended feeding protocols for infants born to HIV positive mothers, based on a balance between their risk of contracting HIV infection, the risks of falling ill, (which takes into consideration the major causes of infant mortality and morbidity in their milieu), the socioeconomic status of the mothers, and the benefits of providing these infants with adequate nutrition and good health (WHO, 2010c). These are the AFASS (Affordability, Feasibility, Acceptability, Sustainability and Safety) criteria. The World Health Organization (2010c) recommends that counselors provide HIV positive mothers two main options of feeding: Exclusive breast-feeding (EBF) or replacement feeding (RF). Some non-conventional methods such as wet-nursing and heat-treated expressed breast milk are also recommended (WHO, 2010c). MF is not recommended, as it carries higher risks of infection (Coovadia et al., 2007; Atashili et al., 2008). The revised WHO (2010c) HIV and infant-feeding guidelines recommend two main modes of feeding for HIV positive mothers; EBF and RF:

Exclusive breast-feeding for the first six months of life, thereafter, the introduction of appropriate complementary foods while continuing breastfeeding up to 12 months. Weaning should be gradual, during a period of 1 month. This applies in cases where the AFASS criteria cannot be met. Replacement Feeding: Here, breastfeeding is totally avoided and replacement feeding introduced from birth with appropriate replacement formulae if AFASS criteria are met. Where HIV status of the baby is positive, the baby should be fed according to the recommendations for the normal population. Most mothers in the developed world practice replacement feeding (Desclaux and Alfieri, 2009). Unfortunately, in resource-limited settings where basic resources such as water supply are not available, the AFASS criteria are likely not to be met for RF to be considered safe (WHO, 2010c).

Cameroon has an HIV prevalence of 5.1% and in the South West Region the prevalence of HIV is 8% (WHO, 2008). With such significant values, high priority has been given to HIV prevention including the creation and strengthening of PMCT programmes in Cameroon. Thus, ensuring the HIV-free survival of HIV-exposed infants by simple costless measures such as ensuring appropriate feeding methods is paramount (Arpadi et al., 2009).

This study was designed to assess the infant-feeding practices of HIV positive mothers in the South West Region of Cameroon, and identify mothers' reasons for choice of feeding. The results might serve as a guide for national policy makers and health care providers, when faced with the problem of infant-feeding options in HIV-exposed infants.

## **2. Materials and methods**

It was a cross-sectional study, carried out from April 2012 to July 2012 in purposively selected ANC/IWC clinics in the South West Region of Cameroon. These clinics include indoor and outdoor settings, containing chairs or benches arranged in rows, attached to consultation offices that attend to all, regardless of HIV status. The clinics are run by medical doctors, midwives or nurses who may or may not be officially trained on PMTCT programmes. Health care providers attend to children weekly, though consultation offices open every day to receive and treat affected mothers and infants. Cases that require expert attention are referred to the gynaecologist or paediatrician within or beyond the clinical setting.

All consenting HIV positive mothers having infants aged 1.5-12 months attending infant welfare clinics were included in the study. A structured questionnaire and an infant weighing scale were the main instruments used.

### **2.1. Research procedure**

Ethical approval was obtained from the Institutional Review Board (IRB) of the University of Buea, and administrative clearance was provided by the Regional Delegation of Public with Ethical clearance No. 2012/0014/UB/FHSIRB of 13/04/2012 and administrative clearance No. R11/MPH/SWR/RDPH/FP-R/4312/66 of 01/11/2011.

Health, including the administrative authorities of participating health institutions. Strict anonymity and confidentiality was maintained in the handling of patients' records and results.

After the infants received their vaccines, all mothers, irrespective of HIV status, were directed to the consultation office. Each mother and her baby were consulted and counselled for other illnesses including nutritional problems. The nurse assisting the investigator gave even numbers to HIV positive mothers and odd numbers to negative mothers. Those who were negative were consulted for other problems but excluded from the study, and those who were positive were briefed on the study, and given the choice to participate or not. Mothers willing to participate signed a consent form and were assisted in compiling the questionnaires.

This study has considered the following definitions as described by Young et al. (2010) and Yetayesh and Jemal (2008):

**Exclusive breast-feeding:** The receipt of only breast milk since birth; only oral rehydration solution (ORS) drops and syrups (vitamins, minerals or medicines) are permitted. Here, we included all mothers who had either breastfed for, or had intentions to breastfeed for at least 4 months.

**Replacement feeding:** This is the practice of substituting completely, breast milk from the diet of the infants. This is usually done with commercial infant formula, or modified cow milk.

**Wet-nursing:** Is the use of an HIV negative woman to breastfeed the infant of an HIV positive mother.

**Heat-treated expressed breast milk:** Expression of milk by the HIV positive mother and heating to kill the virus.

### **2.2. Statistical analysis**

Data was compiled and analyzed with Microsoft Excel 2010 version and Epi info version 3.5.1 software program. The Chi Square test was used to determine the strength of association between socio-demographic factors and nutritional status versus mode of feeding. P-values <0.05 have been considered statistically significant. Bivariable logistic regression analysis was done to determine predictors for infant-feeding method.

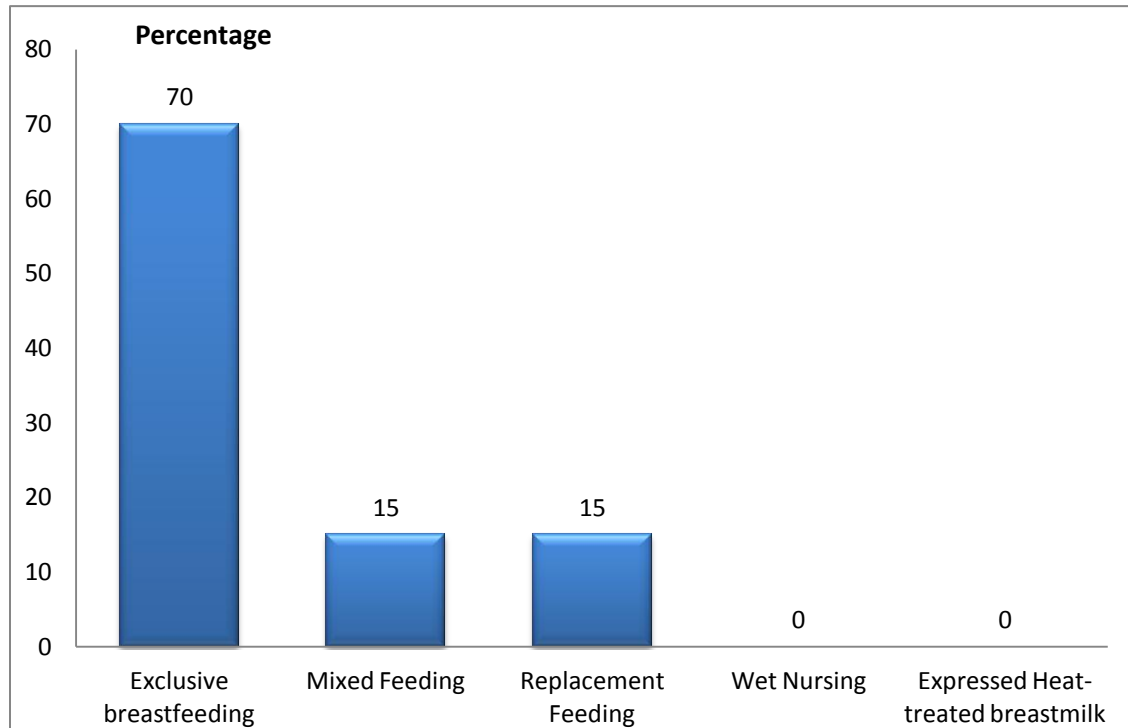
## **3. Results**

A hundred and ten HIV-positive mothers attending IWC were assessed for infant-feeding habits. A good proportion (54.5%) was between 26 and 35 years of age, married (59.1%) and unemployed (31.8%). Majority had attended secondary school (59.1%) and up to 45% earned between 10,000 and 30,000 FCFA (20 to 50US\$) as salary per month.

Amongst those having a partner, 80.4% had disclosed their HIV status to the latter; whereas only 48.2% had disclosed their HIV status to a family member (other than partner). The majority (90%) of these mothers gave birth through the vaginal route, and only 10% underwent caesarean delivery.

Of all these mothers, one (0.9%) did not attend ANC at all, and only 93.9% took ARVs during pregnancy with the child in question. 75.5% of mothers were counselled by health care providers on infant-feeding habits during ANC, 11.8% received counselling only after delivery, and only 7.3% were cancelled during ANC and after delivery. Of these, 43.6% were told to choose the mode of feeding they wanted to practice, 43.6% were told to practice EBF, 7.2% were told to practice RF, and 5.5% gave no response.

During ANC, the majority (75.5%) of mothers chose to practise EBF, 20.9% had chosen RF, and 3.6% had made no choice. Of these, 70% actually practiced EBF, and 15% either practiced RF or MF.



**Fig. 1.** Various modes of feeding practised amongst HIV-positive mothers in the south west region of Cameroon.

Most mothers personally made the choice of feeding mode (51%), 24.6% followed the advice of the health care provider, 10.9% cited fear of stigmatization as a reason for choice of feeding, and 4.5% cited family influence, 4.5%, financial difficulties and 4.5%, ignorance.

These results differ from those of Suryavanshi et al. (2008), who conducted a similar study in India where the rates of EBF and RF were equal, at 44% each, with 12% practicing MF. As earlier mentioned, health care providers within the region routinely advice mothers to exclusively breastfeed their babies, which may be the probable reason for the higher rate of EBF in this study.

Young mothers of 25 years and below were 6.6 times more likely to practice MF ( $p < 0.00$ , CI 2.12-20.4). Earlier on, a similar study carried out elsewhere in Cameroon (Muko et al., 2004) showed a decrease in EBF rates with age. The same study also established a positive association between mother's income and the practice of RF, contrary to this study, where no significant relationship has been established between modes of feeding and mother's income ( $p = 0.29$ ). There was equally no statistically significant relationship between the mother's level of education and mode of feeding, as illustrated in Table 1 ( $p = 0.12$ ), similar to results obtained in Ethiopia (Yetayesh and Haidar, 2008). However, Muko et al. (2004), working in Cameroon revealed that, the more educated the mother, the less likely she is to use artificial milk.

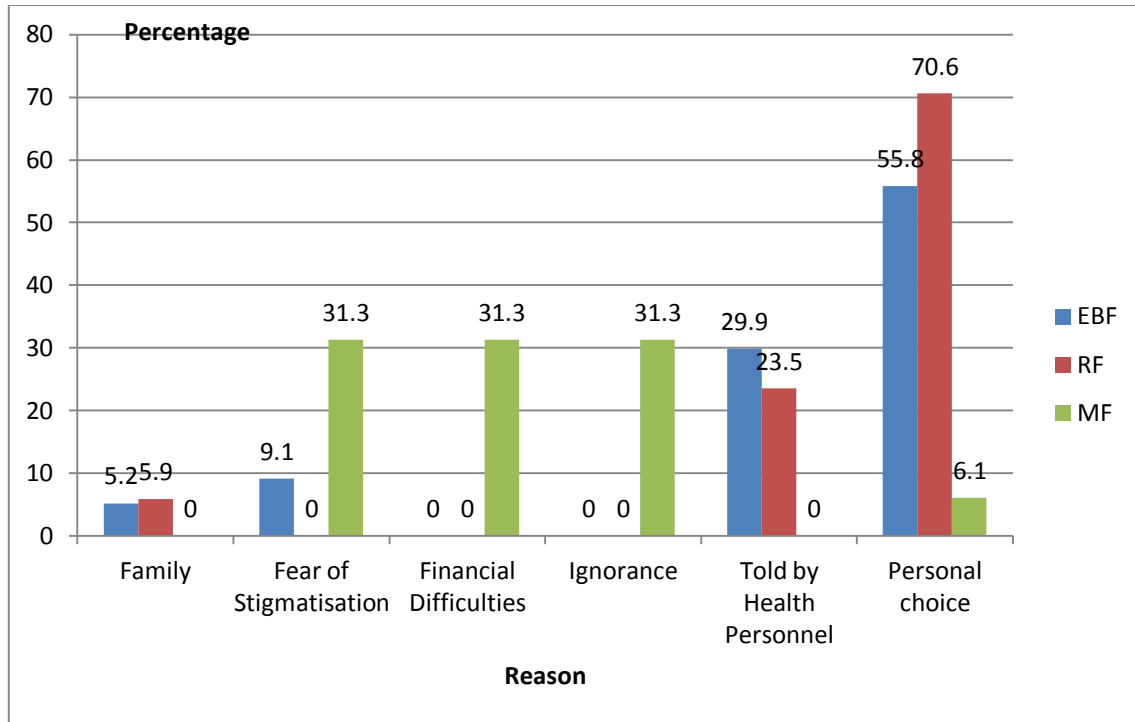


Fig. 2. Major reasons for choice of feeding in various feeding options.

Table 1

Socio demographic factors with no significant association to mode of feeding.

Mother's level of education	Feeding options			Total	P-value
	EBF N (%)	RF N (%)	MF N (%)		
None	0(0.0)	2(33.3)	1(66.7)	3(100)	0.12
Primary	22(66.7)	6(15.2)	5(18.2)	33(100)	
Secondary	49(75.4)	7(13.8)	9(10.8)	65(100)	
University	6(66.7)	2(22.2)	1(11.1)	9(100)	
Employment status of mother					0.64
Employed	47(73.4)	9(14.1)	8 (12.5)	64(100)	
Unemployed	30(65.2)	8(17.4)	8 (17.4)	46(100)	

Other variables that were significantly associated with the choice of MF amongst HIV positive mothers in this study include: not being married, not receiving ARV's during pregnancy, and having an unemployed partner ( $p < 0.01$ ,  $p < 0.1$  and  $p = 0.04$  respectively) (Table 1, 3). However, Muko et al. (2004) showed the contrary i.e. single mothers were more likely to exclusively breastfeed their infants. One possible reason why single mothers preferentially go for MF as in this study could be the fact that, single women lack the marital support their married counterparts benefit.

The choice of MF by the majority women who failed to receive ARVs during pregnancy is a probable indication of some gaps in the antenatal care delivered, either on the part of the mother or the health care provider. These findings confirm those obtained by Yetayesh & Haidar (2008), where MF was significantly associated with poor ANC follow-up and non-disclosure of HIV status to a spouse. In both studies, having an uneducated partner is significantly associated with MF habits.

In Cameroon, mixed feeding amongst infants is the prevailing mode of feeding in the normal population, as only 24% of infants are exclusively breastfed in the first 6 months of life, and 8% are bottle-fed (WHO, 2010b). This explains why the fear of stigmatization is an important reason advanced for mixed feeding (31.3%) including failure to disclose HIV status to family member(s), though ignorance (31.5%) and financial inaccessibility (31.5%) were equally strongly associated with MF. If a reasonable portion of the positive mothers chose RF during ANC (57.14%), the reasons mentioned above could be responsible for change of feeding method after delivery. Having an unemployed partner and financial hardship was associated with MF habits in similar studies conducted in Ethiopia and Cameroon (Yetayesh & Jemal, 2008; Muko et al., 2004).

**Table 2**

Socio demographic factors with no significant association to mode of feeding 2.

ANC attendance	Feeding options			Total	P-value
	EBF/RF N (%)		MF N (%)		
No	0(0.0)		1(100)	1(100)	0.07
Yes	94(86.2)		15(13.8)	109(100)	
<b>Mode of delivery</b>					0.24
Caesarean	10(90.9)	1(9.1)	0(0.0)	11(100)	0.88
Vaginal	67(67.6)	16(16.2)	16(16.2)	99(100)	
<b>Gender of infant</b>					0.88
Male	42(70.0)	10(16.7)	8(13.3)	60(100)	0.29
<b>Income category of mother</b>					
<10,000	2(66.7)	0(0.0)	1(33.3)	3(100)	
10-<30,000	33(73.3)	4(8.9)	8(17.8)	45(100)	
30,000-<60,000	25(73.5)	7(20.6)	2(5.9)	34(100)	
60,000-≤90,000	8(66.7)	1(8.3)	3(25)	12(100)	
>90 ,000	9(56.3)	5(31.2)	2(12.5)	16(100)	

The role of the health care (HC) provider is significant in determining infant-feeding habits. Among those practicing EBF, 55.8% did so as personal choice, 29.9% due to the influence of the health care provider, 9.1% due to fear of stigmatization, and 5.2% due to family influence. Other studies, in South Africa, Ethiopia and elsewhere in Cameroon, has projected the influence of the HC provider and fear of stigmatization as the main influences of mode of feeding (Doherty et al., 2006; Suryavanshi et al., 2008; Muko et al., 2004).

Amongst those practicing RF, 70.6% did so as personal choice, 23.5% did so as a result of the influence of the health care provider, and 5.9% due to family influence.

#### 4. Discussion

Exclusive Breast Feeding was the most common infant-feeding practice (70%) among HIV positive mothers in the South West Region of Cameroon. The other types of Infant-feeding habits include replacement feeding (15%) and mixed feeding (15%). Most women chose replacement feeding or exclusive breast feeding, first by personal choice, and secondly due to the influence of the health care provider. Ignorance, fear of stigmatization, and financial difficulties were the most common reasons cited for choosing mixed feeding. Replacement feeding was associated to disclosure of HIV status to partner and/or family member(s). Attending ANC and marriage were associated with the choice of exclusive breast feeding. Mixed feeding was associated with maternal age 25 years and below, having an unemployed partner, and non-disclosure of HIV status to partner and/or family.

All health care providers working in ANC Clinics should be properly trained on PMTCT programs, and should be constantly updated on current innovations and challenges. This will enable them to properly educate and counsel mothers in order to overcome ignorance, and the fear of stigmatization. Encouraging mothers to disclose their HIV status to their partners and close relations will positively influence the choice of infant feeding.

Exclusive breast feeding practices for the first six months of life should be encouraged amongst mothers within the general population, as it will subsequently result to reduction of mixed feeding practice amongst HIV positive mothers as well as mothers of unknown status.

**Table 3**

Socio demographic factors with no significant association to mode of feeding 3.

Variable (category)	Feeding options		Total	P-Value
	EBF/RF N (%)	MF N (%)		
When advice on feeding habits was given				0.53
Post-natally	11(84.6)	2(15.4)	13(100)	
Both pre and post-natally	8(100)	0(0.0)	8(100)	
During ANC	74(89.2)	9(10.8)	83(100)	
No response	1(16.7)	5(83.3)	6(100)	
<b>Partner's employment status</b>				0.31
Employed	60(71.4)	12(14.3)	84(100)	
Not employed	7(53.8)	2(15.4)	13(100)	

### Competing interests

The authors declare that they have no competing interests.

### References

- Atashili, J., Kalilani,V., Seksaria, E., and Sickbert-Bennet, E. 2008. "Potential impact of Infant-feeding Recommendations on Mortality and HIV-infection in children born to HIV-Infected Mothers in Africa: a Simulation". *Infectious Diseases*, 8 (66),doi: 1186/1471-2334-8-66. (available on <http://www.biomedcentral.com/1471-2334/8/66>)
- Babatunde, O., Oladokun, R., Brown, B. & Kikelomo, I. 2011. "Prevalence and Clinical Pattern of Paediatric HIV Infection at the University College Hospital, Ibadan, Nigeria; A Prospective Cross-sectional Study".*Italian Journal of Paediatrics*,37(29),doi: 10.1186/1824-7288-37-29. (Available on <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3133997/>).
- Coovadia, H., Rollins, N., Bland, R., Little, K., Coutsoydis, A., Bennish, M. & Newell, M. 2007. "Mother-to-child transmission of HIV-1 infection during exclusive breastfeeding in the first 6 months of life: an intervention cohort study." *Lancet*, 369, 1107–16.
- Desclaux, A., & Alferi, C. 2009. "Counselling And Choosing Between Infant-Feeding Options- Overall Limits And Interpretation By Health Care Providers and Women Living With HIV In Resource-poor Countries (Burkina Faso, Cameroon)." *Social Science of Medicine*, 69, 821-829.
- Doherty, T., Chopra, M., Nkonki, L., Jackson, D. & Greiner, T. 2006. "Effect of the HIV epidemic on infant feeding in South Africa: "When they see me coming with the tins they laugh at me"". *Bulletin of the World Health Organization*, 84 (2) 90-96.
- Muko, K., Tchangwe, G., Ngwa, V. &Njoya, L. (2004), "Prevention Of Mother To Child Transmission: Factors Affecting Mothers' Choice of Feeding- A Case Study From Cameroon". *Journal of Social Aspects of HIV/AIDS*,1 (3), 132-138.
- Stephen, A., Ashraf, F., Grace, M., Chipepo, K., Moses, S., Mwiya, M., Donald, M., &Louise, K.(2009), "Growth faltering due to breastfeeding cessation in uninfected children born to HIV-infected mothers in Zambia". *American Journal of Clinical Nutrition*, 90(2), 563-353. (available on <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2709311/>)

- Suryavanshi, N., Jonnalagadda, S., Erande, A., Sastry, J., Pisal, H., Bharucha, K., Shrotri, A., Bulakh, P., Phadke, M., Bollinger, R. & Shankar, A. (2008). "Infant-Feeding Practices of HIV-Positive Mothers in India." *Journal of Health Population and Nutrition*, 24 (54), 463-467.
- UNO, (2010). "The Millennium Development Goals Report." (available on [http://www.un.org/millenniumgoals/pdf/MDG\\_Report\\_2010](http://www.un.org/millenniumgoals/pdf/MDG_Report_2010))
- WHO, (2010a). "Guidelines on HIV and Infant-Feeding." (available on [http://www.who.int/child\\_adolescent\\_health/documents/9789241599757\\_eng](http://www.who.int/child_adolescent_health/documents/9789241599757_eng))
- WHO, (2010b). "Indicators for Assessing Infant and Young Child Feeding Practices: Part 3, Country Profiles." (available on [http://whqlibdoc.who.int/publications/2010/9789241599757\\_eng](http://whqlibdoc.who.int/publications/2010/9789241599757_eng))
- WHO, (2010c). "Anti-Retroviral Drugs for Treating Pregnant Women And Preventing HIV Infections In Infants." (available on <http://www.who.int/hiv/pub/mtct/antiretroviral/en/index.html>)
- WHO, (2008). "Epidemiological Fact Sheet on HIV/AIDS in Cameroon." (available on <http://www.who.int/hiv/pub/epidemiology/pubfacts/en/>)
- Yetayesh, M. & Jemal, H. (2008). "Infant-feeding Practices in HIV Positive Women and Its Determinants in Selected Health Institutions In Addis Ababa, Ethiopia". *Ethiopian Journal of Health and Development*, 23 (2) 107-114.
- Young S., Israel-Ballard A., Dantzer E., Ngonyani M., Nyambo M., Ash D., Chantry C. (2010). "Infant Feeding Practices Among HIV-Positive Women In Dar Es Salaam, Tanzania, Indicate A Need For More Intensive Infant Feeding Counselling." *PUBLIC HEALTH NUTRITION* 2010; Vol. 13 (12): pp 2027-2033.